THE ABILITY OF ARTIFICIAL INTELLIGENCE (AI) IN IMPROVING AUDITOR PERFORMANCE: LITERATURE STUDY

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ABSTRACT

The literature study focuses on the ability of Artificial Intelligence (AI) to improve auditor performance. This study uses Systematic Literature Review (SLR) as a research data search instrument, then bibliometric literature as a data processor analyzed by VOSviewer software. The analysis of this research data using VOSviewer software is used to analyze articles that have been collected through the Scopus database which is taken as a reference for researchers. This study found that AI has significant potential to automate the audit process, auditor performance, improve efficiency, accuracy, and audit quality by detecting anomalies and strengthening data-based decision making. However, the implementation of AI in audit practice faces challenges, including limited auditor skills, dependence on high-quality data and ethical issues related to privacy and transparency. Adequate regulation and control are needed to ensure that the integration of AI runs in accordance with professional audit standards. This study contributes to enriching the literature related to AI by providing insight into the benefits and challenges of implementing AI in improving auditor performance and recommending the need for competency adaptation and the development of a new framework for optimizing AI technology.

Keywords: Artificial Intelligence (AI), Bibliometrics, Auditor Performance, Literature Study

INTRODUCTION

The development of the era of society 5.0 is currently experiencing rapid technological changes. Practices in the world of auditing in several companies face increasingly complex challenges. Traditional practices in auditing are often unable to meet the demands for greater transparency and accountability from various stakeholders and the increasing complexity of financial transactions. Research conducted byFrey & Osborne, (2017)stated that the auditor profession is predicted to have a 94% chance of losing its job due to the existence of financial computerization with Artificial Intelligence (AI) technology. Auditors are significantly lagging behind their clients in terms of adopting new technology.(Oldhouser, 2016). This results in risks that occur from auditing practices such as recording errors, information asymmetry, stakeholder dissatisfaction and even fraud. Therefore, the implementation of technology such as AI offers an opportunity to make a significant transformation in audit practices.

AI is a technology that has the potential to change many aspects of life, including in the field of accounting and auditing. AI has deeper analytical capabilities through fast and accurate data processing. The application of AI can significantly affect business processes in the future.(Khasanah et al., 2024). By using machine learning algorithms, AI can help auditors find patterns, find anomalies, and inform auditors more about risks in financial statements. AI can be used as a technology to prevent and detect fraud in the auditing process.

The Big Four accounting firms Ernst & Young (EY), Deloitte, Klynveld Peat Marwick Goerdeler (KPMG) and PricewaterhouseCoopers (PwC) have invested millions of dollars in AI in an effort to provide more efficient and high-quality audits to clients. For example, KPMG has begun using IBM Watson's deep learning system to analyze bank credit files for commercial mortgage loan portfolios, while Deloitte is working with Kiva's AI system to review contracts, leases and invoices.(Mawlidy et al., 2024). PwC uses Robotic Process Automation (RPA) technology to collect data and determine the filing status of all entities, review trial balances, and transform data into a tax basis.(Alghafiqi & Munajat, 2022). EY firms enhance client services with AI technology through the EY.ai platform designed to help organizations adopt AI using EYQ's large language models. Therefore, by using technologies such as AI can be optimized to identify strange or suspicious transactions, this helps improve efficiency and accuracy in the audit process.

Other research that discusses the use of AI in audit practices carried out bySari & Putri, (2024)shows that external auditors' perceptions of the ease of use of AI contribute to improving audit quality. Then, research conducted byHan et al., (2023)identified the use of AI can improve efficiency in the audit process, with the main findings being, event approach to accounting, real-time accounting, triple-entry accounting and continuous auditing, but has limitations in empirical data, lack of concrete explanation of solutions to risks and challenges and limitations in policies and regulations governing the use of AI in audit practices.

Despite its many potential benefits, the application of AI in auditing is not without its challenges. Privacy issues, data security and ethical considerations surrounding the use of sensitive information are important factors that must be addressed.(Mawlidy et al., 2024). In addition, questions about the ethics of implementing AI in audits, such as the possibility of bias in algorithms or the role of human judgment in decision-making, must be carefully examined. Then, to properly integrate AI into audits, auditors must change their skills and abilities. As AI technology begins to replace routine and repetitive tasks, auditors need to adapt by developing new skills to optimally utilize this technology. The ability to interpret and verify the results of analyses produced by AI, to prioritize professional skepticism, and to understand the ethical and regulatory frameworks involving AI are key competencies that auditors must have in facing this ever-evolving dynamic of change.

Based on previous studies and the phenomena that are the basis for writing this research, a research gap was found that there is a lack of understanding of the application of AI in improving auditor performance. Therefore, further research is needed regarding the application of AI in audit practice. This study uses a Systematic Literature Review (SLR) with bibliometric analysis to combine existing data and draw conclusions by examining research results, methodologies, topics or themes, implications and limitations of articles on the application of AI in improving auditor performance in audit practice that have been published. The results of this study contribute to enriching the literature related to the use of AI in improving auditor performance.

LITERATURE REVIEW

Technology Acceptance Model(TAM)

Technology Acceptance Model(TAM) is an information system theory that explains how users accept and use technology (Sari & Putri, 2024). This theory was introduced by Davis in 1989 and has become one of the most influential and widely used technology adoption models to understand how users accept and use new technologies. This theory aims to explain and predict user acceptance of accounting information systems, by analyzing the relationship between perceived usefulness and ease of use on user interest in adopting information technology (Syahronny & Dewayanto, 2024). This theory helps explain the interaction between user beliefs about the ease of technology and their actual behavior when dealing with the system. Understanding this mechanism allows organizations to design more effective technology implementation strategies according to user needs and expectations. According to (Davis, 1989) explains TAM includes two main factors that influence the acceptance of information technology, namely perceived ease of use and perceived usefulness. Perceived ease of use, namely users believe that the technology or system is simple and barrier-free. Their interactions with the system reflect the extent to which the technology is easy to use.(Adhiputra, 2015). Perceived usefulness is the user's belief that a particular technology or system can improve their performance. This belief refers to the extent to which a person feels that using an information system will support their increased productivity.(Syahronny & Dewayanto, 2024).

Artificial Intelligence(AI)

Artificial Intelligence(AI) is the creation of intelligence by humans and the embedding of this intelligence into machines or technologies that have the purpose of enabling machines to perform tasks in a manner similar to humans. AI is created from the successful application of big data and machine learning technology to understand patterns from the past and project future conditions based on very large data.(Alghafiqi & Munajat, 2022). AI can make decisions by using data and analyzing what is available in the system. Then, so that the technology can be applied well, it must be equipped with knowledge to have the ability to reason. According to research conducted byLubis, (2021)To create an artificial intelligence application there are 2 main parts that are really needed:

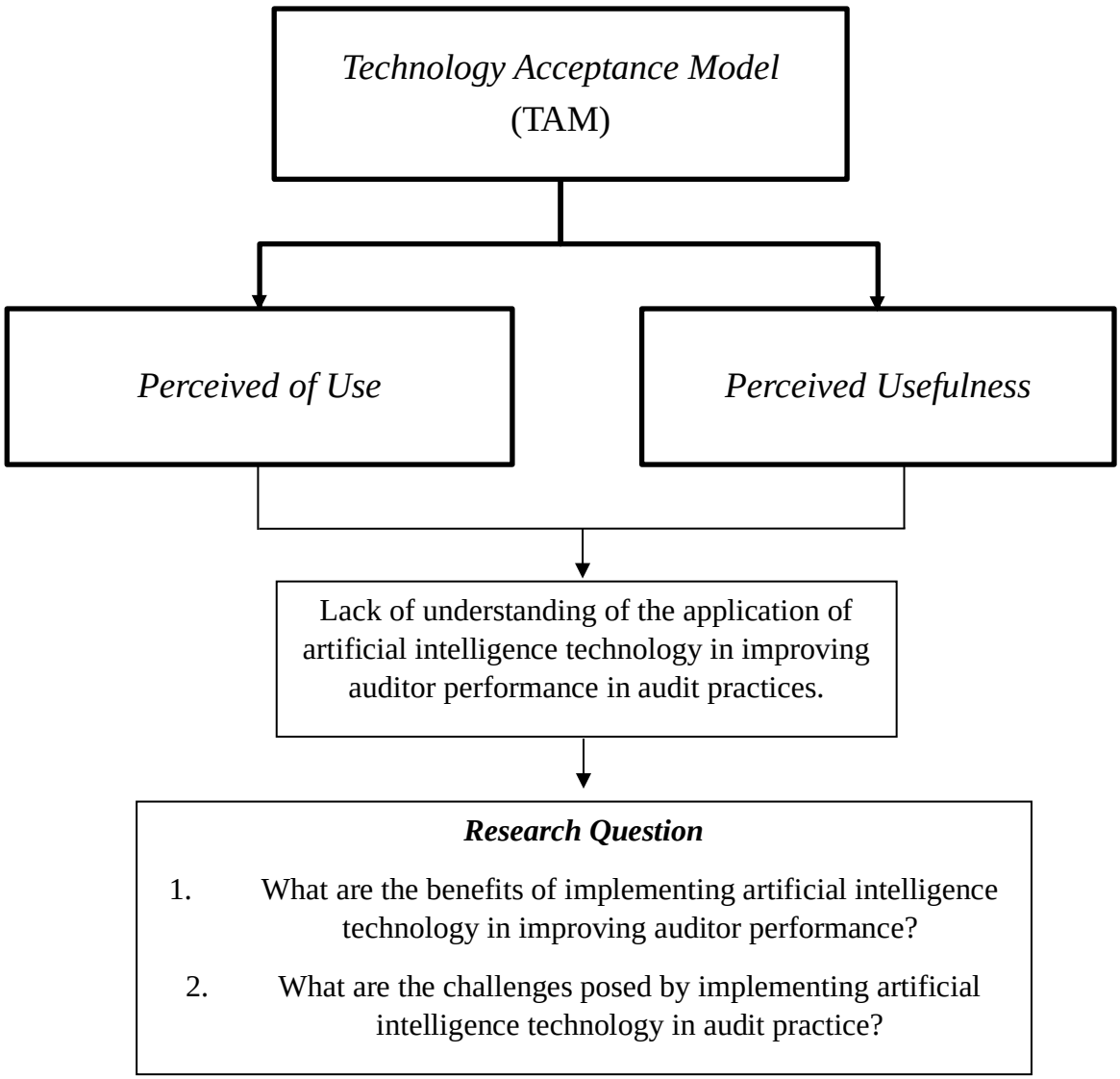
1. *Knowledge base*, namely facts, theories, knowledge, concepts and thoughts that are interconnected and used to support the process of understanding and solving problems.
1. *Inference engine*,namely the ability to draw conclusions using existing knowledge and previous experience, enabling the system to make decisions or provide recommendations.

Auditor Performance

Audit performance refers to the auditor's ability to complete audit tasks effectively and efficiently (Bonner & Lewis, 1990). Thus, auditors are expected to carry out the audit process with high quality and accuracy by paying attention to the optimal use of resources. Auditor performance is the auditor's work behavior in carrying out their duties to achieve good and objective results, which aim to determine whether or not the audited financial statements are in accordance with applicable accounting standards (Nasution & Nasution, 2022). Auditors not only need to work according to strict professional standards but also must have a keen sense of detail and analytical skills to identify risks accurately. Good audit results ultimately provide reliable and relevant information for stakeholders, supporting more informed decision-making in the organization.

Theoretical Framework

Figure 1. Theoretical Framework



RESEARCH METHODS

This study uses a qualitative approach with the Literature Review method. In qualitative research, more emphasis is placed on the analysis of deductive and inductive thinking processes and the analysis of the dynamics of the relationship between observed phenomena using scientific logic and qualitative research is also a natural research (state of nature), namely research conducted in natural subject conditions.(Alaslan et al., 2023). This study uses the Systematic Literature Review (SLR) method. SLR is the process of reviewing and analyzing existing publications on a particular topic and aims to identify gaps in the existing literature and inform future research. SLR means that research is a study of written documentary materials (Sujarweni, 2015) such as books, articles, journals, news and other types of literature related to the theme as the main object.

Literature Search Strategy

This study applies the PICO structure as a research framework referring toMawlidy et al., (2024).

Table 1. PICO Framework

PICO Tool	
Population	Analyzing Auditor Performance
Intervention	Use of Artificial Intelligence
Comparison	There is no comparison
Outcome	Auditor Performance

Source: Article analysis

Data Sources and Keywords

This study uses secondary data collection techniques by collecting reading sources that have gone through the process of searching, selecting, analyzing and presenting as data sources, in accordance with the research theme and to obtain information relevant to this literature study. The presentation of data in this study will be in the form of words that have been processed to be concise and systematic. Research data were obtained from SCOPUS via the HPOP (Harzing's Publish Or Perrish) application. The keywords used include: ("artificial intelligence" OR "Auditor Performance". These keywords are the basis for literature searches during the research process. Furthermore, publication data is downloaded in RIS format to be processed using the VOSviewer application. In this application, publication data is mapped and analyzed by applying filters based on year, author, title, and keywords.

Literature Criteria

The literature criteria include inclusion and exclusion criteria, which have been adapted to the previously established PICO framework, with the following additional adjustments:

Table 2. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Subject	Research focused on artificial intelligence technology	In addition to research that focuses on artificial intelligence
Language	English	No English language
Source	Research articles accessed through reputable and academically recognized journals	Research articles that are not accessible in reputable journals
Article Type	The role of artificial intelligence in improving audit performance	After conducting an in-depth analysis, the article turned out to be irrelevant to the main problem being researched.
Time period	2014-2024	2014-2024
Journal Content Theme	In the fields of management, business and accounting	Apart from the fields of management, business and accounting
Area	Research includes artificial intelligence technology and Performance Auditor.	In addition to research on technology, artificial intelligence and performance auditors.

Source: Article Analysis

RESULTS AND DISCUSSION

Research result

The initial search results produced a total of 200 Scopus indexed articles successfully collected through the Harzing's Publish Or Perrish application. Then all the data was compiled in the Mendeley application for the reference management process resulting in a total of 175 articles. Furthermore, after data management using data sources and keywords and using literature criteria, it resulted in 42 relevant articles covering the time period from 2014 to 2024. The following is a total publication data table for that time period.

Table 3. Total Data on Artificial Intelligence and Auditor Performance Article Publications

By Year Range

No	Year Range	Number of Publications
1	2024-2022	9
2	2021-2019	54
3	2018-2016	91
4	2015-2014	46

Source: Processed by Researchers, 2024

Scientific publications were obtained through Harzing's Publish or Perish software, then exported in RIS format to be processed and analyzed using the VOSviewer application. The following is the result of the visualization of article data generated through processing with VOSviewer.

*Co-Authorship*and Year of Publication

The results of the analysis based on VOSviewer visualization show that there are 18 research relationships that conduct joint research. Based on the distribution of data, related researchers produce publications with a wide distribution. Rozario, Velte, Beck, Asante-appiah and Zahid. are studies with research relationships in the field of artificial intelligence and auditor performance over the past five years.

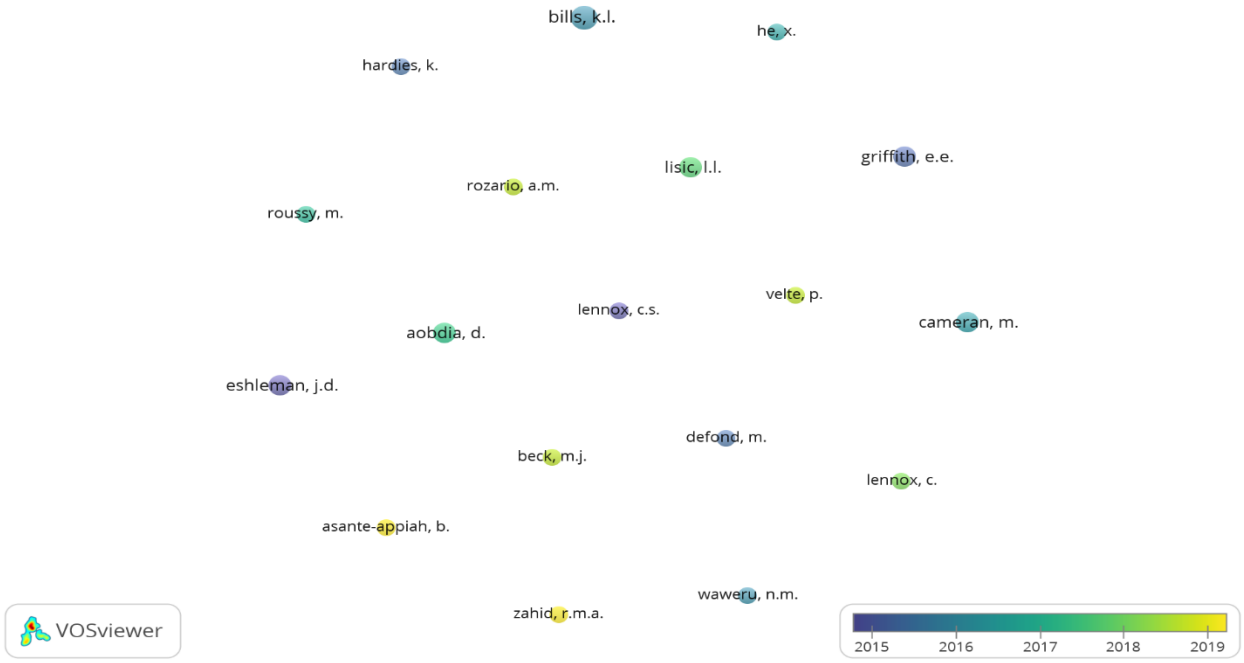


Figure 1. Co-Authorship

Source: Processed data, VOSviewer software

VOSviewer Visualization

Network Visualization

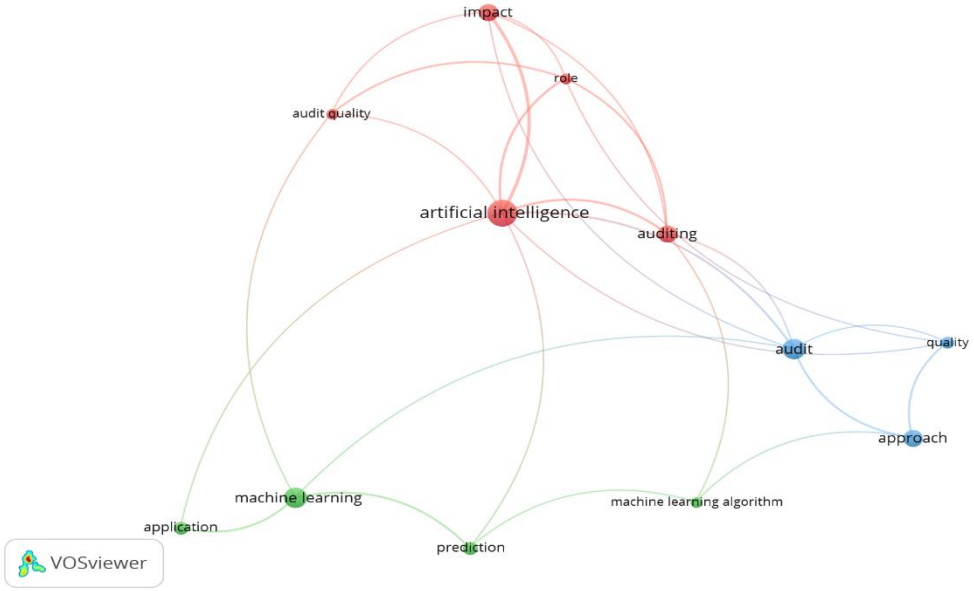


Figure 2. Network Visualization Map of Artificial Intelligence Development and *Performance Auditor*
Source: Processed data, VOSviewer software

Overlay Visualization

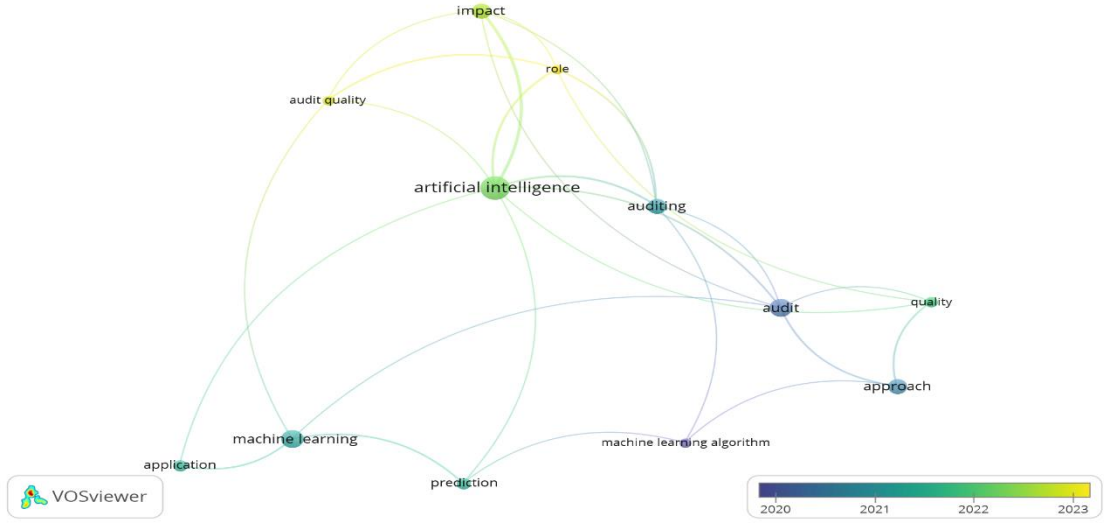


Figure 3. Overlay Visualization of Artificial Intelligence Development Map and *Performance Auditor*
Source: Processed data, VOSviewer software

Density Visualization

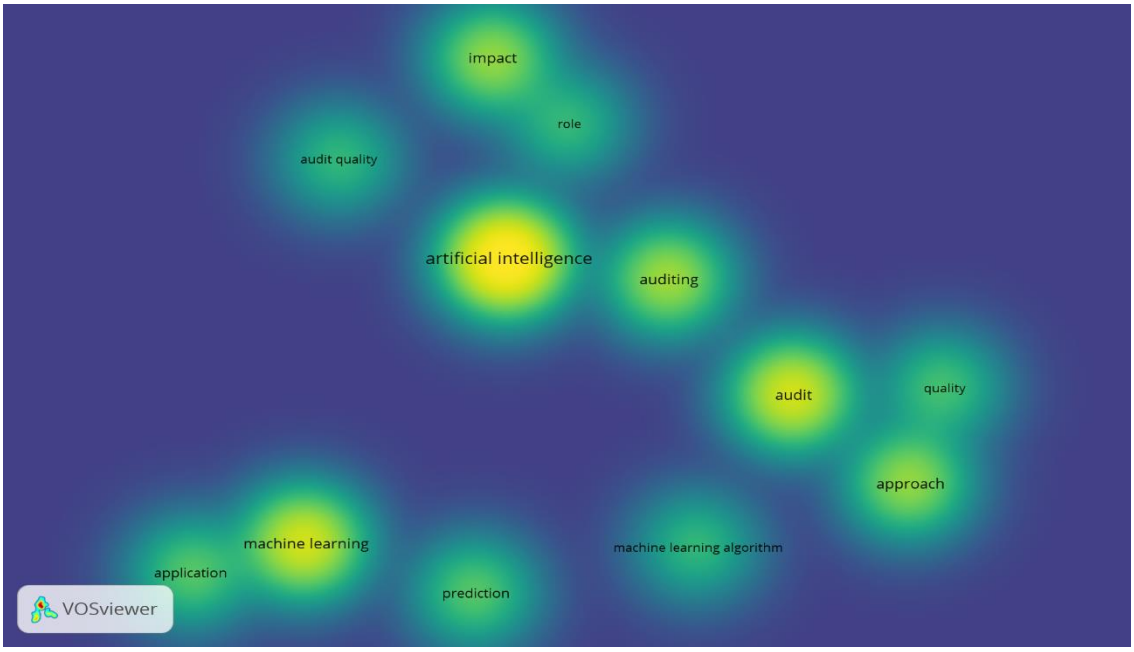


Figure 4. Density Visualization Map of Artificial Intelligence Development and *Performance Auditor*
Source: Processed data, VOSviewer software

SoftwareVOSviewer visualizes the relationship between research trends with the theme of artificial intelligence and auditor performance. The results of the application show that there are 3 main clusters and 12 research topics identified as follows:

a. Cluster 1, consists of 5 research items: audit quality, auditing, audit, impact and role.
b. Cluster 2, consists of 4 research items: application, prediction, audit and audit quality.
c. Cluster 3, consists of 3 research items: machine learning algorithm, audit, and quality.

Discussion

This study uses a systematic literature review that aims to review the ability of artificial intelligence technology to improve auditor performance in the audit process and this study also examines and documents the differences between various empirical studies that have been conducted previously.

Table 4. Benefits of Implementing Artificial Intelligence Technology in Improving Auditor Performance

No	Title	*Author*(s)	Research result

1	*The Effect of Technology Readiness on Adopting Artificial Intelligence in Accounting and Auditing in Vietnam*	(Anh et al., 2024)	The study shows that AI can automate the audit process, reduce repetitive work, and improve data analysis. This allows auditors to focus on more strategic and analytical tasks, thereby increasing the overall efficiency of the audit process.
2	*The Impact of Artificial Intelligence on Information Audit Usage: Evidence from Developing Countries*	(Almaqtari et al., 2024)	Research shows that there is a positive relationship between the intention to use information audit technology and its actual use, where the presence of AI strengthens this association.
3	*Both eyes open: Vigilant Incentives help auditors improve AI safety*	(Bova et al., 2024)	The application of AI is encouraging auditors to adopt new tools and approaches in auditing, which can improve the overall quality of the audit. This includes the use of predictive models and advanced analytics that can provide deeper insights into risk and compliance.
4	*The role of artificial intelligence in achieving auditing quality for small and medium enterprises in the Kingdom of Saudi Arabia*	(Musa & Lefkir, 2024)	The research findings show that accountants and external auditors in KSA believe that the use of AI can improve audit quality. Furthermore, it was found that there was no statistically significant difference in how accountants and auditors evaluated the 'contribution of AI to audit quality.
5	*Accounting and auditing with blockchain technology and artificial intelligence: A literature review*	(Han et al., 2023)	This research provides several advantages in the adoption of AI technology, namely efficiency, reducing transaction completion time, minimizing fraud and increasing regulatory efficiency.

Source: Article Analysis

Table 4provide results regarding research showing that AI technology has significant benefits in improving auditor performance. AI technology has the ability to be more effective

in detecting unsafe behavior or risks that may not be visible in traditional audits, this helps in detecting errors and non-compliance in financial statements and auditors act as supervisors to ensure that technology companies develop and implement AI systems safely(Anh et al., 2024;Bova et al., 2024). Meanwhile, research conducted byHan et al., (2023)discusses the combination of AI technology and accounting and auditing practices, there are four main themes that emerge from the research, namely, event approach to accounting, real-time accounting, triple entry accounting and continuous auditing. The application of AI provides benefits in improving auditor performance, because the use of AI enables a more efficient and reliable continuous audit process due to the traceable nature of transactions. Traditional audit methods are no longer sufficient in the digital era. Continuous auditing, powered by AI and blockchain, enables continuous automation of testing, risk analysis and anomaly detection.

Table 5. Challenges in Implementing Artificial Intelligence Technology in Audit Practice

No	Title	*Author*(s)	Research result
1	*Leveraging information communication technology (ICT) and artificial intelligence (AI) to enhance auditing practices*	(Thottoli, 2024)	The challenges of implementing AI in this study indicate that many auditors may not have sufficient knowledge of computer information systems and automated audit techniques. This can hinder their ability to plan, direct, and monitor work related to these systems.
2	*Artificial intelligence co-piloted auditing*	(Gu et al., 2024)	The system integration challenge of integrating AI systems into traditional audit procedures requires significant changes to infrastructure and the use of new applications, such as OpenAI's ChatGPT and Playground.
3	*Using Artificial Intelligence in ESG Assurance*	(Li et al., 2024)	This study shows that AI relies heavily on high-quality data. However, ESG data is often scattered, unstandardized, and can be biased, resulting in inaccurate assessments or unreliable conclusions.

4	*Adoption of artificial intelligence in banking services: an empirical analysis*	(Rahman et al., 2021)	The absence of regulatory requirements, data privacy and security, and the lack of relevant skills and IT infrastructure are significant challenges in AI adoption.
5	*Auditors' Perception on the Impact of Artificial Intelligence on Professional Skepticism and Judgment in Oman*	(Puthukulam et al., 2021)	This study reveals various challenges in the application of AI, especially in one of its sub-technologies, namely machine learning. In the context of a fully digitalized audit using machine learning, the technology does not pay attention to data from an ethical perspective or data validation processes.

Source: Article Analysis

Although the application of artificial intelligence (AI) technology provides significant benefits in the audit process, various studies have shown that this technology also presents complex challenges and risks that cannot be ignored. AI challenges include cyber attacks, the spread of biased information, intellectual property infringement, and ethical and legal issues related to privacy and transparency. Many auditors have difficulty in using AI algorithms, so new capabilities are needed to optimize their use (Rahman et al., 2021; Puthukulam et al., 2021). In addition, research conducted by(Thottoli, 2024)shows that uncertainty in the audit process is a challenge in the use of AI can create uncertainty in audit procedures, especially related to the "black box" of AI, where the decision-making process is not always transparent. This can raise concerns about audit quality and the necessary controls. In addition, the application of AI can trigger concerns about audit quality and create uncertainty in procedures that require tight controls. This situation emphasizes the importance of developing new methodologies and more adaptive audit frameworks to ensure that the application of AI can support audits without reducing their reliability and accountability.

CONCLUSION

Research on the ability of AI technology to improve auditor performance has become a topic of interest for researchers and has experienced rapid development compared to previous literature. Research trends related to AI capabilities show variations influenced by changes in time and various factors that influence it. The results of the study indicate that the benefits of implementing AI in audit practice are to improve auditor performance through automation of

repetitive tasks, reduction of transaction time, anomaly detection, and strengthening data-based decision making. Challenges in implementing AI include the lack of ethical and regulatory issues, auditor knowledge of AI technology, dependence on high-quality data, and limitations of adequate information technology infrastructure. Bibliometric research related to AI in improving auditor performance can contribute to mapping research trends as well as identifying areas that are still rarely studied. Auditors need to develop new competencies, including understanding technology and the application of data analytics and opening up opportunities for further development in technological fields in the application of audit practices.

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