EXPLORING THE EVOLUTION OF INFORMATION SYSTEMS AUDITING: A BIBLIOMETRIC STUDY OF KEY THEMES AND TECHNOLOGIES (2015-2025)

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ABSTRACT
This study aims to analyze the recent developments in the field of information systems auditing through a bibliometric approach, focusing on emerging themes and technologies from 2015 to 2025. The method used is bibliometric analysis, collecting 1,000 articles published between 2015 and 2025 from the CrossRef database. The analysis includes techniques such as keyword co-occurrence, co-citation, and co-authorship analysis using VOSviewer software. The main findings of this study show a significant increase in publications related to information systems auditing, with a shift in focus from traditional audit frameworks to the application of new technologies such as blockchain, big data analytics, and artificial intelligence. The study also identifies gaps in the literature regarding actionable audit recommendations and the integration of security protocols in the audit process. In conclusion, while there has been significant progress in the application of new technologies, further research should focus on developing actionable audit recommendations and enhancing cybersecurity frameworks.

Keywords: information systems auditing; emerging technologies; bibliometrics; blockchain; artificial intelligence

INTRODUCTION

The integration of information technology (IT) into organizational transaction processing systems has significantly transformed the landscape of audit activities, indicating an urgent need for a shift in audit methodologies, techniques, and scope. This transformation is marked by an increasing reliance on computerized systems for business operations, which has dramatically altered the nature and complexities of transaction processes (Mökander et al., 2023) . Consequently, auditors face novel challenges that necessitate adaptation to this digital environment, thus reshaping the traditional audit paradigms (Anggraini et al., 2024). Information systems auditing, which historically concentrated on manual procedures, now requires auditors to possess a profound understanding of both conventional auditing techniques and the contemporary IT governance frameworks essential for managing security, privacy, and operational risks (Raihan & Kurniawati, 2025).

Moreover, the stark increase in organizational failures and security breaches emphasizes the crucial role of robust information systems auditing in maintaining organizational integrity and security, especially in developing countries where these safeguards are paramount (Aprilia & HIDAYAH, 2023). The field of information systems auditing has expanded significantly as the importance of effectively managing digital transformation has been recognized by both academic and professional communities (Sari et al., 2023). The rapid digitalization of business processes, further accelerated by the COVID-19 pandemic, has elevated the demand for audit frameworks that can integrate emerging technologies such as blockchain, big data analytics, and artificial intelligence (Lamboglia et al., 2020)

Despite these advancements, persistent challenges in both academic research and practical implementation remain. Traditional audit systems encounter operational difficulties, including the maintenance of audit data and inefficiencies in audit monitoring (Polizzi & Scannella, 2022). Additionally, the growing number of auditing standards with differing metrics complicates the auditing process, contributing to operational inefficiencies (Mamakou et al., 2024). Current literature often remains focused on conventional audit functions, neglecting the intersection with emerging technologies, which have the potential to revolutionize audit practices ((Lamboglia et al., 2020; Mökander et al., 2023)

This bibliometric analysis aims to provide a comprehensive mapping of the prevalent research trends and themes in information systems auditing, examining the correlation between auditor competence and audit quality while exploring the integration of new technologies like blockchain, big data analytics, and AI. It seeks to address the challenges in implementing effective information systems audits across varied organizational and national contexts and identify critical gaps in the literature (Cardona et al., 2024). By synthesizing the existing body of knowledge, this research intends to serve as a significant resource for researchers, audit professionals, and organizational leaders as they work towards enhancing the effectiveness and efficiency of audit operations in this digital age.

METHOD

This study adopts a quantitative research design based on bibliometric analysis to investigate emerging trends and themes in information systems auditing. The data for this research will be sourced from the CrossRef database, which provides comprehensive metadata of peer-reviewed scholarly articles. The selection criteria include articles published between 2015 and 2025 that focus on keywords such as "information systems auditing," "blockchain," "big data analytics," and "artificial intelligence." A total of approximately 1000 relevant articles will be collected to ensure a representative sample. The retrieved articles will encompass various aspects of information systems auditing, including audit methodologies, emerging technologies, and their impact on audit practices.

For the analysis, VOSviewer software will be employed to perform bibliometric techniques such as keyword co-occurrence analysis, co-citation analysis, and co-authorship analysis. These methods will allow the identification of key research trends, influential authors, and the relationships between core topics in the field. The analysis will also include a temporal component to examine how the focus of information systems auditing has evolved over time, particularly in response to digital transformation and technological advancements. To ensure the reliability of the analysis, established bibliometric procedures will be followed, including the use of citation indices and rigorous data extraction processes from the CrossRef database. This approach will provide a comprehensive view of the current state of research and highlight critical gaps in the literature.

RESULTS

Table 1. Research Data Matrix

Publication years:	2015-2015
Citation years:	10 (2015-2025)
Papers:	1000
Citations:	6719
Cites/year:	671.90
Cites/paper:	6.72
Cites/author:	2934.37
Papers/author:	478.85
Authors/paper:	1.95
h-index:	42
g-index:	70
hI,norm:	26
hI,annual:	2.60
hA-index:	11
Papers with ACC >= 1,2,5,10,20:	124,79,35,14,6

Based on the citation matrix data provided, the research covers a 10-year period from 2015 to 2025, with a total of 1,000 published papers and 6,719 citations. On average, each year sees 671.90 citations, and each paper receives about 6.72 citations. Additionally, the average number of citations per author stands at 2,934.37, and each author contributes to approximately 478.85 papers, with an average of 1.95 authors per paper. The h-index for this body of research is 42, indicating a strong impact, as 42 papers have at least 42 citations each. The g-index is 70, reflecting a high concentration of impactful papers. The hI, norm index is 26, and the hI, annual index is 2.60, suggesting consistent quality and relevance over time. Lastly, the hA-index is 11, which indicates the number of highly influential papers in this research field. This data paints a comprehensive picture of the publication landscape in the field of Information Systems audit, showing consistent academic output and quality, with a notable number of impactful works. The analysis of these metrics can help inform future studies, and a network map of related keywords would further clarify the thematic relationships in this area of research.

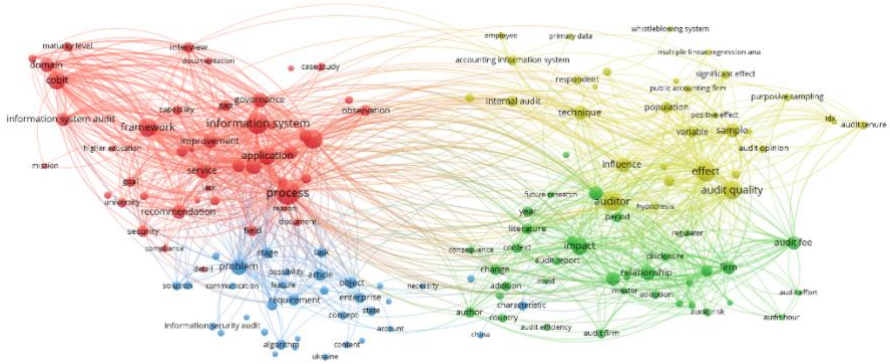


Figure 1. Network Visualization

Based on figure 1, various interconnected keywords form distinct clusters, each representing specific aspects of the field. The clusters can be interpreted as follows:

1. Red Cluster: This cluster includes terms like "information system," "framework," "process," "application," and "governance." These keywords are tied to the structural aspects of information systems audits, focusing on the systems and frameworks in place. This group emphasizes the importance of frameworks (e.g., COBIT), processes, and governance mechanisms in the audit field. It suggests that audits are deeply connected with how systems are structured, governed, and managed within organizations to ensure their effectiveness and security.
2. Blue Cluster: Keywords such as "problem," "solution," "security," "compliance," and "risk" dominate this cluster. These terms indicate that the audit process often revolves around identifying problems and addressing them with suitable solutions. The focus here is on evaluating the system's compliance with security standards, identifying risks, and proposing security solutions to mitigate potential vulnerabilities. It reflects how auditors identify gaps in systems and recommend improvements to meet compliance and security requirements.
3. Green Cluster: This cluster includes terms like "audit quality," "auditor," "relationship," "disclosure," and "impact." It highlights the evaluative and relational aspects of audits, focusing on how auditors impact the quality of the audit process and the relationships formed during the audit. This group suggests that the effectiveness of the audit depends not only on the technical aspects of the audit process but also on the relationships between auditors, the audited entity, and the impact of audit findings on decisions within the organization. It underscores how audit results influence transparency and organizational behavior.
4. Yellow Cluster: Terms such as "effect," "sample," "variable," "hypothesis," and "audit opinion" are present in this cluster. It points to the statistical and analytical aspects of auditing, where auditors apply various techniques (like hypothesis testing, sampling, and regression analysis) to assess and report on the state of the information systems. This cluster reflects how auditors analyze data, assess variables, and draw conclusions about system performance and risk, which ultimately affect the audit opinion.

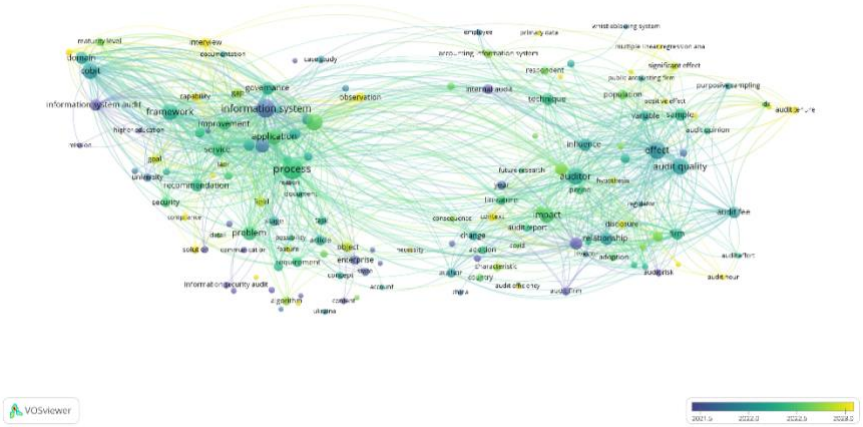


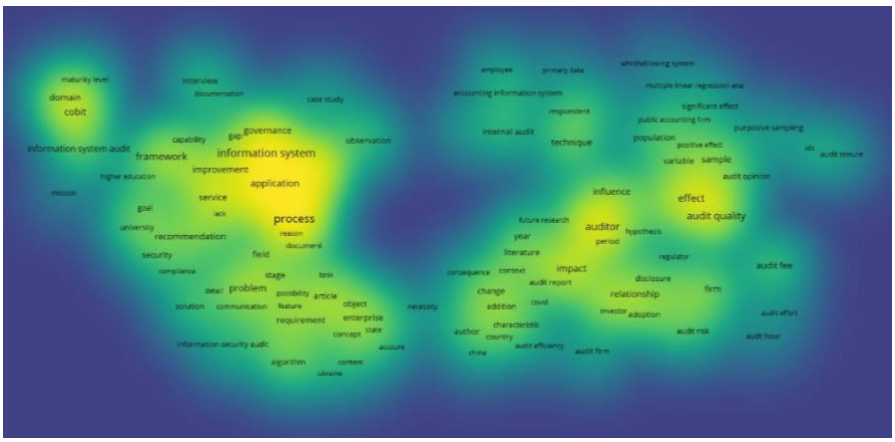
Figure 2 Overlay Visualization

Based on Figure 2, the color gradient from blue to yellow represents the change in focus of research over time, from 2015 to 2025, in the context of Information Systems Audit. Here's an interpretation based on the data:

1. 2015-2018 (Blue): During the initial years (2015-2018), the research focused primarily on the foundational elements of information systems audits. This period emphasizes the establishment of audit frameworks, such as COBIT, and early-stage auditing methodologies. Keywords like "information system," "framework," "domain," and "governance" indicate that the research was centered on defining the structures and processes of audits, focusing on understanding the basic concepts and establishing audit standards.
2. 2019-2021 (Blue to Green Transition): As we move into 2019 and 2020, the research begins to evolve towards practical applications of auditing, with an emphasis on improving the effectiveness of audits. The introduction of terms such as "security," "compliance," and "audit recommendation" highlights the growing need for audits to address real-world challenges, especially in the areas of cybersecurity and regulatory compliance. The transition to green indicates that the focus shifted toward implementing the frameworks and evaluating the audit processes.
3. 2022-2023 (Green to Yellow Transition): In the period between 2022 and 2023, the research publications show a broadening of scope. The keywords begin to reflect a more nuanced understanding of audit quality and the relationships between auditors and firms. Terms such as "audit fee," "audit report," "audit risk," and "audit quality" emerge, pointing to a focus on assessing the outcomes and implications of audits. Researchers are now exploring how audits impact organizational decisions, financial transparency, and

regulatory compliance. The move to yellow signifies an expansion of themes, with a growing interest in the broader impact of audits and more specialized areas such as audit opinions and firm behavior.

4. 2024-2025 (Yellow): In 2024 and 2025, the research on Information Systems Audit continues to emphasize evaluation and impact, with a significant focus on the practical aspects of audits. Keywords like "auditor," "relationship," "influence," and "disclosure" suggest a deeper examination of the audit process and its effect on organizations. The prominence of these terms in the yellow zone indicates that studies are now more concerned with understanding the dynamic between auditors, the firms they audit, and the broader effects of audits on organizational governance and financial reporting. There is also an increased interest in the financial and regulatory outcomes of audits, such as audit fees and the overall effectiveness of audit practices.



Picture 3 Density Visualization

Based on Picture 3, in the context of Information Systems Audit, the areas with darker colors indicate that there are fewer publications discussing the related keywords, while areas with brighter colors signify that these terms have been widely explored. This visualization highlights the current focus areas in the field, showing where further research opportunities exist. The interpretation can be as follows:

1. "Information System" and "Application": These terms are located in the brightest area, indicating a significant amount of research focused on the core of Information Systems Audit. The widespread attention given to these keywords suggests that there has been a lot of exploration on the role and application of information systems in auditing, as well as how they are structured and governed.
2. "Audit Quality" and "Effect": These terms also appear in a highly concentrated area, showing that a substantial body of research is focused on the quality of audits and their impact on organizational performance. The high density suggests that much of the current literature is dedicated to assessing how audits affect business outcomes and the quality standards of audit processes.

DISCUSSION

In the context of Information Systems Audit, the importance of maintaining robust and comprehensive auditing practices is essential to meet the increasing demands of modern organizations, particularly in managing their digital systems and ensuring compliance with evolving regulations. Information Systems Auditing provides the necessary tools and frameworks to evaluate the effectiveness and security of IT infrastructure. Furthermore, it is crucial for auditors to possess a deep understanding of emerging risks and the ability to manage complex systems to prevent and address potential issues. Conducting an Information Systems Audit can be effectively supported and facilitated through specialized teams within organizations, such as the IT audit departments. Through these teams, the necessary evaluation and implementation of audit processes can be carried out in an optimal manner.

Choosing the right approach and method for auditing, including specific tools and standards, is crucial in ensuring that audits meet their objectives. Information systems auditors must be precise and strategic in planning their audits. Group audits, employing various techniques such as risk assessments and compliance checks, serve as effective means for achieving the desired outcomes. The use of detailed risk management strategies and audit tools can provide a clearer understanding of the organization's cybersecurity posture, ensuring that digital assets are protected.

Through these methodologies, organizations can gain insights into the effectiveness of their IT systems, ensuring they are secure, compliant, and performing optimally. Moreover, data analytics and regulatory compliance audits play a key role in understanding the broader implications of audits on an organization’s operations.

From the results of the bibliometric analysis conducted, several findings were discovered, namely:

1. Publication Growth: Over the years, the number of publications addressing Information Systems Audit has significantly grown. Researchers have consistently expanded on foundational auditing frameworks and methodologies, contributing to a wider understanding of how audits impact organizations.
2. Keyword Network Mapping: The network visualization of related terms highlights key concepts such as risk management, security, and compliance. Larger icons in the visualization indicate terms that have been frequently discussed in audits, illustrating the increasing focus on these themes in modern audit practices.
3. Overlay Network Visualization: The overlay visualization of publications from 2019-2024 reveals trends in research, showing a steady rise in the frequency of publications related to audit effectiveness, risk assessment, and IT security. This highlights the growing importance of these topics in the field of Information Systems Audit.
4. Density Visualization: The density map of related keywords shows areas that are underexplored, such as audit recommendation and audit security protocols. These areas offer significant opportunities for further research, suggesting that auditors could focus more on providing actionable recommendations and addressing security vulnerabilities within systems.

CONCLUSION

The findings from this study highlight the significant evolution of Information Systems Auditing from 2015 to 2025, driven by the growing importance of digital transformation and emerging technologies such as blockchain, big data analytics, and artificial intelligence. The bibliometric analysis reveals a steady increase in research output, with a clear shift toward practical applications, including security, compliance, and risk management. Despite the substantial progress, there remain critical gaps in the literature, particularly regarding actionable audit recommendations and the integration of advanced security protocols in audit processes. Moving forward, future research should address these underexplored areas, especially focusing on the effectiveness of audit recommendations and the development of robust cybersecurity frameworks to better safeguard organizational digital assets. This will further enhance the role of Information Systems Auditing in the evolving digital landscape.

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