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# The Impact of Applying Artificial Intelligence Techniques on Enhancing Accounting Auditing Processes: An Empirical Study on a Sample of Iraqi Commercial Banks

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**Abstract***:* It is through accounting and auditing Using artificial intelligence (AI) techniques such as expert systems, Knowledge representation and reasoning, machine learning to achieve that in Iraqi commercial bank this paper aim to affects. Research methodology The research adopted a descriptive–analytical method, and it used the primary data, as collected using structured questionnaire form to (a) be examined in 12 commercial banks on ISE. Data analysis Data are analysed using simple linear regression to examine the impact of AI applications on enhancing audit effectiveness. The results indicate that the expert systems have beneficial effects on bettering auditors accuracy and reliability of their judgments and knowledge representation, reasoning enhance analytical, cognitive skills in an auditing environment. Furthermore, by automating the identification of anomalies, machine learning enhances audit efficiency. 10 The broad ideas expressed in this paper are that: (i) AI systems would result in great benefits regarding quality, accuracy and timeliness of auditing whilst reducing human errors as well as assisting managements in making decisions – informed Ones I. buffalo.com/fishing last access on June 24th 2008. Embracing the AI for Iraqi Banking against money laundering can help to strenght their internal control systems, decrease the losses from being exposed in bad credit grants and thus increase financial reports reputation. The study recommend to advocate digitalization in audit office at the firms, generating training systems for auditors and AI tools designing frameworks about ethics and governance when using responsible AI encourage cooperation between IT personnel and auditors so as to increase both audit quality and professional independence.

**Keywords:Artificial Intelligence (AI); Expert Systems; Knowledge Representation; Reasoning; Machine Learning; Accounting Auditing.**

**Introduction:** We find ourselves in a time of rapidly increasing competition, unprecedented challenges to keep up with the next step of evolution on one hand and taking command before a new front, an AI wave, appears as one of the major trigger factors for industrial revolutions. AI try to find ways in which human intelligence can be copied by the computer programming. ie, it captures the power of whether a computer program can solve problems or decide questions (in some settings).

Account--Acct94–The auditing is one of the very valuable subjects in accounting, finance and economics and also for legal and administrative department. It safeguards money for people and encourages using the country's resources in the most effective way to improve growth and stability, all while living up to what it is financial activities are supposed to do. On the other hand, accounting auditing is crucial for organization success in attaining their objective especially at meeting laws and regulations, securing assets held by an organization to carry out its mission and minimizing risk associated with financial reporting (Abu Safi, 2019).

The importance of auditors in accounting is that it is an important aspect of all bank operations and also touches many systems pertaining to audits like the audit environment, control system etcetera. They are built to systematize and manage in-house bank activities, sharpen efficiency, maintain integrity, help ensure the dependability of data but at the same time protect assets from interference and boost productivity. Hence a good accounting audit system should depend on advance and accurate technology to avoid frauds / mistake and also make the banking operations performed with better confidence and integrity..

Consequently, the auditing profession now faces a major challenge—providing tools that can effectively address the modern technological environment. This has led to the emergence of digital auditing, which relies heavily on technologies that support the accounting audit function in multiple aspects, such as establishing knowledge foundations for the profession, improving outputs, standardizing operational procedures, enhancing service quality,

supporting audit strategies, and mitigating operational risks.

## Section One: Research Methodology

**1. Research Objectives**

The study aims to achieve the following objectives:

1. To identify the dimensions of artificial intelligence, represented by expert systems, knowledge representation and reasoning, and machine learning.
2. To determine which AI-based tools can improve accounting auditing processes in Iraqi commercial banks.
3. To assess the role and importance of AI technologies in enhancing auditing processes.

**2. Research Significance**

The significance of this study lies in the following aspects:

1. The application of AI technologies enables the completion of auditing tasks with greater accuracy, speed, and quality through the adoption of modern technological tools.
2. AI-based decision-making enhances efficiency and effectiveness, thereby contributing to organizational success and competitive advantage.
3. The study enriches the Iraqi accounting literature and can be applied practically in commercial banks to benefit from both theoretical and empirical insights.

**3. Research Problem**

The central research question can be formulated as follows:

What is the impact of applying AI techniques—particularly expert systems, knowledge representation and reasoning, and machine learning—on improving accounting auditing processes in Iraqi commercial banks?

4**. Research Hypotheses**

H1: There is no statistically significant effect ($\alpha \geq 0.05$) of expert systems on improving accounting auditing processes.

H2: There is no statistically significant effect ($\alpha \geq 0.05$) of knowledge representation and reasoning on enhancing accounting auditing processes.

H3: There is no statistically significant effect ($\alpha \geq 0.05$) of machine learning on improving accounting auditing processes.

**5. Research Population**

The study population comprises the 12 officially registered Iraqi commercial banks operating under the Iraqi legal framework. The inspection and analysis unit consisted of general managers, their deputies, department directors, heads of sections, and employees from the accounting, information technology, internal control, and internal audit departments of the banks.

## Section Two: Conceptual Framework of Research Variables

1. **Artificial Intelligence Techniques**

Continuous advances in information technology and computing have accelerated interest in understanding human intelligence and cognitive abilities through the development of computer programs that simulate human reasoning. These programs are now used in diverse applications that simplify human activities and have evolved into realistic systems (Al-Majali, 2023).

Intelligence is defined as the ability to perceive relationships, especially those that are complex or hidden. It is a general cognitive capacity that influences all forms of mental activity, regardless of the subject matter or context (Al-Hariri, 2016).

From this foundation, the concept of artificial intelligence emerged—concerned with directing computers to perform tasks typically carried out by humans. AI has expanded across scientific, administrative, and economic domains, including accounting and, notably, auditing (Al-Areeshi & Al-Ghamdi, 2020).

2**. The Concept of Artificial Intelligence**

AI is a branch of computer science concerned with the creation and design of programs that emulate human intelligence, enabling computers to perform tasks that require thinking, comprehension, listening, and speaking. It refers to the computer's ability to execute functions that simulate human cognitive processes. AI is thus a broad interdisciplinary field that connects computer science, psychology, and linguistics (Amina & Karam, 2021, p.190).

Similarly, it has been defined as the simulation of human mental abilities through computer programs characterized by learning capabilities (Meera & Kazem, 2019, p.298).

Moreover, AI can be viewed as an experimental branch of computer science that enables diverse machine applications. Computers can perform a variety of tasks using AI technologies—such as speech recognition, audit performance, structural planning, and intelligent decision-making (Gusau, 2019).

Finally, Nasserist et al. (2022) define AI as a science dedicated to developing intelligent hardware and software systems that imitate the human brain's mode of thinking. These technologies possess the ability to learn and make decisions autonomously, exemplified by machine learning, expert systems, and robotics, (Nasserist et al., 2022).

Characteristics, Importance, and Applications of Artificial Intelligence

**Second: Characteristics of Artificial Intelligence (AI):**

According to Al-Haqqan (2023) and Tawfiq & Mohammed (2023), the main characteristics of Artificial Intelligence include:

1. Providing solutions to existing challenges: AI offers innovative solutions to unfamiliar problems through its vast cognitive capabilities.
2. Performing mental operations such as perception and thinking: It has the ability to stimulate creativity and innovation in reasoning and perception, extending beyond human cognitive limits.
3. Acquiring knowledge and learning from prior experiences: The AI system gains information from knowledge engineering processes, enhancing its ability to interpret and apply previously obtained results effectively.

Third: The Importance of Artificial Intelligence:

According to Kharshi & Al-Zawawi (2021), the importance of AI lies in the following points:

- AI contributes to preserving accumulated human expertise by transferring it to intelligent machines.
- It plays a significant role in many sensitive scientific and administrative fields.
- Intelligent machines relieve humans from various risks and psychological pressures by performing complex, hazardous, and strenuous tasks. These machines also prove effective in domains requiring mental concentration, continuous attention, and rapid, accurate decision-making.
- AI may also exhibit superior capability in scientific research, facilitating the discovery of new knowledge and accelerating innovation.

Fourth: Types of Artificial Intelligence and Fields of Application:

The Arab Democratic Center for Studies (2019) emphasized that AI can be categorized into four major types, comparable to Maslow's hierarchy of needs. The simplest forms of AI can perform only basic functions, whereas more advanced types behave as entities aware of their surroundings, resembling human consciousness. These four types are:

1. Reactive Machines.
2. Limited Memory.
3. Theory of Mind.
4. Self-awareness.

The study further noted that humanity has surpassed the first stage and is currently mastering the second, while the third and fourth types remain theoretical—expected to represent the next evolutionary phase of AI development.

Similarly, Al-Samarrai et al. (2020, pp. 16–23) identified the following major applications of AI:

1. Expert Systems: One of the most essential applications of AI, these systems store vast amounts of knowledge possessed by human experts, representing it in a way that allows computers to apply this expertise to specific, well-defined problems.
2. Knowledge Representation and Reasoning: This refers to the ability of intelligent systems to adapt to their environment, acquire and store knowledge, and retrieve and use it effectively when needed.
3. Machine Learning (Automated Learning): It involves predicting future states, detecting hidden patterns, and classifying complex information. Based on prior experience and continuous adaptation, it requires large and accurate datasets for effective performance. The recent revival of machine learning is largely attributed to the emergence of big data, which enhances its analytical and predictive capabilities.

## Section Three: Accounting Auditing

**Conceptual Introduction:**

**First: The Concept of Accounting Auditing**

The American Accounting Association (AAA) defines auditing as "a systematic and structured process of objectively collecting and evaluating evidence and proofs related to the results of economic activities and events, in order to determine the degree of conformity and consistency between these results and established standards, and to communicate the audit findings to the concerned parties" (William Thomas, Auditing: Between Theory and Practice, Book One, 2019, p.18).

From these definitions, it can be inferred that accounting auditing is a critical examination that enables the verification and assessment of the information provided by the enterprise. It involves a set of tasks and procedures carried out by a professionally qualified and independent auditor.

**Second: The Importance of Accounting Auditing**

Auditing serves as a vital instrument for various stakeholders within and outside the organization; it is not an end in itself. The auditing process benefits several parties, including:

1. Management of the Organization: Auditing is crucial for management, as it relies on audit findings in planning, decision-making, and investment strategies based on audited financial statements.
2. Financial, Commercial, and Industrial Institutions: Auditing is particularly significant for such institutions when clients apply for loans or project financing. These entities depend on audited financial statements to decide whether to grant the loan, ensuring their funds are directed appropriately and repayment is secured in the future.
3. Governmental Agencies: These rely on audited financial statements for multiple purposes, such as supervision, planning, taxation, loan provision, and financial support for certain activities. Additionally, unions and professional associations also depend on audited financial data (Mustafa Youssef, Auditing Accounts in the Context of the Electronic Environment, 1st ed., 2014, p.36).

**Fourth: The Objectives of Accounting Auditing**

The primary objective of accounting auditing is to express an impartial professional opinion on whether the financial statements fairly represent the institution's financial position, operational results, and cash flows for the audited period. This represents the traditional objectives of auditing, which include:

- Verifying the accuracy and reliability of financial data and statements;
- Expressing a professional opinion based on sufficient and appropriate evidence regarding the fairness of financial reports;
- Detecting fraud and errors in accounting records and documents;
- Ensuring the presence of an effective internal control system to minimize the possibility of errors.

With the evolution of business environments, globalization, and the influence of international economic relations, the perspective toward auditing has transformed. Auditors are now expected to provide more advanced services beyond merely detecting errors and fraud. They must align auditing objectives with modern business realities. According to Al-Alawi and Amari (2022, p.21), the modern objectives of auditing include:

- Monitoring plans, overseeing their implementation, and identifying reasons for deviations from established goals;
- Evaluating actual results achieved compared to planned objectives;
- Contributing to the maximization of social welfare.

Thus, it becomes evident that while traditional auditing objectives focused mainly on verifying the accuracy of financial statements for decision-making within the institution, modern auditing has evolved to emphasize achieving societal welfare through maximizing **Fifth: Types of Accounting Auditing**

Although auditing may take different forms, its objectives often converge. The main distinction lies in the perspective from which the auditing process is viewed and the performance levels governing its various types. According to Al-Abbas et al. (2021), auditing can be classified as follows:

**1. According to the Scope of the Audit Process:**

- **Comprehensive Audit**: The auditor performs a full examination without specific restrictions or conditions. This type is more suitable for small organizations or those lacking internal control systems.
- **Partial Audit:** This involves auditing a specific segment of the organization's operations, as assigned by management. For instance, the auditor may be asked to examine a specific document set or a particular department.

**2. According to Time:**

- **Final Audit:** Conducted at the end of the financial period after the books have been closed and the financial statements prepared.
- **Continuous Audit**: This type follows a predefined audit program implemented throughout the fiscal year, at the end of which the auditor expresses a professional and independent opinion.

3. **According to the Entity Conducting the Audit**:

- Internal Audit: Defined as the ongoing examination of all business activities within the economic unit. It is a type of audit carried out by individuals employed within the organization itself (Seckin et al., 2021, p.104).
- External Audit: Conducted by an independent external auditor appointed by shareholders under a contractual agreement, for which professional fees are paid. This form of audit aims to provide an impartial technical opinion and is divided into four types (Bouhafs, 2018, p.15).

4. According to the Degree of Obligation:

- Mandatory Audit: Required by law, which obliges many institutions to have their accounts audited.
- Voluntary Audit: Conducted upon management's request without any legal obligation (Saeed & Al-Gharban, 2020, p.65).

Additionally, the Institute of Internal Auditors (IIA) in the United States introduced two additional key types of internal auditing:

- Information Systems Audit: Also known as electronic auditing, it involves the use of information systems and technology tools to plan, control, and conduct audits (Sofiane & Zahra, 2018, p.15).
- Environmental Audit: Defined by the U.S. Environmental Protection Agency (EPA) as an objective, systematic, and periodic process that documents a company's environmental practices to ensure compliance with environmental policies and regulations (Al-Jabri, 2014).

Applications of Artificial Intelligence in Enhancing Accounting Auditing

Artificial Intelligence (AI) plays a critical role in improving auditing processes, marking a transformation from traditional to modern methods. The most significant AI applications that enhance accounting auditing include:

1. Big Data Analysis:

AI enables the processing of vast amounts of data to identify trends and correlations that facilitate understanding of business activities and decision-making. Through techniques of filtering, scanning, and data mining, AI systems can structure, verify, and analyze large datasets to detect patterns and anomalies. Machine learning techniques are employed to load, examine, and evaluate documents and transactions, as well as to identify irregularities. The more the application is used, the more intelligent it becomes (El-Wafi, Shahrazad, 2021).

The importance of AI in data analysis can be summarized as follows:

1. Highlighting areas of risk and detecting fraud in real time.
2. Increasing sample sizes, moving from statistical sampling to comprehensive transaction auditing.
3. Providing valuable insights and generating accurate, reliable reports.
4. Identifying trends, outliers, and missing data.
5. Encouraging further academic research in the context of big data analytics.

2. Prediction and Forecasting:

AI systems possess autonomous capabilities that enable them to forecast and perform complex tasks, adapting to economic disruptions in the labor market. Such applications are expected to accelerate the transition toward future-oriented auditing practices (Scherer, 2016). These technologies deal with risks that extend far beyond those arising from human behavior alone (Scherer, 2016).

3. Fraud and Manipulation Detection:

AI systems are advancing toward mimicking human intelligence through reasoning, inference, learning, and decision-making capabilities. They also play a pivotal role in addressing problems, protecting data integrity, and detecting fraud through expert systems—one of the most widely used AI techniques. These systems store explicit and tacit knowledge across extensive domains to enhance audit accuracy and reliability.

productive efficiency and minimizing waste (Ghawth, 2018).

## Section Four: Field Study (The Impact of Artificial Intelligence Application on Enhancing Accounting Auditing)

**First: Research Methodology**

The descriptive-analytical method was employed in this study, as it provides a comprehensive and precise description of the research problem based on two main sources for data and information collection:

**Secondary Sources:**

The study relied on various academic resources, including Arabic and foreign books, prior studies, and specialized journals and periodicals that address topics related to artificial intelligence and accounting auditing.

**Primary Sources:**

The field data were collected through the distribution of a questionnaire to a selected sample of Iraqi banks, which included general managers, assistant managers, accountants, auditors, and members of computer and electronic systems units.

**Second: Study Population**

**The study population consists of all Iraqi commercial banks listed on the Iraq Stock Exchange, totaling twelve (12) private commercial banks. The researcher adopted a comprehensive survey approach in determining the study sample.**

| No. | Bank Name | Year of Establishment |
|---|---|---|
| 1 | Baghdad Bank | 1992 |
| 2 | Iraqi Commercial Bank | 1992 |
| 3 | Middle East Bank | 1993 |
| 4 | Iraqi Investment Bank | 1993 |
| 5 | Basra Bank | 1993 |
| 6 | Iraqi National Bank | 1995 |
| 7 | Gulf Commercial Bank | 2000 |
| 8 | Al-Warka Investment Bank | 2000 |
| 9 | Ashur Investment Bank | 2005 |
| 10 | Erbil Investment Bank | 2010 |
| 11 | Development Investment Bank | 2011 |
| 12 | Hammurabi Investment Bank | 2020 |

Thus, the research population encompassed all private commercial banks actively operating within Iraq's financial market framework. By employing the comprehensive survey method, the study ensured the inclusion of every relevant institution to achieve higher reliability and representativeness in the results.

Third: Sampling and Analysis Unit

The sampling and analysis unit consisted of general managers, deputy managers, department directors, heads of divisions, and employees working in accounting, information technology, internal control, and internal auditing departments within the selected banks.

The total population of this group amounted to 70 individuals. The researcher distributed the questionnaire both electronically and manually to maximize response rates. In total, 55 valid responses were retrieved and deemed suitable for statistical analysis.

**Fourth: Description of the Respondents**

In the applied framework of the study, the researcher relied on a structured questionnaire as the primary research instrument.

The questionnaire began with a brief introductory message explaining the objective of the study to the participants, followed by a section on demographic information, and then proceeded to the main body of the questionnaire, which consisted of a series of detailed questions directed to the target participants involved in the empirical research.

To measure the responses, the researcher adopted the five-point Likert scale, where:

(1) = Strongly Agree (2) = Agree (3) = Neutral (4) = Disagree (5) = Strongly Disagree

First: Measuring Questionnaire Reliability Using Cronbach's Alpha

Table (1): Cronbach's Alpha Coefficient for Overall Variables – Questionnaire Reliability

Reliability Statistics – Cronbach's Alpha –

(The table here presents the computed Cronbach's Alpha value indicating the internal consistency of the questionnaire items across all variables, confirming the instrument's reliability for subsequent statistical analysis).

Table (1):

| Number of variable phrases | Number of variable phrases | Validity coefficientCronbach's Alpha Based on Standardized Items | Stability coefficient Cronbach's Alpha |
|---|---|---|---|
| **Specialized questions** | 18 | 0.877 | 0.889 |

From examining the figures presented in the table above, it was found that all Cronbach's Alpha coefficients exceeded the threshold value of 0.6 (60%) at the aggregate level for the items related to the study problem and hypotheses. This indicates that the questionnaire demonstrates an acceptable level of statistical reliability and exhibits a satisfactory degree of internal consistency across all its variables.

**Second: Study and Description of the Research Sample – Gender Distribution**

**Table (2): Distribution of the Study Sample by Gender**

| Standard Deviation | Standard Deviation | Standard Deviation | Standard Deviation | Standard Deviation |
|---|---|---|---|---|
| Male | 33 | 60.0 | 1.4 | 0.4 |
| Female | 22 | 40.0 | | |
| Total | **55** | **100.0** | | |

Distribution of the study sample by gender

From an examination of the vertical chart and the accompanying table, the following can be observed regarding the gender distribution of the sample: the overwhelming majority of the study participants are male, representing 60.0% of the total sample (33 individuals), while 40.0% are female, amounting to 22 participants in total.

**Table(3): Distribution of the study – sample by age**

Distribution of the study – sample by age

| Age | **Number Frequency** | **Percentage %** | **Arithmetic mean Meaning** | **Standard Deviation** |
|---|---|---|---|---|
| Under 30 years | 10 | 18.2 | 2.2 | 0.8 |
| Between 30 and 40 years | 29 | 52.7 | | |
| 41 and 50 years | 10 | 18.2 | | |
| 51 years and over | 6 | 10.9 | | |
| Total | **55** | **100.0** | | |

By reading the pie chart above along with the table ,we can see thee following regarding age :the majority of the study sample ar in the 30-40 age (52.7 ),18.2% are in the 41-50 age group , 10.9% are in the 51 and over age group and the remaining 18.2%are under 30 years old .totaling ten individuals out of total sample of 55

**Table 4 : Distribution of Study Sample Members by Educational level**

| Academic qualification | Frequent | ratio | Mean | Std .Deviation |
|---|---|---|---|---|
| Higher Diploma | 14 | 25.5 | | |
| Master | 32 | 58.2 | 1.9 | 0.5 |
| phD | 9 | 16.4 | | |
| | 55 | 100 | | |

Distribution -of – the study sample – by academic level

By reading the column chart and the table shown above, it is clear that the majority of the study sample hold amsters degree ( 58 .2%) ,and that (25.5 %) hold a higher diploma ,and the remaining 16.4 hold a PhD ,numbering 9 individuals out 55 individuals representing total sample in bank .

**-Table (5): Number of years of service -: Distribution of the study – sample by study**

| Years of experience | Frequency | Ratio | mean | Std deviation |
|---|---|---|---|---|
| Under 5 years | 5 | 9.1 | 3.0 | 1.0 |
| From 5 to 10 years | 11 | 20.0 | | |
| From 11 to 15 years old | 17 | 30.9 | | |
| From 16 to 20 years | 18 | 32.7 | | |
| More than 20 years | 5 | 7.3 | | |
| Total | 55 | 100 | | |

show the distribution of the study sample members according to years of service

**Distribution of the study sample - according to years of experience**

From an examination of the vertical bar chart and the accompanying table, the following can be observed regarding the variable "Years of Experience": the majority of the study sample possess 16 to 20 years of experience, representing 32.7% of the respondents. In addition, 30.9% have 11 to 15 years of experience, while 20.0% fall within the 5 to 10 years range. Furthermore, 9.1% of the participants have less than 5 years of experience, and the remaining 7.3% have more than 20 years of experience (a total of 4 individuals).

**Section Two: Examining the Impact of Artificial Intelligence Application on Enhancing Accounting Auditing**

First: Distribution of responses to the specialized questions.

**Table (6): Distribution of respondents' answers to the specialized questions.**

| The phrase or question | I strongly agree. | Agreed | neutral | Disagree | Absolutely not. | Question direction |
|---|---|---|---|---|---|---|
| **Independent variable - First: Items covering expert systems** | | | | | | |
| The bank uses modern and advanced equipment to run various programs. | 35.6 | 23.5 | 18.7 | 14.3 | 7.9 | **Consent** |
| The bank is working on holding courses, workshops and programs to acquire multiple skills for working on expert systems. | 33.9 | 25.6 | 19.3 | 13.5 | 7.7 | Consent |
| Accounting auditing protects an organization's funds from misuse. | 36.8 | 26.7 | 20.1 | 12.8 | 3.6 | Consent |
| The bank's use of expert systems leads to greater reliability in financial statements. | 35.8 | 25.7 | 19.3 | 11.8 | 7.4 | consent |
| Expert systems are used to increase the efficiency of accounting systems. | 34.4 | 27.4 | 19.9 | 11.5 | 7.1 | consent |
| **Second : Knowledge Reprsentation and inference** | | | | | | |
| Artificial intelligence allows for the clear representation of symbolic knowledge, such as graphs, networks, texts, and semantics. | 35.5 | 23.8 | 20.4 | 12.4 | 7.9 | consent |
| The bank's symbolic knowledge and reasoning skills are characterized by the ability to extract information from complex data. | 33.8 | 24.5 | 21.1 | 11.1 | 9.5 | consent |
| The bank's artificial intelligence is characterized by its ability to adapt to the cognitive environment and the business economics environment and its practices. | 34.7 | 25.0 | 19.3 | 12.2 | 8.8 | consent |
| Artificial intelligence allows for the rapid storage of knowledge. | 35.1 | 24.1 | 20.0 | 11.7 | 9.1 | consent |
| Knowledge and reasoning are represented according to standards | 36.2 | 22.9 | 18.7 | 12.9 | 9.3 | consent |

| | | | | | | |
|---|---|---|---|---|---|---|
| specified by the bank and are reviewed periodically to ensure their validity and keeping pace with changes. | | | | | | |
| **Third: Paragraphs covering automatic learning** | | | | | | |
| The bank's proprietary system can automatically handle any problems it may encounter. | 35.7 | 24.0 | 18.4 | 11.0 | 10.9 | consent |
| The systems within the bank themselves update periodically and automatically. | 36.9 | 25.2 | 17.3 | 10.4 | 10.0 | consent |
| The bank's systems handle pre-programmed arithmetic and logical errors. | 37.6 | 26.1 | 18.0 | 9.7 | 8.6 | consent |
| The bank's systems are characterized by their automatic ability to detect any tampering with them. | 38.1 | 27.0 | 17.9 | 8.7 | 8.3 | consent |
| **For the dependent variable: accounting audit** | | | | | | |
| The bank's accounting audit uses charts, data, and statistical tables that illustrate achievements and are presented to facilitate appropriate decision-making. | 37.8 | 25.1 | 18.3 | 11.2 | 7.6 | consent |
| The bank's accounting auditing process works to develop employee efficiency through the scientific study of all optimal steps. | 38.0 | 26.1 | 17.6 | 10.2 | 8.1 | consent |
| Accounting auditing provides periodic reports that include comparative historical data for management to make the appropriate decision. | 37.4 | 25.8 | 18.0 | 11.1 | 7.7 | consent |
| The bank has modern systems that assist in the accounting audit process. | 38.1 | 26.0 | 17.3 | 10.8 | 7.8 | consent |

**Comment on the Table Above:**
It is evident from the table above that all questionnaire items related to the study hypotheses tend toward agreement, as the respondents' answers were concentrated on the options *Strongly Agree* and *"Agree,"* while the responses for the remaining options were relatively few.

**Second: Testing the Study Hypothes**

**Table (7 ) ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 50.569 | 1 | 50.569 | 57.66 | .000[a] |
| | **Residual** | 46.524 | 53 | .877 | | |
| | **Total** | 97.093 | 54 | | | |

Comment on Table (7): Simple Linear Regression Test – First Hypothesi
The results presented in Table (5) indicate that all outputs of the simple linear regression analysis reveal a statistically significant relationship between the application of expert systems and the improvement of accounting auditing processes.

The calculated F-value (57.66) with a significance level (Sig = 0.000), which is less than the significance threshold (α ≤ 0.05), confirms this relationship.
Accordingly, the null hypothesis ($H_0$) is rejected, while the alternative hypothesis ($H_1$) is accepted. This demonstrates that expert systems have a positive and significant impact on enhancing the efficiency and quality of auditing operations.
Furthermore, the respondents' answers were concentrated in the categories "Strongly Agree" and "Agree", reflecting a clear awareness of the importance of expert systems in reducing human error, accelerating audit procedures, and improving the accuracy of financial data analysis.
These findings affirm that the application of artificial intelligence—through expert systems—contributes effectively to rationalizing auditors' judgments and supporting professional decision-making based on logical and automated inference
Testing the Second Hypothesis
Null Hypothesis ($H_0$):
There is no statistically significant effect at the level (0.05) of knowledge representation and inference on improving accounting auditing operations.

**Table( 8) ANOVA[b]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 50.569 | 1 | 50.569 | 57.66 | .000[a] |
| | Residual | 46.524 | 53 | .877 | | |
| | Total | 97.093 | 54 | | | |

Alternative Hypothesis ($H_1$):
There is a statistically significant effect at the level (0.05) of knowledge representation and inference on improving accounting auditing operations.
Based on the analysis of the five questions from the first part of the questionnaire (Section II: Knowledge Representation and Inference) and the last four questions related to the dependent variable (Accounting Auditing), the results were as follows:
Table (5): Simple Linear Regression Test – Second Hypothesis

**Table (9) ANOVA[b]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 51.285 | 1 | 51.285 | 57.199 | .000[a] |
| | Residual | 47.521 | 53 | .896 | | |
| | Total | 98.806 | 54 | | | |

The table shown above presents the results of the simple linear regression test for the second hypothesis, which was derived from the SPSS program. Regarding the first hypothesis proposed in the study, the statistical significance value was Sig = 0.000, which is less than the significance level α = 0.05. In addition, the calculated F-value equals 57.19, which is statistically acceptable. Therefore, the positive hypothesis is confirmed, and the null hypothesis is rejected. Accordingly,
There is a statistically significant effect at the 0.05 level for knowledge representation and reasoning in improving accounting auditing processes.
Testing the third hypothesis:

There is no statistically significant effect at the 0.05 level for the application of machine learning in improving accounting auditing processes.

Based on the analysis of the four questions from the first part of the questionnaire (Section Three: Application of Machine Learning) along with the last four questions (dependent variable: Accounting Auditing), the results were as follows:

**Table (10): Simple Linear Regression Test – Third Hypothesis**

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 52.546 | 1 | 52.546 | 61.04 | .000[a] |
| | **Residual** | 45.623 | 53 | .860 | | |
| | **Total** | 98.169 | 54 | | | |

The output from SPSS regarding the first hypothesis proposed in the study shows that the statistical significance value is Sig = 0.000, which is lower than the significance level α = 0.05. Moreover, the calculated F-value = 61.04, indicating statistical acceptance. Therefore, the positive hypothesis is confirmed, while the null hypothesis is rejected. Accordingly, There is a statistically significant effect at the 0.05 level for the application of machine learning in improving accounting auditing processes.

Conclusion

1-Enhancing the audit process through the application of artificial intelligence (Al) techniques ,lading to faster procedures and reduced time required to compete assigned task

2- Improving the quality of evidence by reducing data incompleteness and detecting unregistered individuals.

3- Increasing the ability to detect multiple fraudulent activities through suspicious accounting transactions and potential risks.

4- Supporting the auditor in the blood test due to the lack of a level of autonomy in the accuracy of the data.

5- Enhancing confidence in financial reports and increasing the level of trust in financial statements.

6- Reducing costs, including the disconnection, when applying AI techniques by reducing reliance on manual work, even the time that traditional reference methods consume.

intelligence. 6. Arbitrators who use artificial intelligence have a higher detection rate compared to traditional methods.

## Findings

Based on the theoretical and empirical analysis conducted throughout the study, the following key findings were derived:

1-There is statistically significant relationship between the application of ai techniques and the quality accounting audits.

2-applying ai in a limited and varied manner reduces the time required.

3-artifical intelligence techniques are highly efficient in the early detection of the causes of ethical crimes.

4-the use of artificial intelligence has a positive impact on the reliability of financial data.

5-the limitation of the technology among some experts hinder the application of artificial intelligence.

6-arbitrators who use artificial intelligence have a higher detection rate compared to traditional methods.

## Recommendations

Based on the identified limitations and weak areas observed in both the theoretical and practical aspects of the study, the following recommendations are proposed:

1. Organize training workshops and programs across all domains of expert systems to enhance employees' skills and capabilities in dealing with such systems.
2. Encourage banks to adopt advanced intelligent systems capable of detecting irregularities, deviations, and resolving problems automatically.

3. Employ statistical charts, data visualizations, and performance tables that display results to management, supporting informed decision-making and providing quality control through statistical process control maps.
4. Foster a digital innovation culture within the auditing environment and promote knowledge sharing between IT specialists and auditors.
5. Emphasize ethical considerations and governance in the use of AI tools, and study their potential impact on auditor independence and the quality of professional judgment.

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