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# Smart Forensics: Tracing the Rise of Artificial Intelligence in Forensic Accounting, Fraud Detection and Risk Management

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**Abstract:** This research examines the evolution of scholarly interest in artificial intelligence (AI) in forensic accounting and risk management. Using a dataset of 261 publications indexed in Scopus between 2002 and mid-2025, the study examines shifts in publication trends, recurring topics, and gaps that remain underexplored. Bibliometric tools, including VOS viewer, Microsoft Excel, and Publish or Perish, were used to analyse citation activity, author collaborations, and keyword patterns. A noticeable increase in published work was seen after 2017, with "forensic accounting" and "fraud" being the most frequently used terms. The results indicate an increasing academic focus on technologies such as blockchain, big data, and advanced analytics. Most studies have been published in peer-reviewed outlets, particularly within the domains of Business, Management, and Accounting. Jordan stands out for its consistent research output, supported by active engagement from several scholars and academic institutions. Eight major themes were identified, covering governance and fraud control, professional skills, financial crime investigation, emerging technologies, forensic audit practices, audit roles, localized education, and analytical methods. Although this review is confined to English-language articles listed in Scopus, it still offers a clear overview of the progression of research in this field over time. It highlights prevailing trends, significant areas of concentration, and existing gaps, providing useful guidance for both researchers and practitioners. With the evolution of AI, this study's results could also guide future developments in forensic accounting, fraud detection, and risk management.

**Keywords:** *Forensic Accounting, Artificial Intelligence, Fraud Detection, Risk Management, Bibliometric Analysis.*

## 1. Introduction

Financial crimes and corporate misconduct have become increasingly complex, rendering many traditional forensic accounting approaches insufficient. Conventional methods, such as manual audits and standardized investigative procedures, while still relevant, demonstrate clear limitations when applied to modern digital financial environments, necessitating a shift towards more advanced technological approaches. (Daraojimba et al., 2023). AI has emerged as a critical solution to these challenges, offering substantial improvements in fraud detection capabilities and risk management systems.

Forensic accountants are now able to manage and interpret vast datasets more efficiently due to AI advancements, including tools like machine learning and natural language processing. These advanced analytical tools can identify subtle fraudulent patterns and suspicious transactions that often escape detection through traditional manual review processes. Beyond fraud detection, "AI applications significantly enhance risk assessment methodologies and strengthen organizational control frameworks" (Bello et al., 2023).

Academic research examining AI applications in forensic accounting has expanded considerably in recent years. Numerous studies have investigated various aspects, including the improvement of audit processes and the investigation of complex financial crimes (Adejumo & Ogburie, 2025). Despite this growing body of research, critical knowledge gaps remain regarding the overall development of this research area. There exists a pressing need for systematic analysis of publication trends, identification of influential researchers and institutions, and examination of geographical contributions. Future research should also focus on tracking emerging topics and technological developments within this increasingly important field.

To bridge the identified research gap, this study applies bibliometric analysis to systematically examine and map the evolution of scholarly publications at the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. Based on 261 publications indexed in Scopus from 2002 to July 2025,

this study aims to identify key research trends, dominant thematic clusters, and existing gaps that can inform future academic exploration and professional practice.

In line with this objective, the study focuses on the following research questions:
RO1: What is the current state and publication trend of research on the application of AI in forensic accounting, fraud detection, and risk management?
RO2: Who are the most productive and influential contributors, including authors, institutions, and countries?
RO3: Which documents are most frequently cited in the context of AI applications in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management?
RO4: What are the keywords, thematic clusters, and emerging research topics within this domain?
RO5: What are the emerging research directions for applying artificial intelligence in forensic accounting and fraud detection?

To explore these questions, data were obtained from the Scopus database and examined utilizing Microsoft Excel, VOS viewer, and Publish or Perish software. This research provides important perspectives for scholars, professionals, and decision-makers regarding the changing influence of AI in moulding forensic accounting research and its application.

The next section covers the literature review, followed by the research methodology of this study. The discussion of research findings and conclusions with the identified limitations and suggestions for future research is presented in the subsequent sections.

## 2. Literature Review

### Bibliometric analysis

Researchers now widely adopt bibliometric methods as a robust way to analyze publication patterns and research impacts across disciplines (Yan & Zhiping, 2023). These quantitative methods enable researchers to systematically examine publication patterns, citation networks, and knowledge structures, providing valuable insights into the development of scientific disciplines. Within accounting research specifically, bibliometric analysis serves three fundamental purposes: mapping intellectual structures through co-citation and co-word network visualizations, assessing research impact using citation metrics, and evaluating scholarly productivity via publication trend analysis (Ahmi, 2021).

This approach allows for a deeper understanding of critical issues in specialized accounting fields, tracing how knowledge evolves, how ideas influence one another, and how research priorities shift over time. From a strategic perspective, bibliometric analysis offers three key advantages for researchers: (1) revealing understudied topics and emerging challenges, (2) providing measurable benchmarks to assess a study's alignment with broader disciplinary trends, and (3) highlighting new frontiers that can shape future inquiry (Ogutu et al., 2023). By applying these insights, scholars can refine their research agendas with greater confidence, while institutions and funders can allocate resources more strategically, ensuring their investments drive meaningful progress in the field.

### Forensic accounting is empowered by artificial intelligence for fraud detection and risk management.

Several studies have systematically reviewed forensic accounting literature to map its development, identify key themes, and highlight research gaps. However, most of these reviews concentrate on broader fraud typologies and governance without emphasizing how AI technologies are transforming investigative approaches, a gap this study aims to address. These reviews provide valuable syntheses of existing knowledge while revealing opportunities for future research to advance both theory and practice in this field. Mustafa Airout et al. (2024) conducted a bibliometric analysis of 268 articles on forensic accounting published between 2004 and 2023 in the Web of Science database. Using techniques such as keyword cartography, citation analysis, bibliographic coupling, and content analysis, the study identified four main research clusters: financial statement fraud triangle, corporate governance and fraud prevention, fraud detection techniques and methodologies, and the broader consequences of fraud. The analysis highlighted key journals, authors, and institutions contributing to the field, with the USA, Australia, and China leading in research output. The study

provided 58 potential future research questions, offering a comprehensive research agenda to guide scholars and practitioners in advancing forensic accounting research.

While Mustafa Airout et al. (2024) emphasized trends in forensic accounting, AL-Raggad & Al-Raggad (2024) conducted a comprehensive bibliometric analysis to examine trends and patterns in administrative law and forensic accounting in the context of the digital era. The research utilised a comprehensive bibliometric analysis to examine trends and patterns in forensic accounting within the digital era. Using the Web of Science database and VOS viewer software, it analyzes 543 publications from 2010 to 2024 through cluster analysis, co-occurrence analysis, and bibliographic coupling. The findings reveal a growing focus on forensic accounting's role in addressing financial misconduct and regulatory challenges driven by technological advancements. By identifying key contributors and emerging topics, the study highlights the need for adopting advanced technologies and fostering interdisciplinary collaboration to enhance fraud detection and financial transparency in the digital economy.

Recent bibliometric studies by Ellili et al. (2024) and Chávez-Díaz et al. (2024) collectively highlight the increasing focus on artificial intelligence in forensic accounting and fraud detection, mapping the field's development from traditional approaches toward AI-driven solutions. Ellili et al. (2024) conducted a bibliometric analysis of 232 forensic accounting publications from 1991 to 2021 using Scopus and VOS viewer, highlighting limited global research output in the field. Their study mapped key trends, influential contributors, and research gaps, emphasizing the potential of integrating technologies like AI to advance fraud detection and forensic accounting practices. Whereas Chávez-Díaz et al. (2024) conducted a bibliometric analysis to explore research trends at the intersection of artificial intelligence (AI), accounting, auditing, and forensic accounting from 2020 to 2023, using 124 Scopus-indexed publications. Applying the PRISMA model, keyword co-occurrence analysis, and social structure mapping via R Studio, they identified key journals, authors, and institutions contributing to AI applications in accounting fields. The study revealed increasing AI adoption for fraud detection, tax auditing, and financial decision-making, while highlighting ethical concerns and the need for human-AI collaboration in accounting processes. Notably, forensic accounting is increasingly integrating AI and machine learning tools to enhance fraud detection and reduce manual errors. The authors recommended that accountants develop data analysis skills and adapt to AI-driven systems to maintain relevance in the digital era. Their study offers a foundation for future interdisciplinary research, advocating organizational transformation and regulatory adaptation to support AI-based forensic and auditing practices.

Building on the bibliometric analyses of these literatures, which emphasize the growing role of artificial intelligence in forensic accounting and fraud detection, this study extends the scope by systematically mapping research developments at the intersection of artificial intelligence, forensic accounting, fraud detection, and risk management, aiming to identify dominant themes and guide future scholarly and professional advancements.

## 3. Methodology

This study utilizes a bibliometric analysis, a method for systematically evaluating and quantifying scientific literature to provide an objective, comprehensive assessment of current research trends. Originally introduced by Pritchard (1969), bibliometrics has since become a cross-disciplinary tool, applied in fields ranging from medicine to social sciences (Dao et al., 2023; Donthu et al., 2021). Recent studies have even adopted it to map emerging domains, such as AI in education (Kavitha & Joshith, 2024). At its core, bibliometrics applies statistical and mathematical techniques to analyse patterns in scholarly communication, including publications, citations, and conceptual networks (Ahmi, 2021).

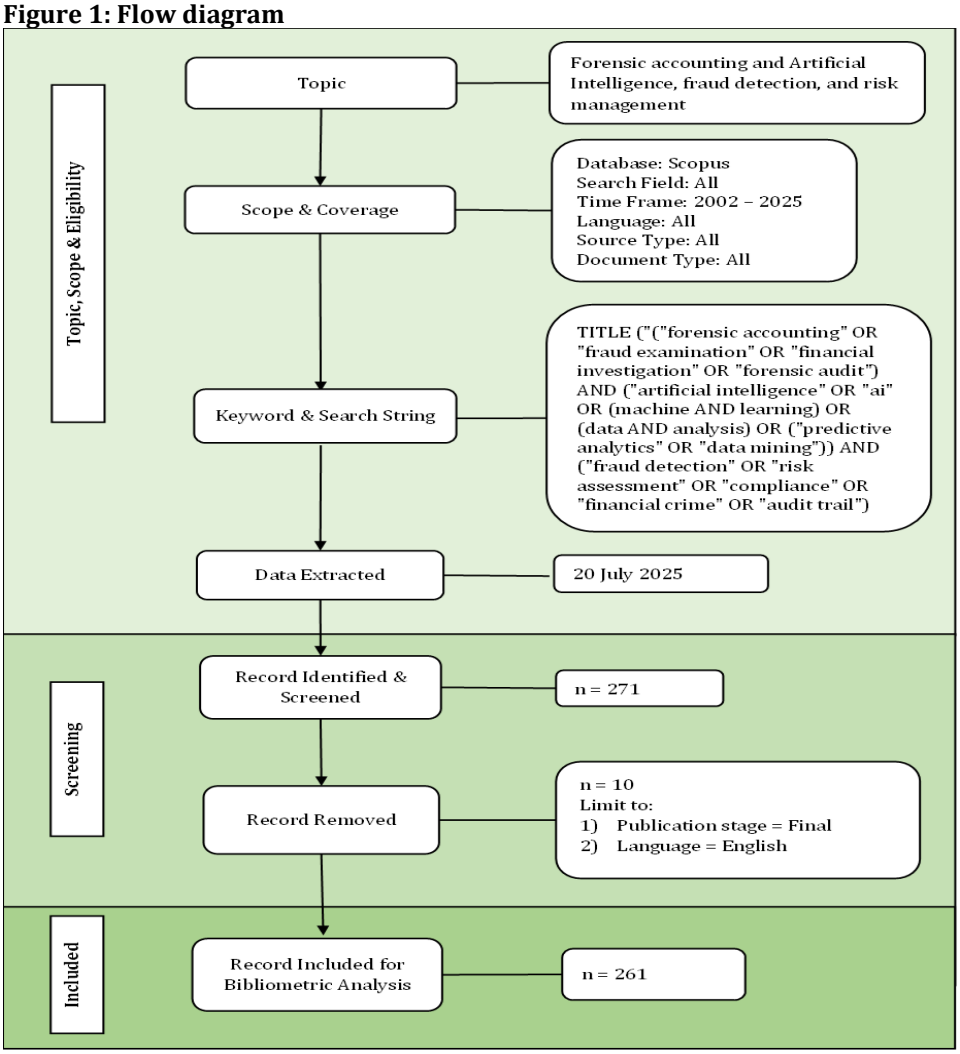
This study retrieved bibliometric data from the Scopus database on 20 July 2025 using the following search phrase: TITLE-ABS-KEY ("forensic accounting" OR "fraud examination" OR "financial investigation" OR "forensic audit") AND ("artificial intelligence" OR "AI" OR (machine AND learning) OR (data AND analysis) OR ("predictive analytics" OR "data mining")) AND ("fraud detection" OR "risk assessment" OR "compliance" OR "financial crime" OR "audit trail"). The search strategy systematically combined three conceptual domains: (1) forensic accounting terminology, (2) AI-related technologies, and (3) application areas in financial crime detection. Scopus was selected for its multidisciplinary coverage and reliability in bibliometric research (Alam

et al., 2025; Chin & Chew, 2021). Following Cora et al. (2024), Scopus AI (Beta) was utilized to optimize keyword selection and refine the search phrase within the TITLE-ABS-KEY field, ensuring alignment with study objectives while maintaining methodological accuracy.

Scopus was chosen for this study due to its comprehensive coverage of peer-reviewed literature and established reliability for bibliometric research (Alam et al., 2025; Chin & Chew, 2021). Its multidisciplinary scope makes it particularly suitable for analysing the intersection of forensic accounting and AI. A total of 271 documents were retrieved from the initial query. However, this study includes only English-language publications at the final stage, resulting in a total of 261 documents for further bibliometric analysis.

Figure 1 illustrates the search strategy flow. A preliminary analysis was conducted to validate the dataset before proceeding with the bibliometric analysis. The study employed a multi-method analytical approach to examine the Scopus data. Descriptive statistics (frequencies, percentages, and visualizations) were used to describe publication trends. Citation metrics, including total citations, cited publications count, and average citation rates, were extracted from Scopus RIS files using Publish or Perish software. For network visualization maps, the dataset was processed in VOS viewer to generate co-occurrence maps. Keywords were standardized by consolidating synonymous terms to ensure greater accuracy and consistency in the co-occurrence analysis.

**Figure 1: Flow diagram**



## 4. Results and Discussion

This study employs several bibliometric indicators to examine the publication landscape on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. The analysis focuses on key metrics, including citation analysis and annual publication trends. Reviews document profiles, which involve the number of research documents published in Scopus between 2002 and 2025, categorized by document type, source type, and subject area. Furthermore, the study identifies the most productive contributors by analysing publications by authors, institutions, and countries. In addition, it highlights the most highly cited documents within these research areas. Co-occurrence analysis of authors' keywords is also conducted to determine the most frequently used terms. Additionally, thematic mapping is used to identify the main research themes that have emerged over time. In addition, this study reports several core bibliometric indicators, including the total number of publications (TP), number of cited publications (NCP), total citations (TC), average citations per publication (C/P), average citations per cited publication (C/CP), and the h-index (h).

### Bibliometric profile

Table 1 presents the bibliometric profile of the study. Covering 23 years of publications on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management, the analysis includes a total of 261 papers and 3,034 citations. The analysis indicates an average of 131.91 citations per year. On average, each author contributed to 11.62 papers, while each paper involved approximately 2.74 authors.

**Table 1: Citations Metrics**

| Metrics | Data |
|---|---|
| Papers | 261 |
| Number of Citations | 3034 |
| Year | 23 |
| Citations per Year | 131.91 |
| Citations per Paper | 11.62 |
| Authors per Paper | 2.74 |
| h-index | 24 |
| g-index | 46 |

### Publication Trends and Research Growth

To answer RQ1 (What is the current state and publication trend of research on the application of AI in forensic accounting, fraud detection, and risk management from 2002 to 2025?), the author examines publication trends in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management using total publications based on year, document type, source type, and subject area.

Figure 2 shows that the number of publications increased significantly between 2013 and 2024. The decline in 2025 is expected, as the data was collected mid-year. The overall upward trend highlights the growing academic interest and relevance of this research area. The steady increase reflects the rising importance of AI, forensic accounting, fraud detection, and risk management, especially in response to global developments such as Industry 4.0 and the rapid adoption of AI technologies. The most productive year was 2024, with 54 publications and 40 citations. Interestingly, 2015, despite having only six publications, recorded the highest citation count, with 410 citations and an average of 68.33 citations per article.

**Figure 2: Total publications and citations by year**

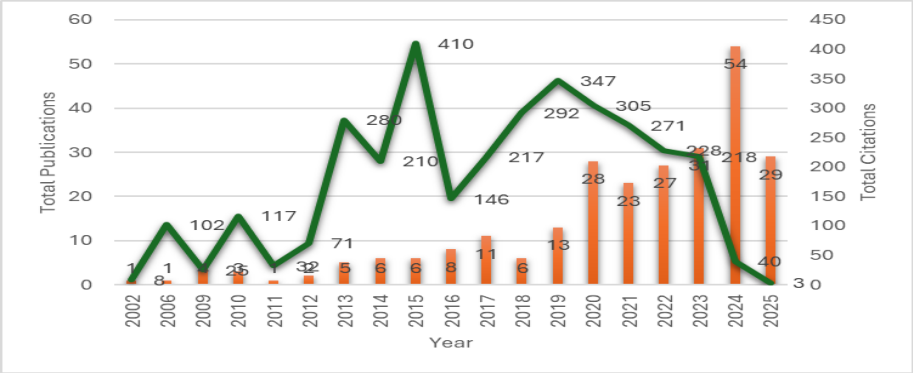



Table 2 outlines the development of publications and citations spanning from 2002 to 2025. The initial documents in this research field emerged in 2002, accumulating a total of 62 citations. In 2017, the area experienced its first year with over 10 published documents, though it fell to 6 publications in 2018. The peak number of publications was noted in 2024, with a total of 54. As for 2025, since data were collected in July, there have already been 31 publications in this domain. This pattern reflects an increasing academic interest and a steady rise in research output, particularly in recent years, highlighting the growing significance of artificial intelligence in forensic accounting, fraud detection, and risk management.

The highest average citations per publication (C/P) and average citations per cited publication (C/CP) were reported in 2012, suggesting that earlier foundational works continue to receive strong academic recognition. The highest h-index (h) was recorded in 2020 (13), indicating that publications during that period had a wider academic impact and influence.

**Table 2: Year of Publication - 2002 to 2025 (23 years)**

| Year | TP | NCP | TC | C/P | C/CP | h |
|---|---|---|---|---|---|---|
| 2025 | 31 | 10 | 65 | 2.10 | 6.50 | 6 |
| 2024 | 54 | 36 | 157 | 2.91 | 4.36 | 7 |
| 2023 | 31 | 28 | 242 | 7.81 | 8.64 | 9 |
| 2022 | 27 | 22 | 132 | 4.89 | 6.00 | 7 |
| 2021 | 23 | 19 | 263 | 11.43 | 13.84 | 9 |
| 2020 | 28 | 27 | 594 | 21.21 | 22.00 | 13 |
| 2019 | 13 | 13 | 86 | 6.62 | 6.62 | 6 |
| 2018 | 6 | 6 | 89 | 14.83 | 14.83 | 3 |
| 2017 | 11 | 11 | 477 | 43.36 | 43.36 | 8 |
| 2016 | 8 | 5 | 26 | 3.25 | 5.20 | 3 |
| 2015 | 6 | 6 | 173 | 28.83 | 28.83 | 5 |
| 2014 | 6 | 6 | 160 | 26.67 | 26.67 | 4 |
| 2013 | 5 | 4 | 31 | 6.20 | 7.75 | 3 |
| 2012 | 2 | 2 | 329 | 164.50 | 164.50 | 2 |
| 2011 | 1 | 1 | 2 | 2.00 | 2.00 | 1 |
| 2010 | 3 | 3 | 24 | 8.00 | 8.00 | 3 |
| 2009 | 4 | 4 | 53 | 13.25 | 13.25 | 4 |
| 2006 | 1 | 1 | 69 | 69.00 | 69.00 | 1 |
| 2002 | 1 | 1 | 62 | 62.00 | 62.00 | 1 |
| **TOTAL** | **261** | | | | | |

**Notes:** TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; and h-index.

The document types published by various scholars are provided in Table 3. Most of the publications are produced as articles (61.30%), while others are as conference papers (13.79%) and book chapters (13.03%). Examining different source types helps to identify the most important literature within a particular discipline.

This helps to understand the main ways in which research is disseminated. Understanding the different categories of documents helps in selecting the appropriate databases and search techniques.

**Table 3: Document Types**

| Documents Type | Total publications | Percentage |
|---|---|---|
| Article | 160 | 61.30% |
| Conference Paper | 36 | 13.79% |
| Book Chapter | 34 | 13.03% |
| Book | 18 | 6.90% |
| Review | 10 | 3.83% |
| Conference Review | 2 | 0.77% |
| Editorial | 1 | 0.38% |

Table 4 presents the distribution of publications by source type. Journal articles make up the largest proportion, with 170 publications accounting for 65.13% of the total. Books contribute 31 publications (11.88%), while both book series and conference proceedings each account for 30 publications (11.49%). This indicates that, alongside journals, books, book series, and conference proceedings play a modest but balanced role in contributing to this research area.

**Table 4: Source Type**

| Source Type | Total publications | Percentage |
|---|---|---|
| Journal | 170 | 65.13% |
| Book | 31 | 11.88% |
| Book Series | 30 | 11.49% |
| Conference Proceeding | 30 | 11.49% |

The findings show that this research area spans multiple disciplines. Table 5 highlights Business, Management, and Accounting as the leading contributor, with 49.81% of publications, reflecting the close link between forensic accounting, auditing, and corporate governance. Economics, Econometrics, and Finance follow with 45.98%, driven by interest in AI's role in fraud detection and risk management. Social Sciences contribute 37.93%, focusing on fraud behaviour, ethics, and regulation. Although other fields each contribute less than 30%, their presence is particularly from computer science, law, and criminology. This demonstrates the growing relevance of AI technologies in financial investigations and fraud prevention.

**Table 5: Subject Area**

| Subject Area | Total publications | Percentage |
|---|---|---|
| Business, Management, and Accounting | 130 | 49.81% |
| Economics, Econometrics, and Finance | 120 | 45.98% |
| Social Sciences | 99 | 37.93% |
| Computer Science | 72 | 27.59% |
| Engineering | 34 | 13.03% |
| Decision Sciences | 33 | 12.64% |
| Mathematics | 15 | 5.75% |
| Environmental Science | 9 | 3.45% |
| Energy | 6 | 2.30% |
| Medicine | 6 | 2.30% |
| Physics and Astronomy | 5 | 1.92% |
| Psychology | 4 | 1.53% |
| Agricultural and Biological Sciences | 3 | 1.15% |
| Arts and Humanities | 3 | 1.15% |
| Earth and Planetary Sciences | 3 | 1.15% |
| Multidisciplinary | 3 | 1.15% |
| Biochemistry, Genetics, and Molecular Biology | 2 | 0.77% |
| Materials Science | 2 | 0.77% |

| | | |
|---|---|---|
| Health Professions | 1 | 0.38% |
| Nursing | 1 | 0.38% |
| Pharmacology, Toxicology, and Pharmaceutics | 1 | 0.38% |

**Leading Contributors: Authors, Institutions, and Countries**

To address RQ2 (Who are the most productive and influential contributors, including authors, institutions, and countries?), this section provides a summary of publication data, emphasizing the most prolific authors, institutions, countries, and journals in the research field.

Table 6 lists the ten most prolific authors contributing to research at the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. Alshurafat, H.**,** from Hashemite University (Jordan), ranks first with 14 publications and 235 total citations, making her the most prolific contributor. Gottschalk, P.**,** affiliated with Handelshøyskolen *BI* (Norway), follows in second place with 11 publications and 56 citations**.** Al-Sartawi, A.**,** from Ahlia University (Bahrain), ranks third with 8 publications and 53 citations.

In fourth and fifth place are authors who have co-authored five publications in the field. Those ranked sixth to tenth have contributed four publications each, though their citation counts vary. Among these authors, Klingelhöfer, H.E. achieved the highest number of citations, totalling 98. Overall, the distribution of authors reflects growing scholarly engagement in this field, with significant contributions from both developed and emerging regions.

**Table 6: Most Productive Authors**

| Author Name | Affiliation | Country | TP | NCP | TC | C/P | C/CP | h |
|---|---|---|---|---|---|---|---|---|
| Alshurafat, H. | Hashemite University | Jordan | 14 | 13 | 235 | 16.79 | 18.08 | 8 |
| Gottschalk, P. | Handelshøyskolen BI | Norway | 11 | 8 | 56 | 5.09 | 7.00 | 5 |
| Al-Sartawi, A. | Ahlia University | Bahrain | 8 | 8 | 53 | 6.63 | 6.63 | 4 |
| Akinbowale, O.E. | Tshwane University of Technology | South Africa | 5 | 5 | 119 | 23.80 | 23.80 | 4 |
| Zerihun, M.F. | Tshwane University of Technology | South Africa | 5 | 5 | 119 | 23.80 | 23.80 | 4 |
| Al Shbail, M.O. | Al Al-Bayt University | Jordan | 4 | 4 | 81 | 20.25 | 20.25 | 4 |
| Huy, P.Q. | University of Economics Ho Chi Minh City | Vietnam | 4 | 1 | 3 | 0.75 | 3.00 | 1 |
| Klingelhöfer, H.E. | Tshwane University of Technology | South Africa | 4 | 4 | 98 | 24.50 | 24.50 | 3 |
| Mathews, J. | Indian Institute of Technology Hyderabad | India | 4 | 4 | 29 | 7.25 | 7.25 | 3 |
| Mehta, P. | Prin. L. N. Welingkar Institute of Management Development & Research | India | 4 | 4 | 29 | 7.25 | 7.25 | 3 |

**Notes:** TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

Table 7 provides an overview of the distribution of institutional publications in this research area. Hashemite University leads with 21 publications, followed by Handelshøyskolen BI with 11 publications. Other institutions contribute fewer than 10 publications each. Notably, although Tshwane University of Technology has only five publications, it ranks third in terms of total citations among the top institutions. Universiti Teknologi MARA is the only institution from Malaysia featured among the leading contributors in this field.

**Table 7: Publications by institutions that publish more than five documents**

| Institution | Country | TP | NCP | TC | C/P | C/CP | h |
|---|---|---|---|---|---|---|---|
| Hashemite University | Jordan | 21 | 18 | 267 | 12.71 | 14.83 | 8 |
| Handelshøyskolen BI | Norway | 11 | 8 | 56 | 5.09 | 7.00 | 5 |
| Al Al-Bayt University | Jordan | 9 | 8 | 104 | 11.56 | 13.00 | 6 |
| Ahlia University | Bahrain | 9 | 9 | 56 | 6.22 | 6.22 | 4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| University of Economics Ho Chi Minh City | Vietnam | 8 | 3 | 18 | 2.25 | 6.00 | 3 |
| Al-Ahliyya Amman University | Jordan | 7 | 7 | 43 | 6.14 | 6.14 | 4 |
| Bina Nusantara University | Indonesia | 7 | 6 | 55 | 7.86 | 9.17 | 3 |
| Universiti Teknologi MARA | Malaysia | 5 | 3 | 44 | 8.80 | 14.67 | 2 |
| Tshwane University of Technology | South Africa | 5 | 5 | 119 | 23.80 | 23.80 | 4 |
| Al-Balqa Applied University | Jordan | 5 | 3 | 16 | 3.20 | 5.33 | 2 |
| The University of Jordan | Jordan | 5 | 3 | 24 | 4.80 | 8.00 | 3 |

**Notes:** TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

Table 8 summarizes the publication output from countries contributing ten or more papers in this research area. Jordan produced the largest number of publications (TP = 42) with a total of 337 citations, followed by India with 29 publications and 181 citations. The United States contributed 24 publications and achieved the highest total citations with 510, reflecting strong citation impact. Indonesia ranked fourth, contributed 22 publications (124 citations), while Malaysia produced 12 publications (112 citations), and the average citations per paper was 9.33. Other countries each contributed fewer than 15 publications, with citation counts varying across the group. Overall, the analysis indicates that Asian countries lead in publication output within this area. Contributions from other continents include two African nations, along with one country each from Oceania, North America, and Europe. This distribution highlights Asia's prominent role in driving research in this dynamic field, while also reflecting meaningful contributions from various global regions.

**Table 8: Most Productive Countries**

| Country | TP | NCP | TC | C/P | C/CP | h | Continent |
|---|---|---|---|---|---|---|---|
| Jordan | 42 | 32 | 337 | 8.02 | 10.53 | 9 | Asia |
| India | 29 | 22 | 181 | 6.24 | 8.23 | 7 | Asia |
| United States | 24 | 20 | 510 | 21.25 | 25.50 | 10 | North America |
| Indonesia | 22 | 17 | 124 | 5.64 | 7.29 | 6 | Asia |
| Saudi Arabia | 13 | 10 | 39 | 3.00 | 3.90 | 4 | Asia |
| Bahrain | 12 | 11 | 62 | 5.17 | 5.64 | 4 | Asia |
| Malaysia | 12 | 8 | 112 | 9.33 | 14.00 | 6 | Asia |
| Nigeria | 11 | 10 | 117 | 10.64 | 11.70 | 6 | Africa |
| Australia | 10 | 9 | 232 | 23.20 | 25.78 | 6 | Oceania |
| Norway | 10 | 7 | 54 | 5.40 | 7.71 | 5 | Europe |
| South Africa | 10 | 10 | 145 | 14.50 | 14.50 | 6 | Africa |
| Viet Nam | 10 | 4 | 20 | 2.00 | 5.00 | 3 | Asia |

**Notes:** TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

**Highly Cited Documents in the Research Area**

To address RQ3 (Which documents are most frequently cited in the context of AI applications in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management?) Citations per publication provide a measure of the relative impact of research within a particular field, whereas total citations reflect the overall number of times articles have been cited within the database (Alam et al., 2025).

Table 9 shows the most popular and most-cited research papers in forensic accounting, fraud detection, and risk management. Older studies, like Nigrini (2012), focused on basic tools like Benford's Law to find fraud. Over time, research started using more advanced technology, like Amani & Fadlalla (2017), who discussed data mining in accounting, and Morales et al. (2014), who looked at why people commit fraud using the fraud triangle idea. More recent papers, like Alshurafat et al. (2021) and Kaur et al. (2022), show that many researchers are now interested in how artificial intelligence (AI) and data analysis can help detect fraud. Even though these newer studies are quite recent, they have already been cited a lot, which shows this topic is getting more attention. Overall, the research has moved from traditional ways of checking fraud to using AI and modern technology to deal with more complex financial crimes.

**Table 9: Top 20 highly cited documents**

| No | Authors | Year | Title | Source | Cites | Cites Per Year |
|---|---|---|---|---|---|---|
| 1 | Nigrini, M.J. | 2012 | Benford's law: Applications for forensic accounting, auditing, and fraud detection | Benford's Law: Applications for Forensic Accounting, Auditing, and Fraud Detection | 250 | 19.23 |
| 2 | Camin, F. | 2017 | Stable isotope techniques for verifying the declared geographical origin of food in legal cases | Trends in Food Science and Technology | 178 | 22.25 |
| 3 | Amani, F.A. | 2017 | Data mining applications in accounting: A review of the literature and organizing framework | International Journal of Accounting Information Systems | 133 | 16.63 |
| 4 | Morales, J. | 2014 | The construction of the risky individual and vigilant organization: A genealogy of the fraud triangle | Accounting, Organizations and Society | 131 | 11.91 |
| 5 | Fragiacomo, P. | 2020 | Technical-economic analysis of a hydrogen production facility for power-to-gas and hydrogen mobility under different renewable sources in Southern Italy | Energy Conversion and Management | 108 | 21.60 |
| 6 | Free, C. | 2015 | Looking through the fraud triangle: A review and call for new directions | Meditari Accountancy Research | 83 | 8.30 |
| 7 | Nigrini, M.J. | 2012 | Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations | Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations | 79 | 6.08 |
| 8 | Schneider, S. | 2006 | Privatizing economic crime enforcement: exploring the role of private sector investigative agencies in combating money laundering | Policing and Society | 69 | 3.63 |
| 9 | Marcella, A.J. | 2002 | Cyber forensics: A field manual for collecting, examining, and preserving evidence of computer crimes | Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes | 62 | 2.70 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | Alshurafat, H. | 2021 | Strengths and weaknesses of forensic accounting: implications for the socio-economic development | Journal of Business and Socio-economic Development | 59 | 14.75 |
| 11 | Sadaf, R. | 2018 | An investigation of the influence of the worldwide governance and competitiveness on accounting fraud cases: A cross-country perspective | Sustainability (Switzerland) | 58 | 8.29 |
| 12 | Levi, M. | 2020 | Understanding the laundering of organized crime money | Crime and Justice | 57 | 11.40 |
| 13 | Levi, M. | 2015 | Money for Crime and Money from Crime: Financing Crime and Laundering Crime Proceeds | European Journal on Criminal Policy and Research | 55 | 5.50 |
| 14 | Akinbowale, O.E. | 2020 | An innovative approach to combating economic crime using forensic accounting techniques | Journal of Financial Crime | 54 | 10.80 |
| 15 | Alshurafat, H. | 2020 | Perceptions of the usefulness of various teaching methods in forensic accounting education | Accounting Education | 50 | 10.00 |
| 16 | Kaur, B. | 2023 | A systematic review of forensic accounting and its contribution towards fraud detection and prevention | Journal of Financial Regulation and Compliance | 49 | 24.50 |
| 17 | Yang, C. H. | 2020 | Developing a strategy map for forensic accounting with fraud risk management: An integrated balanced scorecard-based decision model | Evaluation and Program Planning | 49 | 9.80 |
| 18 | Van Akkeren, J. | 2017 | Perceptions on the Causes of Individual and Fraudulent Co-offending: Views of Forensic Accountants | Journal of Business Ethics | 49 | 6.13 |
| 19 | Wahyuni-TD, I.S. | 2021 | The effects of good governance and fraud prevention on performance of the zakat institutions in Indonesia: A Sharīʿah forensic accounting perspective | International Journal of Islamic and Middle Eastern Finance and Management | 40 | 10.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20 | Kumari Tiwari, R. | 2017 | Forensic accounting: a blend of knowledge | Journal of Financial Regulation and Compliance | 40 | 5.00 |

**Keyword Analysis, Thematic Clusters, and Emerging Research Directions**

To answer RQ4 (What are the key keywords, thematic clusters, and emerging research topics within this domain?), this study uses VOS viewer to explore and visualize the keywords. A co-occurrence network and overlay map were created based on keywords provided by authors, along with key terms found in the titles and abstracts of the documents. The focus is on keywords that appeared more than 10 times, which were grouped into different themes using keyword clusters. This method helps to highlight the main research topics, identify new trends, and point out any gaps in the current research.

Frequently used keywords were identified using the VOS viewer's co-occurrence analysis, applying a minimum threshold of three occurrences to capture key research themes. In this context, "occurrences" refer to how often a specific keyword appears within the dataset, reflecting its importance and relevance in the field. This method helps pinpoint dominant topics, emerging trends, and potential research gaps.

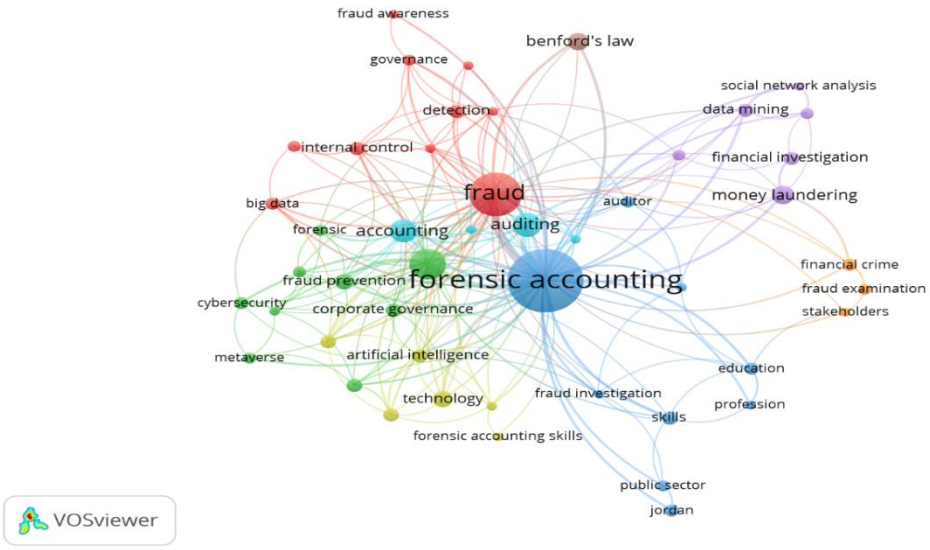
As shown in Table 10, frequently used keywords highlight the main areas of focus in the literature. "Forensic accounting" stands out as the most frequent term, appearing 129 times (27.74%), showing its central role in the research area. This is followed by "fraud" (62 occurrences, 13.33%) and "fraud detection" (31 occurrences, 6.67%), which indicate a strong concentration on fraud-related studies. Other commonly used keywords include "auditing" (20 occurrences, 4.30%), "accounting" (17 occurrences, 3.66%), and "money laundering" (12 occurrences, 2.58%), reflecting continued interest in financial crime and regulatory topics. Overall, the findings demonstrate a growing focus on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management, highlighting opportunities for future research to explore technology's role in combating financial fraud and strengthening forensic practices.

**Table 10: Frequently Used Authors' Keywords**

| Keyword | Occurrences | Percentage (%) |
|---|---|---|
| Forensic accounting | 129 | 27.74 |
| Fraud | 62 | 13.33 |
| Fraud detection | 31 | 6.67 |
| Auditing | 20 | 4.3 |
| Accounting | 17 | 3.66 |
| Money laundering | 12 | 2.58 |

This study applies the VOS viewer for mapping analysis. As explained by Sedighi (2016) and Alam et al. (2025), "the distance between nodes in this visualization network represents the relationship between phrases or concepts, while the nodes themselves reflect a term or concept." Based on Figure 3, in this network map, each color represents a specific cluster. Based on the analysis, eight clusters were identified: Cluster 1 (Red) focuses on *Forensic Audit Practice and Broader Accounting Discipline*; Cluster 2 (Green) highlights *Governance and Fraud Control*; Cluster 3 (Blue) relates to *Professional Competency and Regional Focus*; Cluster 4 (Yellow/Lime Green) reflects *Emerging Technologies in Forensic Accounting*; Cluster 5 (Purple) covers *Financial Crime Investigation and Data Techniques*; Cluster 6 (Cyan/Teal) represents *Localized Educational Research*; Cluster 7 (Orange) focuses on *Audit and Forensic Practice Specificity*; and Cluster 8 (Brown) includes *Analytical Methods and Fraud Detection Tools*.

**Figure 3: Network visualization of the co-occurrence of authors' keywords**




The keyword analysis revealed eight main themes in research related to artificial intelligence, forensic accounting, fraud detection, and risk management. Table 11 shows these key themes based on keyword grouping. The themes include governance and fraud control, professional skills, financial crime investigation, emerging technologies, forensic audit practices, audit roles, local education focus, and analytical methods. Overall, the results show that most studies focus on fraud prevention, financial crime, and the increasing use of technology, while also discussing the importance of professional skills and country-specific research areas.

**Table 11: Identified Themes from Keyword Clusters**

| Theme | Description | Focus Areas (Keywords) |
|---|---|---|
| 1. Forensic Audit Practice and Broader Accounting Discipline | Explores forensic audit work within the larger field of accounting, including issues like corruption, detection methods, and risk management. | Big data, corruption, detection, financial transactions, forensic audit, fraud, fraud awareness, governance, internal control, risk management. |
| 2. Governance and Fraud Control | Focuses on research about governance systems, fraud prevention, internal controls, and how organizations handle fraud risks, especially in forensic accounting. | Corporate governance, business, management, accounting, cybersecurity, digital forensics, forensic, fraud detection, fraud prevention, fraud triangle, metaverse. |
| 3. Professional Competency and Regional Focus | Highlights studies on professional skills in forensic accounting, education topics, and country-specific research, with notable contributions from Jordan, which recorded the highest number of publications in this area. | Forensic accounting, forensic accountant, auditor, education, Jordan, public sector, profession, skills, fraud investigation. |
| 4. Emerging Technologies in Forensic Accounting | Focuses on new technology trends in forensic accounting, such as AI, blockchain, big data, and data analytics. This theme reflects the modern shift toward technology-driven audit and investigation methods. | Artificial intelligence, blockchain, big data analytics, data analytics, forensic accounting skills, and technology. |
| 5. Financial Crime Investigation and Data Techniques | Covers research related to financial crime cases and the use of data techniques to support investigations and fraud detection. | Data mining, financial investigation, financial reporting, money laundering, social network analysis, and tax evasion. |

| | | |
|---|---|---|
| 6. Localized Educational Research | Relates to local studies focusing on forensic accounting education in certain countries. | Bahrain, forensic accounting education, accounting, auditing. |
| 7. Audit and Forensic Practice Specificity | Focuses on specific audit roles, professional identity, and day-to-day forensic audit activities. | Financial crime, fraud examination, and stakeholders. |
| 8. Analytical Methods and Fraud Detection Tools | Covers research using special tools and analytical methods for fraud detection, especially Benford's Law. | Benford's Law. |

**Artificial Intelligence (AI) Adoption in Forensic Accounting: Key Findings**

To answer RQ5 (What are the emerging research directions for applying artificial intelligence in forensic accounting and fraud detection?), this study identified publications that mention artificial intelligence in the title and/or abstract. The findings provide useful insights to help future researchers recognize current research gaps and suggest key areas for further exploration and development.

Table 12 shows 12 publications that mention artificial intelligence in the title and/or abstract. Studies by Archna & Bhagat (2024) and Ali et al. (2024) demonstrate AI's effectiveness in enhancing fraud detection, while blockchain technology further improves transparency and real-time monitoring (Badkul et al., 2025). Rule-based expert systems Öztürk & Usul, 2020) and intelligent audit automation Saluja et al., 2024) also show promise, though challenges like implementation costs and data quality remain.

Legal and ethical frameworks are critical for AI-driven forensic accounting, as highlighted by Quang Huy & Kien Phuc (2025) and Naqvi (2020). Innovations like federated learning combined with blockchain (Alshareet & Awasthi, 2025) address privacy and accountability concerns. While AI and blockchain offer significant advancements, future research must focus on scalability, interdisciplinary applications, and long-term impacts to fully realize their potential in forensic accounting.

**Table 12: List of Publications Featuring Artificial Intelligence in Title and/or Abstract**

| No | Authors | Research title | Research Objective | Findings |
|---|---|---|---|---|
| 1 | Archna R. & Bhagat N. (2024) | Artificial intelligence challenges and their impact on the detection and prevention of financial statement fraud: A theoretical study | Investigate AI's potential in forensic accounting for financial statement fraud detection and prevention and examine implementation challenges. | Provides valuable insights for organizations, regulators, and professionals in combating financial fraud and promoting accurate financial reporting. |
| 2 | Badkul S., Kishor A., & Madvariya S. (2025) | The role of cloud computing in regulating blockchain and virtual currency | Investigate how cloud platforms improve blockchain networks for real-time transaction monitoring and extensive forensic audits in regulating blockchain and virtual currencies. | Cloud services enhance transparency and compliance, with AI and machine learning enabling automated anomaly detection and predictive analytics for fraud prevention. |
| 3 | Alshareet O. & Awasthi A. (2025) | A Novel Framework for Integrating Blockchain-Driven Federated Learning with Neural Networks in E-Commerce | Introduce a framework integrating federated learning (FL) with a permission blockchain to ensure verifiable, privacy-preserving, and ethically accountable machine learning collaborations. | Demonstrates stable convergence, reduced communication overhead, robust predictive accuracy, and enhanced adaptability with multi-layered security measures. |

| | | | | |
|---|---|---|---|---|
| 4 | Ali A.M., Futaih R.F., Shukur M., & Al-Orfali A.K. (2024) | Forensic Accounting and Fraud Detection: Emerging Trends and Techniques | Assess how AI, blockchain, and data analytics improve forensic accounting for fraud detection. | Data analytics (β=0.35) and AI (β=0.30) significantly enhance fraud detection; blockchain improves transparency and traceability. Beneish M-Score supported earnings manipulation detection. |
| 5 | Saluja S., Nayyar V., Dawra S., Jain M., & Prakash R.S. (2024) | Artificial intelligence in forensic accounting | Investigate current fraud detection issues and propose a business intelligence framework for financial accounting fraud detection (FAFD). | Illustrates how business intelligence can be used to detect accounting fraud. |
| 6 | Huy P.Q. & Phuc M.A.V.K. (2025) | Insight into How Legal and Ethical Considerations Improve Artificial Intelligence Capabilities to Enhance the Performance of Cyber Forensic Accounting | Explore the interconnection between legal and ethical considerations (LEC) and cyber forensic accounting performance (PCFA), and AI's mediating role. | Statistical data confirms LEC's significant interconnection with PCFA, mediated by AI capabilities, aiding practitioners and policymakers in enhancing PCFA. |
| 7 | Quang Huy P. & Kien Phuc V. (2025) | Insight into how legal and ethical considerations of artificial intelligence enhance the effectiveness of cyber forensic accounting | Explore the correlation between legal and ethical considerations (LEC) and cyber forensic accounting effectiveness (ECFA), with AI competencies (AIC) as a mediator. | LEC significantly and favorably influenced ECFA, and AIC partially mediated this link, aiding governments in formulating strategies for forensic accounting and AI implementation. |
| 8 | Alkababji M.W., Mostafa R.M.A., Freihat A.F., Gad W.N.-E.-D., Alzahrane M., Yami N., Guellim N., & Shaaban M.S.I. (2024) | Forensic Accounting Practices: Evaluating the Current Research | Provide a complete evaluation of current forensic accounting research, covering corporate governance, fraud investigation, digital forensics, and AI integration. | Highlights forensic accounting's efficient role in maintaining financial integrity and promoting ethical corporate behavior. |
| 9 | Goyal Y. & Kumar P. (2024) | Forensic accounting and litigation support: Navigating legal challenges with fraud investigation mechanisms | Measure forensic accounting's impact on litigation outcomes and fraud detection, and the influence of legal procedure complexity on detection effectiveness and satisfaction with legal outcomes. | Research has deep legal implications related to litigation processes, highlighting the role of quality investigation and internal control. |
| 10 | Mehta C.K., Kaushik V., & Bhargav S. (2021) | A Study of the Impact of Internal Control Measures on the ease of use of Forensic | Investigate AI's mediating role on the perceived usefulness of forensic auditing services (FAS) in | Study outcomes help auditors and professionals understand AI's |

| | | | | |
|---|---|---|---|---|
| | | Audit Mediated by Artificial Intelligence Techniques | tracking financial scams and fraud in financial institutions. | usefulness in forensic accounting for tracking fraudulent activities. |
| 11 | Öztürk M.S. & Usul H. (2020) | Detection of accounting fraud using the rule-based expert systems within the scope of forensic accounting | Determine accounting fraud in enterprises using rule-based expert systems within forensic accounting. | Rule-based expert systems enable enterprises to better detect existing fraud and prevent future irregularities. |
| 12 | Naqvi A. (2020) | Artificial Intelligence for Audit, Forensic Accounting, and Valuation: A Strategic Perspective | Provide a strategic viewpoint on comprehensively integrating AI within audit management, forensic accounting, and valuation to help organizations compete. | AI is a critical competitive factor for audit and accounting firms, necessitating firm-wide AI capabilities for modernization. |

## 5. Conclusion

This study looks at how research on artificial intelligence (AI), forensic accounting, fraud detection, and risk management has grown from 2002 to 2025. The findings show that interest in this area has increased a lot since 2017, with most research coming from countries like Jordan, India, and the United States. Some universities, like Hashemite University, and authors, like Alshurafat H., stand out as the most active contributors. This suggests there are key experts in the field who could lead more joint research in the future.

AI tools such as machine learning, data mining, and natural language processing are transforming forensic accounting practices, particularly in detecting and preventing fraud. An analysis of keywords revealed eight primary research themes, with emerging technologies such as blockchain and big data beginning to gain traction. Nonetheless, there are ongoing obstacles, especially in promoting the broader and responsible use of these technologies, particularly in less-studied nations.

In short, this study gives a useful overview of where the research stands today. It shows that some regions are still underrepresented and suggests future studies should involve more global cooperation. New technologies like blockchain, metaverse, and advanced data analytics are also areas with a lot of potential for future research. This study focuses only on Scopus and English-language articles, so it may miss some local studies. Future research should use more sources and encourage wider participation to give a more complete picture of this field.

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