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# ARTIFICIAL INTELLIGENCE TECHNIQUES IN ENHANCING THE EFFECTIVENESS OF INTERNAL CONTROL PROCEDURES

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Article history:		Abstract:		
Received: Accepted:	14 <sup>th</sup> February 2025 11 <sup>th</sup> March 2025	The research aims to identify the concepts and techniques of artificial intelligence, determine the nature and concept of internal control system procedures, and explain the role of artificial intelligence techniques in improving the effectiveness of internal control procedures. The research reached a set of conclusions, the most important of which is that increasing knowledge and learning about artificial intelligence techniques and employing these techniques to improve internal control activity is of great importance to decision-makers, and that the existence of a set of rules for using artificial intelligence techniques is considered a guiding model that achieves the guarantee and security of exploiting artificial intelligence applications, in addition to the fact that the processes of retrieving information and data from the database, analyzing and archiving them electronically greatly assist in decision-making processes. The research recommended the importance of providing electronic learning and training programs to keep pace with modern technologies in the work environment and the necessity of using the latest programs to use artificial intelligence techniques within internal control activities due to its importance in reducing time and effort.		

**Keywords**: Artificial Intelligence (AI), Internal Control Procedures, Effectiveness, AI in Auditing, Risk Management, Fraud Detection, Automation, Financial Compliance.

#### **INTRODUCTION:**

The advancement of computer technology and the evolution of business intelligence have led to an increasing focus on utilizing modern technologies across various fields. These advancements help overcome human limitations in performing tasks, thereby enhancing the efficiency and effectiveness of operations. Information technology plays a crucial role in facilitating accurate decision-making and improving overall productivity in the financial and accounting systems, the use of data and internal control mechanisms significantly impacts business organizations. As a result, artificial intelligence (AI) has been integrated into auditing and control procedures, as it enables the execution of tasks with greater accuracy, reduced costs, and shorter timeframes. AI-driven automation not only enhances the efficiency of auditing processes but also improves the quality of internal controls, minimizes risks, and strengthens fraud detection mechanisms. By leveraging AI technologies, businesses can achieve more reliable financial oversight and regulatory compliance, ensuring a more secure and transparent financial environment.

## **1.1**Research Problem:

The rapid advancement of information technology, particularly in the field of artificial intelligence (AI), has significantly enhanced work efficiency by reducing time and effort for users of financial and accounting information. This technological progress necessitates raising awareness among auditors regarding the adoption of AI techniques to improve the effectiveness of internal control procedures. Despite the potential benefits of AI in auditing and control, many auditors still rely on traditional methods, which may limit efficiency and accuracy. Therefore, understanding and integrating AI-driven solutions in risk assessment, fraud detection, and compliance monitoring has become essential for strengthening internal controls and ensuring more reliable financial oversight. This study aims to address the challenges and opportunities associated with implementing AI technologies in auditing and to explore their impact on enhancing internal control effectiveness.

#### 1.2Research Objectives:

1. Explore the concept and technologies of Artificial Intelligence (AI) – Understanding the fundamental principles, applications, and advancements in AI that impact various industries, particularly in auditing and financial control.



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- 2. Examine the nature and framework of internal control procedures Identifying the key components, objectives, and significance of an effective internal control system in ensuring financial accuracy, transparency, and regulatory compliance.
- 3. Analyze the role of AI in enhancing the effectiveness of internal control procedures Investigating how AI-driven solutions, such as automation, predictive analytics, and machine learning, contribute to improving risk assessment, fraud detection, and decision-making processes within organizations.
- 4. By addressing these objectives, the research aims to highlight the potential of AI in optimizing auditing functions, strengthening internal controls, and promoting a more efficient and secure financial environment.

### **1.3Research Significance:**

The significance of this study lies in the crucial role of artificial intelligence (AI) in enhancing the effectiveness of internal control procedures. The integration of AI-driven technologies in auditing and financial oversight offers numerous advantages, including increased accuracy, real-time data analysis, risk identification, and fraud detection. By automating complex auditing tasks and improving decision-making processes, AI helps organizations reduce human errors, optimize resource allocation, and strengthen regulatory compliance. This research highlights the transformative potential of AI in modernizing internal control systems, ensuring more efficient financial governance, and promoting transparency in business operations.

#### 1.4Research Hypothesis:

The current study is based on the fundamental hypothesis that "Artificial intelligence (AI) technologies contribute to enhancing the effectiveness of internal control procedures".

This hypothesis suggests that the integration of AI in auditing, risk management, and compliance monitoring can lead to more efficient, accurate, and proactive control mechanisms. AI-driven solutions, such as machine learning, data analytics, and automation, have the potential to identify anomalies, detect fraud, and optimize decision-making within internal control systems.

By testing this hypothesis, the study aims to assess the impact of AI technologies on financial oversight, demonstrating how AI can improve audit quality, reduce operational risks, and strengthen governance frameworks in modern organizations.

#### 1.5Research Methodology:

This study adopts a descriptive approach for the theoretical framework, aiming to provide a comprehensive understanding of artificial intelligence (AI) technologies and their role in internal control procedures. Additionally, a descriptive-analytical approach is employed for the practical aspect of the research, focusing on analyzing real-world applications of AI in auditing, risk management, and fraud detection.

By combining these methodologies, the study seeks to examine existing literature, evaluate current AI-driven internal control practices, and provide data-driven insights on how AI enhances financial oversight. This dual approach ensures a well-rounded analysis, allowing for both theoretical exploration and practical validation of AI's impact on internal auditing and corporate governance.

#### 2.1Artificial Intelligence Techniques

#### 2.1.1Concept of Artificial Intelligence (AI):

Artificial Intelligence (AI) is a branch of computer science that aims to design intelligent systems capable of exhibiting human-like behavior. It operates based on the principle of describing objects, events, and processes using their logical and computational properties (Jajil & Othman, 2015: 9).

AI has been defined as "a field of study that models machine learning capabilities and enables systems to respond to certain known methods, also referred to as artificial intelligence" (Alsedvah, 2017: 40).

Additionally, AI is described as "the ability of computer systems to simulate and execute tasks that resemble human intelligence processes, enabling decision-making based on knowledge derived from data and past experiences to enhance performance and achieve objectives. AI is widely used in data analysis, image processing, translation, planning, and improving the performance of robots and automation systems" (Jin et al., 2022: 570).

#### 2.1.2Characteristics and Importance of Artificial Intelligence

Accuracy and Speed in Data Processing: AI allows for high accuracy and speed in receiving data and using humanlike methods to solve complex operations. This ability enables AI systems to perform tasks with great precision and efficiency.

Automation of Tasks: AI can automate a wide range of tasks, which leads to significant increases in productivity and efficiency. By handling repetitive or time-consuming tasks, AI frees up human resources for more strategic and creative endeavors.



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Documenting Human Expertise and Providing Alternatives: AI helps to document human expertise, creating systems that can offer multiple alternatives, reducing the reliance on expert judgment, and thus lowering operational costs. This feature also enables the system to learn from vast amounts of data, providing solutions even in complex or uncertain situations.

Risk Monitoring and Control: One of the critical concerns with AI is the risks associated with its autonomy. AI not only involves predictive capabilities but also presents challenges in control and supervision. Monitoring these risks becomes crucial to prevent any unintended consequences or issues arising from AI decision-making processes.

Fostering Innovation: AI plays a key role in driving innovation by contributing to the development of new products, services, and technologies. Its ability to analyze large data sets and recognize patterns can lead to new insights and improvements, making it a valuable tool for continuous development and competitiveness.

In summary, AI is not just a tool for enhancing operational efficiency but also a catalyst for fostering innovation, reducing costs, and improving decision-making processes across various industries.

### 2.1.3Mechanism of Artificial Intelligence (AI)

AI systems involve the use of data sets that include images, audio, and various types of data (inputs). These inputs are processed using AI algorithms and techniques (processing) to derive outputs or results. The process begins with the collection of relevant data, followed by applying machine learning models, natural language processing, or computer vision techniques, depending on the type of task.

Humans play a crucial role in the development and refinement of AI systems. They are responsible for building, tuning, and testing AI systems in a structured and precise manner, ensuring the accuracy and efficiency of the algorithms used. Additionally, training AI models using large datasets is necessary to enable these systems to learn and improve their performance over time.

Thus, the AI process can be broken down into three main steps:

Data Collection and Input: Gathering relevant data (e.g., images, text, sound).

Data Processing and Algorithm Application: Applying machine learning models, neural networks, or other AI techniques.

Results/Output: Producing outcomes that assist in decision-making or problem-solving, such as predictions, classifications, or recommendations.



Figure (1): The mechanism of artificial intelligence

The mechanism of artificial intelligence works in three stages: Receiving data (inputs) and processing it using artificial intelligence algorithms and methods and then reaching the results (outputs). (Al-Rumaih, 2021: 17)

#### 2.1.3 Artificial Intelligence Technology

Artificial Intelligence (AI) refers to the development of computer systems and software that can perform tasks typically requiring human intelligence. These systems can process large amounts of data, recognize patterns, make decisions, and even learn from experience. AI technologies are used in a wide range of applications, from automation to data analysis, and have a profound impact on industries such as healthcare, finance, manufacturing, and customer service.

Some of the key AI techniques include:

Machine Learning (ML): This involves algorithms that enable systems to learn from data and improve their performance over time without being explicitly programmed. ML is commonly used in predictive modeling, data mining, and classification tasks.

Natural Language Processing (NLP): NLP allows machines to understand, interpret, and generate human language. It is used in chatbots, voice assistants, and translation services.

Computer Vision: This AI technique enables machines to interpret and make decisions based on visual information, such as analyzing images or videos. It is commonly used in facial recognition, autonomous vehicles, and medical imaging.

Robotics: AI-powered robots can perform tasks autonomously or semi-autonomously. These systems are often equipped with sensors and decision-making algorithms to interact with their environment effectively.



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Expert Systems: These are AI programs that simulate the decision-making ability of a human expert in specific domains, such as medical diagnosis or technical support

2.1.5Types of Artificial Intelligence (AI)

Artificial Intelligence is divided into three main types:

Narrow AI (Weak AI): This is the simplest form of AI, designed to perform tasks within a specific, limited scope. It is characterized by the ability to function under predefined conditions and limitations, and it is typically used for single tasks such as voice recognition or data analysis.

General AI (Strong AI): This type of AI can perform intellectual tasks that are typically done by humans. It is more complex than Narrow AI and aims to replicate the broader cognitive abilities of the human mind. General AI systems are capable of learning, reasoning, and problem-solving across a wide range of tasks.

Superintelligent AI: This type of AI possesses a high level of intelligence, surpassing human cognitive abilities. Superintelligent AI can outperform human intelligence in virtually every field, including scientific creativity, problem-solving, and social intelligence. It has the potential to exceed the capabilities of its creators and may sometimes even surpass human-level intelligence in specific areas (Zabiba, 2023: 30).

### 2.2.1Concept of Internal Control System

Internal control is defined as "the organizational plan, means, and procedures established by an entity to assist in achieving management's goals. It ensures the effectiveness and efficiency of operations, the application of management policies, the protection of assets and properties, the prevention and detection of fraud and errors, as well as the accuracy and completeness of accounting records and the timely preparation of financial statements".

The American Institute of Certified Public Accountants (AICPA) defines it as "a set of procedures and methods used by economic entities to safeguard cash and other assets, detect errors, and ensure the accuracy of records." (Haddab, 2023: 3).

The Arab Organization for Development defines internal control as "the methods and techniques adopted by the management of an entity, including its board of directors, managers, and employees, to provide reasonable assurance that the entity's objectives are achieved." (Mashkoor, 2016: 38).

### 2.2.20bjectives of Internal Control

The objectives of an internal control system include the following:

Protecting the assets of the economic unit from manipulation and embezzlement.

Ensuring the accuracy of data and determining the level of reliance on it for making administrative decisions and forming policies.

Enhancing productivity and resource utilization to achieve the maximum possible return.

Encouraging adherence to administrative decisions and policies.

Minimizing errors, fraud, violations, and misuse of resources. (Hilimi, 2016: 6)

#### 2.2.3Components of the Internal Control System

An internal control system involves a set of interconnected components that ensure its success and enhance its effectiveness. Below are the main components of an internal control system:

Efficient Organizational Structure: the organizational structure is the framework that defines the internal composition of the company. It outlines the departments and divisions that carry out the various tasks and activities required to achieve the company's objectives

while specifying the responsibilities and powers of each department.

Sound Accounting System: an effective internal control system requires a reliable accounting system that ensures proper accountability for all company activities. It also includes the preparation of financial statements and balance sheets, along with the enforcement of controls over operations. The Iraqi Accounting and Auditing Standards Board's Audit Guide No. (4) defines the accounting system as "a set of processes and procedures through which information and data are processed to achieve the management's objectives. This includes record-keeping and accounting practices followed to prepare, analyze, calculate, classify, post, summarize, and report financial information. (Jowad, 2015: 12).

Employee Competence: the effectiveness of the internal control system depends on the competence of the employees. Although authority lines and responsibilities may be clear, the system may fail to achieve its goals if employees are not capable of performing the tasks assigned to them. Therefore, the company must adopt a sound policy for hiring new employees, promoting existing staff, and developing their skills through training programs. Detailed Procedures for Task Execution: responsibilities should be divided between different departments within the

Detailed Procedures for Task Execution: responsibilities should be divided between different departments within the company to prevent a single person from handling an entire process—from asset custody to accounting because this poses a risk of manipulation or embezzlement. Therefore, the company must implement procedures that ensure employee compliance with internal control instructions.



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Performance Monitoring Across Company Departments: the management of the company is responsible for efficiently using available resources to achieve goals. This requires taking the necessary steps to control materials, use resources appropriately, plan employee assignments, and monitor performance. Internal control systems should evolve from their traditional role of ensuring smooth financial and accounting processes to improving productivity and evaluating employee performance.

Use of Electronic Tools: the use of electronic tools ensures the accuracy and reliability of recorded accounting data and safeguards the company's assets from fraud or theft. This enhances the effectiveness of the accounting system and provides more accurate and reliable results in financial reporting.

#### 2.2.4Internal Control Procedures

The internal control system uses various means to achieve its intended goals and regulate accounting operations by providing reliable and credible information for users. Several procedures within the internal control system support its key components, including:

First: Organizational and Administrative Procedures

Organizational and administrative procedures pertain to management performance through the identification of duties, task division, responsibility allocation, and others, as follows: (Tawaher & Sadeqi, 2003: 99-100)

Defining Competencies: competencies should be clearly defined in the organizational structure of each institution to avoid conflicts of responsibility.

Division of Labor: there must be a division of labor to support the identification of competencies within the institution, aimed at reducing the likelihood of errors. An appropriate division of labor is based on several considerations, such as: separation of duties and authority to record transactions.

Division of accounting work.

Separation of authority to retain assets and the authority to record them.

Separation of authority to retain assets and the authority to report their acquisition.

Distribution of Responsibilities: distributing responsibilities among employees reduces the occurrence of errors by enabling each employee to understand their work boundaries and be held accountable within this scope, ensuring accuracy in task execution.

#### **Second: Procedures Related to Accounting Work**

One of the keys supporting elements for an effective internal control system is the presence of a sound accounting information system. Below are the main procedures related to accounting work

Transaction Recording: recording transactions immediately after they occur helps avoid the accumulation and loss of documents, ensuring accuracy in the registration process.

Ensuring Document Accuracy: when designing documents, simplicity should be prioritized to facilitate their use. It is also important to define the required number of copies and provide clear guidelines on how the documents should be used.

Periodic Reconciliations: internal control procedures include periodic reconciliations to detect incorrect documents, which may affect the outputs of the accounting information system and, consequently, the financial statements of the institution.

### Third: General procedures: (Halimi, 2016: 8)

Property insurance: The institution seeks to achieve its goals by

- 1. practicing its activity by optimally exploiting resources and preserving properties through insurance.
- 2. Insurance against breach of trust: One of the procedures of the internal control system is insurance for employees who work directly in cash.
- 3. Dual control: This procedure is used to preserve cash and avoid manipulation and theft.
- 4. The general procedures mentioned by Halimi (2016: 8) relate to risk management and enhancing security within the institution, through several steps to protect properties and resources. Here is an explanation of these procedures:
- 5. Property insurance: It aims to insure the properties owned by the institution against potential risks such as accidents or theft. This procedure contributes to maintaining the continuity of the institution's work and reducing financial losses.
- 6. Insurance against breach of trust: This procedure aims to protect the institution from risks resulting from illegal acts or fraud by employees who deal directly with money or cash. This type of insurance covers employees who may be in a position where they can commit acts that put the organization at risk.
- 7. Dual control: This is a control mechanism that aims to prevent manipulation or theft by having more than one person in the process of handling cash or sensitive resources. This system reduces the chances of committing errors or illegal acts and enhances financial security.

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- 2. Insurance against breach of trust: One of the procedures of the internal control system is insurance for employees who work directly in cash.
- 3. Dual control: This procedure is used to preserve cash and avoid manipulation and theft.
- 4. The questionnaire form was distributed to a sample of auditors of government departments and teachers in Wasit Governorate, where (80) forms were distributed and were retrieved in full after answering the questionnaire questions.

### 1-3 Reliability Test:

When conducting the reliability test for the measurement tool used in the study with Cronbach's alpha, the reliability coefficients were calculated as follows:

- 1. Cronbach's alpha coefficient for the independent variable "Artificial Intelligence Techniques" is.(0.902)
- 2. Cronbach's alpha coefficient for the dependent variable "Internal Control Procedures" is (0.870).
- 3-3Statistical Analysis of the Questionnaire Axes:

The questionnaire was divided into two axes: the first axis is related to the independent variable (Artificial Intelligence Techniques), and the second axis is related to the dependent variable (Internal Control Procedures). Below is the statistical analysis for both axes:

### **Axis One: Applications of Artificial Intelligence**

Do artificial neural networks have the property of learning?

- 1. The arithmetic meaning of the opinions from the research sample was (3.96), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (1.09), suggesting less dispersion and greater homogeneity.
- 2. Does the unit rely on artificial neural networks as information systems that mimic human nerves?
- 3. The arithmetic mean of the opinions from the research sample was (3.50), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (1.09), suggesting less dispersion and greater homogeneity.
- 4. Does the unit rely on a set of rules in administrative processes to solve problems?
- 5. The arithmetic meaning of the opinions from the research sample was (3.88), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (1.1), suggesting less dispersion and greater homogeneity.
- 6. Is the unit striving to enhance the retrieval of information that plays a role in decision-making?
- 7. The arithmetic meaning of the opinions from the research sample was (4.12), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.99), suggesting less dispersion and greater homogeneity.

Conclusion From this, we can conclude that the management is interested in applying the transactions of neural networks, as they form the backbone of procedures that reflect the values established by senior management and assist in achieving objectives. Additionally, the identification of a set of rules in administrative processes helps the unit solve the problems it faces and predict issues based on intelligent computers, allowing for preventive measures to be put in place before problems occur.

#### **Axis Two: Internal Control Procedures**

Does the organization have an organizational structure that is appropriate for its size and nature to help achieve its goals?

- 1. The arithmetic mean of the opinions from the research sample was (3.54), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.84), suggesting less dispersion and greater homogeneity. Are the authorities granted utilized to provide an effective basis for internal control?
- 2. The arithmetic meaning of the opinions from the research sample was (3.49), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.82), suggesting less dispersion and greater homogeneity. Do the control procedures in the unit, which involve ensuring the accuracy of calculations and the correctness of recording transactions according to authorized powers, reduce the time spent on auditing?
- 3. The arithmetic meaning of the opinions from the research sample was (3.59), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.99), suggesting less dispersion and greater homogeneity. Does the size of the economic unit and its activities influence inherent risks?



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- 4. The arithmetic mean of the opinions from the research sample was (3.99), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.93), suggesting less dispersion and greater homogeneity. Does appropriate segregation of duties play a role in preventing intentional and unintentional distortions?
- 5. The arithmetic mean of the opinions from the research sample was (3.58), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.98), suggesting less dispersion and greater homogeneity. Does the management of the unit identify important information and deliver it to users in a timely manner?
- 6. The arithmetic meaning of the opinions from the research sample was (4.09), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.73), suggesting less dispersion and greater homogeneity. Is the follow-up in the unit conducted by qualified individuals with sufficient experience to mitigate risks and provide neutral technical opinions?
- 7. The arithmetic mean of the opinions from the research sample was (3.65), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.83), suggesting less dispersion and greater homogeneity. Do correct directives from management play a role in reducing internal control risks?
- 8. The arithmetic meaning of the opinions from the research sample was (3.60), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.04), suggesting less dispersion and greater homogeneity. Does effective risk assessment and appropriate response by the management of the unit lead to reduced internal control risks?
- 9. The arithmetic meaning of the opinions from the research sample was (3.62), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.82), suggesting less dispersion and greater homogeneity. Does accurate information generated by the unit's accounting system affect the level of internal control risks?
- 10. The arithmetic mean of the opinions from the research sample was (3.54), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.85), suggesting less dispersion and greater homogeneity. Are information security and confidentiality guaranteed and in compliance with laws and regulations?
- 11. The arithmetic mean of the opinions from the research sample was (3.86), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.72), suggesting less dispersion and greater homogeneity. Are weaknesses in the internal control system identified and necessary adjustments made?
- 12. The arithmetic mean of the opinions from the research sample was (3.48), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.55), suggesting less dispersion and greater homogeneity. Are the internal auditor's observations and recommendations regarding internal control implemented?
- 13. The arithmetic mean of the opinions from the research sample was (3.67), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.59), suggesting less dispersion and greater homogeneity. Is the internal auditor involved in training sessions that enable the identification of risks?
- 14. The arithmetic meaning of the opinions from the research sample was (3.72), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.62), suggesting less dispersion and greater homogeneity. Is there assurance of electronic and physical security to protect records, programs, and files?
- 15. The arithmetic meaning of the opinions from the research sample was (3.49), which is greater than (3.40) and less than (4.19). This indicates that the sample's inclination was towards (Yes). The standard deviation was (0.57), suggesting less dispersion and greater homogeneity.

#### 4-3 Statistical Analysis and Hypothesis Testing

The simple correlation coefficient was employed to test the research hypothesis, which concerns the relationship between the independent variable (artificial intelligence techniques) and the dependent variable (internal control procedures). The strength of the coefficient correlation is determined based on the criteria established by Cohen & Cohen (1983) as follows:

- 1. If the correlation coefficient value is less than (0.10), this indicates a low correlation relationship.
- 2. If the correlation coefficient value is between (0.10 0.30), this indicates a moderate correlation relationship.
- 3. If the correlation coefficient value is greater than (0.30), this indicates a strong correlation relationship.



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The following table shows the correlation matrix, which indicates that there is a strong positive correlation because its value is greater than (0.30) and is statistically significant between artificial intelligence techniques and the effectiveness of internal control procedures at the 1% level, where the simple correlation coefficient reached (0.01). Table (1)

Correlation Matrix Between Artificial Intelligence Techniques and the Effectiveness of Internal Control Procedure

Correlation					
		Artificial Intelligence Technologies	Effectiveness of internal control procedures		
Artificial Intelligence Technologies	Pearson Correlation	1	0.01		
	Sig.		000.		
Effectiveness of internal control procedures	Pearson Correlation	0.01	1		
procedures	Sig.	000.			

# CONCLUSIONS AND RECOMMENDATIONS 1-4CONCLUSIONS:

The research reached several conclusions, which are:

- 1. Increasing knowledge and learning of artificial intelligence techniques and employing these techniques to improve internal control activities is of great importance to decision-makers.
- 2. The existence of a set of rules for using artificial intelligence techniques serves as a guiding model that ensures the safe and secure exploitation of AI applications.
- 3. The process of retrieving, analyzing, and electronically archiving data from databases significantly aids decision-making.
- 4. Management continually seeks to manage and reduce control risks, which helps in controlling them in the future.
- 5. Management seeks to provide important information and deliver it to users in a timely manner.
- 6. The follow-up process within the unit is carried out by qualified individuals with the necessary scientific background and experience to reduce risks.

#### 2-4RECOMMENDATIONS:

- 1. Provide electronic learning and training programs to keep up with modern technologies in the work environment.
- 2. Provide computers and electronic software, which contribute to the use of modern electronic technologies in control activities.
- 3. It is essential to use the latest software to integrate artificial intelligence techniques within internal control activities due to its importance in reducing time and effort.
- 4. It is necessary to create special units to adopt ideas and suggestions for improving operations and enhancing internal control capacity by promoting a culture of innovation.
- 5. Active participation between the auditing and internal control departments is essential to provide necessary recommendations.
- 6. Intensify training courses in internal control to reduce risks.

#### **RESOURCES**

1. Aswar Shtewi Abdul (The reality of accounting considering artificial intelligence in Iraq), Tikrit Journal of Administrative and Economic Sciences, 2023.



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- Jad Allah Khalaf Hamid Rajab (Evaluation of the procedures of the internal control system according to the COSO framework), University of Mosul, College of Administration and Economics, 2020.
- 3. Halimi, Nabil (Evaluation of the effectiveness of the internal control system for collection in the economic institution), Master's thesis, University of Qasdi Meriah Ouargla, Algeria, 2016.
- Reem Muhammad Al-Rumaih (Using artificial intelligence techniques in implementing control tasks), the thirteenth scientific research competition in the field of financial control of the Arab Organization of Supreme Audit Institutions, 2021.
- Saud Jaid Mashkoor, (Electronic operation of accounting data and its impact on improving the efficiency of internal control performance), Al-Muhaseb Journal of Accounting and Auditing Sciences - Syndicate of Accountants and Auditors, Iraq, Volume 23, Issue 45, 2016.
- 6. Tawaher, Muhammad Al-Tahami, and Siddiq Masoud (Auditing and Auditing Theoretical Framework and Applied Practice), Ibn Akshouf, Algeria, 2023.
- 7. Abdul Rahman Jad Hamid, Nazim Shaalan Al-Tamimi (The role of artificial intelligence techniques in supporting audit quality from the point of view of auditors),
- 8. Ali Karim Khadir Abu Zubaiba (The role of artificial intelligence applications in enhancing internal control and its impact on financial performance), Master's Thesis, Kufa, 2023.
- 9. Anbar, Sami (Audit Quality by Adopting Artificial Intelligence), PhD Thesis, University of Baghdad, 2015.
- 10. Fatima Fazaa Hadab (Internal Control of Grants and Aid in Non-Governmental Organizations), Al-Jazeera for Printing, Publishing and Distribution, 2023.
- 11. Fatima Abdul Jawad (The Impact of Information Technology on the Internal Control System and Financial Matters), Financial Supervision Bureau and the Iraqi Accountants and Auditors Syndicate, 2015.
- 12. Al Sedrah, (2017) Artificaial I ntelliagence, Advances d' Analysis and Deswign, CNIT 380.
- 13. Scherer , matthew Ua , (2016). Regeulating Artificial Intellignce Systems ,Riskes challenges Competnces and Straetegies tlareravd Journael of low & Technoleogy ,vol .28.
- 14. Zemankova ,A, (2019) , Artificial Intelligence and Blockchain in Audit and Accounting. Literature Review WSEAS transactions or Basiness and Economics .
- 15. Jin, Huiquan, Jin, Lei, Qu, (2022), Chongxlao, Fan, changjun, Liu, Shuo, and Zhang, yongin, The impact of Artificial Intelligence on the Accounting Industry, Advances in Social Science, education and Humanities (ICHSSR), vol(664)8th international conference.