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Article

The Use of Artificial Intelligence and Audit Quality: An Analysis from the Perspectives of External Auditors in the UAE

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Abstract: This paper aims to explore external auditors' perception of the use of artificial intelligence (AI) in the United Arab Emirates (UAE). It investigates whether there is a perception among external auditors toward the contribution of AI to audit quality. It also aims to test whether the perception of AI usage and its impact on audit quality differs between local and international external auditors. Data were collected using an online survey from 22 local and 41 international audit firms to achieve these research objectives. Participants were either the auditing manager, audit partners, senior auditors or other personnel who may have experience in the field of accounting and auditing. To test our hypotheses, data analysis was undertaken using reliability and validity tests, descriptive analysis and independent samples *t*-test. We found that the analysis shows that there is a non-significant difference in the perceived contribution of AI to audit quality between local and international audit firms. All the audit firms, whether local or international, have equal perceived contributions with regard to the audit quality.

Keywords: artificial intelligence; contribution; audit quality; external auditors; external auditors' perceptions



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1. Introduction

As business becomes more difficult in today's corporate climate, maximizing the use of technology-based decision aids is becoming increasingly vital. The Organization for Economic Co-operation and Development (OECD) defines artificial intelligence (AI) as “a machine-based system that can make predictions, suggestions, or judgments influencing actual or virtual environments for a certain set of human-specified objectives” (OECD 2021). Within the auditing field, technological advancements have created numerous and significant research possibilities. As external auditors encounter increasingly sophisticated client-side systems, a new need for understanding how to give assurance on the complicated client systems while also utilizing the increasingly advanced technologies and data analytics during audit test work has emerged. As a result, to maintain a competitive edge, the audit profession is evolving by adopting AI technologies.

The main goal of this study is to investigate whether there are any differences in the perceived contributions of AI usage to audit quality for local and international audit firms in the UAE, as well as how external auditors in the UAE perceive the use of AI in relation to audit quality.

Since it has become challenging to understand a company's financial and nonfinancial performance in utilizing vast amounts of structured and unstructured data, Kokina and Davenport (2017) claim that auditing is especially well suited to data analytics and AI applications. Client consulting, provision of services such as audit and fraud detection, and improvement of audit firms' internal operations are all possible AI uses for audit firms. AI is being used to help enhance the accuracy and efficiency of the auditing process, as well

as to detect potential issues with a company's financial statements and to detect potential fraud on the books. It is also used to look for problems with a company's accounting methods. AI helps to improve the accuracy of a company's accounting procedures even further (Kaplan and Haenlein 2019). Aside from that, technology has contributed to the improvement of audit quality. AI has assisted in ensuring that the auditing process is completed on time, accurately and thoroughly (Aduloju et al. 2014).

According to Raji and Buolamwini (2019), numerous auditing processes that previously required manual labor are now automated by AI, which includes data entry processes. AI systems, unlike human auditors, can examine 100% of data, create audit tests and write scripts. The computerized analysis of accounting entries is one way that AI alters auditing. The minimization of human error is a benefit when it comes to employing AI to create automatic entries. AI can detect fraudulent entries and raise the alert at the head office, in addition to decreasing human intervention (Moffitt et al. 2018).

Overall, AI is a significant device that can aid in the efficiency and cost-effectiveness of audits. It has also been shown to be a reliable method for reducing the chance of human mistake. AI should be explored if firms seek a new technique to improve their auditing process. As part of the auditing process, one of the elements that must be evaluated is the risk of a material misstatement. If financial consequences are not adequately documented, financial statements are likely to be materially misstated. Hence, auditors are expected to evaluate the transactions to ensure there are no misstatements. It could be challenging for auditors to detect irregularities later if illicit transactions and/or other anomalies are not identified immediately. As debated by Salem (2012), auditors cannot always be the people who are responsible for the client's financial statement due to human error in detecting fraud, such as in cases of expert forgery and deterrents to detection. High-risk transactions are easily found by using AI-based auditing technologies. This is something that the manual auditing process may not detect thoroughly due to sample population testing, but AI technology allows for whole population testing. Integrating AI into each step of the auditing process eliminates repetitive duties and makes it easier for auditors to analyze vast amounts of data to have a thorough view of the business operation (Kokina and Davenport 2017). This also makes it easy for auditors to focus on activities that provide the greatest value to clients (Luo et al. 2018). The literature also shows that the quality of the audits produced by audit firms who invest more in AI is significantly improved, as seen by a considerable fall in the number of misstatements for issued audits, including major restatements and accruals restatements.

Using AI-based technology in auditing provides auditors with the option of automating auditing procedures from stage to stage (Moffitt et al. 2018). From pre-engagement to presenting an audit report's opinion, effectiveness is critical at each stage (Kokina and Davenport 2017).

As operations become more complex in today's business environment, the widely applied technology-based decision tools become increasingly important. Consequently, to stay ahead of the curve, the audit profession is adapting to this transition by incorporating AI technology. Considering the necessity to adopt AI tools and a sound auditor's professional skepticism, AI is viewed as an underlying aspect that would enhance the interaction among AI tools and the audit process. This necessitated modifying the original research model to include abilities of the use of information technology (IT) tools and professional audit competencies. This further supported the study's abductive technique (Aduloju et al. 2014).

The use of AI technology supports the improvement of the accuracy and efficiency of the auditing process. It also assists in identifying potential issues with a company's financial statements and has helped to identify potential fraud on a company's books. It is also beneficial for identifying potential issues with a company's accounting practices. Implementing AI assists in enhancing the accuracy of a company's accounting operations even more (Kaplan and Haenlein 2019). Other than that, the technology has also helped to improve the quality of an audit. The use of AI has helped to ensure that an audit is

conducted in a timely, accurate and thorough manner (Aduloju et al. 2014). Evidently, AI is a powerful tool that can help to make audits more efficient and cost-effective. It has also shown to be a reliable way of reducing the risk of human error. AI should definitely be considered if organizations are looking for an innovative way to improve their auditing process.

This study differs from earlier studies in the following ways. We investigated external auditors' perceptions of AI's contribution to audit quality, whereas Balios et al. (2020) sought to investigate the impact of big data and data analytics on external auditing. Lina and Klovienė (2019) investigated the use of big data analytics in external auditing from a contingency theory approach. Khamis (2021) investigated the implications and impact of AI on the efficiency and effectiveness of the auditing process as well as various accounting decision-making processes. Albawwat and Yaser (2021) conducted a descriptive study in Jordan to investigate the perceived ease of use, usefulness and contribution to audit quality of various AI types: assisted, augmented and autonomous. An online questionnaire was used to collect information from 124 auditors representing Jordanian audit firms.

Consequently, the current paper seeks to make the following contributions to the existing literature. First, we add to the literature by highlighting the external auditors' perceptions of the contribution of AI to audit quality. However, in the existing auditing literature, the external auditor's perceptions of AI to audit quality have not been investigated in the United Arab Emirates. Second, because external auditor perceptions in particular and employee perceptions, in general, have been strongly recommended to improve audit quality, a study into how auditors perceive AI is extremely important and might have a significant impact on audit productivity. Third, there is limited studies on AI and its application in auditing around the world, including in the UAE, and the research in this area has not yet reached the best level. Therefore, our paper fills this research gap.

The rest of the paper is structured as follows. Section 2 presents the literature review and hypotheses development. Section 3 presents the sample selection process and the research design. Section 4 presents the data analysis, the findings and the discussion. Section 5 concludes the paper.

2. Literature Review and Hypotheses Development

2.1. Theoretical Framework

AI is a branch of computer science and engineering concerned with developing intelligent machines or computers capable of reasoning, learning and acting autonomously. AI applications can analyze large amounts of data, recognize patterns and make decisions on their own (Hemin 2017). There is a growing trend of using AI in auditing in the UAE. The automation of many tasks that are currently performed by humans, such as data entry and analysis, is the primary reason for its growing popularity. This has made audits much more efficient and cost-effective, providing audit teams with greater insights into the business they are auditing (Hassan 2022). Another benefit of using AI in auditing is that it can help to reduce the risk of human error. By automating certain tasks, audit teams can easily identify and correct any mistakes that may be made. This is particularly important in cases where the accuracy of financial data is crucial (Omoteso 2012).

The use of AI in auditing is still in its early stages in the UAE, but a few companies are already using it to help with the auditing process. Etisalat, for example, is using AI to help with customer service, and companies such as PricewaterhouseCoopers (PwC) are using it to help with auditing and compliance (Schulenberg 2007). There are a number of ways that AI can be used in auditing. It can be used to help with data analysis and the review of documents and to help with the decision-making process. In addition, AI can be used to create customized reports specific to an organization's needs (Gentner et al. 2018).

Chukwuani and Eginyi (2020) investigated the impact of AI on the accounting field. By doing this, they demonstrated the amount of development in the accounting sector regarding the automation of the accounting process. They concluded by outlining the role that accountants play in contemporary automation and how accountants in the twenty-

first century can adjust to the industry's pervasive automation. Through survey-based descriptive research, [Chukwudi et al. \(2018\)](#) presented the effects of AI on accounting tasks. In their study, they found that the use of AI had a favorable impact on how well accounting firms in South East Nigeria performed their duties.

In a study on Malaysian firms using various AI-based accounting software, [Lee and Tajudeen \(2020\)](#) found that AI use is not limited to large firms. They also realized that businesses were employing AI-based accounting software to save invoice images and fully automate the information collection process.

2.2. Literature Review

2.2.1. Application of AI in Auditing

Some studies focus on how AI is being used in auditing. For instance, [Schulenberg \(2007\)](#) investigated how AI is being used in auditing through "Cognitive Auditing". Cognitive auditing is a computerized process that uses AI to help auditors find errors and issues in financial reports. IBM created cognitive auditing, which employs machine learning algorithms to assist auditors in identifying mistakes and anomalies in financial reporting ([Schulenberg 2007](#)). Another study ([Gentner et al. 2018](#)) confirmed that AI is being used in auditing to help auditors find errors and issues in financial reports faster. It is also being used to help auditors identify patterns in data and make predictions or decisions. [Nwakaego and Ikechukwu \(2015\)](#) mentioned that AI is revolutionizing the auditing process and AI-enabled auditing software can carry out complex audits much more efficiently and accurately than humans can. It can also analyze large volumes of data much more quickly and effectively than a human auditor can. This means that AI can play a much more vital role in the auditing process and is likely to become increasingly important in the years to come. [Chassignol et al. \(2018\)](#) focused on the use of AI in helping auditors to identify and prevent fraud. AI can be used to identify patterns in data that may indicate fraud is taking place. This can then be used to investigate the matter further and arrest those responsible. AI has enormous potential to improve the overall auditing process, as it can speed up the process enormously and help ensure that audits are carried out accurately and efficiently. As AI continues to develop, its role in auditing will likely become even more significant. According to [Lin and Hazelbaker \(2019\)](#), AI will enhance the quality of accounting activities and offer more meaningful information, whereas [Nickerson \(2019\)](#) agreed that it could increase productivity by performing other high-level tasks and creating new jobs.

Similarly, [Greenman \(2017\)](#) believes that it is common for the job description of accountants to develop throughout time. To accomplish business objectives, accountants can utilize AI technology and concentrate on more complex duties ([Lin and Hazelbaker 2019](#)). According to a report by the Association of Chartered Certified Accountants (ACCA), AI would enable accountants to refocus their efforts from traditional activities such as bookkeeping and transaction recording to services such as consultation, advising and growth planning ([Jariwala 2015](#)).

2.2.2. Risks and Benefits of Artificial Intelligence

Few researchers have investigated the potential drawbacks of AI in auditing. However, the potential use of AI to significantly minimize the need for human auditors is maybe much more significant. Companies may no longer need human auditors to audit their books as AI becomes more efficient at identifying errors and anomalies in financial data. This could result in significant job losses in the auditing sector and lower the quality of financial audits ([Hemin 2017](#)).

According to one of the University of Oxford studies mentioned by the Institute of Chartered Accountants in England and Wales ([ICAEW 2016](#)), 95% of accountants risk losing their jobs due to the development of new machine technology. [Chassignol et al. \(2018\)](#) mentioned that AI could threaten financial data security. As AI becomes better at identifying patterns in data, it may be able to identify sensitive information that should not

be disclosed to outsiders. If this information fell into the wrong hands, it could be used to exploit financial institutions or to commit other crimes. The literature also demonstrates the advantages of applying AI. According to [Kokina and Davenport's \(2017\)](#) argument, it becomes difficult to incorporate massive amounts of structured and unstructured data to gain insight into a company's financial and non-financial performance. As a result, auditing is well suited to data analytics and AI applications.

Similarly, automating audit tasks can speed up audit assignment completion while maintaining data integrity. Automatic analysis of accounting entries is one way in which AI is transforming auditing ([Baldwin et al. 2006](#)). According to [Moffitt et al. \(2018\)](#), utilizing AI to create automatic entries helps reduce human mistakes and sometimes detect fraudulent intrusion to decrease human intervention.

2.2.3. Technology Acceptance Model

According to [Davis \(1989\)](#), the technology acceptance model (TAM) is an information systems theory that outlines how users accept and use technology. Real system usage is the point at which humans employ technology. Users' behavioral intentions are one factor that inspires them to use technology. The attitude (AT) regarding the broad impression of the technology influences the behavioral intention (BI). When new technology is offered to customers, the model contends that a range of factors impact their decision on how and when to utilize it.

In this study, the technology acceptance model refers to how people interact with and accept AI. This includes how people view AI technology, how they use it and how they think about it. Figure 1 shows the theoretical research framework adapted from TAM.

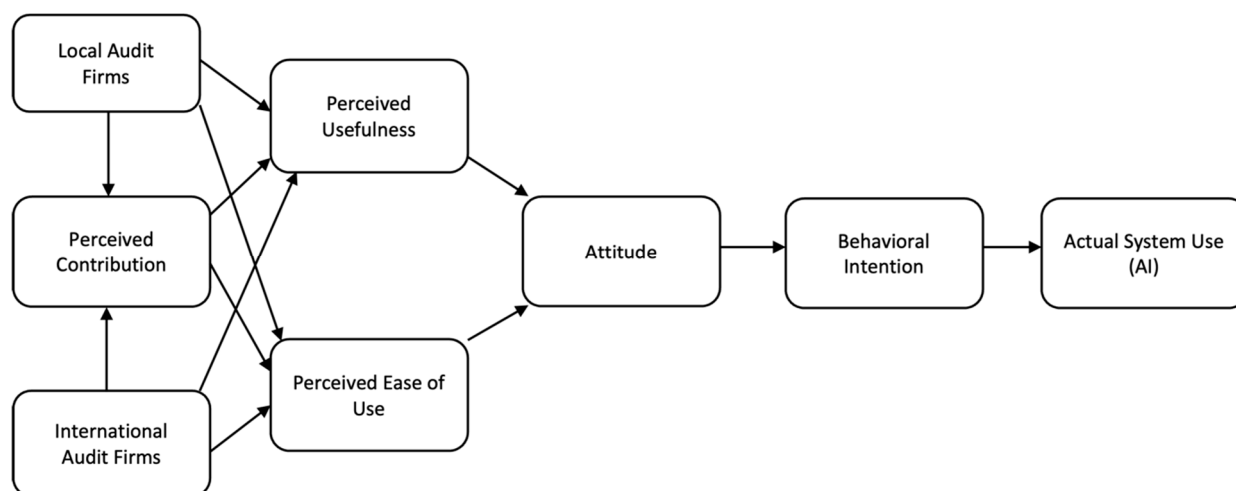


Figure 1. Research framework adapted from technology acceptance model ([Davis 1989](#)).

2.2.4. Perceived Contribution and Acceptance of AI

There have been other studies about the auditors' interactions and acceptance of AI technologies ([Omoteso 2012](#)). The manner in which people engage with and accept AI technology were mentioned as being part of the AI technology acceptance model. This encompasses how individuals use, perceive and think about AI technology. Passively, actively and skeptically are the three basic ways that humans engage with and adopt AI technology ([Omoteso 2012](#)).

[Hassan \(2022\)](#) mentioned that people passively accept AI technology as it is presented to them. They may not understand how it works or what it can do, but they accept it as a part of their life. This type of acceptance is common among people who are unfamiliar with AI technology or have negative preconceptions about it. Active acceptance occurs when people use AI technology in a way that benefits them or helps them to achieve their goals. They understand how it works and can use it to improve their lives. Skeptical acceptance is

when people do not believe in AI technology or think it is impossible to achieve. They may be afraid of its capabilities or think it will harm them in somehow.

Askary et al. (2018) focused on the factors influencing how people interact with and accept AI technology. These include personal beliefs, experience with the technology, social norms and the environment in which the technology is used. Personal belief is people's opinions about themselves and the world around them. They can influence how people view AI technology and how they use it. For example, people who believe that AI is a tool that can be used to improve their lives will be more likely to accept it actively. A social norm is the expectation that society has about a certain behavior. They can influence how people use or accept AI technology. The environment in which the technology is used can also affect how people interact with and accept it. For example, if a person uses AI technology at work, they are likely to be more active than those who use it at home. There are several ways that people can interact with and accept AI technology. These factors include passive factors, active factors and skeptical factors.

AI is introducing audit effectiveness and efficiency in a variety of ways. AI is evolving at an impeccable time, as suggested by Hemin (2017). Auditors today must sift through massive amounts of data and make sense of it in a short period. For example, entering accounting data into auditing software allows auditors to collect processed data in the background.

There are several potential contributions that AI could bring to the audit process, including improving accuracy and efficiency. AI can help automate specific tasks, such as data entry and analysis, improving accuracy and speeding up the auditing process. AI can help to generate more insights and understanding of complex data sets, which can improve the accuracy and reliability of audit reports (Hassan 2022). AI can help to improve communication and collaboration between auditors and other stakeholders, enabling better decision-making and improved audit quality. Overall, there is evidence to suggest that AI could positively impact audit quality in the UAE. However, it should be important to carefully consider how it is used and evaluated before any definitive conclusions can be drawn.

2.2.5. Research Gap

Since the majority of studies in the literature have concentrated on identifying the advantages of AI, the current study contributes to the body of knowledge by examining the perceived contribution of AI to the quality of external audits and determining the significant differences between local and international audit firms in the UAE. The literature also supports the study's results by focusing on the use of AI in the auditing process. According to Schulenberg (2007), the use of AI in auditing is still in its early stages in the UAE, but there are already a few companies that are using it to help the auditing process. The study mentioned the example of Etisalat, which is using AI to help with customer service, and companies such as PwC use it to help with auditing and compliance. According to Gentner et al. (2018), there are several ways that AI can be used in auditing. It can be used to help with data analysis, review documents and assist in the decision-making process. The study's findings also supported that AI can be used to create customized reports specific to an organization's needs. According to Aduloju et al. (2014), several benefits can be gained from using AI in auditing. It can help organizations to [1] save time and resources; [2] improve their accuracy and precision when reviewing documents; [3] identify potential risks more quickly and accurately; and [4] improve their decision-making process. In this way, it is confirmed that there is no significant difference in the perceived contribution of AI to audit quality between local and international audit firms in the UAE. Hassan (2022) also supported the results of the study by emphasizing the positive impact of AI on audit quality. There are various potential improvements man-made reasoning could bring to review interactions, including improving precision and effectiveness.

AI insight can assist with mechanizing specific errands, such as the passage and examination of information, which can further develop exactness and accelerate the evaluation

system. More considerable knowledge and understanding of AI knowledge can assist with creating more experiences and comprehension of complicated informational collections, which can help to develop the precision and dependability of review reports. Upgraded correspondence and cooperation with AI can assist by further developing correspondence and joint efforts among reviewers and different partners, which can empower a better independent direction and further develop review quality. There is proof to propose that man-made reasoning could emphatically affect the review quality in the UAE. Notwithstanding, it is critical to thoroughly consider how things are utilized and assessed before any authoritative ends can be drawn.

2.3. Hypotheses Development

[Al-Aroud \(2020\)](#) indicated that AI technologies are critical for the future of the auditing profession. These technologies are critical tools that provide auditing professionals with the tools they need to improve the effectiveness and efficiency of their jobs. The researcher's study aimed to investigate the impact of AI technologies on audit evidence from the perspective of certified auditors in Jordanian IT companies. This study found that an expert system significantly impacted audit evidence. The use of neural network technology had no discernible impact on audit evidence. The study recommended that audit offices in Jordan take a greater interest in AI technologies because of their scientific importance in improving the collection of audit evidence.

According to [Demska \(2007\)](#) and [Greenman \(2017\)](#), deep learning enables the implementation of various machine learning applications and expands the scope of AI research. Deep learning has already been used in a variety of applications. AI can be viewed as a "container" of human wisdom. As a result, the advancement of deep learning algorithms and methods expands this "container" to the extent that humans cannot predict. The argument is that auditors have widely adopted the new techniques and tools made available by IT and AI. They made more relevant and timely information available to facilitate and accelerate the auditor's decision-making process. As a result, they increased the audit's effectiveness and quality ([Vasarhelyi and Kogan 1998](#)).

[Deniz and Sorenson \(2022\)](#) mentioned that many businesses are either adopting AI applications or considering their implementation for enterprise processes, which is relevant to financial statement information. That means auditors may soon be required to understand how AI processes can impact the substance underlying the financial information. [Solaimani et al. \(2020\)](#) examined the connection between corporate control and AI in the UAE emerging market. In the previous study, the research questions were developed through an exploratory investigation. Using the nonprobability purposive sample technique, 10 interviewees with extensive expertise were chosen. Semi-structured interviews were used in 2019 to obtain comprehensive primary data. The findings indicated that AI has a favorable effect on business efficiency and the auditing process, but its influence on accounting information systems is less certain. In order to improve the business performance and lower the chance of AI systems being misused, the researchers advised managers to carefully choose accounting specialists who can work with these AI systems.

As a result, the following hypotheses are stated:

H1. *There is a perception of external auditors in the UAE that using AI contributes to audit quality.*

H2. *The perceived contribution of AI usage to audit quality significantly differs between local and international external auditors in the UAE.*

3. Research Design

3.1. Sample and Data

The population of this study consisted of respondents from local and international audit firms in the UAE. The target respondents of the survey were external auditors with various backgrounds. The participants were either the auditing manager, audit partners, senior auditors or other personnel who may have experience in the field of accounting and

auditing. The final sample received were from 22 local audit firms and 41 international audit firms.

3.2. Dependent Variable

The technology acceptance model (TAM) is a popular theory of information systems that describes a user's adaptation, acceptance and use of technology. The point at which people adopt technology is referred to as genuine system utilization. One aspect that motivates people to utilize technology is their behavioral goals. According to the model, the attitude or a general impression of the technology determines the behavioral intention. When users are presented with modern technology, the model asserts that a variety of factors influence their decision on how and when to use it for various purposes. The acceptance model of AI technology relates to how humans engage with and accept the contribution of AI to audit quality. This encompasses how people perceive AI technology, how they use it and how they think about it. People interact with and adopt AI technology in three ways: passively, actively and skeptically (Omoteso 2012).

We refer to a study by Albawwat and Yaser (2021) which adopted items from the Financial Reporting Council (FRC) report on "The Use of Technology in the Audit of Financial Statements") to construct the survey items as shown in Table 1. Perceived contribution (PC) is the dependent variable which was used to measure the acceptance of AI toward audit quality and what the respondents think about the contribution of this disruptive technology.

Table 1. Items for perceived contribution to audit quality.

Item Code	Items for Perceived Contribution to Audit Quality (Adapted from Albawwat and Yaser 2021)
PC1	Using AI systems and tools in auditing will aid my professional skepticism.
PC2	Using AI systems and tools in auditing will automate routine audit processes and procedures, allowing more time to focus on areas of significant judgment.
PC3	Using AI systems and tools in auditing will deepen my understanding of the entity and its processes.
PC4	Using AI systems and tools in auditing will facilitate robust risk assessment through the analysis of entire populations.
PC5	Using AI systems and tools in auditing will enable ongoing risk assessment throughout the audit process.
PC6	Using AI systems and tools in auditing will facilitate the focus of audit testing on the areas of the highest risk through the stratification of large populations.
PC7	Using AI systems and tools in auditing will enable me to perform tests on large or complex datasets where a manual approach would not be feasible.
PC8	Using AI systems and tools in auditing will enable the independent re-performance of complex calculations and modeling.
PC9	Using AI systems and tools in auditing will improve consistency and central oversight in group audits.
PC10	Using AI systems and tools in auditing will identify instances of potential fraud.
PC11	Using AI systems and tools in auditing will identify unusual patterns and exceptions that might not be discernible using more traditional audit techniques.

3.3. Independent Variable

We examined two types of independent variables, which are local audit firms and international audit firms. We wanted to identify the perceived contribution of using AI to audit quality for each type of independent variable. The second objective was to identify if there is any significant difference in the perceived contribution of using AI to the evidence of audit quality between local and international audit firms in the UAE. The characteristics of respondents from independent variables were varied with regard to job position, years of experience and qualification.

4. Data Analysis and Results

4.1. Validity and Reliability Test of the Instrument

To ensure the validity and reliability of the survey instruments, Cronbach's alpha was used as it is the most useful test to check the scale's reliability and consistency. Eleven survey items were tested, with the result of the reliability test being 0.96 as in Table 2, which indicated the value of Cronbach's alpha is at the exceptionally proficient level. This shows that the survey's items are internally consistent, valid and reliable.

Table 2. Validity and reliability test.

Cronbach's Alpha	Number of Items
0.96	11

4.2. Demographic Analysis

In the demographic part of the survey, the respondents needed to supply information about the type of audit firm that they are currently employed in, their gender, education qualifications, years of experience, current job positions and professional certifications. Figure 1 shows the percentage for the two types of audit firms. This accounted for 65% of respondents who work in international audit firms, whereas 35% are employed in local audit firms (Figure 2).

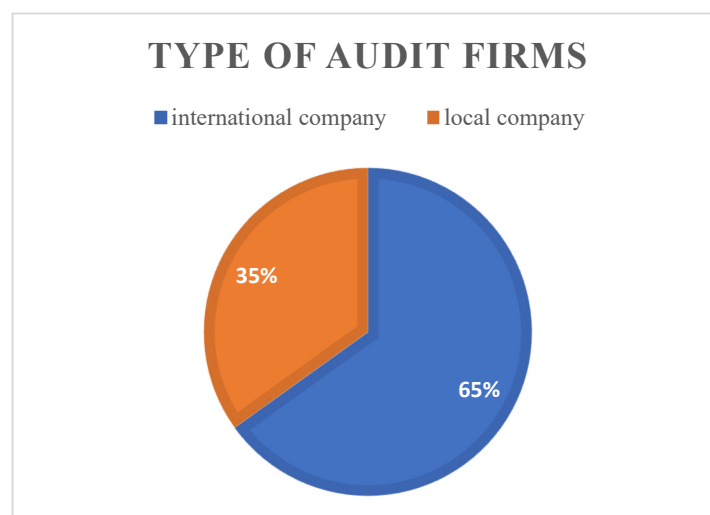


Figure 2. Dominating presence of respondents from international audit firms.

Table 3 shows the gender of the participants. It shows that 52% of the respondents are females, whereas 48% of the respondents are males. With regard to respondents' qualifications, 57% of the total population have a bachelor's degree. The number of master's degree holders is 28%, whereas the number of Ph.D. holders is only 2%. Another 13% of the participants are qualified with other types of certifications. Regarding the years of experience, 38% of the participants have 6 years of work experience, 25% of the participants in the survey have 0–2 years of work experience, 21% have experience of at least 4 years and 16% have experience of at least 2 years but less than 4 years. As for the job position, 22% of the population work as auditor managers, whereas 21% work as senior auditors, 22% work as auditor partners and 35% have other job positions. The table also shows that 11% of the participants hold CPA certificates for their professional certification; 19% of participants have ACCA certificates, whereas 3% hold CIA certificates. Finally, it shows that 14% of the participants hold local certificates, whereas 51% hold other professional certifications.

Table 3. Items for demographics.

Demographic Items		Frequency	Response Rates
Type of Audit Firms	Local Audit Firms	22	35%
	International Audit Firms	41	65%
Gender	Female	33	52%
	Male	30	48%
Education Degree	Bachelor's Degree	36	57%
	Master's Degree	18	28%
	Ph.D. Degree	1	2%
	Other	8	13%
Years of Experience	0–2 Years	16	25%
	Above 2, less than 4	10	16%
	Above 4, less than 6	13	21%
	More than 6 years	24	38%
Job Position	Audit Partner	14	22%
	Audit Manager	14	22%
	Senior Auditor	13	21%
	Other	22	35%

4.3. Descriptive Statistics

We present the descriptive statistics to identify the perceived contribution of using AI to audit quality, specifically for each type of audit firm. The data was collected from respondents of two types of audit firms in the UAE that include (1) local audit firms ($n = 22$) and (2) international audit firms ($n = 41$). The descriptive statistics in Table 4 show that the perceived contribution of AI toward audit quality for local audit firms revealed an overall mean score of 3.975 ($SD = 0.736$) and (2) international audit firms had an overall mean score of 3.927 ($SD = 0.768$). This indicates that the perceived contribution of AI toward audit quality scores the highest ratings by respondents who work in local audit firms compared to the international audit firms.

Table 4. Descriptive statistics.

Perceived Contributions		
	(1) Local Audit Firms	(2) Int. Audit Firms
Valid	22	41
Mean	3.975	3.927
Std. Deviation	0.736	0.768

Table 5 shows the descriptive analysis for each survey item to compare the mean of the survey items of perceived contributions (PC) between local and international audit firms. The results in Table 5 show that items in PC4 had the highest mean value of 4.091 ($SD = 0.921$) for (1) local audit firms, indicating that the perceived contribution of AI systems creates a robust risk assessment through the analysis of the whole population. This result was also supported in the study by Puthukulam et al. (2021), which indicated that AI and ML process large data in a faster time and offer the ability to enhance the quality of risk assessment. Furthermore, items in PC10 had the highest mean value for both category (1) and (2), with 4.091 ($SD = 0.921$) for (1) local audit firms and 4.000 ($SD = 0.922$) for (2) international audit firms. This indicates that both categories of audit firms agree

that the perceived contribution of AI systems identifies instances of some potential threats and frauds, as also proven by the study, and assists with professional skepticism and judgement. It indicates that AI helps in detecting errors and frauds by using predictive analysis methods (Puthukulam et al. 2021). Hence, H1 confirmed that there is a perceived contribution of using AI to the audit quality for each type of audit firm.

Table 5. Descriptive statistics for survey items of perceived contributions.

	PC4		PC10	
	(1) Local Audit Firms	(2) Int. Audit Firms	(1) Local Audit Firms	(2) Int. Audit Firms
Valid	22	41	22	41
Mean	4.091	3.878	4.091	4.000
Std. Deviation	0.921	0.900	0.921	0.922

4.4. Hypotheses Testing

To answer hypothesis 2, an independent samples *t*-test was conducted to contrast the perceived contributions among external auditors in local and international audit firms in the UAE. The results in Table 6 show that there were non-significant differences (*t* (df) = 61, *p* = 0.81) in scores for (1) local audit firms (*n* = 22) (*M* = 3.975, *SD* = 0.736) and (2) international audit firms (*n* = 41) (*M* = 3.927, *SD* = 0.768). The magnitude of the differences in the means (mean difference = 0.048, 95% CI: −0.352 to 0.448) was not significant. Therefore, H2 is rejected.

Table 6. Independent samples *t*-test of perceived contribution.

Independent Samples <i>t</i> -Test						95% CI for Mean Difference	
	<i>t</i>	df	<i>p</i>	Mean Difference	SE Difference	Lower	Upper
PEOU	0.242	61	0.810	0.048	0.200	−0.352	0.448

p-value associated with the *t*-test is significant at *p* < 0.05.

4.5. Discussion

To revisit the research questions, this study examined the perception of external auditors in the UAE toward the contribution of AI to audit quality. The aim of the research was also to determine if there is any significant difference between local and internal auditors toward the perceived contribution of AI usage to audit quality. Survey data were analyzed using a difference statistical test, which included a validity and reliability test to ensure the reliability of the survey instruments. Descriptive statistics were conducted to test hypothesis 1 to identify the perceived contribution of using AI to audit quality, specifically for each type of audit firm, whereas an independent samples *t*-test was performed to test hypothesis 2 to determine the significant differences in the perceived contributions among external auditors in local and international audit firms in the UAE.

From the results of the hypotheses testing derived from the research questions, the external auditors who work in both audit firms agree that the perceived contribution of AI systems and tools in auditing identify instances of potential threats and frauds. Hence, H1 was confirmed; there is a perceived contribution of using AI to the audit quality for each type of audit firm. The literature also supports the results of the study by focusing on the use of AI in the auditing process. According to Schulenberg (2007), the use of AI in auditing is still in its initial stage in the UAE, but there are already a few companies that are using it to help with the auditing process. The study mentioned the example of Etisalat, which has used AI to help with customer service, and a company such as PwC has used it to help with auditing and compliance. There is another study in the literature that supported the results of the study. According to Gentner et al. (2018), there are several ways that AI can be used in

auditing. It can be used to help with data analysis, document review and decision-making. The study's findings also supported the idea that AI can be used to create customized reports specific to an organization's needs. Using AI can help organizations to save time and resources and to support organizations in improving their accuracy and precision when reviewing documents. It also can assist organizations in identifying potential risks more quickly and accurately and improving their decision-making process.

For hypothesis 2, the results of the study found that there is no significant difference in the perceived contribution to audit quality of using AI between external auditors who work in local and international audit firms in the UAE. This is supported by prior research. Another study focused on the importance of audit efficiency and mentioned that audit activity provides the highest value for a given amount of input, such as managerial time, training and firm capital. The study found that AI is introducing audit effectiveness and efficiency in a variety of ways and is evolving at the perfect time. The study put emphasis on the focus of auditors to examine a huge amount of data and make sense of it in a shorter amount of time. Entering accounting data into auditing software allows auditors to collect processed data in the background. [Hassan \(2022\)](#) also supported the study's results by emphasizing the positive impact of AI on audit quality. Artificial reasoning could bring various potential developments to review interactions, including improving precision and effectiveness. Artificial insight can assist with mechanizing specific errands, such as the passage and examination of information, which can further develop exactness and accelerate the evaluation system. As reported by one of the local audit firms in the UAE, the application of AI as an intelligence auditing tool can change the auditing function in this country by helping to process many databases, reducing human interplay and making AI a necessity for auditors. However, UAE auditors are challenged to find AI's true potential and use it to assist with audit quality ([Avianna Accounting 2021](#)).

5. Conclusions

The findings from this study contribute to the measurement of perceptions on AI's contributions that could assist practitioners and researchers in adopting this disruptive technology to their auditing process. This study contributes to the body of new knowledge by examining the perceived contribution of AI to the quality of external audits and determining the significant differences between local and international audit firms in the UAE. As a consequence of knowing the perceptions among external auditors and their acceptance toward using AI technology, AI can be used to assist in auditing, and concurrently, auditors can increase their technical skills regardless of which type of audit firm they work for. The practical implications of these research findings are critically important for accounting professionals and corporate executives. Managers in the private and public sectors should consider the value and importance of adopting AI to improve work speed and quality. However, they must plan and organize AI adoption to avoid unsatisfactory results. In addition, managers should select skillful accounting professionals who can integrate with these AI systems to improve firm performance and reduce the risk of misusing the AI systems.

Related to the research limitation, this study has several challenges due to the limited sample study received. As the population of the independent variables are unknown, we managed to obtain 63 responses, of which 22 were from local audit firms and 41 were from international audit firms in the UAE. We would suggest future studies to have a larger sample size and to identify different determinants such as a comparison between the Emirates or a cross-country study that is able to identify the perceived contributions among different policy makers. Secondly, we recommend investigating the contribution of AI from a distinct perspective, not only concerning audit quality but regarding different audit processes.

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References

- Aduloju, Kunle, Olowokudejo Folake, and Obalola Musa. 2014. Information technology and customer service performance among insurance companies in Nigeria. *European Journal of Business and Management* 6: 80–87. [CrossRef]
- Al-Aroud, Shaher Falah. 2020. The Impact Of Artificial Intelligence Technologies On Audit Evidence. *Academy of Accounting and Financial Studies Journal* 24: 1–11.
- Albawwat, Ibrahim, and Frijat Yaser. 2021. An analysis of auditors' perceptions towards Artificial Intelligence and its contribution to audit quality. *Accounting* 7: 755–62. [CrossRef]
- Askary, Saeed, Nasser Abu-Ghazaleh, and Yasean Tahat. 2018. Artificial Intelligence and reliability of accounting information. *Lecture Notes in Computer Science* 11195: 315–24. [CrossRef]
- Avianna Accounting. 2021. How Artificial Intelligence will Change the Auditing Function in Dubai, UAE. Available online: <https://aviaanaccounting.com/best-audit-firms-in-dubai-uae/> (accessed on 12 May 2022).
- Baldwin, Amelia, Carol E. Brown, and Brad S. Trinkle. 2006. Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing. *Intelligent Systems in Accounting, Finance and Management* 14: 77–86. [CrossRef]
- Balios, Dimitris, Panagiotis Kotsilaras, Nikolaos Eriotis, and Dimitris Vasiliou. 2020. Big data, data analytics and external auditing. *Journal of Modern Accounting and Auditing* 16: 211–19.
- Chassignol, Maud, Aleksandr Khoroshavin, Alexandra Klimova, and Anna Bilyatdinova. 2018. Artificial Intelligence trends in education: A narrative overview. *Procedia Computer Science* 136: 16–24. [CrossRef]
- Chukwuani, Victoria Nnenna, and Modeska Amaka Egiyi. 2020. Automation of Accounting Processes: Impact of Artificial Intelligence. *International Journal of Research and Innovation in Social Science (IJRISS)* 4: 444–49. Available online: <https://www.rsisinternational.org/journals/ijriss/Digital-Library/volume-4-issue-8/444-449.pdf> (accessed on 12 May 2022).
- Chukwudi, O. Longinus, Silas C. Echefu, Uche Boniface, and Nnenna V. Chukwuani. 2018. Effect of Artificial Intelligence on the Performance of Accounting Operations among Accounting Firms in South East Nigeria. *Asian Journal of Economics, Business and Accounting* 7: 1–11. [CrossRef]
- Davis, Fred D. 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly* 13: 319–40. [CrossRef]
- Demski, Joel S. 2007. Is accounting an academic discipline? *Accounting Horizons* 21: 153. [CrossRef]
- Deniz, Appelbaum, and Jeffery Sorenson. 2022. Artificial Intelligence and the Auditor: Are You Ready? Available online: <https://idea.caseware.com/ai-auditor-are-you-ready/> (accessed on 3 June 2022).
- Gentner, Daniel, Birgit Stelzer, Bujar Ramosaj, and Leo Brecht. 2018. Strategic foresight of future b2b customer opportunities through machine learning. *Technology Innovation Management Review* 8: 5–17. [CrossRef]
- Greenman, Cindy. 2017. Exploring the impact of Artificial Intelligence on the accounting profession. *Journal of Research in Business, Economics and Management* 8: 1451.
- Hassan, Rizvan Ahmed. 2022. Artificial Intelligence (AI) in accounting & auditing: A Literature review. *Open Journal of Business and Management* 10: 440–65.
- Hemin, Ali Qadir. 2017. Will Artificial Intelligence Brighten or Threaten the Future Science, Ethics, and Society. Available online: https://www.researchgate.net/publication/323535179_Will_Artificial_Intelligence_Brighten_or (accessed on 6 June 2022).
- ICAEW. 2016. Artificial Intelligence and the Future of Accountancy. Available online: <https://www.icaew.com/-/media/corporate/files/technical/information-technology/thoughtleadership/artificial-intelligence-report.ashx> (accessed on 6 June 2022).
- Jariwala, Harsha Vijaykumar. 2015. Analysis of financial literacy level of retail individual investors of Gujarat State and its effect on investment decision. *Journal of Business & Finance Librarianship* 20: 133–58.
- Kaplan, Andreas, and Michael Haenlein. 2019. Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of Artificial Intelligence. *Business Horizons* 62: 15–25. [CrossRef]
- Khamis, Abdullah. 2021. The Impact of Artificial Intelligence in Auditing and Accounting Decision Making. Available online: https://www.researchgate.net/publication/352166419_The_Impact_of_Artificial_Intelligence_inAuditing_and_Accounting_Decision_Making (accessed on 23 May 2022).
- Kokina, Julia, and Thomas H. Davenport. 2017. The Emergence of Artificial Intelligence: How Automation Is Changing Auditing. *Journal of Emerging Technologies in Accounting* 14: 115–22. [CrossRef]

- Lee, Cheah Saw, and Farzana P. Tajudeen. 2020. Usage and Impact of Artificial Intelligence on Accounting: 213 Evidence from Malaysian Organisations. *Asian Journal of Business and Accounting* 13: 213–40. [CrossRef]
- Lin, Paul, and Tom Hazelbaker. 2019. Meeting the challenge of Artificial Intelligence. *CPA Journal* 89: 48–52. Available online: <https://www.cpajournal.com/2019/07/03/meeting-the-challenge-of-artificial-intelligence/> (accessed on 27 May 2022).
- Lina, Dagiliene, and Lina Klovienė. 2019. Motivation to use Big Data and Big Data Analytics in external auditing. *Managerial Auditing Journal* 34: 750–82.
- Luo, Yuchuan, Ming Xu, Kai Huang, Dongsheng Wang, and Shaojing Fu. 2018. Efficient auditing for shared data in the cloud with secure user revocation and computations outsourcing. *Computers & Security* 73: 492–506.
- Moffitt, Kevin C., Andrea M. Rozario, and Miklos A. Vasarhelyi. 2018. Robotic process automation for auditing. *Journal of Emerging Technologies in Accounting* 15: 1–10. [CrossRef]
- Nickerson, Mark A. 2019. AI: New Risks and Rewards. Available online: <https://sfmagazine.com/post-entry/april2019-ai-new-risks-and-rewards> (accessed on 11 May 2022).
- Nwakaego, Duru Anastasia, and Okpe Innocent Ikechukwu. 2015. The effect of accounts payable ratio on the financial performance of food and beverages manufacturing companies in Nigeria. *Journal of Research in Business and Management* 3: 15–21.
- Omoteso, Kamil. 2012. The application of Artificial Intelligence in Auditing: Looking back to the future. *Expert Systems with Applications* 39: 8490–95. [CrossRef]
- Puthukulam, Gopalan, Anitha Ravikumar, Ravi Vinod Kumar Sharma, and Krishna Murthy Meesaala. 2021. Auditors' Perception on the Impact of Artificial Intelligence on Professional Skepticism and Judgment in Oman. *Universal Journal of Accounting and Finance* 9: 1184–90. [CrossRef]
- Raji, Inioluwa, and Joy Buolamwini. 2019. Actionable Auditing: Investigating the Impact of Publicly Naming Biased Performance Results of Commercial AI Products. Paper presented at the 2019 AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society, Honolulu, HI, USA, January 27–28.
- Solaimani, Reem, Fatima Rashed, Shahad Mohammed, and Walaa Wahid ElKelish. 2020. The impact of artificial intelligence on corporate control. *Corporate Ownership and Control* 17: 171–78. [CrossRef]
- Salem, Mohamed S. M. 2012. An overview of research on auditor's responsibility to detect fraud on financial statements. *Journal of Global Business Management* 8: 218.
- Schulenberg, Jennifer L. 2007. Analysing police decision-making: Assessing the application of a mixed-method/mixed-model research design. *International Journal of Social Research Methodology* 10: 99–119. [CrossRef]
- The Organization for Economic Co-operation and Development (OECD). 2021. Available online: [Oecd.org](https://www.oecd.org/) (accessed on 3 May 2022).
- Vasarhelyi, Miklos A., and Alex Kogan. 1998. *Artificial Intelligence in Accounting and Auditing: Towards New Paradigms*. Princeton: Markus Wiener Publishers, vol. 4.