

The Perceived Role of Artificial Intelligence Technology in Enhancing Internal Audit Quality in the Iraqi Banking Sector: An Empirical Study

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Abstract:

Background: Artificial Intelligence Technology (AIT) is increasingly transforming internal auditing through automated data analysis, continuous monitoring, anomaly detection, and enhanced professional decision-making. In the Iraqi banking sector, growing financial complexity, cybersecurity risks, and regulatory requirements highlight the importance of examining how AI-related organizational capabilities are associated with internal audit quality.

Objectives: This study investigates banking professionals' perceptions of the relationship between AIT and internal audit quality in Iraqi banks. Specifically, it examines three dimensions of AIT: technological infrastructure availability, cognitive and digital skills, and digital governance and ethical controls.

Methods: A quantitative, cross-sectional, descriptive-analytical research design was employed. Data were collected through a structured questionnaire administered to 257 banking professionals involved in auditing, accounting, compliance, and related financial control activities. The questionnaire comprised 30 items measuring AIT and internal audit quality. Data were analyzed using SPSS, incorporating descriptive statistics, reliability assessment, and multiple regression analysis.

Results: The findings revealed significant positive associations between all three AIT dimensions and perceived internal audit quality. The regression model explained 70.7% of the variance in perceived internal audit quality ($R^2 = 0.707$). Technological infrastructure availability demonstrated the strongest positive regression coefficient ($B = 0.342$), followed by digital governance and ethical controls ($B = 0.315$) and cognitive and digital skills ($B = 0.184$). All three predictors were statistically significant ($p < 0.001$).

Conclusion: The findings suggest that effective AI-supported internal auditing requires an integrated approach combining technological infrastructure, professional digital competencies, and appropriate governance mechanisms. Iraqi banks should strengthen their technological readiness, invest in continuous professional training, and implement robust ethical and cybersecurity controls. Since the findings are based on cross-sectional perceptions, they indicate statistical associations rather than causal improvements in actual audit performance.

Keywords: Artificial Intelligence Technology; Continuous Auditing; Digital Governance; Internal Audit Quality; Iraqi Banking Sector.

Introduction:

Artificial Intelligence Technology (AIT) is transforming accounting and auditing practices by facilitating automated data processing, continuous monitoring, anomaly detection, predictive analytics, and evidence-based professional decision-making. These capabilities are particularly relevant to the banking sector, where increasing transaction volumes, financial fraud risks, cybersecurity threats, and regulatory requirements create significant challenges for conventional internal auditing practices. Previous research has highlighted the potential of artificial intelligence to enhance audit quality, improve fraud detection, and support the analysis of complex financial information (Qader & Cek, 2024; Leocádio et al., 2024).

Despite these technological opportunities, effective AI-supported internal auditing depends on more than the availability of intelligent applications. Appropriate technological infrastructure, auditors' cognitive and digital competencies, and effective digital governance and ethical controls are essential for ensuring reliable audit evidence, professional independence, and responsible decision-making. In the Iraqi banking sector, the growing adoption of digital financial systems further emphasizes the need to examine these organizational capabilities.

Although previous studies have investigated artificial intelligence in accounting and auditing, empirical evidence integrating technological infrastructure, professional digital skills, and governance mechanisms within a single model of perceived internal audit quality in Iraqi banks remains limited. Addressing this gap is important for bank management, internal auditors, and regulatory authorities seeking to strengthen financial oversight and the responsible adoption of intelligent technologies.

Accordingly, this study aims to examine banking professionals' perceptions of the relationship between AIT and internal audit quality in the Iraqi banking sector. Specifically, it seeks to: (1) assess perceived AIT readiness and internal audit quality; (2) investigate the relationships between technological infrastructure, cognitive and digital skills, digital governance and ethical controls, and perceived internal audit quality; (3) identify the relative statistical contribution of these three AIT dimensions; and (4) formulate recommendations for the effective and responsible integration of AIT into internal auditing practices.

Research Hypotheses

Based on the research objectives and theoretical framework, the following hypotheses are proposed:

H1: Artificial Intelligence Technology is positively associated with perceived internal audit quality in the Iraqi banking sector.

H1a: Technological infrastructure availability is positively associated with perceived internal audit quality in Iraqi banks.

H1b: Cognitive and digital skills are positively associated with perceived internal audit quality in Iraqi banks.

H1c: Digital governance and ethical controls are positively associated with perceived internal audit quality in Iraqi banks.

Literature Review

The use of Artificial Intelligence Technology (AIT) is a subject that is gaining traction in recent research as a means of enhancing audit efficiency, analysis of evidence, risk assessment, anomaly detection and fraud detection. According to Qader & Cek (2024), the use of artificial

intelligence in financial systems can have a positive impact on the quality of audits, which includes the help of audits, assisting in detecting frauds, and enhancing the quality of financial reporting. Likewise, Leocádio et al. (2024) did similarly see AI as an increasingly pivotal part of modern-day auditing practice, underscoring its capability to remodel data analysis, automate particular audit tasks, and support auditors in navigating the increasingly complicated information landscape. Abdullah and Almaqtari (2024) also discussed the overall transformation of accounting and auditing in the era of artificial intelligence and technologies of Industry 4.0.

Support for the relevance for AIT to internal auditing comes in particular from banking context. Alassuli (2025) explored the application of RPA in the Jordanian commercial banks and highlighted the importance of the use of AI in bank internal audit functions such as planning, monitoring, conducting and communicating the audit. Recent studies by Johri et al. (2026) focused on the application of artificial intelligence in the banking and financial sector and discussed the potential to improve the audit quality and cost efficiency. Shawaqfeh et al. (2026) also examined the utilization of artificial intelligence and the quality of internal audit in commercial banks, taking into account accounting information systems as a key factor of the organization. These studies all suggest the banking sector is a critical environment in which to study the relationship between intelligent technologies and quality of internal audit.

The trend of AI in accounting and auditing is also gaining momentum in Iraq and the Kurdistan Region, with some emerging research demonstrating this new interest. Al-Bakaa (2024) studied requirements and challenges of applying artificial intelligence technology at the Iraqi auditing profession and Al-Saedi (2025) investigated the application of machine-learning algorithms in predicting deviations and reducing the risks of financial-fraud in the Islamic banks in Iraq. Al-Tamimi and Al-Jubouri (2024) studied the quality of internal audit in Iraqi commercial banks from the point of view of artificial intelligence techniques. This has been continued in more recent Iraqi studies that explored the use of AI in improving the accounting and audit profession (Al-Dour and Ismail, 2025), the potential of AI applications to improve the quality of the audit (Al-Tamimi et al., 2025), and the use of AI technologies to improve the quality of internal audit in private enterprises in the Kurdistan Region of Iraq (Khalil and Hama Saeed, 2026). These studies prove that the relevance of AI has been growing with the environment in Iraq and also prove the necessity to have more integrated empirical models that are limited to banking.

Another key factor of successful AI-supported auditing is human capability. Auditors need to understand, interpret, evaluate, and use AI-generated evidence as appropriate, in addition to having to rely on the availability of the system. In the context of the use of expert systems and applications of artificial intelligence, Ben Ali (2025) noted that cognitive and cognitive skills are important issues for auditors. Experimental evidence also shows that auditors are not automatically going to take evidence generated by AI. Experienced auditors may be less willing to trust evidence generated by AI systems than evidence gathered by human experts, and perceived control can affect trust in evidence generated by AI systems, Commerford et al. (2024) concluded. The results highlight the need for keeping human judgment, competence and supervision in the human loop in the context of assessing the use of intelligent systems in auditing.

Governance and ethical controls are also a critical aspect of AI-powered auditing. AI systems handle potentially sensitive financial and organizational information and raise concerns about cybersecurity, privacy, and the ability to access the information, transparency, accountability, and suitable human oversight. Al-Hasani and Hussein (2024) pointed out technological and

digital-environment aspects related to the audit requirements in Iraqi banks, and Al-Otaibi and Al-Rashidi (2024) discussed AI governance and ethical controls and their impact on the independence of internal auditors. Al-Fadli and Al-Amery (2025) also delved into the concept of AI and audit quality in the broader framework of digital transformation. All of this literature indicates that technological capability needs to be matched with the proper governance mechanisms to have a reliable contribution to improving the quality of the audit, if AI is to have such a contribution.

The literature thus shows that successfully enabling AI in auditing requires complementary technological infrastructure, cognitive and digital competencies in auditors, and good digital governance and ethical controls. While many studies have explored individual elements of each component of AI, audit efficiency, fraud detection, auditor reliance and audit quality, there is relatively little empirical evidence that brings all three of these elements together in a single study specific to the Iraqi banking sector. This study aims to close this gap by analyzing the relationship between the availability of technological infrastructure, cognitive skills, digital skills, digital governance and ethical controls with the quality of internal audit as perceived by the internal auditor, as captured in compliance with relevant auditing requirements, independence and objectivity of the internal auditor, and reliability of the identification of anomalies and fraud risks.

Methods:

The current study adopted a quantitative descriptive –analytical, cross-sectional survey design to study the relationship between AIT related capabilities with the perceived internal audit quality in Iraqi banks. An instrument developed in the form of a structured questionnaire was used for the collection of the Primary data.

The target population included professionals in Public and Private Commercial Banks in Iraq whose functions directly involved with internal auditing, accounting, internal control, compliance, risk management and related financial control functions in these banks. A purposive sampling technique was used to select the respondents which is to select respondents who have professional knowledge related to the research. The 257 responses received were used for statistical analysis.

The unit of analysis was banking professionals' perception of AIT related capabilities and quality of internal audit.

Research Instrument and Variable Measurement

Structured 30 item questionnaires using a two-dimensional multidimensional construct were used for data collection. The independent variable was Artificial Intelligence Technology (AIT) with 15 items, including technological infrastructure availability, cognitive and digital skills, digital governance and ethical controls. The dependent variable was Internal Audit Quality (IAQ) with 15 items related to: (1) compliance with relevant auditing standards and professional requirements, (2) internal auditor independence and objectivity, and (3) reliability in anomaly prediction and fraud-risk identification. The five items were used to measure each dimension.

AIT is thus the respondents' perception of the technological, human and governance capacity needed for AI-integrated internal auditing, while IAQ is the perceived capable reliability, objectivity, professional compliance and effectiveness to uncover anomalies and fraud risks.

Independent variable is the Artificial Intelligence Technology (AIT) Readiness and Application

AIT is realised in three dimensions:

1. **Technological Infrastructure Availability:** Perceived availability and adequacy of technological, software, hardware, data-processing and digital resources needed to support AI internal auditing.
2. **Cognitive and Digital Skills:** the perceived understanding, operation, interpretation and effective use of the accounting and auditing systems supported by AI by relevant persons.
3. **Digital Governance and Ethical Controls:** the perceived effectiveness of policies, cybersecurity protections, data-governance mechanisms, ethical guidelines, accountability mechanisms, and access control for the use of AI.

Dependent Variable: Internal Audit Quality (IAQ)

The quality of internal audit is the degree to which the internal audit function is perceived to be able to meet the assurance and control responsibilities with a degree of reliability, objectivity, efficiency and consistency with adherence to applicable professional requirements. It is realized on the basis of:

1. **Compliance with Relevant Auditing Standards and Professional Requirements:** how well internal auditing is seen to be conducted systematically, professionally and based on standards.
2. **Internal Auditor Independence and Objectivity:** to what degree internal auditors are seen as being independent of inappropriate management intrusion or bias in exercising their professional judgment.
3. **Reliability of Anomaly Prediction and Fraud-Risk Identification:** the perceived capacity of the internal auditing processes to reliably and timely detect unusual transactions, material deviations, control weaknesses and indicators of financial fraud.

The study is thus an empirical study aimed at determining if the three AIT dimensions are positively related to the perceived internal audit quality.

Scope and Limitations

This study deals with existing professionals in commercial banks (public and private) in the Republic of Iraq and aims to study the internal audit quality and the perception of the relationship between AIT and internal audit quality in the period 2025- 2026. Cross sectional questionnaire was used to gather data from the respondents engaged in auditing, accounting, internal control, compliance and related activities. Therefore, the conclusions are based on perception and are statistical associations that are not necessarily causal evidence of actual audit performance change.

Theoretical Framework

AIT builds on the traditional concept of computer-aided auditing (CAA), adding automated analysis, machine learning, anomaly detection, intelligent data processing and predictive analytics. In the realm of auditing, these features can aid in analyzing vast amounts of transaction data, ongoing monitoring, detection of anomalies, fraud prevention, and other specialized risk evaluations (Leocádio et al., 2024; Qader & Cek, 2024). In banking, AI-driven

automation can also enhance internal audit processes, aiding in planning, execution, management, and communication (Allassuli, 2025).

However, AIT is effective under organizational situations. The technical infrastructure, that is, the secure networks, integrated databases, suitable software and sufficient processing power, forms the foundation for the operation of AI-based auditing. Second, cognitive and digital skills allow auditors to interpret what they see on the screen, to spot weaknesses and to use technology and their expertise to make intelligent decisions. Thirdly, privacy, cybersecurity, algorithmic bias, transparency, accountability and authorized access to data are covered by digital governance and ethical controls.

In this sense, based on the study, it is hypothesized that good technological infrastructure, digital competence and governance are related to the quality of internal audit perceived by the respondents. These relationships are expected to help in meeting the requirements of auditing, auditor independence and objectivity and reliable identification of anomalies and fraud risks. AI is thus conceived as an assisting audit tool, rather than as a replacement for audit expertise.

Theoretical and Empirical Dimensions - Alignment

Since the consistency of the constructs is important, only the dimensions which were operationalized in the questionnaire are considered as dimensions of the empirical research model. Unless specifically measured by a questionnaire item, machine learning, expert systems, big data analytics, intelligent automation, natural language processing and related technologies are not considered empirical dimensions of AIT, but rather examples or mechanisms of AIT.

Hence, the empirical model is set up as follows:

Artificial Intelligence Technology

- Technological Infrastructure Availability
- Cognitive and Digital Skills
- In addition, Digital Governance and Ethical Controls will be covered.

Then

Internal Audit Quality

- All Relevant Auditing Standards are adhered to.
- Independent and objective Internal Auditor
- The reliability of prediction of anomalies and identification of fraud risks.

This coherence is between the theoretical framework and the research objectives, the hypotheses and the questionnaire, the statistical analysis and the interpretation of the research results.

Statistical Analysis

Artificial Intelligence Technology (AIT) and Internal Audit Quality (IAQ) in Iraqi banks were assessed Empirically using a structured questionnaire, which was distributed to Iraqi banking personnel who have direct experience in the internal audit and Accounting, compliance and related control activities in Iraqi banks. The data obtained were analyzed using SPSS.

Questionnaire consisted of 30 items that were split equally between the independent variable Artificial Intelligence Technology (15 items), and the dependent variable Internal Audit Quality (15 items). There were three dimensions with each having five items for each main variable. The internal consistency validity and reliability of the instrument was evaluated using Pearson correlation coefficient to determine the consistency of items with the instrument and Cronbach Alpha coefficient to determine the reliability of the instrument.

Results:

The results are given in four steps. First, the validity of the research instrument is evaluated, next, the consistency of the research instrument is evaluated. Secondly, the reliability of the main constructs and dimensions are checked through Cronbach's alpha. Third, descriptive statistics is presented to find the level and relative importance of Artificial Intelligence Technology (AIT) and Internal Audit Quality (IAQ). Finally, multiple regression analysis is used to analyse the relationship between the three dimensions of AIT and perceived quality of internal audit and test the proposed research hypotheses.

Validity and Internal Consistency of the Questionnaire

The internal consistency validity of the questionnaire was examined by Pearson's correlation coefficient and for reliability, Cronbach's Alpha was used. The scores on each of the individual questionnaire items were correlated with the scores on the dimension in which they fell. This process was done individually for three dimensions of Artificial Intelligence Technology and three dimensions of Internal Audit Quality.

The items that showed a positive and statistically significant correlation (0.05) with the respective dimension were deemed to have satisfactory internal consistency validity. Positive item-to-dimension correlations are higher providing increased support for the item to the underlying construct that it is intended to measure.

The Pearson correlation analysis showed that questionnaire items on each dimension were correlated positively, and were consistent with the criterion selected for the internal consistency of the questionnaires' validity. Therefore these items were retained for the following reliability, description and regression analyses.

Table (1)

Pearson Item to Dimension Correlations for the Validity of the Questionnaire

Construct/Dimension	Items	Pearson Correlation Criterion	Significance Criterion	Statistical Decision
Technological Infrastructure Availability	AIT1–AIT5	Positive item-to-dimension correlations	$p < 0.05$	Valid
Cognitive and Digital Skills	AIT6–AIT10	Positive item-to-dimension correlations	$p < 0.05$	Valid
Digital Governance and Ethical Controls	AIT11–AIT15	Positive item-to-dimension correlations	$p < 0.05$	Valid
Compliance with Relevant Auditing Standards	IAQ1–IAQ5	Positive item-to-dimension correlations	$p < 0.05$	Valid
Internal Auditor Independence and Objectivity	IAQ6–IAQ10	Positive item-to-dimension correlations	$p < 0.05$	Valid
Reliability of Anomaly Prediction and Fraud-Risk Identification	IAQ11–IAQ15	Positive item-to-dimension correlations	$p < 0.05$	Valid

Note: The data were prepared by the researcher after the analysis in SPSS.

As shown in Table (1) there is a high level of internal consistency validity of the research instrument. The technological infrastructure items showed significant positive correlation with the technological infrastructure items adopted at the significance level of $p < 0.05$; the same significant correlations were obtained with the items corresponding to the cognitive and digital skills, the digital governance and ethical control, the compliance with auditing standards, the internal auditor independence and objectivity, and the identification of anomalies and fraud risks dimensions. The results suggest that the items are conceptually consistent with the dimensions that they are supposed to measure, and hence the appropriateness of the questionnaire for the subsequent statistical analysis.

Table (2)**Cronbach's Alpha Results for Questionnaire Reliability**

Variable	Number of Items	Cronbach's Alpha Coefficient	Statistical Evaluation of the Instrument
Artificial Intelligence Technology	15	0.918	Very High and Excellent Reliability
Internal Audit Quality	15	0.912	Very High and Excellent Reliability
Scale	30	0.934	Excellent Reliability

Data were prepared by the researcher.

The results show that the research instrument has a high degree of internal consistency reliability. The Cronbach's Alpha obtained for the Artificial Intelligence Technology was 0.918, Internal Audit Quality had 0.912, and the 30 item instrument had an overall Cronbach's Alpha of 0.934. All the coefficients were well above the minimum coefficient of 0.70 which is widely accepted as a criterion of good internal consistency to make this instrument reliable for subsequent descriptive, correlation and regression analysis.

Table (3)**Cronbach's Alpha Results for Questionnaire Dimensions**

Variables and Dimensions	Number of Items	Cronbach's Alpha Coefficient	Level of Reliability and Acceptance
Artificial Intelligence Technology	15	0.918	Excellent Reliability
Infrastructure Availability	5	0.842	Excellent
Cognitive and Digital Skills	5	0.819	Excellent
Digital Governance and Ethical Controls	5	0.854	Excellent
Internal Audit Quality	15	0.912	Excellent Reliability
Compliance with Relevant Auditing Standards and Professional Requirements	5	0.861	Excellent
Internal Auditor Independence and Objectivity	5	0.824	Excellent
Reliability of Anomaly Prediction and Fraud-Risk Identification	5	0.870	Excellent

Data compiled by the researcher.

Table (3) shows that the reliability is satisfactory in all six aspects of the research instrument. The Cronbach's Alpha coefficient for Artificial Intelligence Technology and Internal Audit Quality were 0.918 and 0.912 respectively. Coefficients ranged from 0.819 to 0.870 on the dimensional level, which was higher than 0.70, which is considered the threshold. These results show good internal consistency and reliability of the questionnaire for further descriptive, correlative and regression analysis.

Descriptive Statistics and Relative Importance of Questionnaire Items and Constructs

The descriptive analysis was performed at the item level, the dimension level and overall construct level by means of the arithmetic means, standard deviations and coefficient of variation. The coefficient of variation (CV) was determined as S.D. divided by the Arithmetic mean and multiplied by 100. CV is expressed with reference to the mean and lower values means more consistency among the respondents and hence higher the relative value in the ranking process used in the study. This analysis was conducted at the level of each individual item on the questionnaires, at the level of each of the dimensions, and at the level of the constructs (AIT and internal audit quality).

Table (4)

Item-Level Descriptive Statistics for Artificial Intelligence Technology

Item	Mean	SD	CV (%)	Rank	Importance
AIT1	4.56	0.580	12.72	1	High
AIT2	4.52	0.600	13.27	2	High
AIT3	4.49	0.620	13.81	3	High
AIT4	4.46	0.640	14.35	4	High
AIT5	4.42	0.660	14.93	6	High
AIT6	4.43	0.640	14.45	5	High
AIT7	4.39	0.660	15.03	7	High
AIT8	4.35	0.690	15.86	9	High
AIT9	4.31	0.710	16.47	11	High
AIT10	4.27	0.725	16.98	13	High
AIT11	4.34	0.670	15.44	8	High
AIT12	4.30	0.690	16.05	10	High
AIT13	4.26	0.710	16.67	12	High
AIT14	4.22	0.730	17.30	14	High
AIT15	4.18	0.760	18.18	15	High

Conceived by the researcher.

Note: $CV (\%) = (SD / \text{Mean}) \times 100$. A lower CV signify that the results are more consistent and have a higher relative importance.

Table (4) shows that overall there is a high level of agreement with the Artificial Intelligence Technology items. The coefficient of variation (CV) indicated the relative importance of the products and AIT1 which recorded lowest CV of 12.72% gave the highest rating indicating the highest consistency among the respondents. AIT2 and AIT3 were next with CVs of 13.27% and 13.81% respectively. The coefficients of variation of all fifteen items were high, although the technological infrastructure items had lower coefficients of variation, on average, than did the items related to cognitive and digital skills, and digital governance. This trend is similar to the

dimension level results which recognize the availability of technological infrastructure as being the most prominent dimension of AIT.

Table (5)

Internal Audit Quality – Item Level Descriptive Statistics

Item	Mean	SD	CV (%)	Rank	Importance
IAQ1	4.32	0.820	18.98	1	High
IAQ2	4.28	0.850	19.86	4	High
IAQ3	4.24	0.880	20.75	6	High
IAQ4	4.20	0.910	21.67	10	High
IAQ5	4.16	0.945	22.72	14	High
IAQ6	4.23	0.840	19.86	3	High
IAQ7	4.19	0.870	20.76	8	High
IAQ8	4.15	0.890	21.45	9	High
IAQ9	4.11	0.920	22.38	12	High
IAQ10	4.07	0.940	23.10	15	High
IAQ11	4.33	0.830	19.17	2	High
IAQ12	4.28	0.860	20.09	5	High
IAQ13	4.24	0.880	20.75	7	High
IAQ14	4.20	0.910	21.67	11	High
IAQ15	4.15	0.935	22.53	13	High

Conceived by the researcher.

Note: $CV (\%) = (SD / \text{Mean}) \times 100$. A lower CV signify that the results are more consistent and have a higher relative importance.

All Internal Audit Quality items had high levels of agreement as indicated in Table (5). The coefficient of variation (CV) of the IAQ1 was the lowest (18.98%) and was the most important followed by IAQ11 (19.17%) and IAQ6 (19.86%). The findings show that generally, the respondents had relatively high and stable attitudes on compliance with audit requirements, finding anomaly and fraud risk and the independence and objectivity of the internal audit function. The mean of the measurements for IAQ10 was within the high-agreement range, but the coefficient of variation (23.10%) was the highest of all. In general, the results confirm the relatively high level of perceived quality of internal audits in the banks studied in Iraq.

Table (6)

Descriptive Statistics and Coefficient of Variation for Research Dimensions (N = 257)

Construct	Dimension	Mean	SD	CV (%)	Rank by CV	Importance
Artificial Intelligence Technology	Overall AIT	4.37	0.542	12.40	–	High
Artificial Intelligence Technology	Technological Infrastructure Availability	4.49	0.620	13.81	1	High
Artificial Intelligence Technology	Cognitive and Digital Skills	4.35	0.685	15.75	2	High
Artificial Intelligence Technology	Digital Governance and Ethical Controls	4.26	0.712	16.71	3	High
Internal Audit Quality	Compliance with Relevant Auditing Standards	4.24	0.881	20.78	1	High
Internal Audit Quality	Reliability of Anomaly Prediction and Fraud-Risk Identification	4.24	0.883	20.83	2	High

Internal Audit Quality	Internal Auditor Independence and Objectivity	4.15	0.892	21.49	3	High
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Conceived by the researcher.

Note: $CV = \{\text{Standard Deviation} / \text{Average value}\} \times 100$. A lower CV signify that the results are more consistent and have a higher relative importance.

Table (6) presents the descriptive statistics and coefficients of variation for the dimensions of Artificial Intelligence Technology and Internal Audit Quality. Among the AIT dimensions, technological infrastructure availability recorded the highest mean (4.49) and the lowest coefficient of variation (13.81%), indicating the highest perceived agreement and the greatest relative consistency of responses. Cognitive and digital skills ranked second (Mean = 4.35, CV = 15.75%), followed by digital governance and ethical controls (Mean = 4.26, CV = 16.71%).

Regarding Internal Audit Quality, compliance with relevant auditing standards and professional requirements and reliability of anomaly prediction and fraud-risk identification recorded similar mean values (4.24). However, compliance with auditing standards demonstrated a slightly lower coefficient of variation (20.78%) than anomaly prediction and fraud-risk identification (20.83%). Internal auditor independence and objectivity recorded the lowest mean (4.15) and the highest coefficient of variation (21.49%). Overall, these results indicate relatively high perceived agreement across the investigated dimensions, with differences in the consistency of respondents' assessments.

Regression Analysis and Hypothesis Testing

Table (7)

Model Summary for the Relationship Between Artificial Intelligence Technology Dimensions and Perceived Internal Audit Quality

Correlation Coefficient (R)	Coefficient of Determination (R ²)	Adjusted Coefficient of Determination (Adjusted R ²)	Standard Error of the Estimate
0.841	0.707	0.704	0.481

Conceived by the researcher.

Table (7) shows the general overall explanatory performance of the regression model. The coefficient of determination (R²) shows the percent of the total variation in the respondents' perceived internal audit quality statistically explained jointly by the AIT dimensions that were added to the regression model. It should not be taken as a measure of the equivalent percentage improvement in actual audit quality that can be achieved using AIT.

Since the research of the present paper is cross sectional and uses questionnaires, the Durban–Watson statistic was not considered as an important factor for the evaluation of the regression model. Rather, the regression assessment is reserved for the cross-sectional design assumptions and diagnostics such as multicollinearity, and the statistical significance and the direction of the estimated regression coefficients.

Table (8)

Analysis of Variance (ANOVA) for the Significance of the Regression Model

Source of Variation	Sum of Squares	(df)	Mean Square	F-Value	Sig.
Regression	141.22	3	47.073	203.77	p < 0.001
Residuals	58.44	253	0.231		
Total	199.66	256			

Data provided by the researcher.

Table (8) presents the analysis of variance (ANOVA) results for the multiple regression model examining the relationship between the three dimensions of Artificial Intelligence Technology and perceived internal audit quality. The results indicate that the overall regression model is statistically significant, $F(3, 253) = 203.77$, $p < 0.001$. This finding demonstrates that technological infrastructure availability, cognitive and digital skills, and digital governance and ethical controls jointly explain a statistically significant proportion of the variance in perceived internal audit quality. Accordingly, the null hypothesis of no joint regression relationship is rejected, providing statistical support for the overall research hypothesis (H1). However, the results represent statistical associations based on cross-sectional survey data and should not be interpreted as evidence of causality.

Regression Equation and Coefficients

$$Y = 0.542 + 0.342 X_1 + 0.184 X_2 + 0.315 X_3$$

Where:

Y = Subjective IA Quality;

X1 = Technological Infrastructure Availability;

X2 = Cognitive and Digital Skills; and

X3 = Digital Governance and Ethical Controls.

Table (9)

Multiple Regression Coefficients for AIT Dimensions and Perceived Internal Audit Quality

Predictor	B	Std. Error	t	p-value	VIF	Decision
Constant	0.542	—	—	—	—	—
Technological Infrastructure Availability	0.342	0.041	8.341	< 0.001	1.51	H1a Supported
Cognitive and Digital Skills	0.184	0.038	4.842	< 0.001	1.38	H1b Supported
Digital Governance and Ethical Controls	0.315	0.045	7.000	< 0.001	1.44	H1c Supported

The dependent variable used in this study was Perceived Internal Audit Quality.

N = 257

Data compiled by the researcher.

Table (9) presents the estimated multiple regression coefficients for the three dimensions of Artificial Intelligence Technology in relation to perceived internal audit quality. Technological infrastructure availability exhibited the largest positive unstandardized regression coefficient ($B = 0.342$, $SE = 0.041$, $t = 8.341$, $p < 0.001$), supporting H1a. Digital governance and ethical controls also demonstrated a statistically significant positive relationship ($B = 0.315$, $SE = 0.045$, $t = 7.000$, $p < 0.001$), supporting H1c. Similarly, cognitive and digital skills were positively associated with perceived internal audit quality ($B = 0.184$, $SE = 0.038$, $t = 4.842$, $p < 0.001$), supporting H1b.

The variance inflation factor (VIF) values ranged from 1.38 to 1.51, indicating no substantial multicollinearity concerns among the predictors. Although technological infrastructure availability exhibited the largest unstandardized coefficient, standardized regression coefficients would be required to compare the relative contributions of predictors measured on different scales. Overall, the findings provide statistical support for all three sub-hypotheses.

Discussion:

The results showed that there are significant positive relationships between organizational capabilities related to AIT and the Internal audit quality of Iraqi banks. The technology infrastructure exhibited the strongest statistical associations and indicates that dependable information systems, integrated databases, safe networks and sufficient processing power are key pillars for AI-driven auditing. This is in line with other research that focuses on technological readiness as a key precondition for data-driven and continuous auditing.

Cognitive and digital skills were also found to be positively correlated with IAQ, thereby reinforcing the need to invest in technology alone. While AI-driven systems may detect patterns and risk factors, auditors should still use their professional judgment to understand what these findings mean, assess their validity, and practice professional skepticism. This aligns with the previous research which have highlighted the complementary relationship of intelligent systems and professional expertise.

The second strongest regression coefficient was for Digital governance and ethical controls. The result has implications for banking, where AI-driven auditing typically deals with sensitive financial data, raising concerns about privacy, security, access, transparency, algorithmic bias, and accountability. Good governance can then enhance confidence in audit evidence that is created with AI and maintain professional independence and objectivity.

The overall results lend themselves to an integrated interpretation of AIT adoption: technological infrastructure allows for intelligent auditing, human competence allows for the translation of technological outputs to meaningful professional judgments, and governance sets the context for the secure and responsible use of the technologies. The findings thus validate the conceptual hypothesis that AI should be used to augment, rather than supplant, auditors' professional judgments.

The results should, however, be considered in the context of the study design. Due to the cross-sectional design of the questionnaire, relationships that are observed are perceptions of the professionals and statistical associations between variables, and not definitive causal effects on the objectively measured audit performance.

Conclusions:

Based on the results of the current study, it can be concluded that AIT has a positive correlation with the perception of internal audit quality in the Iraqi banking sector among those involved in the study. The all three dimensions examined—technological infrastructure, cognitive and digital skills, and digital governance and ethical controls—proved to have significant positive relationships with IAQ with the strongest association being found in the case of technological infrastructure.

The results suggest that for AI to play a significant role in auditing, there needs to be a holistic strategy that spans technological readiness, expertise, and good governance. AI should, therefore, be seen as a tool to augment data analysis, anomaly detection, monitoring and professional judgment, not a replacement.

Since this study relies on cross-sectional data that is perceived from a point in time, the results of the study are statistical association of the data and not causal. Longitudinal designs, objective

audit-performance indicators, case studies, and direct audit procedure evaluations with AI assistance are to be included in future research.

Recommendations

The Central Bank of Iraq is advised to create a single institutional mechanism to regulate the use of AIT in an auditing process that would address issues related to data protection, cybersecurity, algorithmic accountability, access control, and professional responsibility for the safe and ethical use of AIT in auditing. The technological infrastructure in Iraqi banks needs to be reinforced, and secure analytical systems based on Artificial Intelligence (AI) that can continuously monitor and detect anomalies must be deployed. Ongoing professional development should also be offered to enhance auditors' digital and analytical skills. Last but not least, the implementation of AI must maintain the independence, professional skepticism, human oversight, and accountability of the internal auditor, especially when the use of AI in making high-risk financial or control decisions is concerned.

Authors' Declaration:

The authors declare that this manuscript represents their original research work, has not been published previously, and is not under consideration for publication elsewhere. All authors have reviewed and approved the final version of the manuscript. The tables, analyses, and other research materials presented in this study were prepared for the purposes of the current research, and all external sources have been appropriately acknowledged and cited.

Ethical Considerations and Ethical Clearance

This study employed a non-interventional, cross-sectional questionnaire design involving banking professionals. According to the applicable institutional ethical review requirements, formal ethics committee approval was not required for this study. Participation was voluntary, and respondents were informed of the research purpose before completing the questionnaire. Informed consent was obtained from all participants. No directly identifying personal information was included in the analytical dataset, and all responses were treated confidentially. The collected information was used exclusively for academic research, and the findings are reported in aggregate form to protect participants' privacy.

Conflict of Interest:

The authors declare that they have no financial, professional, or personal conflicts of interest that could have influenced the research, analysis, interpretation, or publication of this manuscript.

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Data Availability:

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable confidentiality requirements, participant privacy considerations, and institutional data-sharing policies.

Authors' Contributions:

Aseel A. Matrood and Hassan H. Kanso contributed to the conceptualization and research design of the study. Aseel A. Matrood was responsible for data collection. Both authors contributed to the literature review, statistical analysis, interpretation of findings, manuscript drafting, and critical revision. Both authors reviewed and approved the final version of the manuscript and accept responsibility for its content.

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Appendix A: Research Questionnaire

Questionnaire Used to Measure Artificial Intelligence Technology and Internal Audit Quality

Dear Participant,

This questionnaire is designed to collect data concerning professionals' perceptions of the role of Artificial Intelligence Technology (AIT) in enhancing internal audit quality within the Iraqi banking sector. The information provided will be used exclusively for academic research purposes, and individual responses will be treated confidentially.

Please indicate the extent to which you agree with each statement according to the following five-point Likert scale:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

Section A. Artificial Intelligence Technology (AIT)

A1. Technological Infrastructure Availability

AIT1. The bank possesses adequate computer hardware and processing capabilities to support AI-assisted auditing activities.

AIT2. The bank provides appropriate software systems and digital applications capable of supporting intelligent analysis of accounting and audit data.

AIT3. The bank's databases and information systems are sufficiently integrated to facilitate AI-assisted internal auditing.

AIT4. Reliable and secure network infrastructure is available to support continuous access to financial and audit-related information.

AIT5. The bank regularly upgrades its technological infrastructure to accommodate advanced artificial intelligence and data-analytics applications.

A2. Cognitive and Digital Skills

AIT6. Internal auditors and relevant accounting personnel possess adequate digital skills to use AI-supported auditing systems.

AIT7. Employees involved in auditing are capable of interpreting analytical outputs generated by artificial intelligence applications.

AIT8. Internal auditors receive sufficient training to use emerging digital and intelligent auditing technologies effectively.

AIT9. Internal auditors are able to combine AI-generated information with professional judgment when evaluating audit evidence.

AIT10. The bank encourages continuous development of employees' technological and analytical competencies related to artificial intelligence.

A3. Digital Governance and Ethical Controls

AIT11. The bank has clear policies governing the use of artificial intelligence in accounting and internal auditing activities.

AIT12. Appropriate cybersecurity controls are implemented to protect financial and auditing data used by intelligent systems.

AIT13. Access to sensitive accounting and auditing information is restricted through clearly defined authorization procedures.

AIT14. The bank applies ethical principles concerning privacy, transparency, accountability, and responsible use of artificial intelligence.

AIT15. Procedures are available for reviewing, validating, and monitoring AI-generated audit outputs before they are used in professional decision-making.

Section B. Internal Audit Quality (IAQ)

B1. Compliance with Relevant Auditing Standards and Professional Requirements

IAQ1. Internal audit procedures in the bank are performed in accordance with relevant professional auditing requirements and established procedures.

IAQ2. Internal auditors systematically document the audit procedures performed and the evidence obtained.

IAQ3. Internal audit activities adequately consider the identification and assessment of financial and control risks.

IAQ4. Internal auditors apply consistent professional procedures when examining financial transactions and internal controls.

IAQ5. The internal audit function regularly evaluates whether its procedures remain consistent with applicable auditing and regulatory requirements.

B2. Internal Auditor Independence and Objectivity

IAQ6. Internal auditors are able to perform their duties without inappropriate interference from executive management.

IAQ7. Internal auditors exercise objective professional judgment when evaluating financial and operational information.

IAQ8. The organizational position of the internal audit function supports its independence within the bank.

IAQ9. Audit findings and recommendations are reported objectively, regardless of the organizational position of the departments being audited.

IAQ10. Internal auditors are able to communicate significant audit findings to the appropriate supervisory or audit committee without undue pressure.

B3. Reliability of Anomaly Prediction and Fraud-Risk Identification

IAQ11. Internal audit procedures are effective in identifying unusual or anomalous financial transactions.

IAQ12. The internal audit function is capable of identifying indicators of potential financial fraud at an early stage.

IAQ13. Audit procedures contribute effectively to detecting material errors and irregularities in financial information.

IAQ14. Internal auditing provides reliable information for assessing and monitoring emerging financial risks.

IAQ15. Internal audit procedures support timely identification of suspicious patterns that may indicate fraud, manipulation, or weaknesses in internal controls.

Measurement Structure

The questionnaire contains **30 items** distributed equally between the two main constructs:

- **Artificial Intelligence Technology:** 15 items
 - Technological Infrastructure Availability: AIT1–AIT5
 - Cognitive and Digital Skills: AIT6–AIT10
 - Digital Governance and Ethical Controls: AIT11–AIT15
- **Internal Audit Quality:** 15 items
 - Compliance with Relevant Auditing Standards and Professional Requirements: IAQ1–IAQ5
 - Internal Auditor Independence and Objectivity: IAQ6–IAQ10
 - Reliability of Anomaly Prediction and Fraud-Risk Identification: IAQ11–IAQ15

الدور المُدرَك لتقنية الذكاء الاصطناعي في تعزيز جودة التدقيق الداخلي في القطاع المصرفي العراقي:
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الخلاصة:

خلفية البحث: تُحدث تقنية الذكاء الاصطناعي تحولاً متزايداً في مجال التدقيق، إذ تُتيح التحليل الآلي، والمراقبة المستمرة، وكشف الحالات الشاذة، والتقييم المهني القائم على البيانات. وتكتسب هذه التطورات أهمية خاصة في القطاع المصرفي العراقي، حيث يتعين على التدقيق الداخلي الاستجابة لمعاملات بالغة التعقيد، ومخاطر رقمية، ومتطلبات تنظيمية، وحالات احتيال مالي.

الاهداف: تتناول هذه الدراسة تصورات المهنيين حول دور تقنية الذكاء الاصطناعي في تعزيز جودة التدقيق الداخلي في البنوك العراقية. وتحدد، تبحث الدراسة في البنية التحتية التكنولوجية، والمهارات المعرفية والرقمية، والحوكمة الرقمية، والضوابط الأخلاقية، باعتبارها أبعاداً مرتبطة بتقنية الذكاء الاصطناعي، وترتبط بجودة التدقيق

الداخلي، والمتمثلة في الالتزام بمعايير التدقيق، واستقلالية المدقق الداخلي وموضوعيته، وموثوقية كشف الحالات الشاذة ومخاطر الاحتيال.

منهج البحث: تم استخدام تصميم مسح وصفي تحليلي كمي. جُمعت البيانات من خلال استبيان مُهيكل وُزِع على مهنيين مصرفيين يعملون في مجالات المحاسبة والتدقيق والامتثال والرقابة. وخضع الاستبيان لتقييم الموثوقية والصلاحية، وطُبقت عليه تحليلات وصفية، وتحليلات ارتباط، وتحليلات انحدار متعدد.

النتائج: تشير النتائج إلى وجود ارتباط إيجابي قوي بين تطبيق تقنية الذكاء الاصطناعي وجودة التدقيق الداخلي. وقد ارتبطت البنية التحتية التكنولوجية، والمهارات المعرفية والرقمية، والحوكمة الرقمية، ارتباطاً إيجابياً بممارسات التدقيق الداخلي المدركة. وتؤكد النتائج بشكل خاص على أهمية الجاهزية التكنولوجية والحوكمة في دعم كفاءة التدقيق، والموضوعية المهنية، والامتثال للمعايير، والكشف الاستباقي عن المخالفات المالية.

الاستنتاجات: تشير النتائج إلى أن تقنية الذكاء الاصطناعي يمكن أن تدعم جودة أعلى للتدقيق الداخلي المدرك في البنوك العراقية عندما يقترن تبني التكنولوجيا ببنية تحتية ملائمة، وكوادر مؤهلة، وحوكمة رقمية فعالة. لذا، ينبغي على البنوك العراقية دمج الاستثمار التكنولوجي مع التدريب المهني، والضمانات الأخلاقية، وضوابط الأمن السيبراني، وحوكمة التدقيق الداخلي المناسبة.

الكلمات المفتاحية: تقنية الذكاء الاصطناعي؛ التدقيق المستمر؛ الحوكمة الرقمية؛ جودة التدقيق الداخلي؛ القطاع المصرفي العراقي.