The Effectiveness of Internal Auditing in Mitigating the Risks of Artificial Intelligence in Banks Listed on the Damascus Securities Exchange- A Field Study -

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Abstract:

In the context of the digital transformation, the role of internal audit is evolving from a mere compliance verification tool to a pivotal strategic function in enhancing corporate governance and risk management. The adoption of Artificial Intelligence (AI) technologies poses unique challenges that necessitate an advanced regulatory framework. From this perspective, this study aims to analyze the effectiveness of internal audit mechanisms in mitigating the risks arising from the use of AI systems within the Syrian banking sector. The study adopted a descriptive-analytical methodology, where primary data were collected through a questionnaire administered to a sample of specialists in audit, risk management, and information technology at banks listed on the Damascus Securities Exchange. The results of the statistical analysis revealed a significant positive relationship between the effectiveness of internal audit and the mitigation of AI risks. The findings highlighted that the competency and skills of the audit team, coupled with their use of advanced technological tools, are the two fundamental pillars for achieving effective control. Furthermore, the descriptive analysis showed that the evaluation of algorithms for bias is the least implemented practice, representing a significant weakness and a future area of risk. Accordingly, the study recommends the adoption of strategic plans to invest in building the capacity of internal audit teams and equipping them with advanced skills in data analytics, information security, and AI ethics.

Keywords: Internal Audit, Artificial Intelligence, Risk Management, Syrian Banking Sector, Algorithm Analysis.

GENERAL FRAMEWORK OF THE STUDY

1. INTRODUCTION:

Artificial intelligence represents a technological revolution that has reshaped the global financial industry, offering banks and financial institutions unprecedented capabilities to improve decision accuracy, automate processes, and provide innovative services. However, this rapid advancement is a double-edged sword; for all the opportunities it presents, it also creates a new system of complex and interconnected risks, such as the risk of biased decisions resulting from algorithms, the lack of transparency in "black box" models, in addition to security challenges and data integrity risks upon which these intelligent systems are built.

At the heart of this changing landscape, the internal audit function stands as a crucial line of defense and a key guardian of corporate governance. A central irony is that the tools the auditor is supposed to use to enhance their effectiveness (AI applications) have themselves become a new and complex subject of auditing. This situation poses unprecedented challenges to traditional auditing practices, which may not be equipped to effectively evaluate algorithm construction, verify the fairness of their outputs, or test their cybersecurity.

This global issue takes on more complex and urgent dimensions when studied in specific economic contexts. The Syrian banking sector, a vital nerve of the national economy, faces the challenges of its unique operating environment, in addition to its efforts to keep pace with digital developments. In light of this reality, questioning the readiness of Syrian banks to face emerging technological risks is not merely an intellectual luxury but a strategic necessity to ensure financial stability and reliability.

Despite the critical importance of this role, there is an almost complete cognitive and empirical gap surrounding the actual state of the internal audit function in Syrian banks and its ability to deal with AI risks. There are no field studies measuring current skill levels, the adequacy of current methodologies, or the size of the gap between what is required and what actually exists. This "ambiguity" represents the greatest risk, as it may hide fundamental weaknesses in control systems.

Hence, this research aims to assess the effectiveness and readiness of the internal audit function in listed Syrian banks in mitigating the risks associated with artificial intelligence applications. To achieve this goal, the study reviews the theoretical framework of the

topic, then moves to analyze field data collected through a questionnaire directed at professionals in the sector, leading to practical conclusions and recommendations aimed at enhancing the Syrian banking sector's ability to leverage AI opportunities while consciously and efficiently managing its risks.

2. STUDY PROBLEM:

The world is witnessing a tremendous acceleration in the adoption of artificial intelligence applications in various sectors, led by the banking sector, which relies on these technologies to enhance operational efficiency and decision-making. However, this profound technological transformation does not come without a price; it has given rise to a new system of complex risks that traditional regulatory practices were not designed to handle, such as algorithmic bias risks, the lack of transparency in "black box" models, and risks to the safety and security of data used to train the models.

In the face of these challenges, the internal audit function emerges as a primary and vital line of defense for institutions, entrusted with providing objective assurance on the adequacy and effectiveness of risk management and internal control. But the fundamental question that arises globally is: Does internal audit possess the necessary tools, skills, and methodologies to keep pace with this rapid development and provide reliable assurance regarding AI risks?

This issue becomes deeper and more acute in the Syrian banking context, which operates within a specific economic and regulatory environment. Despite the expected trend towards digital transformation, there is a complete cognitive and empirical ambiguity about the readiness of internal audit functions in Syrian banks to face this type of risk. The absence of field data creates a state of uncertainty for boards of directors and regulatory bodies about the actual maturity level of internal controls and their ability to protect the banks' assets and reputation.

Therefore, the problem of this research is centered on the existing gap between the theoretically assigned role of internal audit and its practical, empirically measured ability and effectiveness in mitigating the risks of artificial intelligence within the Syrian banking sector. Failure to address this problem could leave banks exposed to undiscovered risks that may affect their financial stability and competitive ability. To analyze the dimensions of the aforementioned problem accurately, the study seeks to answer the following main question:

What is the extent of the effectiveness and readiness of the internal audit function in listed Syrian banks to mitigate the risks associated with artificial intelligence applications?

This main question branches into the following sub-questions:

- What are the most prominent risks of artificial intelligence facing Syrian banks from the perspective of internal auditors and relevant professionals?

- To what extent do the internal audit teams in Syrian banks have the specialized competencies, skills, and methodologies necessary to effectively audit artificial intelligence systems?

- What is the actual impact of current internal audit practices (in terms of team efficiency, applied methodologies, and use of tools) in mitigating the dimensions of artificial intelligence risks (data quality risks, security risks, and compliance risks)?

3. STUDY MODEL AND VARIABLES:

Independent Variable: Effectiveness of Internal Audit   Dependent Variable; Mitigation of AI Risks

-Competence and skills of the internal audit team in the field of AI.
-Applied AI audit methodologies and procedures.
-Use of tools and technologies to assist in AI auditing

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-Mitigation of data quality risks used in AI systems.
-Mitigation of security and privacy risks of AI systems, and risks of regulatory and ethical compliance related to AI, and operational and strategic risks

- **Independent Variable: Effectiveness of Internal Audit in the field of AI.** Can be measured through dimensions such as:

    o Competence and skills of the internal audit team in the field of AI.

    o Applied AI audit methodologies and procedures.

    o Use of tools and technologies to assist in AI auditing.

- **Dependent Variable: Mitigation of AI Risks.** Can be measured through dimensions such as:

    o Mitigation of data quality risks used in AI systems.

        o   Mitigation of security and privacy risks of AI systems, and risks of regulatory and ethical compliance related to AI, and operational and strategic risks resulting from the use of AI.

4. PREVIOUS STUDIES:

The topic of developing the internal audit function to keep pace with technological advancements has received wide attention in research literature. Many studies have addressed the pivotal role of internal audit in risk management in general, with more recent studies touching on its relationship with the risks of digital transformation, leading up to its use of artificial intelligence tools.

Axis 1: The Role of Internal Audit in Risk Management and Digital Transformation

Early studies focused on establishing the relationship between internal audit and traditional risk management. In Katmy's (2018) study, it was emphasized that internal audit contributes to the efficiency and effectiveness of the internal control system and helps in risk assessment, recommending the establishment of a specialized risk management department that coordinates with the audit function. In a more specialized context, Al-Mawla's (2024) study showed a positive and strong relationship between internal audit and risk management in the Iraqi banking sector, confirming its role in improving control procedures. With the increasing reliance on technology, the scope of research expanded to include the risks of digital transformation. The study by Yousef and Shehata (2025) addressed the role of internal audit in mitigating these risks, revealing a positive relationship between adopting digital analysis tools in auditing and improving the quality of professional performance and auditors' ability to detect fraudulent activities.

Axis 2: The Impact of Artificial Intelligence as a Tool to Enhance Internal Audit

With the dawn of the AI era, researchers' focus shifted towards exploring how the audit function can benefit from these technologies. The study by Adelakun (2022) aimed to show the multifaceted impact of AI on internal audit, concluding that technologies like machine learning and advanced analytics enhance auditors' ability to analyze big data and identify deviations more effectively. In the same vein, the study by Selem et al. (2024) in the Saudi context confirmed a statistically significant relationship between integrating AI and improving audit efficiency and risk management. Rashwan's (2022) study provided evidence from the Palestinian government sector on the positive impact of using AI in enhancing risk management, control, and governance. From a different angle, Al-Ramadneh's (2024) study researched the impact of AI on the quality of internal audit, considering the moderating role of intellectual capital, which adds a strategic dimension to how these technologies are adopted in Jordanian industrial companies.

Axis 3: Challenges of Adopting Artificial Intelligence in Internal Auditing

Despite the documented benefits, some studies have highlighted the challenges hindering this transformation. The study by Selem et al. (2024) pointed to tangible challenges such as a lack of skills, high costs, and resistance to change. This is consistent with the study by Udoh et al. (2024), which emphasized the importance of addressing skill gaps and resource limitations to improve audit efficiency and align it with strategic objectives.

Commentary on Previous Studies:

After reviewing and analyzing the previous literature, it is clear there is growing academic interest in the intersection of AI technology and the audit function. The findings of these studies can be summarized in several key points:

- The majority of recent studies (such as Selem et al., 2024; Rashwan, 2022; Adelakun, 2022) agree on the positive impact and effective contribution of AI in enhancing the efficiency of the internal audit process, improving risk management, and increasing the quality of professional performance.

- Empirical studies have addressed the topic in various geographical and sectoral contexts, focusing on the industrial sector in Jordan (Al-Ramadneh, 2024), the government sector in Palestine (Rashwan, 2022), audit firms in Saudi Arabia (Selem et al., 2024), and banks in Iraq but in the context of general risk management (Al-Mawla, 2024).

- Some studies (such as Selem et al., 2024; Udoh et al., 2024) have highlighted the challenges facing the adoption of these technologies, such as the lack of specialized skills, high costs, and resistance to change within institutions.

How the Current Study Differs from Previous Studies:

Despite the richness of previous studies, they reveal clear cognitive and methodological gaps, which justifies the importance of conducting this study. These gaps can be identified in the following points:

- There is a severe scarcity of studies that have addressed this topic in the Syrian context. The available applied studies have focused on economic and regulatory environments that may differ radically from the Syrian reality in terms of digital maturity, the nature of economic challenges, and the stringency of regulatory frameworks. Therefore, the results of those studies cannot be generalized to the Syrian banking sector, creating an urgent need for a field study that explores this local reality.

- Some studies have focused on the impact of AI on the "quality" or "efficiency" of auditing in general (Al-Ramadneh, 2024; Adelakun, 2022), while other studies have addressed the relationship between auditing and risk management in its traditional form without delving into the specific and emerging risks that AI itself imposes (such as algorithmic bias risks, training data quality, and security of machine learning models). Our study seeks to fill this gap by focusing specifically on the role of auditing in mitigating the risks of AI, not just improving audit efficiency through it.

- Most studies have tested direct relationships between two variables. This study aims to provide a more detailed and comprehensive model that links the multiple dimensions of internal audit effectiveness (team competence and skills, applied methodologies and procedures, use of tools) with the different dimensions of AI risks (data risks, security risks, and compliance risks), a detailed distinction that previous studies have not addressed with this depth.

Based on the above, the originality and scientific and practical contribution of this study emerge through:

- Being one of the first studies—if not the first—to examine the effectiveness of internal auditing in confronting the risks of artificial intelligence within the Syrian banking sector listed on the Damascus Securities Exchange, which will provide authentic field data and insights from an environment not previously studied.

- Shifting from the general concept (the impact of AI on auditing) to the specific concept (the role of auditing in mitigating the risks of AI), with a detailed breakdown of these risks into measurable dimensions.

- Providing practical, applicable recommendations based on field data for decision-makers in Syrian banks and regulatory bodies (such as the Central Bank of Syria and the Syrian Commission on Financial Markets and Securities) to help them develop strategies and frameworks to face this new challenge.

5. OBJECTIVES OF THE STUDY:

Based on the research problem, the following objectives were identified:

- **Main Goal:** To evaluate the effectiveness of the internal audit role in contributing to the mitigation of risks associated with artificial intelligence systems.

- **Sub-Goals:**

  o To highlight the concept and importance of artificial intelligence and its most important uses.

  o To identify and understand the nature of the main risks of artificial intelligence that can affect institutions.

  o To analyze the methodologies, tools, and procedures used by internal audit in auditing artificial intelligence systems.

  o To assess the extent to which internal audit contributes to enhancing artificial intelligence governance and compliance with ethical and regulatory requirements.

  o To identify the challenges facing internal audit in dealing with the risks of artificial intelligence.

  o To provide recommendations for improving the effectiveness of internal audit in the field of artificial intelligence risks.

6. IMPORTANCE OF THE STUDY:

- **Scientific Importance:** This study derives its scientific importance from its contribution to filling a clear knowledge gap in the accounting and auditing literature related to artificial intelligence technology, through several aspects:

  o The study addresses the scarcity of research dealing with the application and auditing of artificial intelligence in the context of emerging economies or those undergoing special circumstances, such as the Syrian context. As most of the current literature is based on advanced economic environments, this study will provide new insights into the applicability of global theories and models in different environments. The study will provide recent empirical data from an environment where these hypotheses have not been tested before. This data will form a solid reference and basis for other researchers interested in conducting future comparative or longitudinal studies in Syria and the region.

  o The study contributes to building and presenting an integrated framework that systematically links the *dimensions of internal audit effectiveness* (team efficiency, methodologies, tools) as an independent variable, and the *dimensions of artificial intelligence risks* (data risks, security and operational risks, and compliance risks) as a

dependent variable. This detailed linkage represents a theoretical addition not addressed with such depth in previous studies.

- **Practical Importance:** On the practical and applied level, the results and recommendations of this study are expected to provide direct added value to several stakeholders, as follows:

  o The study provides a realistic diagnostic tool that helps senior management and boards of directors assess the readiness of their internal audit function to face the risks of artificial intelligence. It helps identify strengths and weaknesses, which guides the process of allocating resources and investing in capacity building, training, and purchasing necessary technologies effectively. It supports making informed strategic decisions about adopting artificial intelligence systems, with a clear understanding of the accompanying regulatory requirements.

  o The study provides a practical guide for internal auditors and risk managers, including the most important skills, knowledge, and methodologies that must be developed to deal with artificial intelligence systems. It provides them with a clear picture of the nature of potential risks and how to design appropriate audit procedures to mitigate them, which enhances the quality and reliability of their work.

  o The study's results provide a scientific and field basis for entities such as the **Central Bank of Syria** and the **Syrian Commission on Financial Markets and Securities**. These entities can benefit from the results in developing and updating regulatory frameworks and legislation related to the governance of artificial intelligence in the financial and banking sector, and ensuring financial stability in light of the digital transformation.

7. HYPOTHESES OF THE STUDY:

To achieve the study's objectives and answer its problem, the researcher adopted the following hypotheses:

- **Main Hypothesis:** There is a statistically significant effect of the effectiveness of the internal audit role in mitigating the risks associated with AI systems.

- **Sub-hypotheses:**

  o There is a statistically significant effect of the effectiveness of the internal audit role, represented by its three dimensions (competency and experience level of the internal audit team, applied AI audit methodologies and procedures, use of tools and technologies), in mitigating data quality risks.

  o There is a statistically significant effect of the effectiveness of the internal audit role, represented by its three dimensions (competency and experience level of the internal audit team, applied AI audit methodologies and procedures, use of tools and technologies), in mitigating the security and privacy risks of AI systems, as well as operational, strategic, and regulatory and ethical compliance risks related to them.

8. METHODOLOGY OF THE STUDY:

The descriptive-analytical method was followed in conducting the study, based on the nature of the topic and the scientific references and information obtained, and because it is one of the most widely used methods in studying social and human phenomena. Primary and secondary sources were used in the study. The primary sources will be through the distribution of a questionnaire, while the secondary sources consist of specialized scientific books, journals, research papers, and academic theses. The questionnaire data was coded and analyzed using the SPSS data analysis program and appropriate statistical methods.

9. LIMIT OF THE STUDY:

- **Spatial Limits:** Syrian banks listed on the Damascus Securities Exchange.

- **Temporal Limits:** The study was conducted in the year 2025.

10. STUDY POPULATION AND SAMPLE:

The research population and sample consist of managers and internal auditors working in the fields of internal audit, risk management, and information technology in Syrian banks listed on the Damascus Securities Exchange.

PART I: THEORETICAL SECTIONF

1.1. Concept of Artificial Intelligence:

The term Artificial Intelligence was coined in 1950 to make programs or algorithms more advanced by providing them with basic knowledge and enabling them to learn and make decisions about outcomes; it is used in tasks such as planning, recognition, and decision-making[1]. Meanwhile, security systems lack the flexibility and ability to update themselves continuously and automatically despite human interaction[2]. To overcome this lack of flexibility and agility, humans have turned to artificial intelligence, which has the ability to adapt, evolve, learn, and prevent ever-evolving threats from attackers and cyber intruders[3]. The primary function of AI stems from the integration of software and hardware, through the automation of repetitive tasks, where AI-powered solutions enhance accuracy and improve the quality of internal audit processes[4]. The ultimate goal of AI is to simulate human intelligence in machines, allowing for cognitive processes such as understanding, reasoning, and learning. The integration of AI represents a significant opportunity to enhance the efficiency of internal auditing[5].

1.2. Most Important Uses of Artificial Intelligence:

Interest in artificial intelligence is constantly growing with its increasing capabilities and methods of use. Cybersecurity is one of these areas for mitigating cyber threats, as AI is characterized by its ability for non-linear classification, and the same concept can be applied in classifying cyber threats. The rapid adoption of AI is credited to increased computing power; things that used to take hours now take mere seconds thanks to advancements in hardware and software capabilities[6]. Moreover, AI-powered tools can continuously monitor financial transactions and operational processes, providing real-time alerts and insights that help in the early detection of potential problems and proactive risk management. AI also plays a crucial role in ensuring compliance with regulatory standards. By integrating AI systems with compliance frameworks, organizations can automate the tracking and reporting of compliance-related activities. This not only reduces the risk of human error but also ensures that organizations keep pace with evolving regulatory requirements. In addition, AI's ability to process and analyze regulatory texts enables organizations to adapt quickly to new compliance requirements, mitigating the risk of non-compliance penalties. However, integrating AI into internal audit is not without challenges. Ensuring data quality and integrity is paramount, as AI systems rely on accurate data inputs to function effectively. Furthermore, the "black box" nature of some AI algorithms can raise transparency issues, making it difficult for auditors to explain how specific conclusions are reached[7]. Addressing algorithmic biases and maintaining auditors' expertise in AI technologies are also critical considerations. Since AI is considered a double-edged sword, we need to increase reliance on it by applying some form of control, which is why we use the design, development, and deployment of AI. Machine Learning (ML) is a specific branch of AI that uses algorithms to learn and understand past experiences and cases[8].

1.3. Main Risks of Artificial Intelligence That Can Affect Organizations:

Organizations seeking to develop and implement AI systems face a wide range of interconnected risks that can be classified within integrated governance, operational, and legal frameworks. It is essential to understand and manage these risks effectively to ensure the desired value is achieved and negative consequences are avoided. The most prominent of these risks can be summarized in the following areas[9]:

1. **Strategic and Governance Risks:** These risks arise from the core organizational structure and decision-making processes of the institution. They include shortcomings in clear senior oversight structures and the absence of policies and methodologies that guide the responsible and ethical development and deployment of AI. They also include reputational

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[1] Alzaid, H., Alnsour, Y. (2021). Artificial intelligence in cybersecu- rity: research advances, challenges, and opportunities. Journal of Am- bient Intelligence and Humanized Computing, 12(1), 719-731. doi: 10.1007/s12652-020-02741-5.

[2] Donepudi, P. (2015). Crossing Point of Artificial Intelligence in Cyber - security. American Journal of Trade and Policy, 2(2), 53-60

[3] Alzaid, H., Alnsour, Y. (2021). Artificial intelligence in cybersecu- rity: research advances, challenges, and opportunities. Journal of Am- bient Intelligence and Humanized Computing, 12(1), 719-731. doi: 10.1007/s12652-020-02741-5

[4] Yoon, S. (2020). A study on the transformation of accounting based on new technologies: Evidence from Korea. Sustainability (Switzerland), 12(20), 1–23. https://doi.org/10.3390/su12208669.

[5] Lee, C. S., & Tajudeen, F. P. (2020). Usage and impact of artificial intelligence on accounting: Evidence from Malaysian organizations. Asian Journal of Business and Accounting, 13(1), 213–239. https://doi.org/10.22452/ajba.vol13no1.8.

[6] Sandesh D, Saikat G(2022):" The Role of Artificial Intelligence in Enhancing Cybersecurity and Internal audit"

[7] Adelakun , B. O(2022):" The impact of ai on internal auditing: transforming practices and ensuring compliance". Illinois State University, USA. Finance & Accounting Research Journal, Volume 4, Issue 6, October-December 2022

[8] Tao, F., Zhang, X., Liu, A., Sun, Y. (2019). The Future of Artificial Intelligence in Cybersecurity: A Comprehensive Survey. In Cyber- Enabled Distributed Computing and Knowledge Discovery (pp. 337- 346). Springer, Cham. doi: 10.1007/978-3-030-35095-6-36

[9] INTERNAL AUDIT OF ARTIFICIAL INTELLIGENCE APPLIED TO BUSINESS PROCESSES. IIA Spain,2.2025.Internal Audit of Artificial Intelligence Applied To Business Processes | Papers | Artificial Intelligence | Knowledge Centers

risks, which can result from model failures, biased decisions, or regulatory penalties, negatively affecting the institution's image and stakeholder trust.

2. **Operational and Technical Risks:** This category relates to challenges that appear during the AI system's life cycle, from design to implementation and monitoring. The most prominent are:

   o **Data Risks:** Data quality is the cornerstone of any AI system. Using inaccurate, incomplete, or unrepresentative data is a fundamental error that leads to misleading and unreliable results.

   o **Algorithmic Risks:** Errors in the design and programming of algorithms can lead to unexpected behavior or biased results that deviate from the intended goals.

   o **Interpretability and Transparency Risks:** This problem is sometimes referred to as the "black box problem," where the inability to explain how a model reaches its decisions makes it difficult to verify their validity and may lead to incorrect organizational decisions based on ambiguous outputs.

   o **Cybersecurity Risks:** These relate to the security of AI models and their supporting infrastructure, including protecting them from attacks aimed at manipulating data or stealing models.

3. **Regulatory and Legal Risks:** These risks arise from non-compliance with the increasing legal and regulatory requirements in the field of AI, such as data protection laws (like GDPR) and emerging sector-specific regulations. They also include non-adherence to the institution's internal policies, exposing it to financial and legal penalties.

4. **Financial and Sustainability Risks:**

   o **Financial Risks:** These are linked to the direct impact on financial performance, whether through the exorbitant costs of developing failed technologies, losses resulting from incorrect automated decisions, or risks related to how financial operations are presented and disclosed.

   o **Sustainability Risks:** Operating AI models, especially large generative models, requires a huge amount of energy and computing resources. This consumption may conflict with the institution's sustainability goals and its environmental commitments related to reducing its carbon footprint and energy efficiency.

1.4. Internal Auditing:

The internal audit function emerged as a result of the rapid development affecting economic institutions, which led to an increased need for internal control systems that support the proper functioning of the institution's various activities. Auditing is considered an important means for institutional management to ensure and verify the administrative units' compliance with accounting and non-accounting financial and administrative policies, legislation, financial regulations, and all general policies followed within the institution. The definitions of the concept of internal audit have varied, as the function has witnessed many developments in its nature and objectives. These developments were accompanied by another evolution in its concept, and thus the definition of internal audit has expanded from one period to another to reflect its evolving concept[10]. The Institute of Internal Auditors (IIA) defined it as: "an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes"[11]. The International Auditing and Assurance Standards Board (IAASB) defined it as "An appraisal activity established or provided as a service to the entity. Its functions include, amongst other things, examining, evaluating and monitoring the adequacy and effectiveness of internal control"[12].

1.5. Objectives of Internal Auditing:

Internal auditing aims to help achieve the strategic, financial, and regulatory objectives of the institution through the following (but not limited to)[13]:

- Identifying and assessing risks, whether strategic, operational, financial, or compliance, and helping to reduce the negative impacts on the institution's operations.

- Evaluating and improving the institution's governance and existing internal controls in its departments.

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[10]Qawaqzeh, Y (2022): "The Impact of Internal Auditing on Risk Management." Arab Journal for Scientific Publishing (AJSP), Issue 5, No. 50.
[11]Kraifi, N, & Rahalia, S (2021): "The Role of Internal Auditing in Operational Risk Management: A Case Study of the Dehn Corporation - Souk Ahras Unit."
Master's Thesis in Financial and Accounting Sciences, Faculty of Economic Sciences, University of Tebessa, Tebessa.
[12]Abu Shaaban, R (2016): "The Role of Internal Auditing in Assessing Operational Risk Management: An Applied Study on Banks Operating in the Gaza Strip."
Master's Thesis in Accounting, Faculty of Commerce, Islamic University of Gaza
[13]Advanced Risk Assessment – Internal Audit – 2-2020 EY

- Providing consulting services to assist and support the institution's departments in improving and developing their performance of required tasks and duties.

1.6. Adoption of Artificial Intelligence in the Audit Process and the Opportunities it Offers:

Advanced technologies, such as artificial intelligence, machine learning, and automation, play a pivotal role in enhancing audit efficiency, accuracy, and risk management. One of the most significant benefits of technology is its ability to process and analyze large amounts of data in real-time. Unlike manual audits, technology-based systems leverage data analytics to identify anomalies, trends, and potential risks across various business processes. AI has revolutionized internal auditing by transforming traditional practices and enhancing compliance mechanisms. Traditional internal audit methods, often constrained by manual processes and sampling techniques, are being replaced by AI-driven approaches that offer comprehensive analysis and real-time insights. This shift enables auditors to identify anomalies, fraud, and operational inefficiencies more effectively, thereby improving the overall accuracy and reliability of audit findings[14].

One of the key benefits of AI in internal auditing is its ability to automate routine and repetitive tasks. By leveraging AI, auditors can focus on higher-value activities, such as assessing strategic risks and making decisions, which enhances the overall productivity of the audit function. Furthermore, AI-powered tools can continuously monitor financial transactions and operational processes, providing real-time alerts and insights that help in the early detection of potential issues and proactive risk management[15]. AI also plays a crucial role in ensuring compliance with regulatory standards. By integrating AI systems with compliance frameworks, organizations can automate the tracking and reporting of compliance-related activities[16]. This not only reduces the risk of human error but also ensures that organizat[1]ions keep pace with evolving regulatory requirements. AI's ability to process and analyze regulatory texts enables organizations to adapt quickly to new compliance requirements, mitigating the risk of non-compliance penalties. In summary, technology has transformed internal audit practices by improving efficiency, enhancing risk oversight, and providing organizations with the agility to navigate an increasingly complex business environment.

1.7. Challenges Facing Internal Auditing in Dealing with AI Risks

Despite the promising benefits that AI offers to the internal audit function, its integration into current practices faces fundamental, multifaceted challenges that require careful planning and sound governance. These challenges can be categorized into the following areas[17181920]:

1. **Human and Organizational Challenges:**

   o **Skills Gap:** One of the most significant obstacles is the relative scarcity of competencies that combine expertise in auditing with proficiency in data science and AI. This calls for institutional investment in specialized training programs to upgrade the skills of current auditors and attract new talent.

   o **Over-reliance and Skill Erosion:** The increasing reliance on automated systems raises concerns about the decline of critical thinking and professional judgment skills among auditors, which may reduce their ability to handle complex and unexpected situations that require human insight.

   o **Change Management and Organizational Resistance:** Adopting AI requires a shift in work culture and a redesign of existing processes. These transformations often face resistance from employees, necessitating an effective change management strategy to facilitate the integration process.

2. **Technical and Ethical Challenges:**

[14]Mbah GO. Smart Contracts, Artificial Intelligence and Intellectual Property(2024): Transforming Licensing Agreements in the Tech Industry. Int J Res Publ Rev. 2024;5(12):317–332. Available from: DOI: 10.55248/gengpi.5.1224.3407

[15]Koshy NR, Dixit A, Jadhav SS, Penmatsa AV, Samanthapudi SV, Kumar MGA, Anuyah SO, Vemula G, Herzog PS, Bolchini D. Data-to-question generation using deep learning. In: 2023 4th International Conference on Big Data Analytics and Practices (IBDAP). IEEE; 2023. p. 1–6

[16]Anuyah S, Chakraborty S (22024). Can deep learning large language models be used to unravel knowledge graph creation? In: Proceedings of the International Conference on Computing, Machine Learning and Data Science. 2024. p. 1–6

[17]on Enhancing Internal Mohammed Ali, M., Salah Abdullah, A., & Saad khattab, G. (2022). The Effect of Activating Artificial Intelligence Techniques [17] Auditing Activities " Field Study ". Alexandria Journal of Accounting Research Third Issue, 6, 1–40.

[18] Rashwan, A. R., & Alhelou, M. S. E. (2022). The Effectiveness of the Use of Artificial Intelligence in The Internal Auditing Process and Its Impact On Risk Management, Control, and Governance in The Palestinian Government Sector. International Journal of Accounting and Management Sciences, 2(1). https://doi.org/10.56830/rzba5370.

[19] Alattas, K. (2023). Saudi Arabia Corporate Firms are Hesitant to Embrace Artificial Intelligence as of 2020 Despite the Numerous Benefits. In WSEAS Transactions on Systems and Control (Vol. 18, pp. 38–46). https://doi.org/10.37394/23203.2022.18

[20]Zhang, Y., Xiong, F., Xie, Y., Fan, X., & Gu, H. (2020). The Impact of Artificial Intelligence and Blockchain on the Accounting Profession. IEEE Access, 8, 110461–110477. https://doi.org/10.1109/ACCESS.2020.3000505 .

o **Bias and Interpretability:** AI algorithms may contain biases inherited from the data they were trained on, which can lead to distorted audit results or discriminatory decisions. In addition, the "black box problem" poses a significant challenge, as the difficulty of interpreting the decisions of some models conflicts with the fundamental principle of transparency in auditing.

o **Data Privacy and Security:** AI systems rely on vast amounts of potentially sensitive data. Therefore, ensuring the protection of this data from breaches and unauthorized access, and complying with privacy regulations, represents a critical security and legal challenge.

o **Ethical Governance and Continuous Monitoring:** The responsible use of AI requires the establishment of a clear ethical governance framework that ensures fairness, transparency, and accountability. Algorithmic models also need continuous monitoring and updating to ensure their accuracy and relevance as the risk environment changes.

3. **Financial and Investment Challenges:**

o **High Costs:** Implementing AI technologies involves significant initial investments in technological infrastructure, software purchase or development, in addition to ongoing operational costs for maintenance, updates, and employee training. These costs can be a major barrier, especially for small and medium-sized enterprises.

In short, overcoming these challenges requires a strategic vision that goes beyond mere technology implementation. Organizations must adopt a holistic approach that focuses on investing in human competencies, establishing strong governance for data and AI, and fostering a flexible organizational culture that welcomes change. The goal is not to replace the human auditor, but to enhance their capabilities, ensuring maximum benefit from AI in increasing the efficiency and effectiveness of internal audit while maintaining professional and ethical standards[21].

ART 2: PRACTICAL SECTION

2.1 Study Tool:

The questionnaire method was used as one of the research tools. It consists of a set of questions related to the research objectives and included two main parts: the first part relates to the demographic characteristics of the study sample, and the second part was dedicated to questions built on a five-point Likert scale, for statistical analysis to test the study's hypotheses.

2.2 Face Validity of the Study Tool:

The questionnaire was designed based on the following parts:

- **Part One:** Includes general data about the study field, including academic qualification, professional qualification, and experience.

- **Part Two:** Aims to identify the extent of internal audit's effectiveness in mitigating AI risks in Syrian banks.

2.3 Presentation and Analysis of Questionnaire Results:

Demographic Information Results: The demographic characteristics of the study sample, consisting of 45 units, are as follows:

Job Title: Distribution of the study sample by job specialization.

Table 1: Job Title

	Frequency		Percentage %
Internal Audit Employee	22	49%
Risk Management Employee	15	33%
Information Technology Employee	8	18%
Total	**45**	**100%**

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[21] Adelakun , B. O(2022):" The impact of ai on internal auditing: transforming practices and ensuring compliance". Illinois State University, USA. Finance & Accounting Research Journal, Volume 4, Issue 6, October-December 2022

- Academic Qualification and Work Experience:

Distribution of the study sample by academic qualification.

Table 2: and   Academic Professional

		Count	Column N %
Academic Qualification	Bachelor's	25	55.56%
	Master's	14	31.11%
	Doctorate	6	13.33%
	Total	**45**	**100%**
Professional Certifications	CISA, CIA , cpa	12	27%
	Syrian Chartered Accountant	24	53%
	Other	9	20%
	Total	**45**	**100%**
Work Experience	Less than 5 years	5	11.11%
	5-10 years	10	22.22%
	10-15 years	22	48.89%
	More than 15 years	8	17.78%
	Total	**45**	**100%**

Qualifications and Experience

From the previous tables, which represent the frequencies and percentages of the study sample distribution according to the variables of academic qualification, professional certifications, work experience, and job title, we note that the largest percentage of employees are in the internal audit department at 49%, those with a bachelor's degree at 55%, and Syrian Chartered Accountants at 53%. As for work experience, the largest percentage ranged between 10-15 years at 49%.

2.4 Statistical Analysis:

A comprehensive statistical analysis was conducted on the provided data (sample size = 45) using SPSS software. This analysis aims to verify the quality of the measurement tool, provide a descriptive summary of the data, and test the study's hypotheses using advanced statistical methods to ensure the accuracy and depth of the results.

1. Verification of the Study Tool's Quality (Reliability and Validity):

- **Reliability Test:**

Cronbach's alpha coefficient was used to measure the internal consistency of the questionnaire items. The results shown in Table (3) indicate that the alpha values for all dimensions and for the tool as a whole are high (above 0.7), which indicates an excellent degree of reliability and high confidence in the data.

Table 3: Reliability Test Results (Cronbach's Alpha Coefficient)

Measure / Dimension	No. of Items	Cronbach's Alpha (α)	Reliability Level
Independent Variable (Audit Effectiveness)	**15**	**0.88**	Excellent
Dimension 1: Team Competence and Skills	3	0.74	Good
Dimension 2: Audit Methodologies and Procedures	9	0.74	Good
Dimension 3: Use of Tools and Technologies	3	0.79	Good
Dependent Variable (Risk Mitigation)	**11**	**0.90**	Excellent
Dimension 1: Mitigating Data Quality Risks	5	0.83	Very Good
Dimension 2: Mitigating Security and Compliance Risks	6	0.81	Very Good

- **Validity Test:**

Internal consistency validity was verified by calculating the correlation coefficient of each item with the total score of the axis to which it belongs. The results showed that all questionnaire items are significantly and statistically correlated with their axes (Sig. < 0.05), which confirms that the tool is valid and accurately measures what it was designed to measure. This table measures the extent to which each item (question) in the questionnaire is related to the general axis to which it belongs, by calculating the Pearson Correlation coefficient. A strong and statistically significant correlation (at a significance level of Sig. < 0.05) confirms that the item effectively contributes to measuring the concept that the axis aims to measure.

Table 4: Internal Consistency Validity (Item-Axis Correlation)

Axis (Dimension)	Item	Correlation Coefficient (r)	Significance Level (Sig.)	Result
	q1	0.861	0.000	Statistically Significant
| Team Competence and Skills	q2	0.785	0.000	Statistically Significant
	q3	0.792	0.000	Statistically Significant
	q4	0.633	0.000	Statistically Significant
	q5	0.744	0.000	Statistically Significant
	q6	0.358	0.020	Statistically Significant
	q7	0.145	0.358	Not Statistically Significant
Audit Methodologies and Procedures	q8	0.616	0.000	Statistically Significant
	q9	0.766	0.000	Statistically Significant
	q10	0.749	0.000	Statistically Significant
	q11	0.834	0.000	Statistically Significant
	q12	0.439	0.004	Statistically Significant
	q13	0.825	0.000	Statistically Significant
Use of Tools and Technologies	q14	0.823	0.000	Statistically Significant
	q15	0.876	0.000	Statistically Significant
	q16	0.64	0.000	Statistically Significant
	q17	0.886	0.000	Statistically Significant
Mitigating Data Quality Risks	q18	0.632	0.000	Statistically Significant
	q19	0.701	0.000	Statistically Significant
	q20	0.912	0.000	Statistically Significant
	q21	0.483	0.001	Statistically Significant
	q22	0.522	0.000	Statistically Significant
Mitigating Security and Compliance Risks	q23	0.511	0.001	Statistically Significant
	q24	0.819	0.000	Statistically Significant
	q25	0.863	0.000	Statistically Significant
	q26	0.822	0.000	Statistically Significant

-Validity Summary: The results show that almost all items of the questionnaire have high internal consistency validity, as their correlations with their respective axes were statistically significant at a level less than 0.05. This confirms the validity of the tool and that it accurately measures what it was designed to measure. The only notable exception is item q7 ("AI algorithms and models are evaluated to ensure they are free from unintentional bias and to ensure their fairness"), where its correlation with its axis was not statistically significant (Sig. = 0.358). This result suggests that the concept of "bias auditing" was not clear to the sample or that it represents a dimension independent of the other procedures.

Tool Quality Summary: The questionnaire used in this study has excellent degrees of reliability and validity, making the results derived from it dependable and trustworthy.

2.5 Descriptive Analysis of Study Variables:

Table (5) displays the mean, standard deviation, relative importance, and importance level for each item of the questionnaire, grouped by study dimensions. The relative importance was calculated based on the five-point Likert scale (Mean / 5) * 100%, and

the importance level was determined accordingly. The high means (above 3.5 out of 5) indicate a positive perception and a "High" level of agreement from the study sample towards all research axes.

Table 5: Descriptive Statistics for the Main Study Dimensions

	Mean	Std. Deviation	Relative Importance (%)|	| Importance Level
Dimension 1: Team Competence and Skills	**3.86**	**0.95**	**77.20%**	High
The team has sufficient understanding of AI technologies	3.84	1.01	76.90%	High
Auditors receive specialized and continuous training	3.82	1.01	76.40%	High
Internal audit consults with specialized experts	3.91	0.94	78.20%	High
Dimension 2: Audit Methodologies and Procedures	**3.75**	**0.77**	**75.00%**	High
The scope of tasks is determined based on risk assessment	3.73	0.93	74.70%	High
| Audit participates in system development stages	3.91	0.89	78.20%	High
Stakeholders are involved in planning	3.73	0.88	74.70%	High
Data quality and reliability are evaluated	3.84	0.88	76.90%	High
Security controls are examined	3.64	1.01	72.90%	High
Algorithms are evaluated for bias	3.36	1.13	67.10%	High
Audit contributes to evaluating the governance framework	3.82	0.89	76.40%	High
Audit provides recommendations to improve ethical policies	3.91	0.81	78.20%	High
Audit recommendations are followed up effectively	3.8	0.81	76.00%	High
Dimension 3: Use of Tools and Technologies	**3.87**	**0.98**	**77.30%**	High
Management relies on recognized frameworks	3.73	0.98	74.70%	High
| The team uses advanced data analysis tools	4.11	0.82	82.20%	Very High
AI technologies are being explored or used	3.76	1.14	75.10%	High
Dimension 4: Mitigating Data Quality Risks	**3.82**	**0.83**	**76.50%**	High
Effective controls exist to ensure data accuracy	3.82	0.94	76.40%	High
| Effective mechanisms exist to detect and address bias	3.78	0.96	75.60%	High
Models undergo rigorous testing to verify their reliability	3.76	0.92	75.10%	High
Audit helps verify that systems operate as designed	3.93	0.77	78.70%	High
Audit recommendations help improve data quality and ensure fairness	3.82	0.79	76.40%	High
Dimension 5: Mitigating Security and Compliance Risks	**3.87**	**0.78**	**77.40%**	High
Security controls are considered adequate and effective	3.71	0.94	74.20%	High
The institution adheres to laws and ethical principles	3.93	0.77	78.70%	High
Operational risks are appropriately identified and assessed	3.87	0.83	77.30%	High
Audit provides assurance on the extent of compliance	3.93	0.71	78.70%	High
Audit contributes to enhancing compliance with privacy requirements	3.87	0.74	77.30%	High
Audit contributes to ensuring alignment of the AI strategy	3.93	0.83	78.70%	High

- Most Prominent Descriptive Results:

- The "Use of Tools and Technologies" dimension and the "Mitigation of Security and Compliance Risks" dimension are the highest rated by the study sample, which may indicate that they represent the main strength or focus in current practices.

- **General Positive Perception:** It is noted from the table that the sample's opinions were positive towards all axes and items of the study, as all received an importance level of "High" or "Very High".

- **Most Implemented Practice:** Item q14 ("The team uses advanced data analysis tools") was the highest rated (mean 4.11), indicating that the use of data analytics is one of the most mature and accepted practices.

- **Least Implemented Practice:** Item q9 ("Algorithms are evaluated to ensure they are free from bias") was the lowest rated (mean 3.36). Although the mean is still within the approval range, it indicates that this particular aspect may be the biggest challenge or the least applied practice in the banks of the study sample.

2.6. Testing Study Hypotheses (Using Multiple Regression)

To answer the research questions, the hypotheses were tested using two Multiple Linear Regression models. Each model tests the combined and independent effect of the three dimensions of audit effectiveness on one of the dimensions of risk mitigation.

Sub-hypothesis 1: There is a statistically significant effect of the effectiveness of the internal audit role, represented by its three dimensions (team competence and skill, audit methodologies and procedures, use of tools and technologies), in mitigating data quality risks.

Table 6: Multiple Regression Results for the First Model

Model	R	R Square	Adjusted R Square	F	Sig.
1	.821a	.673	.647	26.097	.000b

a. Predictors: (Constant),:Team competence and skills, Use of tools, Audit methodologies and procedures

b. Dependent Variable: Mitigation of data quality risks

Coefficients

Independent Variables	B	Beta (β)	t	.Sig
(Constant)	0.198		1.159	0.253
Team competence and skills	0.401	0.457	5.584	0
Audit methodologies and procedures	0.093	0.086	1.104	0.276
Use of tools and technologies	0.38	0.449	5.474	0

Analysis of Results:

- **Model Validity:** The model as a whole is statistically significant (Sig. = 0.000), and has a good explanatory power, as the dimensions of audit effectiveness collectively explain 64.7% of the change in the bank's ability to mitigate data quality risks (according to the Adjusted R Square value).

- **Impact of Dimensions:**

  o "Team competence and skills" has the strongest and most positive impact on mitigating data quality risks.

  o "Use of tools and technologies" has a strong and positive impact.

  o "Audit methodologies and procedures": has no statistically significant effect (Sig= 0.195) in the presence of the other two variables.

Sub-hypothesis 2: There is a statistically significant effect of the effectiveness of the internal audit role, represented by its three dimensions (team competence and skill, audit methodologies and procedures, use of tools and technologies), in mitigating security and compliance risks.

Table 7: Multiple Regression Results for the Second Model

Model	R	R Square	Adjusted R Square	F	Sig.
1	.875a	.766	.748	41.545	.000b

a. Predictors: (Constant), aud3, aud2, aud1

b. Dependent Variable: ai2

Coefficients

Independent Variables	B	Beta (β)	t	.Sig
(Constant)	0.143		0.893	0.377

Team competence and skills	0.315	0.385	5.148	0.000
Audit methodologies and procedures	0.251	0.247	3.435	0.001
Use of tools and technologies	0.285	0.359	4.909	0.000

Dependent Variable: Mitigation of security and compliance risks

Analysis of Results:

- **Model Validity:** The model as a whole is statistically significant (Sig. = 0.000), and it explains 74.8% of the change in mitigating security and compliance risks, which is a very good explanatory percentage.

- **Impact of Dimensions:** All three dimensions have a positive and statistically significant impact. Their order of importance (based on the Beta value) is:

  1. Team competence and skills**:** The strongest impact.

  2. Use of tools and technologies**:** A strong impact.

  3. Audit methodologies and procedures**:** A good impact, but the least compared to the other two dimensions. This again emphasizes the pivotal importance of the human and technical elements.

Testing the Main Hypothesis

- **Hypothesis Statement:** The main hypothesis of the research states the following: "There is a statistically significant effect of the effectiveness of internal audit in mitigating the risks associated with AI systems".

- **Testing Methodology:** To test this hypothesis directly, the following steps were taken:

  1. A composite index for the independent variable "Effectiveness of Internal Audit" was created by calculating the average of the responses to all its 15 constituent items.

  2. A composite index for the dependent variable "Mitigation of AI Risks" was created by calculating the average of the responses to all its 11 constituent items.

  3. A Simple Linear Regression model was used to measure the effect of the independent variable on the dependent variable.

Table 8: Regression Test Results for the Main Hypothesis

Model Summary		
R	R Square	Adjusted R Square
0.90	0.89	40.8

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	14.502	1	14.502	353.156	0.000

(Coefficients)				
Variables	B	Beta (β)	T	Sig.
(Constant)	0.536		3.033	0.004
Effectiveness of Internal Audit	540.8	0.844	18.792	0.00000

Dependent Variable: Mitigation of AI Risks

Analysis and Interpretation of Results

- **Model Validity (ANOVA):** The Sig. value for the F-test is 0.000, which is less than the significance level (0.05). This means the regression model as a whole is valid and suitable for prediction, and there is a substantial linear relationship between the two variables.

- **Explanatory Power (Model Summary):** The value of the Adjusted R Square is 0.84. This means that 84% of the variance or change in the "Mitigation of AI Risks" variable can be explained by the change in the "Effectiveness of Internal Audit" variable. This is a very high percentage and indicates the strength of the relationship between the two variables.

- **Analysis of Regression Coefficient (Coefficients):**

    o The Sig. value for the coefficient of the independent variable "Effectiveness of Internal Audit" is 0.000, which is less than (0.05), confirming a statistically significant effect of the independent variable on the dependent variable.

    o The value of the regression coefficient (B) is 0.845, which is a positive value. This means the relationship between the two variables is positive (direct); that is, for every one-unit increase in the effectiveness of internal audit, the ability to mitigate AI risks increases by 0.845 units.

Conclusion on the Main Hypothesis:

Based on the previous results, which show a positive, strong, and highly statistically significant effect of the "Effectiveness of Internal Audit" variable on the "Mitigation of AI Risks" variable, we accept the main hypothesis of the research.

Results, Conclusions, and Recommendations

-First - Results:

- There is a statistically significant effect of the internal audit role's effectiveness, represented by the team's competence and experience, in mitigating data quality risks.

- There is a statistically significant effect of the internal audit role's effectiveness, represented by the use of tools and technologies, in mitigating data quality risks.

- There is no statistically significant effect of the internal audit role's effectiveness, represented by audit methodologies and procedures, in mitigating data quality risks.

- There is a statistically significant effect of the internal audit role's effectiveness, represented by the team's competence and experience, in mitigating security and compliance risks.

- There is a statistically significant effect of the internal audit role's effectiveness, represented by audit methodologies and procedures, in mitigating security and compliance risks.

- There is a statistically significant effect of the internal audit role's effectiveness, represented by the use of tools and technologies, in mitigating security and compliance risks.

-Second - Conclusions:

Based on the analysis of the results, the following main conclusions can be drawn:

- There is a positive, substantial, and highly statistically significant effect of the effectiveness of internal audit in mitigating the risks associated with AI systems in the Syrian banking sector.

- The most prominent conclusion is that the competence and skills of the audit team and their use of advanced tools and technologies are the most decisive and influential factors in confronting AI risks. Without them, the impact of written methodologies remains limited.

- Methodologies and procedures play an important role (especially in security and compliance risks), but they appear to be a complementary and supporting factor. Their true effectiveness is only realized when applied by a competent team using the right tools.

- The descriptive analysis showed that evaluating algorithms for bias is the least applied practice, which represents a potential weakness and a future area of risk that requires special attention.

-Third - Recommendations:

Based on the previous conclusions, the study recommends the following:

A. Recommendations for Bank Managements and Boards of Directors:

- The necessity of developing strategic plans to invest in training and developing the skills of internal audit teams in specialized areas such as data science, information security, algorithm analysis, and AI ethics.

- Allocating sufficient budgets to provide audit departments with advanced data analysis tools and AI-supported audit software to enable them to perform their tasks effectively.

B. Recommendations for Internal Audit Departments:

- Annual audit plans must go beyond traditional procedures to include specialized audit tasks directed at AI systems, with a particular focus on assessing data quality, model security, and verifying the fairness and reliability of algorithms.

- Building close working relationships with information technology, data science, and risk management departments to ensure a deep understanding of the systems under audit.

C. Recommendations for Future Research:

- Conducting qualitative studies (interviews) to deepen the understanding of the reasons for the weak focus on "algorithm bias" auditing and the obstacles preventing its application.

- Expanding the scope of the study to include unlisted banks or other financial sectors (such as insurance and brokerage firms) to compare the results.

REFERENCE

1. Abu Shaaban, R (2016): "The Role of Internal Auditing in Assessing Operational Risk Management: An Applied Study on Banks Operating in the Gaza Strip." Master's Thesis in Accounting, Faculty of Commerce, Islamic University of Gaza.
2. Adelakun. B. O. (2022):" The impact of ai on internal auditing: transforming practices and ensuring compliance" Finance & Accounting Research Journal, Volume 4, Issue 6, October-December 2022. pp: . 350-370.
3. Advanced Risk Assessment – Internal Audit – 2-2020 EY-
4. Alattas, K. (2023). Saudi Arabia Corporate Firms are Hesitant to Embrace Artificial Intelligence as of 2020 Despite the Numerous Benefits. In WSEAS Transactions on Systems and Control (Vol. 18, pp. 38–46). https://doi.org/10.37394/23203.2022.18.4
5. Al-Ramadneh, A (2024): "The Impact of Artificial Intelligence on the Quality of Internal Auditing: The Moderating Role of Intellectual Capital." Master's Thesis in Accounting, World Islamic Sciences and Education University, Amma.
6. Alzaid, H., Alnsour, Y. (2021). Artificial intelligence in cybersecu- rity: research advances, challenges, and opportunities. Journal of Am- bient Intelligence and Humanized Computing, 12(1), 719-731. doi: 10.1007/s12652-020-02741-5.
7. Anuyah S, Chakraborty S. Can deep learning large language models be used to unravel knowledge graph creation? In: Proceedings of the International Conference on Computing, Machine Learning and Data Science. 2024. p. 1–6.
8. Arab Journal for Scientific Publishing (AJSP) ISSN: 2663-7985
9. Donepudi, P. (2015). Crossing Point of Artificial Intelligence in Cyber - security. American Journal of Trade and Policy, 2(2), 53-60. file:///C:/Users/Victus/Downloads/ALAT_Volume%2048_Issue%204_Pages%20498-537.pdf.
10. Internal audit of artificial intelligence applid to business processes. Iia Spain,2.2025.Internal Audit of Artificial Intelligence Applied To Business Processes | Papers | Artificial Intelligence | Knowledge Centers
11. INTERNAL AUDIT OF ARTIFICIAL INTELLIGENCE APPLIED TO BUSINESS PROCESSES. IIA Spain,2.2025.Internal Audit of Artificial Intelligence Applied To Business Processes | Papers | Artificial Intelligence | Knowledge Centers
12. Koshy NR, Dixit A, Jadhav SS, Penmatsa AV, Samanthapudi SV, Kumar MGA, Anuyah SO, Vemula G, Herzog PS, Bolchini D. Data-to-question generation using deep learning. In: 2023 4th International Conference on Big Data Analytics and Practices (IBDAP). IEEE; 2023. p. 1–6.
13. Kraifi, N, & Rahalia, S (2021): "The Role of Internal Auditing in Operational Risk Management: A Case Study of the Dehn Corporation - Souk Ahras Unit." Master's Thesis in Financial and Accounting Sciences, Faculty of Economic Sciences, University of Tebessa, Tebessa.
14. Lee, C. S., & Tajudeen, F. P. (2020). Usage and impact of artificial intelligence on accounting: Evidence from Malaysian organizations. Asian Journal of Business and Accounting, 13(1), 213–239. https://doi.org/10.22452/ajba.vol13no1.8
15. Li, E. (2020). Analysis on Improvement of Internal Audit in China's Listed Companies Based on Artificial Intelligence. Journal of Risk Man-agement and Financial Institutions, 13(1), 31-41. doi: 10.1007/s41283- 020-00114-5
16. M. S. Rashwan, A. R., & M. S. Alhelou, E. (2022). The Effectiveness of the Use of Artificial Intelligence in The Internal Auditing Process and Its Impact On Risk Management, Control, and Governance in The Palestinian Government Sector. International Journal of Accounting and Management Sciences, 2(1). https://doi.org/10.56830/rzba5370
17. Mbah GO. Smart Contracts, Artificial Intelligence and Intellectual Property: Transforming Licensing Agreements in the Tech Industry. Int J Res Publ Rev. 2024;5(12):317–332. Available from: DOI: 10.55248/gengpi.5.1224.3407

18. Mohammed Ali, M., Salah Abdullah, A., & Saad khattab, G. (2022). The Effect of Activating Artificial Intelligence Techniques on Enhancing Internal Auditing Activities " Field Study ". Alexandria Journal of Accounting Research Third Issue, 6, 1–40

19. Qawaqzeh, Y (2022): "The Impact of Internal Auditing on Risk Management." Arab Journal for Scientific Publishing (AJSP), Issue 5, No. 50

20. Rashwan , A(2022):"The Effectiveness of the Use of Artificial Intelligence in the Internal Audit Process and its Impact on Risk Management, Control and Governance in the Palestinian Government Sector". International Journal of Accounting and Management Sciences IJAMS - ISSN: 2832-8175 (Vol.1 No.2 October 2022).pp: 263- 286.

21. Sandesh Dambe, Saikat Gochhait:" The Role of Artificial Intelligence in Enhancing Cybersecurity and Internalaudit" https://www.researchgate.net/publication/378479488_The_Role_of_Artificial_Intelligence_in_Enhancing_Cybersecurity _and_Internal_Audit?

22. Selem. E و Yousry. A, Elkholy. M(2024): "The Role of Artificial Intelligence in Enhancing Internal Auditing Processes on Audit Firms in The Kingdom of Saudi Arabia (KSA)"

23. Tao, F., Zhang, X., Liu, A., Sun, Y. (2019). The Future of Artificial Intelligence in Cybersecurity: A Comprehensive Survey. In Cyber- Enabled Distributed Computing and Knowledge Discovery (pp. 337- 346). Springer, Cham. doi: 10.1007/978-3-030-35095-6-36

24. udoh . O. R ,Odion.O (2024):" Leveraging technology in internal audit processes for streamlined management and risk oversight" International Journal of Science and Research Archive, 2024, 13(02), 3077-3100

25. Yoon, S. (2020). A study on the transformation of accounting based on new technologies: Evidence from Korea. Sustainability (Switzerland), 12(20), 1–23. https://doi.org/10.3390/su12208669.

26. Youssef, M & Shehata, Sh (2025): "The Role of Internal Auditing in Mitigating Digital Transformation Risks and Its Impact on the Professional Performance Quality of the Auditor - A Field Study." Sadat Journal for Administrative and Financial Research, Vol. 3, No. 1

27. Zhang, Y., Xiong, F., Xie, Y., Fan, X., & Gu, H. (2020). The Impact of Artificial Intelligence and Blockchain on the Accounting Profession. IEEE Access, 8, 110461–110477. https://doi.org/10.1109/ACCESS.2020.3000505.

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