

The Role of Artificial Intelligence Technologies in Enhancing External Audit Quality

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Abstract: - External audits are making better using AI technologies for boosting efficiency, accuracy, and how quickly risks are spotted. In fact, AI helps make the audit process more reliable and effective by taking over repetitive tasks, strengthening predictive analysis, and improving fraud detection. This study aims to determine how AI techniques, like expert systems, artificial neural networks, and robotics, are improving audit quality in Jordanian audit firms. The study population consists of all practicing external auditors in Jordan, totaling 542 auditors. A sample of 244 auditors was used to achieve the study's objectives. The study results showed that AI technologies positively impact enhancing the quality of external auditing.

Key-Words: - Artificial Intelligence (AI), external audit quality, expert systems, artificial neural networks, robotics, Jordanian audit firms.

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1 Introduction

Artificial intelligence is one of the fastest-growing areas of human intelligence simulation. In 1950, Alan Turing developed the Turing Test to evaluate machine abilities in stimulating human intelligence, and scientists continued working on reaching advanced levels of machine learning that we see today. In addition, it is expected that the field will continue to grow and will influence many aspects of human life with increasing technological progress in research and development, [1]. Recent events have resulted insignificant global economic losses and disruptions in the ability of companies to prepare regular financial reports due to the epidemic of COVID-19. The epidemic has led to a lack of financial and non-financial information, a lack of reliable data in accounting and auditing, and thus an impact on external audit processes. As a result, the international community is forced to adapt to this crisis using

technological advances, especially in the field of audit, and technology is now the center of focus of discussions. Many studies aim to develop and use information technology and artificial intelligence to create opportunities for a promising future. Researchers believe that AI technologies may overcome many challenges across different sectors by developing problem-solving methods and handling routine tasks efficiently, thereby allowing professionals to focus on more significant activities. In recent years, external auditing has gained importance as a key governance mechanism and an important function that companies rely on to ensure the integrity of information systems and to detect errors and irregularities in financial statements. Consequently, external auditing is one of the professions most impacted by AI technologies. Thus, auditors need to keep pace with the accounting systems used in different organizations since

traditional audit methods are no longer sufficient, and auditors must adapt to new developed technologies and cognitive skills, [2]. This adaptation in turn will improve the efficiency and effectiveness of external auditing in which AI tools improve audit quality in various ways, mainly identifying fraudulent activities, detecting inconsistencies, and evaluating risks accurately. Moreover, processing huge datasets by AI tools at high speeds enables auditors to make decisions faster than ever before. This aligns with many studies on digital transformation that emphasizes the impact of advanced AI tools on auditing, [3]. This research explores how AI applications improve audit quality in Jordanian audit firms. The study is highly significant since it addresses a new topic that links AI technologies with external audit quality. The audit sector plays a critical role in ensuring confidence in financial statements, and intense competition requires firms to deliver high-quality services, something AI applications can help facilitate. Some studies have shown changes in audit processes and external audit functions where AI reshapes audit operations and prompts auditors to improve their technical competence. While the expected benefits of AI in auditing are substantial, [1], [4], [5], [6], [7], [8], [9], [10], [11], there are also downsides. Some of these drawbacks are when some auditors resist using AI due to its complexity, which requires technical expertise and knowledge. In addition, AI training requires specialized courses, and adopting AI could reduce the role of human auditors, which may lead to job losses and lower audit fees. Additionally, using and maintaining AI costs much money, and this leads to making widespread adoption a real challenge for many audit firms, [5], [8]. Taking these challenges into account, this study aims to explore the role of AI technologies in enhancing external audit quality from the perspective of Jordanian external auditors?

2 The Role of AI Tools in Enhancing External Audit Quality

External auditing is very important in firms' governance as it reduces information asymmetry and protects stakeholders by providing accurate and integrated financial data. External auditors provide reports to the company management, which holds internal information, and financial markets. According to [12] the primary objective of auditing is to provide

an independent opinion on the audited accounts, detect errors, and prevent fraud, [13]. Despite its importance, there is no agreed-upon definition of external audit quality, as it varies according to stakeholder needs and the context in which audits occur, [14]. Some perspectives focus on error detection and the accuracy of financial reporting, based on the belief that high audit quality leads to more reliable earnings and financial statements, while other perspectives emphasize audit effort and outputs, [15]. AI technologies play an important role in improving external audit quality in financial and accounting firms. According to [1] AI is a computer science branch that focuses on developing systems that simulate human intelligence where AI tools enable machines and software to learn from past experiences, adapt to new situations, solve problems, and interact with their environment as humans do. [16] defined AI tools as systems that simulate human intelligence to perform tasks and improve their performance based on given data. [4] described AI as computer systems that simulate cognitive functions, including interactive AI systems that respond to specific inputs with pre-programmed responses.

2.1 Key AI Technologies in External Auditing

1. Expert Systems: Expert systems are computer programs that replicate human expert decision-making in auditing, [17]. These systems offer several advantages: they enhance audit efficiency, reduce costs, minimize audit workload, and deliver timely audit results, [18]. Expert systems are among the oldest and most significant AI technologies, representing knowledge-based systems that function as applied knowledge engineering. They use databases containing expert knowledge, including rules, concepts, facts, and professional practices, to facilitate decision-making and task execution, [19]. In many audit firms, using expert systems becomes a reality as they help auditors improve their judgment accuracy and enhance their planning, execution, and reporting and this leads to increase confidence in auditors' reports, [6]. In addition, expert systems help in decision-making processes and link relevant information to speed up learning for new auditors and improving their efficiency in the audit field, [17].

2.2 Artificial Neural Networks (ANNs)

ANNs are computational models inspired by how the human brain processes information and they consist of (neurons) or a set of interconnected computational

units in a way similar to how neurons work in the brain [17] and they are used in different fields such as natural language processing, computer vision, and machine learning. As result, ANNs have an important role in audit quality because of their ability to learn from patterns and instructions, their ability to process complex and massive amount of data easily, [6]. This ability helps identify any abnormal financial behavior or potential fraud cases and also helps auditors predict future trends in financial data, [17]. Moreover, financial data contains unstructured information such as documents, text messages, and emails and ANNs can process this data and make them analyzable information, and this improves audit accuracy, [20]. Additionally, ANNs can also recognize non-traditional patterns in data which helps in detecting manipulations or suspicious financial activities that traditional methods might miss, [10]. Also, ANNs can perform complex analyses of financial data such as classification and predictive analytics, and this helps auditors to issue accurate report for companies' financial position, [18]. Furthermore, ANNs help reduce human errors that may happen in traditional audit processes, and this leads also to provide accurate financial reports and reduce potential risks, [6]. Finally, ANNs can be modified to meet the specific needs of auditors of a particular company or sector, and this leads to enhance the flexibility and efficiency of the process, [17]. All in all, ANNs can be integrated into a continuous auditing system where AI can track and analyze data throughout the year, and this enables early detection of risks or errors before they escalate, [21].

2.3 Robots

They are programmed machines used to perform specific tasks automatically or semi-automatically. In this study, robotics mainly refers to Robotic Process Automation (RPA) systems used for data extraction, reconciliation, transaction matching, and continuous monitoring. These machines can be programmed to perform a variety of functions, ranging from simple tasks like assembly in production lines to more complex ones such as interacting with humans or making decisions in dynamic environments, [22]. Indeed, robots play a significant role in improving the quality of external auditing in several ways. First, they are powerful tools in the auditing field [23] as they can automate many routine and repetitive tasks such as data comparison, invoice matching, or financial record examination, and this improves the process and

reduces human errors, [7]. Second, robots can filter and examine data for errors or minor inconsistencies quickly and accurately without requiring human intervention every time, [17]. In external auditing with massive financial data, robots also can analyze records faster and extract patterns or potential issues, [24]. These robots can track ongoing changes in data and provide real-time analysis of financial performance, [6]. Moreover, robots can monitor unusual patterns in financial data such as irregular or suspicious transactions that may indicate manipulation or fraud, [22]. They can also learn from past cases to improve the accuracy of fraud detection in the future, [23]. Additionally, robots can provide monitoring of data and transactions, and this enables around-the-clock auditing, enhances internal control, and allows for the continuous analysis of financial data, rather than only conducting comprehensive audits at specific intervals, [19]. In light of the above findings, the hypothesis can be formulated as follows: Artificial intelligence technologies positively impact the improvement of external audit quality.

3 Research Methodology

3.1 Study Population and Sample

The total number of licensed external auditors practicing the accounting audit profession in Jordan is 621, while the number of practicing external auditors is 542. This number was adopted by the researcher as the study population (Records of the Jordanian Association of Certified Public Accountants, 2025). A random sample of 280 practicing auditors working in Jordanian audit firms was drawn, representing 52% of the practicing auditors. The study questionnaire was distributed to them, of which 250 were retrieved, with a response rate of 90%. However, six questionnaires were excluded due to unsuitability for analysis, leaving 244 questionnaires for analysis, accounting for 97% of the retrieved responses, which is an acceptable percentage for scientific research purposes.

3.2 Study Variables

The research variables were measured using a questionnaire consisting of three sections. The first section includes personal and professional characteristics of the respondents (gender, age, educational qualification, work experience, and professional certifications). The second section consists of 24 statements distributed across three

dimensions to measure the independent variable: artificial intelligence technologies. The third section contains 8 statements to measure the dependent variable: audit quality. In addition, A five-point Likert scale was used in the questionnaire, with values ranging between 1 and 5. The scale was reviewed by academic experts specializing in the field to ensure the validity of the study tool. The Cronbach Alpha coefficient was extracted to evaluate the internal consistency of the study tool, giving a reliability coefficient of 0.87, and this shows a high level of reliability, as a Cronbach Alpha coefficient above 70% is considered acceptable. To reduce common method bias, questionnaire items were structured across distinct sections and variables. Future studies may apply confirmatory factor analysis (CFA) and structural equation modeling for measurement model validation. Alternative model specifications are recommended for future research, including hierarchical and stepwise regression models to test coefficient stability.

3.3 Descriptive Statistics for the Demographic Variables of the Study Sample

The data in Table 1 shows that the gender distribution reflects current professional participation patterns in the Jordanian audit sector. This stems from the nature of the audit process, which requires greater effort, the ability to perform fieldwork, and frequent movement between different institutions. Additionally, cultural and social factors, as well as the prevailing customs and traditions in Jordanian society—which tend to favor employing males over females—influence this distribution. The age group over 40 constitutes the largest portion of the study sample. At this age stage, auditors typically acquire diverse academic and practical experiences.

The variety of age groups shows that the study incorporated successfully the perspectives of all age categories within the study population. The majority of the study sample holds a bachelor's degree, comprising 86.6% of respondents, while more than 13.5% hold a master's or doctoral degree. This shows that the auditors in the sample are highly qualified. The largest portion of the study sample has over 15 years of experience, and this shows a high level of competence among the auditors. This contributes to the accuracy of the responses, thereby enhancing the credibility and reliability of the study's results. Additionally, 11.5% of the sample holds a professional certification alongside the Jordanian

Certified Public Accountant (JCPA), and this represents a significant percentage, as it indicates that these auditors have professional qualifications that enhance their competence in the audit field.

Table 1. Descriptive Statistics for the Demographic Variables of the Study Sample

No.	Characteristic	Category	Frequency	Percentage %
1	Gender	Male	229	93.9%
		Female	15	6.1%
2	Age	Under 30	9	3.7%
		30 - 35	37	15.2%
		35 - 40	19	7.8%
		40+	179	73.4%
3	Education	Bachelor's	182	74.6%
		Master's	51	20.9%
		Doctorate	8	3.3%
		Others	3	1.2%
4	Experience	<5 years	6	2.5%
		5 - 10	31	12.7%
		10 - 15	38	15.6%
		15+ years	169	69.3%
5	Certification	CMA	12	4.9%
		CISCO	2	0.8%
		CPA	14	5.7%
		Others	216	88.5%

Source: Created by the Authors

3.4 Descriptive Statistics for Independent and Dependent Variables

This section of the study presents the descriptive statistical analysis of the variables, as shown in Table 2.

Table 2. Means and Standard Deviations (QA = Audit Quality, RS = Robotics Systems, ANNs = Artificial Neural Networks, SE = Expert Systems)

no	SE		ANNs		Rs		QA	
	Mean	S. D	Mean	S. D	Mean	S. D	Mean	S. D
1	4.33	0.94	4.04	0.78	3.89	0.88	4.38	0.86
2	3.86	0.93	4.00	0.80	3.87	0.82	4.08	0.90
3	3.34	1.04	3.97	0.80	3.89	0.84	4.09	0.83
4	3.58	1.00	3.98	0.83	3.81	0.87	3.90	0.85
5	3.72	0.96	3.75	1.04	3.84	0.87	3.86	0.94
6	3.70	0.96	3.73	0.99	4.08	0.84	3.93	0.92
7	3.84	0.96	3.78	1.01	4.44	0.86	4.25	0.64
8	4.07	0.86	3.83	0.94	4.11	0.90	4.18	0.82
all	3.80	0.72	3.89	0.58	3.99	0.51	4.08	0.44

Source: Authors' analysis

Table 2 shows that the Robotics (RS) dimension of AI technologies achieved the highest mean score (3.99) with a standard deviation of (0.51). It was followed by the Artificial Neural Networks dimension with a mean score of (3.89) and a standard deviation of (0.58), while the Expert Systems (SE) dimension recorded the lowest mean score (3.80) with a standard deviation of (0.72). Additionally, the Audit Quality (QA) dimension achieved a mean score of (4.08) with a standard deviation of (0.43).

3.5 Data Validity Tests for Statistical Analysis

A correlation coefficient exceeding (70%) between two or more variables is considered high and can distort the relationship between one of the independent variables and the dependent variable. To ensure that such correlations do not exist, a correlation matrix was prepared to analyze the interrelationships between the study variables, as shown in Table 3. Additionally, the Variance Inflation Factor (VIF) test was applied to each variable in the study to detect multicollinearity issues. According to [25] a VIF value below (10) indicates no significant multicollinearity problem between the independent variables. Furthermore, the Tolerance test should yield a value greater than (10%).

Table 3. Correlation Matrix (RS = Robotics Systems, ANNs = Artificial Neural Networks, SE = Expert Systems)

	SE	ANNs	Rs	VIF	Tolerance
SE	1			1.098	0.911
ANNs	0.011-	1		1.411	0.709
Rs	***0.257	***0.519	1	1.500	0.667

Note: *** correspond to the significance level of 1%.

Source: Authors' analysis

From the Table 3, it is evident that there is no high correlation between the independent variables of the study, as the highest correlation value was (0.52) between the ANNs variable and the Rs variable. To ensure the absence of multicollinearity issues in the sample, the Variance Inflation Factor (VIF) test was conducted on the independent variables included in the study. This was done to confirm that no multicollinearity exists among all the independent variables.

3.6 Hypothesis Testing

After verifying the suitability of the data for the study model and describing the study variables, the model was subjected to multiple linear regression analysis.

Regression equation:

$$AQ = \beta_0 + \beta_1(SE) + \beta_2(ANNs) + \beta_3(RS) + \varepsilon$$

The model assumes linearity, independence of errors, homoscedasticity, and normality of residuals. The results presented in Table 4 are as follows:

Table 4. Multiple Regression Results for Hypothesis Testing Dependent Variable: Audit Quality

Independent Variable	B	T	Sig
Constant	1.303	6.68	0.000***
SE	0.198	6.58	0.000***
ANNs	0.334	7.84	0.000***
Rs	0.182	3.66	0.000***
$R^2 = 0.468$			
$F = 70.059$			
$Sig = 0.000***$			

Note: *** corresponds to the significance level of 1%.

Source: Authors' analysis

Table 4 shows that the study model used to test the relationship between the variables is significant at the 1% level, as the calculated F value is (70.059), which is confirmed by the significance level (0.000). Based on this, the hypothesis stating that AI technologies contribute positively to improving external audit quality is accepted. This indicates that AI technologies have a significant impact on enhancing external audit quality. The regression coefficients indicate the strength and direction of the relationships, while the explained variance ($R^2 = 0.468$) reflects the overall explanatory power of the model. Individual coefficients do not represent percentages of variance explained. The T-value for Expert Systems was (6.58), with a significance level of ($Sig = 0.000$), meaning that expert systems, as an AI technique, have a statistically significant positive effect on improving external audit quality in Jordanian audit firms. The results further indicate that (19.8%) of the variance in audit quality can be explained by the variance in expert systems as an AI technique. Similarly, the T-value for Artificial Neural Networks (ANNs) was (7.84), with a significance level of ($Sig = 0.000$), indicating a statistically significant positive effect of ANNs as an AI technique in enhancing

external audit quality in Jordanian audit firms. The results suggest that (33.4%) of the variance in audit quality can be explained by the variance in artificial neural networks. Additionally, the T-value for Robotics was (3.66), with a significance level of ($\text{Sig} = 0.000$), demonstrating a statistically significant positive effect of robotics as an AI technique in improving external audit quality in Jordanian audit firms. The results indicate that (18.2%) of the variance in audit quality can be explained by the variance in robotics as an AI technique.

4 Conclusion

The advancement in information technology and the use of computer systems has increased interest in adopting modern technologies in the auditing process. This is because such advancements can overcome certain human limitations in exercising professional judgment and improve the efficiency and effectiveness of the auditing process. New auditing methodologies adopt a risk-based approach that includes a strategic dimension related to a company's ability to achieve its objectives. This requires auditors to rely on advanced technology to identify factors that hinder an entity from reaching its goals. The research findings indicated a high level of interest among external auditors in Jordanian auditing firms regarding artificial intelligence (AI) techniques. All dimensions showed a high relative importance, with robotics ranking first, artificial neural networks (ANNs) second, and expert systems third. This suggests that external auditors in Jordanian firms are keen to implement modern technologies that align with their profession, facilitate task execution, and help solve challenges while supporting the external audit process. This result can be attributed to Jordanian audit firms' awareness of AI tools and their necessity for achieving a competitive advantage. The use of modern technology and artificial intelligence positively impacts operational efficiency, accelerates procedures, enhances developmental capabilities, and raises the level of competitiveness. The results also indicated a high level of expert system usage in Jordanian auditing firms. This is due to their reliance on expert systems as decision-making advisors by utilizing stored knowledge base information. These systems replicate human expertise in problem-solving. Similarly, the use of ANNs in Jordanian auditing firms was found to be high. Firms are integrating neural network systems to handle big data due to their

superior analytical capabilities. Auditors aim to create a technological environment that eliminates certain tasks requiring extensive time in traditional auditing settings, as AI systems significantly reduce the effort needed to complete tasks. Additionally, the use of automation and robotics in audit activities is noticeably increasing as robots improve the efficiency and accuracy of external audit processes by performing routine and repetitive tasks quickly and accurately more than humans do. In addition, they analyze and audit great amounts of data to check for incorrect patterns, inconsistencies, and anomalies that may indicate errors or fraud. Furthermore, the results showed that elevated level of external audit quality due to the expertise and competence of external auditors and the firm's emphasis on hiring professionals with relevant accounting and financial qualifications. Regarding hypothesis testing, the results found a statistically significant impact of artificial intelligence in improving external audit quality in Jordanian audit firms at a significance level of 1%. This indicates that artificial intelligence increases the use of electronic tools in auditing and enhances efficiency and accuracy by enabling auditors to perform their tasks more effectively and efficiently. Similarly, auditors realize the advantages of AI-tools in auditing, such as increased accuracy, automation, and improved risk detection. These findings align with studies by [6], [7], [9], [10], [11] which found a positive impact of AI technologies on external audit quality. The results also found a statistically significant impact of expert systems on improving external audit quality at a significance level of 1%. This indicates that using expert systems in Jordanian audit firms is essential for protecting their assets and client data, and for reducing the human and physical risks associated with audit procedures. For expert systems, it was found that they facilitate audit processes by ensuring swift task execution, timely data retrieval, and compliance with international accounting and auditing standards. This study has some limitations such as its reliance on perceptual data, the absence of empirical validation, and the exclusion of regulatory and organizational variables. Thus, the results should be interpreted within an analytical framework based on perception. This study also relies on the professional perceptions of auditors and does not include objective performance indicators or empirical verification. Future studies should incorporate audit performance measures, experimental simulations, and system-based evaluations to

empirically measure AI effectiveness. Finally, this study adopts a field-based perceptual design; therefore, experimental simulations and system-level performance comparisons between traditional audit models and AI-powered audit models are suggested as future research directions.

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