Enhancing Audit Evidence Quality through Artificial Intelligence in Saudi Arabia

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Abstract:

The study aims to explore how cloud artificial intelligence (AI) technologies can impact the quality of audit evidence in Saudi Arabian. A survey was conducted on nine joint stock companies listed in the Saudi Arabian Stock Exchange (Tadawul), focusing on those in the telecommunication services and software services sectors with strong infrastructure in cloud AI. Results revealed a lack of alignment between auditing standards and AI technologies, hindering the improvement of audit evidence quality. However, there was a significant correlation between the proposed use of cloud AI technologies and enhancing audit evidence quality. To address this, the study recommends the adoption of cloud AI techniques such as visual recognition, text analysis, and natural language processing in auditing practices. It also suggests the development of standards compatible with cloud AI and fostering collaboration between professional bodies to ensure better audit evidence quality.

Keywords: Cloud Artificial Intelligence, Audit Evidence, Saudi Arabia.

1. Introduction

In the last two decades, there has been a significant evolution in technology and its applications within the business world. This transformation has impacted various industries and professionals, including auditors who play a crucial role in providing essential information to decision-makers. As a result, it has become necessary for individuals in these sectors to develop new skills and expertise to effectively utilize these technological advancements. Furthermore, this technological shift has led to the emergence of new economic and societal trends that support the adoption of advanced technology. This allows for its proper utilization in a way that benefits both companies and society as a whole, ultimately driving development and prosperity (Ping, 2021).

Related information technology (IT) services such as cloud artificial intelligence are transforming the economy from its traditional form to the digital economy in a fast way. According to the Global Deloitte expectations, a staggering 87% of companies are capitalizing on the power of cloud artificial intelligence. Among them, 70% are leveraging cloud AI services through applications, while 65% are taking the plunge and creating their own innovative applications. These technological advancements are driving a wave of digital transformation across industries, prompting a widespread reassessment of traditional business practices in organizations worldwide. The dawn of this new era heralds a shift towards cutting-edge solutions and strategies that are revolutionizing the way businesses operate and compete in the modern landscape (Deloitte, 2020).

The advancement of cloud artificial intelligence technology marks a significant step forward in human progress. With the rapid development of Internet of Things devices and sophisticated AI technologies, auditors are witnessing a transformation in their traditional work methods. Cloud artificial intelligence is revolutionizing the auditing process and boosting productivity by an impressive 40%. with its unparalleled analytical capabilities and long-term efficiency, artificial intelligence is poised to bring about a revolutionary change in auditing. By delivering precise analyses and swift calculations, this technology streamlines the auditing process, empowering auditors to enhance their performance levels. Moreover, AI simplifies data management, storage, retrieval, and analysis, breaking free from the confines of time and location constraints (Li, 2020).

The growing significance of cloud artificial intelligence in audit procedures is reshaping and revolutionizing the auditing landscape. By offering innovative methods and tools, AI is not only modernizing the audit process but also transforming the role of auditors. Auditors are now leveraging modern devices and techniques to gather audit evidence, analyze data, and interpret findings. This shift is enhancing the quality of audit reports and paving the way for a more efficient and effective auditing process.

1.1. Research Questions

The ever-changing landscape of technology has presented auditors and regulatory bodies with a plethora of new challenges that require them to enhance their skills and adapt to keep up with the advancements in the business realm. Outdated audit standards,

tools, and methods are no longer effective in meeting the diverse needs of various stakeholders in the face of these profound technological changes.

The integration of cloud artificial intelligence has rapidly become a crucial component in managing and analyzing vast amounts of data. Predictions indicate that this technology will generate over a billion dollars in revenue annually by 2025. Its advanced analytical tools provide numerous benefits, enabling efficient storage, retrieval, review, and processing of data. Currently, a staggering 91% of companies have adopted cloud artificial intelligence solutions, leveraging its automated capabilities to streamline operations and enhance productivity. This technology is particularly valuable in performing tasks that demand precision and accuracy, such as audit processes. Utilizing cloud artificial intelligence not only enhances data analysis but also facilitates human intelligence, enabling individuals to focus on high-level tasks that require strategic thinking. Embracing this innovative technology is essential for organizations aiming to maximize efficiency and effectiveness in their operations (Deloitte, 2021).

In today's fast-paced world, technological advancements present both opportunities and challenges for various industries. One industry that is particularly affected is external audit, which plays a vital role in ensuring financial transparency and accountability. However, the rapid changes in technology, including cloud artificial intelligence, pose challenges for external auditors. As financial, economic, and legal landscapes evolve, external auditors must adapt to these changes while also incorporating new technologies into their processes. Cloud artificial intelligence, in particular, has the ability to access a wide range of data from different departments and branches of a company, making the audit process more complex. To address these challenges, auditors and standard setters must work together to develop plans, procedures, and standards that align with technological developments. This will not only improve the quality of audit evidence but also ensure that external audit functions remain effective in an increasingly digital world. Overall, while technology may present challenges for external audit, it also provides an opportunity for auditors to enhance their practices and add value to their clients. By embracing technological advancements and updating their processes accordingly, external auditors can continue to thrive in a changing business environment.

The study's challenge lies in the discrepancy between the needs of the contemporary business world and the expertise of auditors, along with insufficiencies in current audit standards for cloud-based artificial intelligence systems. This gap could potentially compromise audit quality, making it difficult to predict the necessary time for completion. The divergence in international standards due to varying country agendas further complicates matters, as standards must continuously evolve to meet emerging needs. Auditors must upgrade their skills to adapt to rapid technological advancements in both global and local business landscapes, utilizing technological tools to their advantage. Urgent revisions to international and Saudi auditing standards are necessary to align with technological progress, particularly in cloud artificial intelligence. The study addresses these challenges through the following research questions:

- What are the technologies of cloud artificial intelligence? What is the relationship of artificial intelligence to the external audit of financial statements?
- What is the relationship between auditing standards towards the cloud artificial intelligence technologies? What are the potential problems of applying auditing standards while using artificial intelligence technologies?
- What are the reasons of incompatibility between auditing standards in addressing cloud artificial intelligence technologies?
- What is the proposed role of cloud artificial intelligence technologies in improving the quality of audit evidence in Saudi Arabia?
- What are the practical obstacles of adopting AI?

1.2. Research Importance

The current study derives its importance from the importance of the research issues it addresses, therefore, its importance can be crystallized in two basic dimensions as follows:

The first dimension: scientific importance:

- In the Saudi educational landscape, there is a noticeable lack of research focusing on how cloud artificial intelligence technologies can enhance the quality of audit evidence, particularly within the context of auditing standards in the region. This scarcity highlights a critical gap in understanding the potential impact of these technologies on the audit process in Saudi Arabia.
- The integration of cloud artificial intelligence technologies in the auditing field has the potential to revolutionize the way audits are conducted and improve the quality of audit evidence. However, without proper research and studies addressing this specific topic within the Saudi environment, auditors may not fully grasp the benefits and challenges associated with adopting these technologies.
- Companies around the world are increasingly relying on cloud-based artificial intelligence technologies in the process of making decisions and building strategies. Hence, the importance of research becomes clear in knowing the impact of these technologies on audit evidence in general and knowing the extent of compatibility between them and current audit standards, as it is a professional approach that can be developed. And modify it so that it can be relied upon in light of the expansion of information technology.
- In today's global business landscape, organizations are turning to cloud-based artificial intelligence tools to drive decision-making and shape strategic plans. The significance of conducting research to understand the implications of these technologies on audit evidence cannot be overstated. It is imperative to assess the level of harmonization between these advanced technologies and existing audit standards, ushering in a new era of professional development. This research is crucial in light of the rapid advancement of information technology, ensuring that audit practices remain reliable and effective in the digital age.
- In order to enhance the quality of audit evidence, companies and audit offices are embracing cutting-edge cloud artificial intelligence techniques. This strategic move aims to align with the advancements of the digital era,

establishing robust scientific frameworks and controls. By harnessing the power of AI, organizations are revolutionizing their audit processes, ensuring accuracy and efficiency in their operations. This innovative approach not only enhances the reliability of audit evidence but also enables companies to stay ahead in a rapidly evolving technological landscape.

Therefore, there is an urgent need for increased Saudi studies that delve into the intersection of cloud artificial intelligence technologies and audit quality in Saudi Arabia. By addressing this gap in research, auditors and policymakers can better understand how to leverage these technologies effectively to enhance audit practices and ultimately improve the standards of auditing in the region.

The second dimension: practical importance:

- In the Saudi educational landscape, there is a noticeable lack of research focusing on how cloud artificial intelligence technologies can enhance the quality of audit evidence, particularly within the context of auditing standards in the region. This scarcity highlights a critical gap in understanding the potential impact of these technologies on the audit process in Saudi Arabia
- In the quest for improved efficiency and effectiveness, audit companies are turning to cloud artificial intelligence technologies to enhance the quality of their audit processes and the evidence they produce. By leveraging these advanced technologies, audit firms can maximize their benefits and achieve a higher level of accuracy and reliability in their findings. The integration of cloud AI technologies not only streamlines the auditing process but also ensures the quality of audit evidence is enhanced, leading to more informed decision-making and better outcomes for the companies being audited. This innovative approach is revolutionizing the way audits are conducted, setting a new standard for excellence in the industry.
- The Saudi government's dedication to the Sustainable Development Plan (Saudi Arabian Vision 2030) has sparked a growing interest in cloud artificial intelligence technologies. This fascination is not only motivated by international organizations and professional bodies but also by the vast potential of AI to transform various sectors.
- As Saudi Arabia delves deeper into cloud AI, it is evident that the technology's impact transcends borders. With an increase in international initiatives and groundbreaking experiences from other nations, the Kingdom is motivated to not only adopt cloud AI but to lead the way in innovative solutions that drive sustainable development.
- Shifting the focus of companies towards recognizing the significance of utilizing cloud artificial intelligence technologies to enhance the quality of audit evidence is imperative. It is crucial for regulatory and professional bodies to provide necessary support in this area to ensure successful implementation.

This research delves into the tangible impact of cutting-edge cloud artificial intelligence technologies on enhancing the reliability of audit evidence within the realm of the Saudi Stock Exchange, Tadawul. By aligning with stringent audit standards, these innovations play a pivotal role in bolstering the quality of audit reports, ultimately refining the decision-making processes of stakeholders who rely on these reports.

1.3. Hypotheses

- First Hypothesis (H1): There is no significant difference between the opinions of the study sample regarding the reasons for the incompatibility between auditing standards and cloud artificial intelligence technologies. In contrast with numerous research that have found a positive impact of artificial intelligence on collecting audit evidence (Yin, 2020; Markina et al., 2021; Lee and Tajudeen, 2020; Wadesango et al. 2021).

- Second Hypothesis (H2): There is no significant difference between the opinions of the study sample regarding the problems of applying current auditing standards in addressing cloud artificial intelligence technologies. Most of the literature were limited (zhou, 2021; Albawwat and Frijat, 2021; Gultom et al., 2021) to measure the impact of artificial intelligence on the quality of the audit and the nature of the audit process, and not cloud artificial intelligence or audit evidence, which is what distinguishes the current study.

- Third Hypothesis (H3): There is a statistically significant relationship between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in the Kingdom of Saudi Arabia. Although some studies agree (Gao and Han, 2020; Yaping, 2021; Muñoz et al., 2019; Alaba and Ghanoum, 2020; Wadesango et al., 2021) artificial intelligence and cloud computing will have an impact on changing the role of external auditors, it has shown that benefiting from artificial intelligence and cloud computing in the field of external audit is still limited due to the absence of auditing standards that regulate the auditor's professional work. Moreover, these studies have not provided an integrated analysis of the extent of compatibility between auditing standards and cloud artificial intelligence technologies and their impact on improving the quality of evidence of the auditing process in the Kingdom of Saudi Arabia.

- Forth Hypothesis (H4): There is no significant difference between the opinions of the study sample regarding the obstacles to activating the proposed role of cloud artificial intelligence technologies in improving the quality of audit evidence in the Kingdom of Saudi Arabia. Previous esearch findings from Gao and Han (2020) and Munoko et al. (2020) have concurred that artificial intelligence has a significant impact on improving the quality of the audit process. Nevertheless, the crucial aspect of the compatibility between audit standards and cloud artificial intelligence remains unexplored in the realm of enhancing evidence quality in audits.

1.4. Research Gab

Through reviewing previous studies, the researcher found the following:

1. Some studies (Henry and Rafique, 2022; and Fritz, 2022) have highlighted the pressing necessity for auditors to be trained in cutting-edge technological methods and for the audit process to undergo a transformation that enables the seamless integration of artificial intelligence. This marks a pivotal moment in the auditing industry, where traditional practices must evolve to keep pace with the advancements in technology.

2. Numerous research endeavors have focused on delving into the effects of artificial intelligence on auditing quality, fees, and ethics (De Andrés, 2021; Xing et al., 2020; Munoko et al., 2020).

3. Some studies have found a positive impact of artificial intelligence on collecting audit evidence (Yin, 2020; Markina et al., 2021; Lee and Tajudeen, 2020; Wadesango et al. 2021).

4. Some studies have confirmed (Lee and Tajudeen, 2020; Yaping, 2021; Mookerjee, 2021) the role of cloud computing in enabling auditors to correctly assess risks, which enhances the application of the necessary mechanisms to confront them. It also helps support the operational activities of establishments and allows commercial banks to integrate banking and electronic commerce applications (EC).

5. Some studies were limited (zhou, 2021; Albawwat and Frijat, 2021; Gultom et al., 2021) to measure the impact of artificial intelligence on the quality of the audit and the nature of the audit process, and not cloud artificial intelligence or audit evidence, which is what distinguishes the current study.

6. Although some studies agree (Gao and Han, 2020; Yaping, 2021; Muñoz et al., 2019; Alaba and Ghanoum, 2020; Wadesango et al., 2021) artificial intelligence and cloud computing will have an impact on changing the role of external auditors, it has shown that benefiting from artificial intelligence and cloud computing in the field of external audit is still limited due to the absence of auditing standards that regulate the auditor's professional work. Moreover, these studies have not provided an integrated analysis of the extent of compatibility between auditing standards and cloud artificial intelligence technologies and their impact on improving the quality of evidence of the auditing process in the Kingdom of Saudi Arabia.

7. Abovementioned research suggests that the integration of artificial intelligence and cloud computing could potentially revolutionize the role of external auditors. However, the adoption of these technologies in the field of external audit in Saudi Arabia is hindered by the lack of specific auditing standards to govern the professional conduct of auditors. Furthermore, there is a notable gap in existing studies that fail to provide a comprehensive analysis of how auditing standards align with the innovative technologies of artificial intelligence and cloud computing. This raises questions about the potential impact on enhancing the quality of evidence in the auditing process within the Kingdom of Saudi Arabia.

8. As the landscape of auditing continues to evolve, it is evident that there is a need for further exploration of how these emerging technologies can be integrated effectively within the existing regulatory framework. The intersection of auditing standards, artificial intelligence, and cloud computing presents a unique opportunity for auditors in Saudi Arabia to enhance their practices and deliver higher quality audit services.

9. Research findings from Gao and Han (2020) and Munoko et al. (2020) have concurred that artificial intelligence has a significant impact on improving the quality of the audit process. Nevertheless, the crucial aspect of the compatibility between audit standards and cloud artificial intelligence remains unexplored in the realm of enhancing evidence quality in audits.

10. In this study, the author aims to explore the correlation between auditing standards and cloud artificial intelligence to elevate the standard of audit evidence in Saudi Arabia. This research will focus on conducting a field study within the realm of the telecommunication services and software services sectors, and other sectors utilizing cloud artificial intelligence technologies. This investigation will shed light on the potential impact of integrating these

technologies into the auditing process within joint stock companies, ultimately improving the quality of audit evidence in the region.

2. Literature Review

Yoon (2017) explored the potential of using big data as a crucial component of integrated audit evidence. The study delves into the application of big data in alignment with audit evidence standards, highlighting the benefits of analyzing adequacy and reliability, as well as addressing suitability considerations and critical challenges. It was found that big data holds significant promise in enhancing the audit process by offering complementary evidence to traditional sources. However, in order to fully leverage its potential, issues such as integration with traditional audit evidence, information transfer and transmission, and safeguarding privacy must be carefully considered and managed. Ultimately, the study concluded that big data will play a vital role in the audit review, providing valuable insights when paired with appropriate and well-documented information. This sheds light on the evolving landscape of audit practices and the increasing importance of incorporating big data into the audit process.

The findings of the Yin (2020) research delved into the differences and similarities in audit evidence and collection techniques between China and the United States. It was discovered through thorough analysis that both countries share similar concepts regarding audit evidence, yet have disparate approaches to categorizing it. Furthermore, while modern collection techniques are prevalent in both nations, China stands out for its emphasis on technological methods. In China, collection serves as both a means of supervision and observation, whereas in the United States, re-performance is highlighted as a primary collection technique. Exploring the integration of artificial intelligence technologies in review processes, a study by Alaba and Ghanoum (2020) focused on measuring the effectiveness of utilizing AI to improve the quality of auditing. The research found that artificial intelligence positively impacts the review process across all its stages, ultimately enhancing its overall efficacy. Similarly, Lee and Tajudeen (2020) delved into the impact of artificial intelligence on accounting practices in Malaysian organizations. They discovered various levels of adoption of AI-based accounting software in these organizations, with the technology being utilized to store and analyze audio information, automate invoice approvals, manage risks, monitor user activities, and enhance process governance. This integration has resulted in increased productivity, efficiency, customer service support, and process governance within these organizations.

In recent studies conducted by Xing et al. (2020) and Wang et al. (2020), new insights were uncovered regarding the risks associated with traditional audit processes. The study suggested that implementing artificial intelligence in audits could significantly enhance the speed and effectiveness of the review process. The research recommended the development of an internal audit system that incorporates advanced artificial intelligence techniques and block chains. Through extensive simulations and validation, the proposed system demonstrated the potential to greatly improve the overall efficiency of audits. This groundbreaking approach not only streamlines the audit process but also opens up new possibilities for innovation in the field. By harnessing the power of artificial intelligence, auditors can now revolutionize their practices and stay ahead of the curve in an ever-evolving industry.

In the recent research conducted by Gao and Han (2021), it was highlighted that auditors need to adopt independent assurance methods to maximize the efficiency of leveraging artificial intelligence technologies during audits. It was emphasized that audit proposals must be aligned with the audit objectives, while sourcing audit evidence from diverse and independent sources like expert opinions. This calls for a novel strategy to elevate audit quality and ensure the reliability of financial reporting in the digital age. Munoko et al. (2020) shed light on the necessity for auditing firms to be transparent about their utilization of artificial intelligence in various auditing and consulting activities. The benefits of incorporating artificial intelligence in these functions are undeniable, ranging from time-saving capabilities to quicker data analysis, heightened accuracy levels, and even enhanced customer service through deeper insights into business processes. However, as the researcher delved deeper into the subject, he couldn't ignore the ethical implications that come hand in hand with the implementation of artificial intelligence in auditing practices. The very nature and functions of artificial intelligence raise several moral dilemmas that cannot be overlooked. Muñoz et al. (2019) highlighted the importance of audit data in predicting bankruptcy. Through the utilization of three artificial intelligence techniques - the par and support vector algorithm, random forest algorithm, and machine learning, the study showed that the predictive ability of extracted information was significantly faster than traditional methods. This allowed for the early detection of financial instability with a high degree of accuracy. Furthermore, the study identified that the auditor's opinion and the sections on accountability disclosed in the auditor's report were crucial variables in distinguishing between bankrupt and non-bankrupt companies. The number of comments included in these sections and the description paragraphs also played a significant role in predicting bankruptcy. Ultimately, this research emphasized the critical role that audit data and artificial intelligence techniques play in forecasting financial distress.

Albawwat and Frijat (2021) delved into the concerns raised by audit companies and offices regarding the integration of artificial intelligence techniques in their audit processes. The study, which involved 124 auditors from various companies and local audit offices in Jordan, explored different aspects such as the practical application of AI, the potential advantages it brings, and its impact on overall audit quality. One of the key findings of the study was that audit firms found assistive AI systems to be more user-friendly compared to standalone AI systems. Furthermore, the research highlighted that the effectiveness of audit quality greatly depended on the type of AI system being employed - whether it be enhanced, assisted, or independent. Overall, the study shed light on the benefits and challenges of incorporating artificial intelligence in audit operations, providing valuable insights for audit professionals looking to leverage AI technology for improved efficiency and quality in their practices.

Zhang (2021) suggested that the integration of artificial intelligence in accounting and auditing practices is set to significantly transform the landscape of auditor responsibilities. As technology continues to advance, the traditional tasks performed by auditors will be revolutionized, demanding a new set of capabilities and expertise to ensure optimal efficiency and precision in their job performance. Markina et al. (2021) introduced a groundbreaking methodology for assessing the relative significance of evidence within review programs. By combining expert evaluations with advanced statistical techniques, this innovative approach offers a practical solution for enhancing the efficiency and effectiveness of the review process. This method empowers decision-

makers to prioritize and manage evidence more effectively, ultimately leading to more informed and impactful review outcomes.

In a recent exploration of the potential benefits of blending artificial intelligence with auditing practices, Zhou (2021) highlighted the hurdles obstructing the progress of the audit sector. The study emphasized the importance of leveraging AI technology to elevate the performance and productivity of audit procedures, offering insightful recommendations for bolstering the industry's long-term growth. Central to their findings was the call to refine audit protocols and empower auditors with enhanced professionalism, ultimately amplifying the quality and effectiveness of auditing processes. Kahyaoglu and Aksoy (2021) attention was drawn towards the intricate balance between challenges and possibilities confronting auditing and risk assessment in light of the pervasive influence of digitization and artificial intelligence in today's ever-changing digital business domain. The study dives deep into the repercussions of the rapidly evolving technological landscape, shedding light on the complexities and nuances that arise as a result of these advancements. By unraveling the intricate web of implications brought about by digital transformation, this research provides valuable insights into how auditing and risk assessment can adapt and thrive in the midst of technological disruptions. Fukas et al. (2021) introduced an innovative framework aimed at harnessing artificial intelligence within the realm of audits. This groundbreaking model entails eight distinctive dimensions and five progressive stages for the integration of AI, empowering audit firms to evolve into AI-driven establishments. By offering insightful strategies and tools, this model paves the way for the seamless incorporation of artificial intelligence into audit processes, enhancing their functionality beyond their current capacities.

Yaping (2021) delves into the challenges plaguing the auditing profession, offering innovative solutions to propel its development forward. The study suggests leveraging big data technology through cloud computing, revolutionizing traditional auditing methods, and prioritizing the enhancement of human competencies. Additionally, the incorporation of expert consultants is recommended to elevate the quality of auditing practices. However, with the growing prevalence of Artificial Intelligence in auditing processes, new risks and obstacles are on the horizon, necessitating a proactive approach to address these challenges. Henry and Rafique (2021) found that artificial intelligence technologies are significantly reshaping the landscape of the auditing profession. By conducting a series of in-depth interviews with 100 seasoned auditors, the study highlighted the pressing necessity for providing auditors with comprehensive training on cutting-edge technological tools. Moreover, it underscored the indispensable importance of advancing auditing standards to seamlessly integrate artificial intelligence into auditing practices for optimal efficiency and effectiveness.

In a groundbreaking study conducted by Mookerjee (2021), it was found that robotic process automation (RPA) has the potential to revolutionize the roles of accountants and auditors. This study, which analyzed data from 120 companies in the United States, revealed that RPA could effectively replace traditional accounting practices and auditing tasks. The implications of this research are significant, as it suggests a fundamental shift in the accounting and auditing profession. While RPA may eliminate certain jobs, it also creates new opportunities for accountants and auditors to adapt and specialize in other areas of their field. With the rise of RPA, the accounting industry is poised for innovation and transformation. As technology continues to advance, it will

be crucial for professionals in this field to embrace change and develop new skills to stay competitive in the evolving landscape of accounting and auditing. Commerford et al. (2022) highlighted the benefits of employing artificial intelligence methods in auditing. The study revealed that these techniques aid auditors in performing challenging tasks, particularly in evaluating intricate estimates. Furthermore, the use of AI improves the overall quality of audits by minimizing subjective assessments and reducing costs for audit firms.

De Andrés (2021) explored the influence of smart contracts on the realm of external auditing. The study unveiled that smart contracts serve as a form of crucial evidence for auditors when scrutinizing accounting records, supplementing traditional written contracts. Furthermore, it highlighted the potential of external auditors leveraging smart contracts to execute audit processes automatically, thereby streamlining the generation of immediate reports and granting stakeholders swift access to audit outcomes. The implications of smart contracts extend beyond external auditing, impacting internal auditing practices significantly. The emergence of smart contracts has prompted the formulation of novel regulatory protocols within organizations, necessitating an additional layer of scrutiny to ascertain the presence of robust internal controls and mitigate emerging threats concerning privacy and security risks. Leveraging blockchain technology, smart contracts have the capability to automate internal control evaluations and enforce stringent security measures, thereby diminishing the need for repetitive periodic assessments.

Research conducted by Abdulameer et al. (2022) found that the utilization of artificial intelligence methods significantly enhances auditor efficiency within companies listed on the Jakarta Stock Exchange. By distributing 122 questionnaires, the study revealed a positive correlation between the implementation of AI techniques and increased customer satisfaction among these organizations. Fritz (2022) investigated the significance of incorporating information technology within businesses and its influence on the calculation of external auditor fees was examined. Focusing on a cohort of American companies operating in the information technology sector from 2004 to 2014, the study unveiled a compelling relationship between technological prowess and auditor fee determination. Findings indicate that firms with advanced IT capabilities experience an uptick in auditor work fees compared to their counterparts lacking such technological acumen. Koshiyama et al. (2022) revealed the significant influence of artificial intelligence technologies on accounting procedures and practices. Not only has AI revolutionized the way audits are conducted, but it has also played a pivotal role in transforming the accounting profession as a whole. This technological advancement has not only reshaped the required skill set for accountants but has also altered the essential functions within the industry, paving the way for a more efficient and accurate financial landscape.

Rajagukguk et al. (2024) investigated the impact of social distancing measures on the quality of audit evidence in public accounting firms in DKI Jakarta Results showed positive correlations, highlighting the importance of integrating Artificial Intelligence for enhancing audit staff capabilities and the significant contribution of experienced auditors to audit evidence quality. While professional skepticism plays a role in audit team performance, its effect on audit evidence quality warrants further investigation.

3. Methodology

This study utilizes a combination of inductive and deductive approaches to investigate the compatibility between computational thought and cloud artificial intelligence techniques within the realm of Saudi auditing standards. The inductive approach involves an extensive review and analysis of relevant literature on computational thought, aiming to identify key findings and recommendations that can inform the development of a theoretical framework. On the other hand, the deductive approach focuses on exploring the impact of cloud AI techniques on enhancing the quality of audit evidence in the context of Saudi auditing standards.

Data from survey responses collected from accountants, internal auditors, and auditors in legal audit offices of joint-stock companies is analyzed using statistical methods within the Statistical Program Group for the Social Sciences (SPSS). By applying these methods to the gathered data, conclusions are drawn regarding the potential implications of implementing cloud AI techniques in audit practices within the Saudi business environment. The results are then interpreted to assess their generalizability and practical significance in actual auditing scenarios.

This research focuses on joint-stock companies in Saudi Arabia's telecommunication services and software services sector as the study population for the following reasons:

- The researcher chose joint stock companies registered on the Saudi Stock Exchange as a study population that deal with cloud artificial intelligence technologies, and excluded the application to companies not listed on the stock exchange.
- Choosing companies listed on the stock exchange ensures the experience and competence of the workers in these companies in the field of cloud artificial intelligence technologies, and then their opinions on the research topic and the survey questions can be relied upon.
- The efficiency of accountants and financial management in these companies, the professionalism of their audit firms, and the experience of the managers and employees in these companies.

Therefore, companies in telecommunication services and software services sectors were chosen to become the study population. Delving into the realm of technological advancements, the research community showcases (9) enterprises at the forefront of innovation with their cutting-edge artificial intelligence technology and cloud storage infrastructure. The study included all companies in the telecommunication services and software services sectors listed in Tadawul which are: the Saudi Telecom Company (STC), Etihad Etisalat (Mobily), Zain KSA, Etihad Atheeb Telecommunication company (GO), Al Moammar Information Systems company (MIS), the Arab Sea Information System company (Arab Sea), the Arabian Internet and Communications Services company (Solutions), Elm company (ELM), and Perfect Presentation for Commercial Services company (2P).

3.1. Sample

Within this research, a diverse group of professionals within joint-stock companies, including accountants and internal auditors, as well as auditors from audit offices tasked with reviewing financial statements, were selected as the study sample. Due to the

challenges in accurately estimating the total population of these categories, the researcher opted for a random selection method. This approach considered the expertise, competencies, and ability to comprehend survey inquiries when selecting participants from each category.

In selecting a representative sample of accountants and internal auditors within joint-stock companies, the focus was placed on individuals well-versed in cloud artificial intelligence methods, possessors of relevant professional certifications, and members of information systems departments. The study utilized a judgmental approach, comprising a group of (90) individuals that were identified as fitting the criteria - with (10) participants selected from each company for a comprehensive analysis. In exploring external auditors within audit firms, the researcher honed in on individuals who exhibited expertise and a deep understanding of the research's objectives and survey inquiries. The focus was on how these auditors approached their tasks with seriousness and genuine interest. A selective sample of (45) auditors was chosen based on judgment criteria, with each office subject to a thorough review of (10) specific items conducted by the researcher.

Upon selecting the primary sample for each study group, the researcher dispersed 135 surveys using a variety of methods including face-to-face interviews, physical delivery, email correspondence, and creating a digital survey model through Google Forms. The researcher sorted the retrieved questionnaires to determine the response rate by study categories, and the suitability of these forms to subject them to statistical analysis and extract statistical results. The researcher can explain this through the following table:

Table 1: Responses

Sample	N	Returned Survey		Incomplete or Inappropriate		Completed & Suitable for Statistical Analysis	
		#	%	#	%	#	%
Accountants & Internal Auditors	90	82	91	7	8	75	83
External Auditors	45	39	87	4	10	35	78
TOTAL	135	121	90	11	9	110	81

3.2. Questionnaire

In order to gather comprehensive data, the researcher developed a customized questionnaire that encompassed various elements. Initially, the survey incorporated personal demographic information to establish a clear understanding of the participant's background and expertise. Additionally, the questionnaire featured a series of carefully crafted inquiries, each graded on a five-point Likert scale to streamline the response process. By employing this tailored approach, the researcher aimed to efficiently collect detailed and insightful data from the participants. To better understand the perceptions and opinions of respondents, the researcher strategically divided the survey list into

four distinct sections. The first section delves into presenting key terms and concepts that are crucial for understanding the survey list as a whole. Moving on, the second section focuses on gathering personal data from the respondents, aiding in creating a more personalized approach to the survey analysis. In the third section, emphasis is placed on identifying relevant metadata related to artificial intelligence techniques and their integration within joint-stock companies. This includes a detailed description of the accounting systems utilized by the study sample and the level of dependency on these advanced techniques. Additionally, the section sheds light on the descriptive data associated with audit offices in these companies. Lastly, the fourth section aims at extracting the views and opinions of respondents regarding the research hypotheses put forth. This section plays a crucial role in evaluating the validity of the hypotheses and provides valuable insights into the overall perception of artificial intelligence techniques within joint-stock companies.

Within the survey, a unique focus was placed on the fourth section as it was divided into four sub-sections as follow: The first sub-section delves into the reasons behind the lack of compatibility between auditing standards and cloud artificial intelligence techniques, aiming to validate the first hypothesis. Moving on, the second sub-section tackles the challenges associated with applying current review standards to address the complexities of cloud AI technologies, with a focus on testing the second hypothesis. Shifting gears, the third sub-section explores the potential role of cloud artificial intelligence technologies in enhancing audit evidence quality in Saudi Arabia, seeking to validate the third hypothesis. Finally, the fourth sub-section examines the barriers hindering the implementation of cloud AI technologies in improving audit evidence quality in the Saudi Arabian context, with a primary goal of validating the fourth hypothesis.

In the pursuit of understanding the survey data, the researcher meticulously transcribed the information for analysis. Utilizing a variety of statistical methods within the Social Sciences Statistical Software (Version 28) framework of Statistical Package for Social Science (SPSS), the data was analyzed to reveal valuable insights. Through the application of descriptive statistics techniques such as calculating the arithmetic mean, standard deviation, maximum and minimum values, as well as inferential statistics methods like the Pearson correlation coefficient and reliability test, the researcher was able to extract meaningful results. Additional methods, such as the coefficient of determination, correlation coefficient, simple regression model, and the Mann test, were also utilized to provide a comprehensive analysis of the data.

3.3. Reliability and Validity

The overall effectiveness of the survey instrument was assessed by evaluating its reliability and validity. An analysis of the results was conducted, incorporating Cronbach's alpha coefficient as a statistical measure, as displayed in the subsequent table:

Table 2: Questionnaire Reliability and Validity

Group	Hypothesis	Variables	Questions	Cronbach's alpha	Reliability Coefficient
G1	There is no significant difference between the opinions of the study sample regarding the reasons for the incompatibility between review standards and cloud artificial intelligence technologies		6	0.419	0.682
G2	There is no significant difference between the opinions of the study sample regarding the problems of applying current review standards in addressing cloud artificial intelligence technologies		5	0.491	0.672
G3	There is a statistically significant relationship between the proposed role of cloud artificial intelligence technologies in improving the quality of audit evidence in Saudi Arabia	The proposed role of cloud artificial intelligence technologies	16	0.819	0.927
		Improving the quality of audit evidence in Saudi Arabia	5	0.782	0.862
	Cronbach's alpha for the third hypothesis as a whole		21	0.815	0.918
G4	There is no significant difference between the opinions of the study sample regarding the obstacles to activating cloud artificial intelligence technology in improving the quality of audit evidence in Saudi Arabia.		11	0.971	0.947
	Cronbach's alpha for the table as a whole		43	0.961	0.973

The statistical data presented in table (2) provides valuable insights into the high reliability and validity coefficients observed within the study. These results suggest a strong level of consistency and homogeneity among the variables under investigation, indicating a robust internal consistency within the elements and phrases listed.

4. Data Analysis

Within this portion, the researcher delves into the breakdown of qualifications and background among the individuals participating in the study, highlighting the varying percentages across different categories starting with the demographic questions and the frequency and relative distribution of the personal data of the respondents.

Table 3: Frequency and relative distribution of the personal data of the respondents

Academic Qualifications (AQ)			Years of Experience (YE)		
AQ	**#**	**%**	**YE**	**#**	**%**
Ph.D.	13	12	15 years or more	56	51
Master	43	39	10-15 years	18	16
Bachelor	51	46	5-10 years	23	21
High School	3	3	5 years or less	13	12
TOTAL	110	100	TOTAL	110	100

The data presented in table (3) indicates a rich tapestry of professional experiences and academic credentials among the study participants. A notable 88% of respondents boasted more than five years of experience, underscoring the depth of knowledge and expertise present in the sample. This wealth of experience not only instills confidence in the findings but also paves the way for potential generalizability of the results.

An exploration was conducted to delve into the utilization of cloud artificial intelligence technologies in a selection of companies. The study involved gathering responses from joint-stock companies and their affiliated audit offices. A comprehensive analysis was conducted to understand the companies' and audit offices' perspectives on cloud artificial intelligence technologies. The data collected was tabulated to showcase the descriptive overview of their stance on the adoption of these technologies.

Table 4: Companies and audit offices opinion regarding cloud artificial intelligence technologies

N	Question	Provided Answer	#	%
The opinion of some participating companies regarding cloud artificial intelligence technologies				
1	Does the company rely on cloud artificial intelligence technologies?	It relies on electronic operation only	26	23
		A mixture of electronic operation and cloud artificial intelligence technologies	84	77
2	To what degree do cloud artificial intelligence technologies improve the company's business and value, from your point of view?	High optimization	93	85
		Somewhat improved	17	15
3	Do you think auditing standards are a major cause of increased costs?	Yes	6	5
		No	104	95
4	Who is responsible for evaluating cloud AI technologies in the company?	Auditors	107	97
		Specialists in modern technologies	3	3
5	Are there individuals in the company who have the skill to deal with new cloud artificial intelligence technologies?	Yes	88	80
		No	22	20
6	Do you think that the current auditing standards do not include a guideline for dealing with modern information technology techniques?	Yes	94	85
		No	16	15

7	Which of the IT audit standards do you think is best and useful for the company if cloud AI technologies are used in your company?	IT infrastructure standard (ITIL)	70	63
		ISO standards	25	23
		Objectives of monitoring information and related technology (COBIT)	15	14
The opinion of some audit firms on cloud artificial intelligence technologies				
1	Do auditors need to ensure the accuracy of data entered into cloud AI technologies?	Yes	108	98
		No	2	2
2	Do current auditors understand cloud AI technologies, from your point of view?	Yes	34	31
		No	23	21
		Not Sure	53	48
3	Does the mismatch between current audit standards and artificial intelligence techniques lead to a failure to improve the quality of audit evidence?	Yes	109	99
		No	1	1
4	Are there audit standards for cloud AI technologies?	There is not	89	81
		There is	12	11
		Not Sure	9	8
5	Current audit standards require the use of samples and do not rely on big data analyses	Yes	110	100
		No	0	0
6	In your opinion, how much do cloud AI technologies improve the quality of audit evidence?	High	103	94
		Medium	2	2
		Low	5	4
7	What source will be relied upon when preparing criteria for reviewing cloud artificial intelligence technologies, from your point of view?	PCAOB	8	7
		IAASB	10	9
		ISO	12	11
		A mixture of these standards	80	73
8	Do cloud artificial intelligence technologies affect the responsibilities and rights of the auditor, from your point of view?	Yes	83	75
		No	11	10
		Not Sure	16	15
9	To what extent do current auditing standards develop and interact with modern developments and technologies?	It develops slowly and is not interactive	97	88
		Rapidly evolving and interactive	13	12

The data depicted in Table (4) reveals a striking 77 percent of survey participants indicating a utilization of both electronic operation and cloud-based artificial intelligence technologies within their respective companies. In contrast, a mere 23 percent acknowledged reliance solely on electronic operation. This statistic not only underscores the prevalence of cloud AI technologies among respondents but also highlights a promising trend, especially considering the exclusive participation of telecommunication and software services firms. This insight provides a unique perspective on the technological roadmap embraced by these industries.

Regarding the extent to what degree cloud artificial intelligence technologies improved the company's business and value in the study's sample of joint stock companies, findings revealed a staggering 85 percent of participants acknowledging a significant enhancement in the company's value and business operations. Out of the 110 individuals surveyed, a mere 15 percent (17 individuals) reported only moderate improvements. The results undoubtedly showcase the pivotal role that cloud artificial intelligence technologies play in optimizing and revolutionizing the dynamics of businesses, particularly in joint stock companies. The integration of such advanced

technologies has been proven to be a game-changer, propelling companies towards exponential growth and unparalleled success.

In analyzing the effects of auditing standards on the financial costs incurred by joint stock companies, the data presented in Table 4 reveals that a mere 5 percent, or 6 individuals, acknowledged auditing standards as a significant contributor to rising expenses. Conversely, the overwhelming majority of 95 percent, amounting to 104 individuals, dismissed auditing standards as a primary factor in cost escalation. An analysis of the study data also revealed that an overwhelming majority of contributing companies, comprising of 107 individuals (97 percent) identified auditors as the primary individuals responsible for the assessment of cloud artificial intelligence technologies.

Regarding the availability of skills in dealing with modern technologies for cloud artificial intelligence in the study sample of contributing companies. Out of the sample group, it was observed that 20 percent of participants, which is equivalent to 22 individuals, lacked the necessary skills in dealing with cloud artificial intelligence. On the contrary, a majority of 80% demonstrated proficiency in leveraging modern cloud artificial intelligence technologies. This data sheds light on the importance of upskilling and continuous learning in staying relevant in today's rapidly evolving technological landscape.

In analyzing the incorporation of current auditing standards in handling modern information technology in Saudi joint stock companies, Table 4 revealed that out of the 110 individuals surveyed, all agreed that the current standards encompass guidelines for modern IT techniques. Conversely, feedback from the remaining 94 participants (85 percent) suggested that the existing audit standards lack a fundamental framework for navigating modern information technology, such as cloud computing and artificial intelligence.

When looking into the most effective and preferred information technology review standards among a sample of joint stock companies, the findings revealed a clear distinction. In Table 4, it was uncovered that 15 participants favored the objectives of control over information and associated technology COBIT standards, while 25 others opted for the ISO standards. Surprisingly, the Information Technology Infrastructure Library (ITIL) standard garnered the highest preference, with a whopping 70 respondents (63%) showing a strong inclination towards its adoption.

Regarding the other half of the questionnaire, the opinions of the auditing firms on cloud artificial intelligence technologies, the findings in Table 4 indicated that a high percentage of individuals, specifically 108 out of the total sample (98%) valued the importance of maintaining data accuracy when using cloud artificial intelligence technologies in audit offices. This emphasizes the need for ensuring precise and reliable data input to optimize the efficiency and effectiveness of these advanced techniques. The percentage of current auditors' understanding of artificial intelligence technologies in a sample of audit offices. The results in Table 4 showed 23 participants that confirmed the current auditors' lack of understanding of artificial intelligence technologies, and 34 participants that showed the current auditors' understanding of artificial intelligence technologies. Furthermore, an astonishing 53 participants,

equivalent to 48 percent of the sample, expressed a moderate level of understanding regarding cloud artificial intelligence technologies. This sheds light on the growing importance of cloud networks in enhancing auditors' proficiency in this domain.

The findings presented in Table 4 also indicated that only a mere 1% of individuals perceive the incompatibility between current auditing standards and artificial intelligence techniques as insignificant when it comes to enhancing audit evidence quality. In stark contrast, a whopping 99% of respondents believe that this lack of compatibility hinders the improvement of audit evidence. This implies that the failure to align audit standards with cloud artificial intelligence techniques results in subpar audit evidence quality.

In examining the presence of audit standards for cloud-based artificial intelligence techniques in the participated audit offices, the findings revealed a mixed bag of perspectives. Out of the 110 participants surveyed, some acknowledged the existence of standards pertaining to cloud-based AI technologies, while others believed there were standards to a certain degree but lacked specificity. Surprisingly, the majority of respondents, 89 individuals representing 81% of the sample, expressed that review standards for cloud artificial intelligence technologies were absent. This disparity in opinions highlights the complex landscape of regulating AI in the audit sector, raising questions about the need for clearer guidelines in this rapidly evolving field. In examining the reliance on samples versus big data analyzes in current auditing standards within this study sample of audit offices, it was found that all (100%) of the participants, a total of 110 individuals, confirmed the predominant use of sampling methods. The results indicated that big data analyzes are not heavily relied upon despite their potential benefits, suggesting that traditional sampling methods continue to be favored in auditing practices.

This research also assessed the impact of artificial intelligence techniques on the quality of audit evidence within various audit firms revealed interesting results. Out of the participants, 5 individuals reported a low level of improvement in audit evidence quality with cloud AI techniques, while 2 participants noted a moderate level of enhancement. However, a staggering 94% of the respondents, totaling 103 individuals, indicated a high level of improvement in audit evidence quality when utilizing AI technologies. These findings underscore the significant influence of artificial intelligence in elevating the quality of audit evidence within the auditing profession. Results regarding selecting the most reliable sources for developing standards to assess cloud artificial intelligence technologies in audit offices revealed that the majority (73%) prefer a combination of standards from the Public Company Accounting Oversight Board (PACOB), the International Auditing and Assurance Standards Board (IAASB), and the International Organization for Standardization (ISO). This preference indicates that a blend of these three standards is deemed most effective for establishing criteria in evaluating cloud AI technologies, as opposed to relying solely on individual standards.

By examining the influence of cloud-based artificial intelligence on the roles and privileges of external auditors within a selection of audit firms, the findings displayed a division in opinions. Out of the 110 participants, 11 individuals asserted that the advancements in cloud-based artificial intelligence have no bearing on the obligations

and entitlements of auditors, while 16 respondents argued that there is a noticeable impact on these aspects. Interestingly, the majority of the participants, totaling 83 individuals at a staggering 75% of the sample, firmly believed that cloud-based artificial intelligence indeed does affect the responsibilities and rights of external auditors to some extent. This disparity in viewpoints highlights the complexities surrounding the integration of such technologies in the field of auditing, prompting further exploration and discussion on the matter.

Examining the alignment of current audit standards with technological advancements such as cloud computing and artificial intelligence within a sample of audit offices, findings revealed a stark divide between participants. Out of the 110 participants surveyed, 13 participants only indicated that audit standards were evolving effectively and in tandem with modern developments. However, a majority of 97 participants, making up 88% of the sample, expressed concerns that audit standards were progressing sluggishly and failing to engage with cutting-edge technologies such as cloud computing and artificial intelligence.

4.1. Hypothesis Testing

In this study, the researcher delves into the levels of consensus and discord among sample groups when discussing statements linked to the initial study hypothesis. Utilizing the Whitney-Mann U Test, a popular nonparametric method for comparing outcomes between two independent groups. This test is utilized to determine if two samples are likely to have originated from the same population, suggesting that both populations have similar distributions. While some researchers view this test as a comparison of medians, it is important to note that parametric tests typically focus on comparing means (with a null hypothesis of $\mu1=\mu2$) between independent groups. The Mann Whitney U test offers a distinct approach to analyzing differences between groups, providing valuable insights into population characteristics, the researcher aims to measure the variance present in the opinions of the participants. This test serves as a valuable method for analyzing the diverging perspectives within independent groups and delving deeper into the nuances of hypothesis agreement.

4.1.1. First Hypothesis Test

Table 5: Analysis of variance in the sample groups' opinions about the data of the first hypothesis

Elements related to the first hypothesis	Study groups	N	Average rank	Rank	Mann–Whitney
Auditors' need to understand the nature of their clients' businesses, internal controls, and information systems (IS) (such as cloud artificial intelligence technologies - if they are in use) related to their business operations and financial reports	Joint stock companies (internal auditor - accountant)	75	59.85	1	0.383
	Audit offices (External auditors)	35	54.28	2	

Using different types of review tools such as data analytics	Joint stock companies (internal auditor - accountant)	75	60.52	1	0.452
	Audit offices (External auditors)	35	56.83	2	
Current auditing standards do not provide effective measures of performance quality or clear, concise and definitive mechanisms for auditors to follow when using technological techniques	Joint stock companies (internal auditor - accountant)	75	59.63	1	0.741
	Audit offices (External auditors)	35	56.72	2	
Although the development of new rules and standards by various professional and regulatory bodies aims to improve the quality of the audit process, it increases the complexity of the auditor's work and the costs associated with oversight activities and the preparation of corporate financial reports	Joint stock companies (internal auditor - accountant)	75	57.73	2	0.583
	Audit offices (External auditors)	35	59.83	1	
Integrating cloud artificial intelligence technologies for consensus and encryption algorithms that require technical understanding and are usually visible to users and are therefore difficult for end users to understand, which represents an obstacle to auditors and those responsible for developing the auditing profession	Joint stock companies (internal auditor - accountant)	75	58.65	2	0.750
	Audit offices (External auditors)	35	59.64	1	
Regulators' lack of confidence in the new technologies for cloud artificial intelligence, as they include a set of risks and errors related to programming, and the loss or theft of key information	Joint stock companies (internal auditor - accountant)	75	59.63	1	0.741
	Audit offices (External auditors)	35	57.64	2	
Reasons for the incompatibility between review standards and cloud artificial intelligence technologies	Joint stock companies (internal auditor - accountant)	75	58.63	1	0.693
	Audit offices (External auditors)	35	54.73	2	
TOTAL		110			
** Statistically significant at a significance level of 0.05					

According to the research findings shown in Table 5, the researcher has determined that accountants and auditors working in Saudi joint stock companies showcase the highest degree of agreement with the data related to the compatibility between auditing standards and cloud artificial intelligence techniques. This alignment is reflected in their average rank of 58.63, signifying their strong endorsement for this hypothesis. The Mann-Whitney test's significance level values pertaining to the initial hypothesis data

exceed 5%, revealing a lack of substantial distinctions among the sample groups being studied.

The values of the significance level of the Mann-Whitney test for all data related to the first hypothesis are greater than 5%. This indicates that there are no significant differences between the groups representing the sample under investigation regarding the data of the first hypothesis. In light of the above, the researcher concludes that there is agreement (no significant difference) among the study sample on the reasons for the incompatibility between review standards and companion artificial intelligence techniques, which supports the validity of the first hypothesis of the study.

4.1.2. Second Hypothesis Test

Table 6: Analysis of variance in the sample groups' opinions about the data of the second hypothesis

Elements related to the first hypothesis	Study groups	N	Average rank	Rank	Mann–Whitney
Current auditing standards require auditors to have a good understanding of the nature of the client's business, its IT infrastructure and systems relevant to financial reporting, and the controls in place. To do this, auditors are required to collaborate with IS auditors to collect and interpret evidence	Joint stock companies (internal auditor - accountant)	75	57.83	2	0.479
	Audit offices (External auditors)	35	59.63	1	
Current standards are not sufficient to comply with in order to address these emerging technologies	Joint stock companies (internal auditor - accountant)	75	57.53	2	0.905
	Audit offices (External auditors)	35	59.53	1	
The current standards did not clarify what advanced technological tools and methods are and how to use them, nor did they indicate the inevitability of their use, leaving the topic optional	Joint stock companies (internal auditor - accountant)	75	54.72	2	0.107
	Audit offices (External auditors)	35	61.83	1	
Current standards need to provide guidance on how to evaluate the competency of cloud AI professionals	Joint stock companies (internal auditor - accountant)	75	53.94	2	0.071
	Audit offices (External auditors)	35	67.83	1	
Current auditors do not have sufficient knowledge or skills in modern cloud AI technologies to be able to understand and conclude the specialist's report	Joint stock companies (internal auditor - accountant)	75	57.84	2	0.596
	Audit offices (External auditors)	35	59.05	1	

Problems of applying current review standards in addressing cloud AI technologies	Joint stock companies (internal auditor - accountant)	75	53.62	2	0.068
	Audit offices (External auditors)	35	64.94	1	
TOTAL		110			
** Statistically significant at a significance level of 0.05					

The data shown in Table 6 reveals an impressive trend where accountants and auditors working in audit offices are at the forefront of embracing current auditing standards to address the challenges posed by cloud artificial intelligence technologies. With an average rank of (64.94), they have shown the highest levels of agreement with the second hypothesis.

Results from the Mann-Whitney test revealed that the level of significance in determining the need for current standards to establish guidelines for assessing the proficiency of specialists in cloud artificial intelligence was below 5%. This suggests considerable discrepancies between the groups sampled in relation to this topic. Specifically, participants from the category of Accountants and auditors in top-tier audit firms are in consensus that existing standards should outline a framework for evaluating the expertise of cloud AI professionals. In terms of the lingering obstacles in using traditional review criteria to assess cloud artificial intelligence technologies, the Mann-Whitney test has revealed that all data linked to the second hypothesis show significance level values exceeding 5%. This suggests that there are no noteworthy variances among the categories representing the study sample in relation to the hypothesis data.

In light of the above, the researcher concludes that there is agreement (no significant difference) among the study sample on the problems of applying current review standards in addressing cloud artificial intelligence technologies, which supports the validity of the second hypothesis of the study.

4.1.3. Third Hypothesis Test

The third hypothesis states that there is a statistically significant relationship between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in Saudi Arabia. This hypothesis is tested through correlation and regression testing, and the variables of this hypothesis are as follows:

- The independent variable (PRCAIT) is: the proposed role of cloud artificial intelligence technologies.
- The dependent variable (IQAE) is: improving the quality of audit evidence in Saudi Arabia.

$$IQAE = \alpha + \beta 1\ PRCAIT + \mu$$

Where;

IQAE = improving the quality of audit evidence in Saudi Arabia.

PRCAIT = the proposed role of cloud artificial intelligence technologies.

The following table shows the correlation between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in Saudi Arabia (as a dependent variable) as follows:

Table 7: Results of the correlation between the variables of the third hypothesis

Dependent Independent	Coefficient	(Y): Improving the quality of audit evidence in Saudi Arabia
(X) The proposed role of cloud artificial intelligence technologies	Correlation coefficient (R)	0.492
	Correlation coefficient (R²)	0.261
	Significance	0.000 **

** The correlation coefficient indicates significance at a significance level of 0.01

By analyzing the (positive) sign of the correlation coefficient, researchers can uncover a direct (positive) correlation in their data. Furthermore, the magnitude of the correlation coefficient unveils the intensity of this relationship. Through this examination, researchers gain insight into the strength of the correlation, providing valuable information for their studies.

The correlation coefficient of 0.492 suggests a positive and moderate relationship between the utilization of cloud artificial intelligence methods and the enhancement of audit evidence quality in Saudi Arabia. This correlation signifies that implementing cloud AI techniques in alignment with the proposed framework will result in a significant improvement in the quality of audit evidence in the country. The validation of a correlation coefficient of 0.00, falling below the significant level of 0.01, solidifies the belief that cloud AI technologies play a crucial role in enhancing audit evidence quality within the Saudi Arabian context.

In analyzing the data shown in Table 7, it is evident that the coefficient of determination (R²) stands at 0.261, shedding light on the magnitude to which the autonomous variable elucidates the fluctuations present in the reliant variable. This data signifies that the integration of cloud artificial intelligence methodologies plays a significant role in the enhancement of audit evidence quality within Saudi Arabia, accounting for a notable 26.1%. The remaining percentage, therefore, can be attributed to various other variables and factors at play.

The researcher concludes from the results of the correlation analysis for the third hypothesis that there is a direct, statistically significant correlation between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in Saudi Arabia, which supports the validity of the third hypothesis of the study.

The following table shows the results of simple linear regression analysis of the variables of the third hypothesis in order to arrive at a quantitative model that governs

the relationship of the impact of the proposed role of cloud artificial intelligence technologies (independent variable) on improving the quality of audit evidence in Saudi Arabia (as dependent variable), as follows:

Table 8: Results of regression analysis for the variables of the third hypothesis

Statement	Regression coefficient (β)	T-test value	Significance Level	significance
Constant (α)	1.684	4.628	0.000	Statistically significant
the proposed role of cloud artificial intelligence technologies (PRCAIT)	0.572	5.274	0.000	Statistically significant
The explanatory value of the model (R^2) = 0.261				
Overall significance of the model: the significance level of the ANOVA analysis = 0.000				
The value of the Durbin-Watson test = 1.673				

The results shown in Table 8 give indication of a positive regression coefficient symbolizes a direct relationship between the influence of cloud artificial intelligence technologies and the enhancement of audit evidence quality in Saudi Arabia. In this context, the focus lies on how the independent variable, cloud artificial intelligence, directly impacts the dependent variable, which is the quality of audit evidence.

Incorporating cloud artificial intelligence technologies in audit processes in Saudi Arabia results in a notable improvement in the quality of audit evidence. The regression coefficient assigned to the independent variable denotes that as cloud AI technologies are implemented, there is a corresponding increase of 0.572 units in the quality of audit evidence for every one-unit increase in the role of these technologies. This highlights the significant positive impact that cloud AI technologies can have on effectively enhancing the auditing practices and procedures in Saudi Arabia.

The results of the t-test analysis showed a statistically significant relationship between the use of cloud artificial intelligence technologies as an independent variable and the enhancement of audit evidence quality in Saudi Arabia as the dependent variable. With a significance level of 0.00, lower than the standard threshold of 0.05, the findings confirm the hypothesis that cloud AI has a significant influence on improving audit evidence quality in the Saudi Arabian context.

The assessment of the model revealed a (Durbin-Watson) value of (1.673), fitting perfectly within the desired range of 2 (-1.5 to 2.5). This suggests a lack of autocorrelation among the components within the independent variable, ensuring the accuracy and reliability of the results obtained.

The researcher concludes from the results of the regression analysis for the third hypothesis that there is a statistically significant relationship between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in Saudi Arabia, which supports the validity of the third hypothesis of the study.

4.1.4. Forth Hypothesis Test

Table 9: Analysis of variance in the sample groups' opinions about the data of the fourth hypothesis

Elements related to the first hypothesis	Study groups	N	Average rank	Rank	Mann–Whitney
Cloud AI is a difficult technology to control as it changes the way audits are conducted, as humans are replaced by intelligent software and some current practices become completely automated	Joint stock companies (internal auditor - accountant)	75	54.83	2	0.491
	Audit offices (External auditors)	35	61.64	1	
Cloud Artificial Intelligence can change the process of examining some documents (such as contracts) by using different methodologies such as text mining and DNN (instead of manual previous processing), and it can also replace these procedures with technological analytics	Joint stock companies (internal auditor - accountant)	75	53.73	2	0.026
	Audit offices (External auditors)	35	61.73	1	
Training provided to new auditors can be influenced by cloud artificial intelligence	Joint stock companies (internal auditor - accountant)	75	57.82	2	0.182
	Audit offices (External auditors)	35	62.72	1	
Negative effects on the experience and professional skills of auditors, as it leads to a decrease in the level of their experience and professional skills	Joint stock companies (internal auditor - accountant)	75	56.82	2	0.004
	Audit offices (External auditors)	35	66.82	1	
Rigidity of the standards leads to traditional processes that are not compatible with advanced modern technology	Joint stock companies (internal auditor - accountant)	75	57.91	2	0.592
	Audit offices (External auditors)	35	59.04	1	
Formalizing the steps of the audit process	Joint stock companies (internal auditor - accountant)	75	55.82	2	0.486
	Audit offices (External auditors)	35	61.48	1	
When auditors use cloud AI to assist them in their audits, they are	Joint stock companies	75	54.71	2	0.494

required by the standards to document how the conclusions were reached, including the processing of data and the audit process paths	(internal auditor - accountant)				
	Audit offices (External auditors)	35	64.72	1	
Assuming that auditors are unable to interpret cloud AI algorithms, in this case they are prohibited from using such tools and thus unable to obtain sufficient and appropriate audit evidence to enable them to form a technical opinion	Joint stock companies (internal auditor - accountant)	75	57.83	2	0.490
	Audit offices (External auditors)	35	59.63	1	
The increasing use of artificial intelligence technologies in auditing, management and regulatory applications without adequate guarantees	Joint stock companies (internal auditor - accountant)	75	57.53	2	0.084
	Audit offices (External auditors)	35	59.53	1	
Regulators such as the SEC and PACAOB need to understand the cloud AI tools that companies and auditors use to assess the risks of potential accounting misconduct and audit failure	Joint stock companies (internal auditor - accountant)	75	54.72	2	0.163
	Audit offices (External auditors)	35	61.83	1	
One of the main challenges of adopting cloud AI techniques in the audit process is their lack of interpretability	Joint stock companies (internal auditor - accountant)	75	53.94	2	0.164
	Audit offices (External auditors)	35	67.83	1	
TOTAL		110			
** Statistically significant at a significance level of 0.05					

The data from the fourth hypothesis, which explores the barriers hindering the utilization of cloud artificial intelligence technologies for enhancing audit evidence quality in Saudi Arabia, has unveiled that accountants and auditors in audit offices exhibit the highest level of agreement. With an average rank of 67.83, this category stands out as the most receptive to the proposed role of these technologies.

In exploring the challenges hindering the integration of cloud artificial intelligence methods to enhance audit evidence in Saudi Arabia, the findings from the Mann-Whitney test reveal intriguing insights. The values of the significance level exceeding 5% suggest no substantial variances between the sample groups in terms of the hypothesis data. However, it is worth noting that there was an exception, with a significance level value below 5%, indicating:

- Innovative Cloud AI technology is revolutionizing the way documents, like contracts, are reviewed, eliminating the need for manual processing. Techniques like text mining and DNN are now being used to conduct automated analyses, streamlining the examination process and increasing efficiency. These

advanced methodologies are paving the way for a new era of document examination that is faster, more accurate, and less labor-intensive.

- Deteriorating factors can have detrimental effects on the knowledge and skills of auditors, resulting in a decline in their expertise and competence.

- It is crucial for regulatory bodies like the SEC and PCAOB to remain informed and educated on the cloud-based AI tools utilized by companies and auditors when evaluating the risks of potential accounting misconduct and audit failures. In order to effectively oversee and regulate financial practices, these regulatory bodies must continually adapt and evolve alongside advancing technologies to better understand and address the potential challenges presented by these tools. By staying ahead of the AI curve, regulators can ensure the integrity and accuracy of financial assessments and audits while maintaining the trust and confidence of both investors and stakeholders.

In light of the above, the researcher concludes that there is agreement (no significant difference) among the study sample regarding the majority of obstacles to activating the proposed role of cloud artificial intelligence technologies in improving the quality of audit evidence in Saudi Arabia, which supports the validity of the fourth hypothesis of the study.

5. Conclusion

The study aims to explore how cloud artificial intelligence (AI) technologies can impact the quality of audit evidence in Saudi Arabian companies. A survey was conducted on nine joint stock companies listed in the Saudi Arabian Stock Exchange (Tadawul), focusing on those in the telecommunication services and software services sectors with strong infrastructure in cloud AI. Research results could be summarized as follow:

- There is no significant difference between the study sample on the problems of applying current review standards in addressing cloud artificial intelligence technologies.

- There is no significant difference between the study sample on the reasons for the incompatibility between review standards and cloud artificial intelligence technologies.

- There is a direct, statistically significant correlation between the proposed role of cloud artificial intelligence technologies and improving the quality of audit evidence in Saudi Arabia.

- There is no significant difference between the study sample regarding the obstacles to activating the proposed role of cloud artificial intelligence techniques in improving the quality of audit evidence in Saudi Arabia.

- Only one percent of participants indicated that the incongruity between auditing standards and cloud-based artificial intelligence tactics did not contribute to improving audit evidence. Conversely, a substantial 99 percent of individuals recognized that the lack of harmony between audit standards and cloud artificial intelligence methods resulted in the inability to enhance audit evidence effectively.

- It was found that 13 participants believe that auditing standards are progressing effectively and are embracing modern technologies. However, a staggering 97

participants, accounting for 88% of the total, expressed concerns that auditing standards are evolving slowly and are not integrating effectively with advancements like cloud computing and artificial intelligence. This discrepancy in opinions highlights the current division within the industry regarding the pace at which auditing standards are adapting to the changing technological landscape.

- The majority of participants, approximately 94%, strongly believe that the implementation of cloud artificial intelligence techniques significantly enhances the quality of audit evidence to a high level. This consensus was derived from a sample size of 110 participants, with 5 individuals attesting to a low-level improvement and 2 participants acknowledging a medium-level improvement in audit evidence quality. The overwhelming majority of participants expressed confidence in the efficacy of cloud artificial intelligence in enhancing the audit process and ensuring high-quality evidence collection.
- The findings also indicated that only a small number of participants, 12 in total, acknowledged the existence of relevant standards. Among these, 9 suggested that such standards do exist in some capacity, but do not provide a guarantee. In contrast, a significant majority of 89 participants, representing 81% of the sample, reported the absence of clear guidelines for reviewing cloud artificial intelligence technologies. These results highlight the need for establishing more comprehensive and definitive standards in this emerging field.

5.1. Recommendations

In light of the results reached through the theoretical and field study, the following is recommended:

- Shedding light on the significance of cloud-based artificial intelligence technologies such as visual recognition, textual analysis, natural language processing, and audio processing has become imperative. These cutting-edge tools not only offer a plethora of possibilities but also provide concrete evidence of their potential in revolutionizing the field of auditing.
- In an effort to keep pace with the rapid advancements in technology, governing bodies are introducing fresh standards for the assessment and oversight of cloud artificial intelligence tools in analytical processes. These innovative guidelines not only focus on regulating the use of AI in reviews, but also provide detailed instructions on evaluating the expertise of individuals handling cloud AI technology.
- A concerted effort is being made by governing bodies to foster closer collaboration among professional organizations regulating the auditing industry. This initiative aims to expedite the integration of advanced technologies, particularly cloud artificial intelligence, in order to elevate the quality of audit evidence. By encouraging a shared responsibility between auditors and tech specialists in evaluating these cutting-edge tools, the goal is to bolster trust and confidence in the auditing process.
- Ensuring the safeguarding of data stored in the cloud is crucial for auditors in collaboration with various stakeholders. The evaluation of intelligence effectiveness and efficiency is essential. Conducting tests to gather evidence on

the availability of artificial intelligence within cloud systems is imperative for a thorough audit process.

- It is imperative for the auditing bodies in Saudi Arabia to establish a new auditing standard that incorporates protocols for handling cutting-edge cloud artificial intelligence technologies. This standard will not only enhance the objectivity and quality of audit procedures, but also pave the way for the evolution of substantial evidential proof in audits.

- In a groundbreaking move, the Big 4 audit companies have implemented innovative training programs for their auditors, focused on mastering the intricacies of cutting-edge cloud artificial intelligence technologies. These initiatives aim to equip auditors with the skills needed to leverage these advancements in order to enhance the overall quality of audit evidence. By staying ahead of the curve and embracing the potential of AI in audits, these firms are setting a new standard for excellence in the industry.

5.2. Future Research

- The focus of accounting research in the Saudi business landscape is shifting towards investigating the correlation between cloud artificial intelligence technologies and existing auditing norms. This shift aims to uncover new insights regarding the level of harmony between these cutting-edge technologies and traditional audit standards, and how this harmony can enhance the reliability of audit evidence. By delving deeper into this intersection, researchers hope to shed light on how cloud artificial intelligence can revolutionize audit practices in Saudi Arabia and improve the overall quality of audits conducted in the region.

- In upcoming studies, researchers may explore how cloud-based artificial intelligence (AI) technologies can elevate the standard of external audits. By conducting a comprehensive field study, they may aim to investigate the potential impact of these advanced tools on the quality and efficiency of auditing processes. Through this innovative approach, a new realm of possibilities may be unveiled, shedding light on the transformative capabilities of AI in the realm of external audit practices.

- The impact of applying cloud artificial intelligence techniques on evaluating strategic performance in the government institutions.

- A quantitative model of the impact of using cloud artificial intelligence technologies on cost rationalization in Saudi companies.

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