

**The Effect of Technology Applications on Audit
Quality in Jordan Auditing Firms**

**Prepared by
Abdalrahman Yacoub Zaid**

**Supervised by
Dr. Nawaf Abdullah Aljundi**

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**Department of Financial and Accounting Sciences
Faculty of Business
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أثر استخدام تطبيقات التكنولوجيا على جودة التدقيق
في شركات التدقيق الأردنية

إعداد

عبدالرحمن يعقوب زيد

إشراف

الدكتور نواف عبدالله الجندي

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في المحاسبة

قسم العلوم المالية والمحاسبية

كلية الأعمال



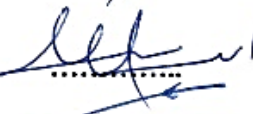

جامعة الشرق الأوسط

كانون الثاني، 2026

Thesis Committee Decision

This thesis, titled “The Effect of Technology (Applications) on Audit Quality in Jordan Auditing Firms.” by researcher **Abdallah Yacoub Zaid** and was successfully defended and approved on 20/01/2026

Examination Committee Members

Name	Title	Entity	Signature
Dr. Nawaf Abdullah Al-Jundi	Supervisor	Middle East University	
Prof. Dr. Asma Ibrahim Al-Amarneh	Internal Member and Committee Head	Middle East University	
Dr. Enas Mahmoud Al-Aboud	Internal Member	Middle East University	
Prof. Dr. Tariq Hammad Al-Mubaydeen	External Member	Zarqa Private University	

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Name: Abdalahman Yacoub Zaid.

Date: 20/01/2026.

Signature:

A handwritten signature in blue ink, consisting of several overlapping, stylized strokes that form a cursive representation of the name.

Acknowledgment

I thank Allah for guidance and for allowing me to complete this thesis.

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My thanks also go to the decision committee and to my family for their encouragement.

Abdallahman Yacoub Zaid

Dedication

This thesis is dedicated as a modest contribution to the advancement of knowledge, with hope that its benefits will extend to the researcher and the academic community, and may Allah accept it as a lasting good deed.

Abdallahman Yacoub Zaid

Table of Contents

Subject	Page
Title.....	I
Thesis Committee Decision.....	II
Authorization.....	III
Acknowledgment.....	IV
Dedication.....	V
Table of Contents.....	VI
List of Tables.....	VIII
List of Figure.....	X
List of Appendices.....	XI
Table of Abbreviations.....	XII
Abstract In English.....	XIII
Abstract In Arabic.....	XIV
Chapter One: Background and Problem Statement	
1.1 Introduction.....	1
1.2 Problem Statement.....	4
1.3 Research Objectives.....	5
1.4 Study Importance: Scientific and Practical Significance.....	5
1.5 Research Questions.....	6
1.6 Study Hypothesis.....	6
1.7 Study Model.....	7
1.8 Research Scope.....	8
1.9 Study sample and population.....	8
1.10 Conceptual Definitions.....	9
Chapter Two: Theoretical Framework and Literature Review	
2.1 Section one: Theoretical Framework.....	11
2.2 Section Two: Previous Studies.....	39
2.3 What Distinguishes this study from Previous studies.....	50
Chapter Three: Methodology (Methods and Procedures)	
3.1 Preface.....	51
3.2 Study methodology.....	51
3.3 Population and Sampling.....	52

3.4 Study variables.....	52
3.5 Data Collection Instruments	53
3.6 Study Instrument.....	53
3.7 Validity Test	54
3.8 Suitability of the Study Model for the Statistical Methods Used	56
3.9 Statistical Approaches Used in the Study	58

Chapter Four: Results of the Study

4.1 Introduction.....	59
4.2 Description of the Study Sample Characteristics	59
4.3 Descriptive Analysis of Study Variables	62
4.4 Hypothesis Testing Results.....	68

Chapter Five: Discussion of Findings and Recommendation

5.1 Introduction.....	74
5.2 Descriptive Results Discussion.....	74
5.3 Discussion of Study Variables Analysis Results	77
5.4 Discussion of Study Hypothesis Results	79
5.5 Results:.....	83
5.6 Recommendations:.....	83
References.....	84
Appendices.....	94

List of Tables

Chapter No- Table No	Title	Page
(2-1)	Types of automation technologies	17
(2-2)	Summary of Previous Studies on the Relationship Between Technological Practices and Audit Quality	46
(3-1)	Constructs Measurements and Measurement Sources	53
(3-2)	Five-point Likert Scale	54
(3-3)	The length of the cells five Likert scale	54
(3-4)	Factors Loading for Dependent and Independent Variables	55
(3-5)	Factors Loading for all paragraphs within the questionnaire	55
(3-6)	Reliability Tests of model variables	56
(3-7)	Correlation matrix for predictor variables	56
(3-8)	VIF for independent variables	57
(3-9)	Normality test	58
(4-1)	Distribution of the Study Sample Based on Personal Data	59
(4-2)	Arithmetic mean and standard deviations of the responses of the study subjects on the dimensions of Technology Practices.	62
(4-3)	Arithmetic mean and standard deviations of the responses of the study subjects on the dimension of Automation	63
(4-4)	Arithmetic mean and standard deviations of the responses of the study subjects on the dimension of Data Analysis	64
(4-5)	Arithmetic mean and standard deviations of the responses of the study subjects on the dimensions of Audit Quality.	66
(4-6)	Arithmetic mean and standard deviations of the responses of the study subjects on the Accuracy.	66
(4-7)	Arithmetic mean and standard deviations of the responses of the study subjects on the efficiency.	67
(4-8)	Arithmetic mean and standard deviations of the responses of the study subjects on the reliability.	68
(4-9)	Regression result of main hypothesis H0	69
(4-10)	Regression result of sub-hypothesis H01	70
(4-11)	Table (4-11) * Regression result of sub-hypothesis H02	70
(4-12)	Regression result of sub-hypothesis H03	71

Chapter No- Table No	Title	Page
(4-13)	Regression result of sub-hypothesis H04	72
(4-14)	Regression result of sub-hypothesis H05	72
(4-15)	Regression result of sub-hypothesis H06	73
(5-1)	Summary of the results of the study hypotheses	79

List of Figure

Chapter No- Figure No	Title	Page
1	The Research Model	7
2	Audit Quality Framework	30

List of Appendices

No	Title	Page
1	Questionnaire	94
2	SPSS output	101

Table of Abbreviations

(ACCA)	Association of Chartered Certified Accountants
(ADA)	Audit Data Analytics
(AI)	Artificial intelligence
(AIS)	Accounting Information Systems
(BDA)	Big Data Analytics
(CAAI)	Continuous Auditing of Artificial Intelligence
(CFA)	Chartered Financial Analysts
(CMA)	Certified Management Accountant
(COBIT)	Control Objectives for Information and Related Technologies
(COSO ERM)	Committee of Sponsoring Organizations – Enterprise Risk Management
(CPA)	Certified Public Accountant
(DA)	data and analytics
(DSR)	Design Science Research (DSR)
(ERP)	enterprise resource planning
(ETL)	Extraction, Transformation, and Loading
(IDP)	intelligent document processing
(IFRS)	International Financial Reporting Standards
(ISAs)	International Standards on Auditing
(ISSM)	Information Systems Success Model
(LLMs)	Large Language Models
(ML)	Machine Learning
(NLP)	Natural Language Processing
(OCR)	Optical Character Recognition
(RBV)	Resource-Based View
(RPA)	Robotic Process Automation
(SEM)	Structured Equation Modeling
(TAM)	Technology Acceptance Model
(TBATs)	Technology-Based Audit Techniques
(TOE)	Technology, Organization and Environment
(UAE)	United Arab Emirates

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Abstract

This study aimed to identify the effect of technological applications (automation and data analysis) on the quality of auditing in Jordanian auditing firms, measured in terms of efficiency, reliability, and accuracy. The study used a descriptive analytical approach and descriptive statistical methods to describe the study data, simple and multiple regression were also used to test the study hypotheses.

The study population consisted of auditing firms operating in Jordan (327), while the study sample included auditing firms operating in the capital, Amman. A special questionnaire was developed for the purposes of the study. A total of (196) questionnaires were distributed and (150) of the questionnaires were returned. The study concluded that the use of technological applications in their various dimensions enhances the quality of the auditing process in terms of efficiency, reliability, and accuracy.

The study recommended that Jordanian auditing firms focus on using modern technological applications and increase their interest in training and qualifying auditors to increase their ability to use modern technological applications.

Keywords: Technological applications, automation, data analytics, audit quality, Jordanian auditing firm

**العنوان: أثر استخدام تطبيقات التكنولوجيا الحديثة على جودة التدقيق
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إعداد

عبدالرحمن يعقوب زيد

إشراف

الدكتور نواف عبدالله الجندي

الملخص

هدفت هذه الدراسة الى التعرف على اثر التطبيقات التكنولوجية مقاسة (بالأتمتة وتحليل البيانات) على جودة التدقيق في شركات التدقيق الأردنية، مقاسة بالكفاءة والإعتمادية والدقة، واستخدمت الدراسة المنهج الوصفي التحليلي، أيضا استخدمت الدراسة أساليب الإحصاء الوصفي، (التكرارات، الوسط الحسابي، والانحراف المعياري) لوصف بيانات الدراسة، كما استخدمت الانحدار البسيط والانحدار المتعدد لاختبار فرضيات الدراسة.

تم استخدام الحزمة الإحصائية للعلوم الاجتماعية لتحليل بيانات الدراسة واختبار فرضياتها، وتكوّن مجتمع الدراسة من شركات التدقيق العاملة في الأردن، اما عينة الدراسة فشملت شركات التدقيق العاملة في العاصمة عمان، وقد تم تطوير استبانة خاصة لأغراض الدراسة، تم توزيع (196) استبانة وإسترداد (150) استبانة منها.

توصلت الدراسة الى ان استخدام التطبيقات التكنولوجية بأبعادها المختلفة يعزز جودة عملية التدقيق من حيث الكفاءة والاعتمادية والدقة، وأوصت الدراسة بأن تركز شركات التدقيق الأردنية على استخدام التطبيقات التكنولوجية الحديثة وزيادة الاهتمام بتدريب وتأهيل المدققين لزيادة إمكانية استخدامهم للتطبيقات التكنولوجية الحديثة.

الكلمات المفتاحية: التطبيقات التكنولوجية، الأتمتة، تحليل البيانات، جودة التدقيق، شركات التدقيق الأردنية.

Chapter One

Background and Problem Statement

1.1 Introduction

The auditing profession is experiencing a significant transformation driven by **technological practices**—specifically **automation, data analytics, and artificial intelligence (AI)**—which represent independent **variables**. Traditionally, audit work relied heavily on manual testing and selective sampling (Celestin et al., 2024). The adoption of these digital technologies has enhanced **auditor effectiveness, accuracy, and reliability**, functioning as **mediating variables** that explain how technology influences audit outcomes. Consequently, these improvements contribute to higher **audit quality**, the **dependent variable**, by reducing human error and enabling deeper and more comprehensive analysis of financial data (Bostan & Dragomirescu, 2024; Raguseo, 2018).

1.1.1 Automation

Automation has become a key technological practice influencing the auditing profession. Traditionally, audit procedures depended on manual processes that were time-consuming and prone to human error. The integration of automation in audit tasks—such as transaction testing and data processing—enhances auditor efficiency and accuracy by standardizing procedures and reducing manual intervention. As a result, automation contributes directly to improved audit quality through faster execution, consistent application of audit procedures, and a lower likelihood of human error (Celestin et al., 2024; Bostan & Dragomirescu, 2024).

1.1.2 Data Analytics

Data analytics represents a significant advancement in auditing by enabling auditors to analyze large volumes of financial data beyond traditional sampling techniques. The use of advanced analytical tools improves auditors' ability to identify anomalies, patterns, and potential risks within financial statements. This enhanced analytical capability increases audit effectiveness and reliability, allowing auditors to gain deeper insights into financial performance and risk areas. Consequently, data analytics positively influences audit quality by supporting more informed audit judgments and comprehensive financial assessments (Raguseo, 2018).

1.1.3 Artificial Intelligence (AI)

Artificial intelligence has further transformed audit practices by introducing intelligent systems capable of learning, pattern recognition, and predictive analysis. AI applications assist auditors in risk assessment, fraud detection, and continuous auditing processes. By improving decision-making accuracy and consistency, AI reduces cognitive bias and enhances auditor judgment. These capabilities lead to higher audit quality, as auditors can perform more precise evaluations and focus on high-risk areas, thereby strengthening the overall reliability of audit outcomes (Bostan & Dragomirescu, 2024).

1.1.4 Audit Quality

Audit quality reflects the extent to which audit procedures are conducted effectively, accurately, and in compliance with professional standards. The adoption of technological practices such as automation, data analytics, and AI enhances audit quality by improving auditors' performance and expanding the scope and depth of audit testing. Through reduced human error, enhanced analytical capabilities, and more reliable audit evidence, technology-driven auditing supports greater assurance and credibility of financial reporting.

Automation in auditing refers to the use of software to carry out repetitive, rule-based activities that have been executed manually. Robotic Process Automation (RPA) automates the extraction and analysis of large datasets in a way that enables auditors to detect anomalies and prioritize high-risk areas (Sun & Vasarhelyi, 2016). Large audit firms are currently using automation suites, according to Maier et al. (2021), to standardize processes, guide auditors through work streams, and flag unusual transactions for additional testing, thereby improving the evidence base and reducing judgmental inconsistencies. Similarly, automation-enabled systems enable continuous auditing by monitoring transactions in real time and highlighting errors before they become aggravated (Bakumenko & Elragal, 2023). Data analytics, on the other hand, allows auditors to examine large, complex datasets with a perspective to determining developments, trends, and aberrations. It enables examination of entire populations of transactions rather than small samples, thus improving objectivity and accountability (Afadzinu, Lóránt, & Fayah, 2024). Deep-learning and anomaly detection algorithms enhance audit reliability by minimizing false positives and negatives (Hemati et al., 2021). With organizations shifting to digital accounting systems and cloud-based systems,

innovations such as Continuous Audit Intelligence as a Service and cloud-based AI provide auditors with integrated data analytics and automation ecosystems with on-demand availability of high-end analytical capabilities with minimal technical knowledge (Dai & Vasarhelyi, 2020; Abu Huson et al., 2025). These technologies together have a direct influence on the dimensions of audit quality, which are accuracy, efficiency, and reliability. Automation removes manually generated errors, and analytics detect aberrations in the data, which improves accuracy (Heliyon, 2024). Automation of repetitive tasks improves efficiency because it allows auditors to focus on analysis of higher order and support functions (Abu Huson et al., 2025). Standardization and responsibility for data-based decision-making increase reliability, reduces subjectivity, and facilitate user confidence in financial reporting (Afadzinu et al., 2024). However, this evolution is not without new challenges. Many businesses, particularly small-scale businesses, are faced with problems such as poor infrastructure, shortage of technical skills, and cybersecurity threats (Pérez-Calderón et al., 2025). Excessive dependence on technology also brings up ethical and governance concerns such as data privacy, algorithmic bias, and auditor accountability (Pinto, 2024). To this extent, the auditor's role is evolving from that of technical leader only to that of strategic evaluator, requiring analytical expertise besides moral judgment and governance acumen (Law & Shen, 2025). Control Objectives for Information and Related Technologies (COBIT), Committee of Sponsoring Organizations – Enterprise Risk Management (COSO ERM), and the Cloud Security Alliance automation audit guidelines are a few of the frameworks that provide structured paths for incorporating governance, accountability, and audit technology (Becker and Bailey, 2014). Despite this innovation, there remains an ongoing gap between technological development and its practical, ethical, and regulatory implementation across various audit environments—particularly emerging countries like Jordan, where infrastructural and training constraints still remain significant concerns. The most important challenge to be met is that of how to balance the benefit of automation and data analytics with maintaining auditor independence, ethical integrity, and contextual responsiveness. While technology improves audit quality by increased accuracy, efficiency, and reliability, its full potential will not be realized without sound governance, adequate infrastructure, and the development of auditors' technological skills. Future research should focus on how these elements interact to ensure that

technological integration complements, rather than substitutes for, human professional judgment in auditing.

1.2 Problem Statement

Even though Jordan has long adopted International Standards on Auditing (ISAs) and International Financial Reporting Standards (IFRS), the way audits are carried out remains mostly traditional. Auditors still rely heavily on manual processes and sample-based testing. This disconnect between regulatory compliance and actual audit practices limits auditors' ability to manage large amounts of data and find complex irregularities. As a result, it reduces the overall effectiveness of audits (Alzoubi, 2016).

Around the world, the auditing field has undergone significant changes due to technological practices like automation and data analytics. These technologies have clearly improved audit efficiency, accuracy, and risk assessment. However, the use and application of these technologies in Jordan's audit environment are limited and inconsistent. This technological gap creates a divide between international audit advancements and local practices, raising concerns about audit quality, stakeholder trust, and the reliability of financial reporting in Jordan.

Previous studies have noted the potential advantages of technology in auditing. Still, there is a lack of solid evidence on how these technologies actually impact audit quality aspects—such as accuracy, efficiency, and reliability—especially in developing countries like Jordan (Alma'aitah et al., 2024). Most existing research in Jordan has focused on regulatory compliance or common audit issues without examining how specific technological practices affect audit quality outcomes in fact. Furthermore, research shows that Jordanian audit firms often do not use advanced technological tools, which could harm audit results (Alhababsah, 2022).

Thus, the main issue this study addresses is the lack of clear evidence about how technological practices—especially automation and data analytics—impact audit quality in Jordan. By testing these relationships, this study aims to fill an important research gap and provide evidence-based insights that can help audit professionals and policymakers use technology to improve audit effectiveness and quality.

1.3 Research Objectives

Based on the study problem, the study aims to identify the effect of technological practice measured by (Automation, Data Analysis) on the audit quality measured by (accuracy, efficiency, and reliability) in Jordanian auditing firms, and to develop actionable recommendations for overcoming adoption barriers and maximizing technological benefits to audit professional in Jordan. Based on the main objective the study aims to identify the following:

1. The effect of Automation on Audit Accuracy in Jordanian audit firms
2. The effect of Automation on Audit Efficiency in Jordanian audit firms
3. The effect of Automation on Audit Reliability in Jordanian audit firms
4. The effect of Data Analysis on Audit Accuracy in Jordanian audit firms
5. The effect of Data Analysis on Audit Efficiency in Jordanian audit firms
6. The effect of Data Analysis on Audit Reliability in Jordanian audit firms

1.4 Study Importance: Scientific and Practical Significance

Scientific Significance

This study advances auditing and accounting information systems concepts through the application of Classical Audit Concepts coupled with Innovation principles. It explores how skill is affected by automation and data analysis, something which is a matter of utmost concern in the case of a developing nation like Jordan. Furthermore, it advances the emerging model of human-machine relationship in auditing by grafting established theoretical frameworks to a new and emerging context.

Practical Significance

The study provides practical implications for practitioners and regulators by identifying Industry-Specific Adoption Patterns, by industry stratified analysis, it reveals how practice in technology practice (Automation, Data Analysis) affects auditing quality (accuracy, efficiency, and reliability) differently, advising audit firms on where to invest in technology. It serves as a reference for the implementation of technology practice (automation and data analytics) in developing economies.

The study findings are expected to make the audit tasks more effective, trustworthy, and precise, thus contributing towards enhanced overall audit quality.

1.5 Research Questions

This study tends to measure the effect of using technology practice measured by the dimensions of (automation and data analysis), on auditing quality measured by (Reliability, Accuracy, Efficiency) in Jordanian audit firm and to cover the research gap of how auditors could benefit from using those technologies through pointing below research questions:

Q: Is there an effect of technology practice measured by the dimensions of (Automation, Data Analysis) on auditing quality measured by the dimensions of (Accuracy, Efficiency, Reliability) in Jordan Auditing Firms?

And the following sub questions are derived from the main question:

- Q1: Is there an effect of Automation on audit Accuracy in Jordan Auditing Firms?
- Q2: Is there an effect of Automation on audit Efficiency in Jordan Auditing Firms?
- Q3: Is there an effect of Automation on audit Reliability in Jordan Auditing Firms?
- Q4: Is there an effect of Data Analysis on audit Accuracy in Jordan Auditing Firms?
- Q5: Is there an effect of Data Analysis on audit Efficiency in Jordan Auditing Firms?
- Q6: Is there an effect of Data Analysis on audit Reliability in Jordan Auditing Firms?

1.6 Study Hypothesis

Based on the study questions, the following hypothesis are extracted:

The main hypothesis

H0: There is no statistically significant effect at the level $0.05 \geq \alpha$ of technological practices measured by (automation and data analysis) on audit quality measured by (Accuracy, Reliability, Efficiency) in Jordan auditing firms, and the following sub hypothesis are extracted from the main hypothesis.

H0-1: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Efficiency in Jordan audit firms.

H0-2: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Reliability in Jordan audit firms.

H0-3: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Accuracy in Jordan audit firms.

H0-4: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Efficiency in Jordan audit firms.

H0-5: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Reliability in Jordan audit firms.

H0-6: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Accuracy in Jordan audit firms.

1.7 Study Model

Conceptual Model

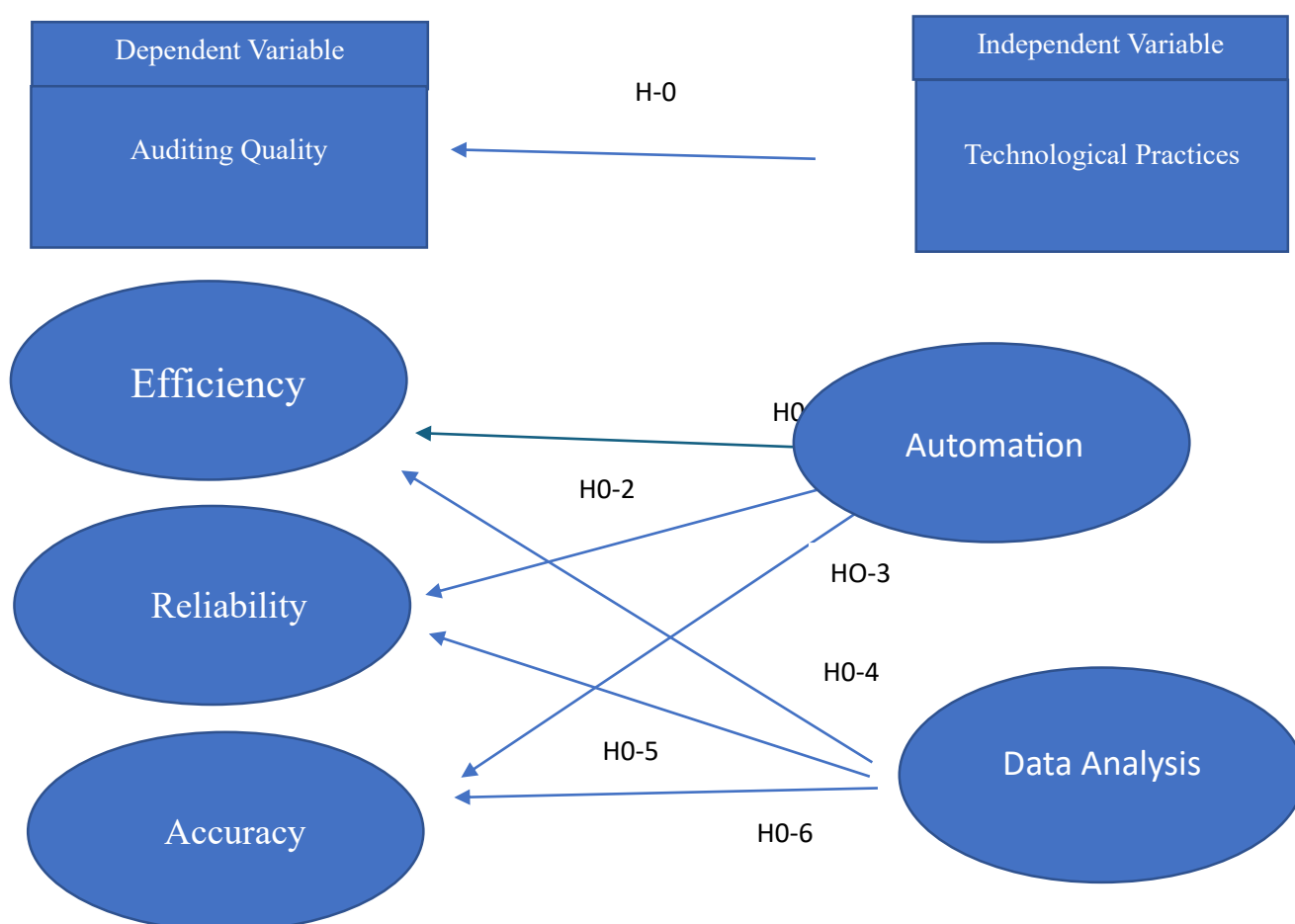


Figure (1): Represents the study model. Based on the studies of (Issa et al., 2016) (Yoon et al., 2015) (Richins et al., 2017)

1.8 Research Scope

The study focuses on examining the effect of technology practices measured by (Automation and Data analytics) on audit quality measured by (Efficiency, Reliability, and Accuracy) in the context of Jordanian audit firms.

Geographic Scope

The study is limited to Jordan, a developing economy in the Middle East where digital transformation in professional services is still emerging. The focus is on all audit firms, including employees of the Big Four companies.

Time Scope

The study conducted during the second half of the year 2025, focusing on current and recent adoption trends. Historical analysis is not included, though references to past audit quality trends may be used for context.

1.9 Study sample and population

The study population consist of all the auditors (partners, managers, and associates), audit quality reviewers, compliance officers, and professionals who have firsthand experience using audit technology in all Audit Firms in Jordan. Those participants are selected based on their field use knowledge of technological practices measured by (automation and data analysis) in auditing. A purposive sampling strategy is used to ensure that the participants have relevant experience and insight required for achieving the research objectives. The basis for the choice of these participants among others is their significant role in applying, assessing, or being impacted by technology tools in audit assignments, thereby making their contribution vital toward knowing how technological practice (automation and data analysis) are impacting in audit quality (Efficiency, Reliability, and Accuracy).

1.10 Conceptual Definitions

Technology practices

Technology practices refer to digital tools and systems, such as automation, data analytics, and artificial intelligence, in audit processes. This helps improve audit performance, widen the testing scope, and raise the quality of audit evidence (Emerging Digital Technologies & Auditing Firms, 2024; Almaleeh & Albakly, 2025).

Audit Automation

Audit automation refers to computer systems and automated tools, including Robotic Process Automation (RPA), to handle routine audit tasks with little human input. The goal is to improve the efficiency, consistency, and accuracy of audit procedures (Alassuli, 2025; The increased role of advanced technology and automation in audit, 2025).

Data Analytics in Auditing

Data analytics in auditing is defined as the application of sophisticated methods and tools for the analysis of large amounts of financial and non-financial information in order to identify patterns and anomalies, and thereby assist in the planning and evaluation of evidence (Smith & Zhang, 2024; Bhatti et al., 2025).

Audit Quality

Audit quality can be defined as the measure of the extent to which auditing procedures are carried out in an appropriate manner in accordance with auditing standards to ensure reliable, accurate, and credible auditing opinions to increase the reliability of financial reporting (El Filali & Harrag, 2025; Pangaribuan, 2024).

Audit Accuracy

Audit accuracy is the auditor's capacity to accurately identify any material misstatement and errors and provide precise audit judgments based on sufficient and appropriate audit evidence (Sayal, 2025; Audit Electronic Role, 2024).

Audit Efficiency

Audit efficiency can be defined as “the auditor’s ability to discharge his/her tasks with optimal time and resources, in a way that complies with auditing standards and fulfills audit objectives” (Alassuli, 2025; Technological Innovation and Its Impact on Audit Quality, 2025).

Audit Reliability

Audit reliability refers to the extent to which audit results/opinions can be relied upon by stakeholders, which in turn depends on the consistency, objectivity, and reliability of audit evidence (Elsharq Journal, 2025; Systematic Literature Review of Audit Risk and Quality, 2025).

Chapter Two

Theoretical Framework and Literature Review

2.1 Section one: Theoretical Framework

2.1.1 Background

This chapter provides theoretical frameworks for investigating the use and effects of technological practices measured by (automation and data analysis) on audit quality measured by (Efficiency, Reliability, and Accuracy) in Jordanian audit firms. It begins with a theoretical framework that underpins the study's conceptual assumptions. followed by literature review of prior literature that explores the intersection of technology practice and audit quality, through this synthesis, the chapter identifies key theoretical constructs, empirical trends, and gaps in the literature that this study aims to address.

2.1.2 Technological Practice

2.1.2.1 Conceptual Foundations of Technological Practice in Auditing

Technological practice, refers to the use of advanced tools and systems, specifically automation and data analysis, which are progressively influencing the characteristics and actions of audit processes. Technological practice deals with the activities and processes used to develop, implement, and use technology for business and professional purposes. (Sutarman et al., 2025) stated that technological practice is greater than the technical use of tools, it is also organizational, and cultural aspects that influence the way technology is understood and applied. From this perspective, technological practice is the implementation of technology as a component of regular job procedures that gives rise to a transitional condition that evolves based on both technological progress and regional demands. Gomes, G. J. N. (2025) defined practice as a synthesis of "doings," "sayings," and "relating," and recognized that technological practice is not only the act of controlling an instrument but also the interactions, language, and cultural figures that include it. In practical terms, this means that using an automation audit system, for example, involves using the software in reality (doing), professional discussions of its accuracy (expressing), and the organizational or regulatory guidelines that allow it to be used (relating). The researcher believe that, technological practice is an integrated whole system consisting of technical activities and human and institutional factors.

2.1.2.2 Technological Advancement and Its Influence on Audit Quality

Technology practice is gaining acceptance as firms apply new technology to improve audit quality such as efficiency, accuracy, and reliability. Technology develops through practice, (Orlikowski, 2000), and this indicates value develops from its usage at the workplace rather than in its construction. Besides that, Research indicates that how auditors employ technology has a direct impact on the quality of audits (Vasarhelyi et al., 2015) Therefore, when studying technological practice through experimental studies, experts frequently divide it into measurable variables.

2.1.2.3 Cultural, Behavioral, and Acceptance Factors Shaping Technological Practice

The function of auditor culture and beliefs is still crucial. Auditors' attitudes toward automation and data analytics are greatly influenced by their technological confidence and willingness to adapt beyond judgment-driven practices. While some practitioners move away from automation due to concerns of reducing their professional independence, others accepted it as a chance to enhance their professional profile in the profession. This conflict of cultures illustrates the Unified Theory of Acceptance and Use of Technology determinants of desire and usage, the auditors would be more willing to use analytics because they view them as career-enhancing and engaging (Venkatesh et al., 2012). Automation and data analysis are two beneficial aspects of technological practice. Technological practice in auditing in the actual world is more than just the use of new technologies, it is also the process of changing the profession's approach, roles, and expectations. In addition, automation and data analytics has been identified as a fundamental component of audit transformation with related implications for regulators and practitioners (Kokina & Davenport, 2017)

2.1.2.4 Ethical, Security, and Institutional Dimensions of Technological Practice

A new direction is that it links technology practice to ethical and cybersecurity issues. Automation and data analytics are based on large data sets and complex networks, and audit processes are susceptible to security weaknesses. Even if audit efficiency is improved, substandard cybersecurity infrastructure can destroy confidence in stakeholders. (Appelbaum et al., 2017) reason that excessive dependence on automated decision-making reduces auditor responsibility, leading to ethical concerns surrounding

professional judgment. These findings augment the Resource-Based View (RBV) by proposing that obtaining a competitive advantage through technology practice requires not only the availability of tools, but also their protection and responsible behavior integration into daily operations. Institutional theory explains further on how technological practices are influenced by pressures from outside. For example, the emerging economies, regulators and experts forward firms to utilize data analytics in order to keep up with international audit standards. In Jordan, this is due to previous evidence indicating that utilization continues to be poor due to constraints in structure (Alhababsah, 2019). Hence, the Technology, Organization and Environment (TOE) model is strengthened since effective implementation is based upon technological competence alignment, firm readiness, and environmental circumstances (Tornatzky et al., 1982). Auditing technology practice is of no use without qualified auditors. Studies show that the divide between the expertise required for more advanced analytics and auditor training is increasing. Thus, uncertainty theory teaches us that the effectiveness of automation and data analytics is dependent on firm-specific conditions, that is, human capital investment (Donaldson, 2001)

2.1.2.5 Strategic Integration, Digital Transformation, and Organizational Readiness in Audit Technology

For Jordanian companies, the problem is not so much acquiring equipment as it is updating instruction and guaranteeing continuous professional education to develop technical skills. Recent literature also underscores automation and data analytics as central to a wider digital transformation of Auditing. Digital transformation involves the incorporation of Artificial Intelligence, Robotic Process Automation (RPA), and cloud-based audit systems in an order to increase productivity and accountability. In comparison to traditional practices, these systems allow for ongoing auditing, which evaluates data in real time rather than recently (Rezaee et al., 2002). While reducing errors is considered the primary benefit of data analytics, recent studies demonstrate that it is the collective use of various technologies—instead of dependence on a single tool—that has resulted in enhancements in audit quality (Moffitt et al., 2024). Supplementing these technological developments is an organizational dimension represented by the dynamic of continuous capability development and strategic realignment within audit firms.

While audit firms use advanced automation, data analytics, and artificial intelligent tools, however, they can actually utilize these technologies relies on how they integrate them into overall audit strategy, management, and culture. According to this perspective, technology practice can be considered a strategic capability, rather than a capacity. Consequently, to the resource-based view (RBV), competitive advantage for the audit firm comes not only from the use of advanced tools, but also from the use of human, technological, and organizational resources in an efficient combination that is rare, difficult to replicate, and well utilized. This indicates that audit firms should invest in employees' continuous development, change management, and process change so that automation and data analytics are integral to normal technology practice rather than separate programs. Practical evidence supports the hypothesis that auditors' exposure to AI value addition to audit quality was positively associated with training and support within their organizations (Al-Hashedi & Magalingam, 2022).

The majority of literature demonstrates that technology practice remodels the concept of professional decision in audit. Greater dependence upon automation and data analytics necessitates that auditors evaluate outcomes from data analytical tools, determine their reliability, and address emerging risks like algorithmic error, data accuracy, and security threats. For example, from research, while interest future analysis and error detection are shown through data analytics (Huang et al., 2022).

This change raises significant ethics and governance concerns. Auditing processes are becoming increasingly real-time, ongoing, and data-dependent, professional guidelines and rulemaking need to stay between of changing practices at ever-faster rates. Auditors and analysts have started demanding clearer directives on how audit firms should verify, report, and justify the use of advanced analytics and automation in audit work (Fedyk et al., 2022).

In addition, the study of (Sewpersadh, 2025), show that the integration of developing technology involves changes in leadership and management structures within audit organizations. Moving audit operations to continuous monitoring and real-time analytics models requires the leadership to develop a plan that takes technological practice as an investment in strategy, not just an operational modification. Recent data analysis indicates that automation of audit processes has a statistically significant positive influence on audit

quality in developing countries if firms integrate organizational structures and invest in suitable technologies (Wu & Huang, 2025).

For instance, a study of Nigerian audit firms (Ibrahim and Jahswill, 2024), found that the automation of audit processes significantly improved audit service quality when supported by infrastructure, training, and a technological availability organizational structure. According to Ditkaew and Suttipun (2023), technological practice should be understood as three linked elements.

Technological capability, which includes tools, platforms, and analytics systems, organizational integration, or process re-design, staff qualifications, and leadership involvement, systems connection to regulatory expectations, professional standards, and users' trust.

When organizations are able to organize the various components, the audit process is enhanced auditors spend less time on standard manual activities and more on value-added decisions, risk assessment, and exception-based management. Data analytics use is positively related to audit quality indicators and evaluation regularity, which results from studies in both developing and advanced economies. (Ditkaew and Suttipun, 2023).

2.1.2.6 Technology Practice Dimension

In defining technological practice, it is convenient to think about two quantifiable characteristics in the audit environment:

1. Audit automation procedures (such as robotic process automation, continuous monitoring systems).
2. Audit data analytics capability.

Their impact on audit quality outcomes (efficiency, accuracy, and reliability) is established by organizational planning (training, culture, and infrastructure) and external factors. Good audit technology practice transformation, by this concept, does not include basic application of tools, but also their integration into routine professional procedure and high levels of integration with strategic aims for auditing.

Technological practice in auditing represents the entire system of technical, human, and institutional processes. It develops via practice, integrates company culture, and is externally determined. Audit firms in situations like the Middle East and Jordanian

economy can potentially gain a strategic advantage by treating automation and analytics as integral parts of audit methodology rather than additional tools, whereby they develop their staff, update organizational rules, and maintain a tradition of continuous learning.

From the researcher point of view, it is essential to incorporate advanced technologies in audits in order to have a successful future in this field. Automation and data analytics in audits are not only technologies but are an advancement in audits that are responsible for increased accuracy and effectiveness in audits. The potential of automation and data analytics in audits and other fields can be achieved when implemented in an organizational methodology by employee development and an organizational company culture. Integration of new technologies in audits is necessary to achieve high-quality audits.

2.1.3 Automation

2.1.3.1 Methodological Implications of Automation in Auditing

Automation in auditing represents the use of technology, like RPA and intelligent software, to perform repetitive rule-based audit tasks with minimal human intervention in order to be more efficient and more accurate. Automation technology used in audit practice has several practical, methodological, and regulatory implications than simple replacements of assignments. From the perspective of methodology, automation enables one to move from frequent sample-based assessment to regular data-driven monitoring. Systems that combine rule-based robotic process automation (RPA) with analytic levels and intelligent document processing (IDP) provide a direction through which auditors can monitor huge numbers of transactions and started investigations based on exceptions rather than focus on small samples (Yoon et al., 2021). For this reason, auditors have to develop monitoring systems, set automated alerting levels, and develop a number of analytic systems that balance accuracy with specificity in discovering errors (Yoon et al., 2021; Minkkinen et al., 2022).

2.1.3.2 Evolving Professional Responsibilities in Automated Audit Environments

Automation enhances professional responsibilities of auditors by shifting their focus from manually collecting data to analysis, evaluation of models, and institutional auditing. Audit systems for automation, in which auditors communicate with and control automated processes, recognize that many audit decisions remain fundamentally human-for example, valuations, importance determinations, and certain error evaluations-and recommend hybrid procedures in which automation enhances rather than replaces the auditor's expertise (Parker et al., 2021). Auditors would then focus on the role of

automation process management: determining control parameters, validation of analytical final results, and applying domain knowledge to deal with cases that are within the analytical confidence levels (Parker et al., 2021; Leocádio et al., 2024).

2.1.3.3 Transformation of Audit Evidence Through IDP and AI Systems

Technological augmentation changes the structure of audit evidence. (IDP) and modern Large Language Models (LLMs) have the capability to extract, classify, and convert unstructured evidence-receiving documents, deals, and other communications-into structured representations suitable for automated controls and analytics (Mandvikar, 2023). When applied appropriately, IDP reduces manual transcription errors, accelerates evidence collection, and extends the range of verified sources. However, this introduces new evidence-quality issues: the validity, preprocessing steps (optical character analyzer quality, regularization), and confidence indicators of extracted fields need to be recorded as part of the audit record to maintain evidence reliability and enable accuracy (Mandvikar, 2023; Leocádio et al., 2024). The Table (2-1) below gives a quick summary of the different automation technologies and their respective contributions to the auditing process (Leocádio et al., 2024)

Table NO (2.1) Types of automation technologies

Technology	Primary Function	Key Benefits	Impact on Audit
Robotic Process Automation (RPA)	Automates repetitive, rule-based processes such as data entry and reconciliation.	Increased efficiency, lower human error, and 24/7 operation.	Audit cycles have been accelerated, and tasks performed with continuity.
Intelligent Document Processing (IDP)	AI/ML are applied to extract, classify, and analyze the data from unstructured documents.	Data collection was facilitated and information was made more accurate.	Processing audit evidence is much faster while the completeness of data has improved.
Artificial Intelligence (AI) / Machine Learning (ML)	It allows predictive analytics, identification of errors, and identification of patterns.	Full-population testing, real-time risk detection, and enhanced insights	More reliable assessments, proactive risk reduction.
Automated Confirmations	Automated information is verified against third-party organizations.	Reduced processing time, improved data integrity.	The auditing procedures were accelerated, and evidence was improved.
Blockchain Technology	A secure database ensures data integrity and verifies transactions.	Increased trust, unchangeable records, and accountability.	Improved verification processes and accurate independent confirmations.

(Leocádio et al., 2024)

2.1.3.4 The Role and Workflow of Intelligent Document Processing (IDP)

IDP Intelligent Document Processing forms a core basis for automation processes since it can transform unstructured or semi-structured material into organized, machine-accessible forms that can easily be used to provide RPA procedures. Generally, IDP is structurally developed on a multistage process that typically includes document collection, pre-processing, classification, data extraction, and validation of information (Kolandaisamy et al., 2024).

Advanced models using concentric networks and transformer-based systems dramatically improved the accuracy of OCR for international documents and poor-quality documents (Cutting & Cutting-Decelle, 2021). Then, the extracted information is categorized and analyzed by machine learning and NLP systems that identify key items, detect situation, and determine confidence levels. This organized data is the basis for robotic automation processes, enabling robots powered by RPA to perform duties-such as account auditing, deal verification, or regulatory reporting-without human assistance (Visalli et al., 2023).

Automation creates managerial, ethical, and assurance challenges that auditors and regulators need to solve. The confidentiality of automation may reduce the extent to which outcomes are obtained, making explanations of it to users more difficult and potentially limiting the auditor's ability to assess model reliability (Minkkinen et al., 2022). Bias in the data can lead to systemic errors where automation has been used to verify financial transactions, identify users, or assess risks. Additionally, legal and security limitations-for instance, data residency laws-affect whether data can be used automatically and the ways in which audit firms must document authorization and processing methods for data (Leocádio et al., 2024; Minkkinen et al., 2022).

2.1.3.5 Requirements for Effective Automated Monitoring Systems

The study underlines (Yoon et al., 2021), that data standards and a three-level monitoring system-transactional accumulation, control-rule detection, and analytic error techniques-are necessary not to overload alerts and direct auditor attention to where it is most productive. Also needed are teams across departments-auditors, data engineers, and regulatory employees-and active change-management processes that preserve

institutional expertise, ensuring automation serves audit quality rather than efficiency advantages. (Parker et al., 2021; Leocádio et al., 2024).

Theoretically, automation can reduce manual errors and provide the possibility for more evaluations, improving detection capabilities and accuracy (Leocádio et al., 2024; Mookerjee & Rao, 2021). On the other hand, automatic dependence on automation could damage auditors' professional skills if routine analytical activities are assigned without preserving any possibilities for learning and decision development (Parker et al., 2021).

The changing technical situation develops new opportunities for frequent auditing of complex, responsive systems—particularly auditing Artificial Intelligence systems themselves. Continuous Auditing of Artificial Intelligence (CAAI) merges near real-time monitoring with accountability criteria to identify if Artificial Intelligence is following regulations and legal standards (Minkkinen et al., 2022). The external auditors for companies that use Artificial Intelligence externally or for users will need systems that routinely analyze model change, performance reduction, accountability measures, and the implementation of approved data usage regulations. In such a way, abilities reduce distinctions between IT auditing, model risk management, and financial/operational assurance by develop new broad abilities (Minkkinen et al., 2022; Leocádio et al., 2024).

The studies of (Parker et al., 2021), (Mandvikar, 2023), (Leocádio et al., 2024) provide the following recommendations for auditors and administrators:

1. Use modular automation systems with clear documentation and comprehension features.
2. Use complex monitoring with carefully determined warning levels to reduce false positives.
3. Keep individual evaluations for critical decisions.
4. Document end-to-end data processes, validation tests, and correction procedures.

From the researcher point of view, automation is more than an innovation in productivity, but a basic revolution of audit technique that fundamentally changes the nature of evidence collection, rebalances human decision, and increases requirements for automated governance. RPA, IDP, and other AI tools have the potential to greatly enhance audit dimension, effectiveness, and quality provided they are appropriately designed, controlled, and administered. Simultaneously, these technologies create new risks-

invisibility, bias, and depersonalization of skills that auditors will need to recognize and actively respond to with multi-discipline controls and continuous validation, with an explicit commitment to be explicable and ethics in data use.

2.1.4 Data Analysis

Data analysis is another important aspect of technological practice is data analysis. It is described as the use of advanced analytics, statistical techniques, and visualization software on large amounts of data that are both structured and unstructured (Yoon et al., 2015) Technology advancement has emerged as an important factor in influencing external audit practices. The use of advanced technologies, such as cloud accounting, robotic process automation (RPA), and artificial intelligence (AI), enables auditors to improve the overall quality of the audit process through increased efficiency, accuracy, and reliability in the audit process (Rozana et al., 2025). The use of these technologies enables auditors to process large volumes of data and perform risk assessment, thereby improving the overall quality of the audit process. (Rozana, A. S. A., Winarningsih, S., & Yadiati, W. (2025)). In practice, it allows auditors to test a population of activities instead of samples, improving risk assessment and abnormality detection. Data analysis was described as a "key step" in auditing because it improves auditors' ability to obtain greater insight into consumer financial and operational performance (Appelbaum et al., 2017). Data analysis can improve fraud detection and audit quality when properly integrated into audit methodologies (Brown-Liburd et al., 2015). On the other hand, data analysis refers to auditors' ability to analyze and arrive at conclusions from large amounts of structured and unstructured data using techniques such as predictive modeling, data extraction, and visualization (Earley, 2015). Data analytics improves audit effectiveness by allowing auditors to analyze entire data distinguishes rather than just sampling them. Similarly, the importance of real-time analytics and visualization for more timely audit planning and risk assessments (Del Caprio, 2025).

The technical auditing practice is the systematic use of data analytics. Auditors and data analytics professionals now use advanced techniques like automated modeling, classification, automatic machine learning, and generative visualization for analyzing large amounts of data (e.g., transactional reports, documents, email correspondence, and other online signals) to improve audit procedures and outcomes. These data analytics-driven methodologies allow auditors to avoid traditional sampling and instead conduct

comprehensive audits, which improves risk assessment, error identification, and overall audit efficacy (Ditkaew & Suttipun, 2023).

From the researcher point of view, technological practice may be defined as the integration of technology into organizational situations, as demonstrated by automation through auditing and data analysis. These elements not only illustration how technology is used, but also how it can improve audit quality, efficiency, reliability and accuracy.

2.1.4.1 Data analytics advantages

Data analytics is of most value for the following reason (Dempsey & van Dyk, 2024) (Baaske, 2025):

1. The planning and risk-assessment stages.
2. Recent tools can, for instance, process whole transaction categories and identify unusual patterns-such as unusual provider transactions, unexpected changes in consumption, or irregular entry groups. What it means is that audit resources can be distributed quickly and with the best possible effect based on data-driven priorities instead of fixed sampling designs.
3. Auditors who use such analytic tools are much better prepared to resolve problems in controls, discover the risks of theft earlier, and change auditing procedures on the performance.
4. Auditors will also be able to utilize visualization tools and interactive analytics during actual audits to investigate behavioral developments, organization activity segmentation, and networks of unusual transactions.
5. Visualizations turn basic numerical data into understood charts, distribution representations, or abnormality networks, which allow auditors better understanding and decision-making.

Data from developing countries indicates that the proficiency of auditors is the factor that controls the relationship between the use of analytics and the quality of audits, if auditors are not properly trained, the benefits of data analytics cannot be fully utilized (Alrashidi et al., 2022).

Technological practice in auditing-as described through data analytics-can be defined as the integration of technology, data, and human professional expertise in organizational audit procedures (Al Lawati, Sanad). Auditors are no longer simple managers of manual

procedures but rather administrators of analytic systems, analyzing automatic findings, verifying the validity of information, applying professionalism to analytic models, and incorporating knowledge about audit decisions. Where implemented properly, data analytics enhances audit quality (via increased coverage and deeper problem detection), efficiency (through automation or semi-automation of data-intensive operations), reliability (through standardization via documented analytic procedures), and accuracy (through timely and relevant information) (Al Farsi, 2024).

The integration of data analytics in auditing marks a significant achievement in the audit profession through changes in traditional methodologies toward better audit quality, effectiveness, and efficiency. Data analytics is the use of advanced statistical, predictive modeling, and visualization tools to analyze enormous quantities of data, thus enabling auditors to review an entire population of transactions rather than a limited sample (Kokina, 2025). This integrated approach makes risk assessment more precise and enhances the detection of mistakes or theft, thus greatly increasing audit insight depth (Saud, 2025).

Data analytics in auditing, benefits are accumulated at the instance of planning and risk assessment. Advanced analytics technologies have the potential to select through complete sets of financial records in search of unusual patterns or behaviors, such as unusual provider transactions or consumption patterns, thus helping auditors distribute resources based on data-driven priorities rather than predetermined sample structures. Additionally, real-time monitoring capabilities allow auditors to constantly assess business and financial activities, which enhances the speed of risk detection and makes audits more responsive (Baaske, 2025; Saud, 2025). Representation technologies support auditors by transforming complex data into comprehensible charts, distribution maps, or network graphs, thus enhancing understanding and decision-making (Baaske, 2025).

2.1.4.2 Data analysis challenges

Despite all these advantages, implementing data analytics in auditing remains highly challenging, particularly in developing countries such as (Hezam et al., 2023; Alrashidi et al., 2022; Al Lawati et al., 2024; Kokina, 2025; Saud, 2025):

1. Infrastructure issues.
2. High initial costs.

3. Restricted access to complete data databases.
4. limitation of information systems all prevents the broad adoption of technology.
5. Auditors lack training in data science and analytics; this factor directly reduces the possibility of gaining full benefits from data-driven audit approaches.
6. Legal constraints and a general shortage of training courses slow the shift from traditional audit techniques to advanced analytics-based methods in Jordan.

Future auditing developments expect increased use of artificial intelligence and machine learning, along with data analytics, for predictive and active auditing, enabling auditors to identify risks better and adjust audit procedures correspondingly (Kokina, 2025; Saud, 2025). However, this evolution will largely depend on how skill gaps are addressed and continuous training and technology infrastructure invested in, especially in developing countries (Hezam et al., 2023). As these challenges continue to be overcome, data analytics will continue to reshape auditing, repositioning auditors as strategic partners with deep insight into organizational risks and performance.

2.1.5 Technology practice as automation and data analytics

In the present technologically advanced administration, the auditing profession is fast evolving as new developments modify established techniques. Among these advancements, automation and data analytics have been recognized as two critical factors influencing how auditors perform their responsibilities, evaluate data, and provide assurance. The combination of automation and data analytics represents the transition from manual, sample-based audits to intelligent, data-driven, and continuous assurance methods (Appelbaum et al., 2017). The resulting system improves audit quality, efficiency, and relevance by allowing auditors to manage large and complicated datasets while using data analysis for identifying mistakes and analyze risks in real time (Panchapakesan et al., 2025).

2.1.5.1 The advantages of technology practice as automation and data analytics in auditing process

The combination of automation and data analytics is critical to what has been known as technical auditing practice. This integration combines automated data extraction, processing, and testing technologies with analytical systems that evaluate, visualize, and generate knowledge from both financial and non-financial data (Rozario & Vasarhelyi,

2018). Automation allows systems to deal with repetitive and time-consuming processes like data collecting, comparison, and transaction verification without the need for human supervision. Data analytics, on the other hand, employs statistical and computerized methods to analyze processed data in order to find connections that inform audit decisions (Wong, 2021).

These technologies work together to form an intelligent auditing system. For example, robotic process automation (RPA) may continuously extract transaction data from enterprise resource planning (ERP) systems, whereas analytical tools use predictive models to conduct real-time risk assessments (Issa et al. 2016). This integration enables continuous auditing, in which auditors monitor transactions and controls on a regular basis rather than only during periodic testing. It enables auditors to change from a past assessment of financial data to a quicker, predictive, and risk-focused approach (Vasarhelyi et al., 2012). The use of automation and data analytics enhances the quality and effectiveness of audits, from the perspective of quality, it enhances the utilization of audit procedures in that it supports the analysis rather than essentially having confidence on insignificant amounts of data. In this regard, this capacity by auditors facilitates the detection of minimal errors, which might have been left out in traditional audits. Automated systems offer data integrity and accuracy while analytics offer data-driven conclusions that present auditor evaluation and minimize the risk of error (Appelbaum et al. 2017).

Regular, repetitive audit procedures for control testing, data analysis, and confirmation validation are automated, enabling auditors to focus their attention on activities requiring expertise and questioning. Modern analytics also help auditors target high-risk areas by identifying mistakes and predictive assessments, thereby enhancing audit planning and decision-making. The integration, therefore, revolutionizes the roles of auditors from data collectors to analytical interpreters and strategic advisors.

A data-driven assurance process depends on an integrated automation and data analysis system. In this approach, auditors depend on a constant process of data from the client's system, which are analyzed automatically through processes and examined in near-real time. A data-driven assurance process enhances the quality of the results obtained in audits by reducing the time between the reporting of the data for analysis (Rozario & Vasarhelyi, 2018). For instance, computer programs allow entries for the

general record to be automatically selected every day, whereas analytical models identify differences from the standard or target ratio.

The constant monitoring process also ensures the added value of integration goes beyond the process of the audit. With the automation of analytics, the management and auditors are able to follow the internal control processes and know the information from the regulations over the accounting period (Vasarhelyi et al., 2012). Therefore, the annual process of the audit for the organization has changed to continuous risk analysis and assurance processes to meet their requirements for quick and accurate assurance information from the rapidly changing and advanced organization sector.

The integration of automation and data analysis tools enhances the auditors' ability to make informed strategic decisions. Rather than concentrating on financial security, auditors are able to offer information on corporate performance, process enhancement, and possible risk exposures. Auditors are able to estimate possible control issues using the predictions of risk analysis and the automation process of information transfer (Appelbaum et al., 2017).

In addition, integration increases the analysis of evidence. Automation facilitates the acquisition of exact results for data at the click of a mouse, and analysis tools examine the data through machine learning techniques. Additionally, the multi-step process above makes it possible for auditors to confirm their results from diverse sources, thus increasing the certainty of the results of the audit process (Issa et al., 2016).

2.1.5.2 The challenges of convergence of technology practice in audit

The possible benefits the convergence of automation and data analysis faces numerous challenges:

1. An important issue in this regard is relevant to the skills gap existing within the auditing profession. Professionals in the auditing field, who traditionally skills within accounting and finance analysis, may lack the skills to develop, manage, and comprehend automated processes and analysis tools (Kokina & Davenport, 2017).
2. The quality of data and accountability are also problematic. Automated processes necessitate the support of precise, structured, and complete data sources. Inaccurate, inadequate, or incomplete data may cause invalid results, thus affecting the validity of the audit process (Alles, 2015)

3. Additionally, the aspect of ethics and regulations should be factored in. With the integration of automation and AI in the field of auditing, problems concerning accountability for decisions reached through computation (Issa et al., 2016).
4. Automation and data analysis integration represent the beginning of a new auditing era characterized by intelligent automation, predictions, and constant assurance. Future auditors will require the skills of an accountant combined with the skills of an automation expert (Appelbaum et al., 2017).
5. In addition, the profession should invest in the underlying technologies for automation and analysis. Not only should cloud-based auditing solutions and risk management tools be established, but there should be an adaptation of regulations to ensure the ethical and uniform application of new technologies within the sector (Appelbaum et al., 2017).

In the researcher's opinion, the combination of automation and data analytics represents an important point for the practice of auditing. Together, automation and data analytics enhance the quality, efficiency, and relevance of audits through automating routine tasks, the ability to analyze data instantly, as well as the provision of proactive knowledge about risk and performances. Not with-standing the challenges associated with skills, data quality, and regulations, the combination of automation and data analytics represents the foundation for the continuous development of auditing based on data analysis in the depart of the transformation experienced by the auditing profession in the depart of the technologies available today.

However, incorporation of automation and data analytics in auditing enhances audit quality and strengthens the accuracy of professional decisions. Technological practice will allow auditors to move away from manual-based approaches and involve themselves with broader, timely assessments. In my opinion, adopting such tools is crucial for enhancing audit effectiveness within an increasingly digitalizing world.

2.1.6 Audit quality

Audit quality, is measured by efficiency, accuracy, and reliability. Audit quality is a central concern in audit practice and research, referring to the efficiency, accuracy, and reliability of the audit process. (DeAngelo,1981) has offered a definition of audit quality as the possibility of an auditor identifying and identifying important errors in financial

reports. Specialists have since broadened this definition to include not only the detection ability, but also the overall characteristics of the audit process contributing to customer trust (Francis, 2011). Audit quality is usually measured in current studies in terms of dimensions such as efficiency, accuracy, and reliability, which in total provide an achievable system for analyzing the effectiveness of auditing practice (Issa et al., 2016; Yoon et al., 2015; Richins et al., 2017).

The audit quality is an emerging phenomenon in the auditing paradigm, and the accuracy of financial information in audits is largely affected by the audit quality. The audit quality is explained by the degree to which the audit can be depended upon to give assurance concerning the error-free nature of the financial statements of an entity and the degree to which the auditor actually did his job with professionalism (Francis, 2011). The concept of audit quality in audits has evolved over the years to encompass various factors concerning the auditor, the reporting environment, and other settings. DeAngelo (1981) describes the audit quality as the “joint probability” of detection and reporting by the auditor of an important error in the accounting records of his client. What is important in DeAngelo's principles is that they represent an acceptable definition in doing research work on quality.

However, more current studies have acknowledged the fact that the audit quality is more of a process with varying levels of confidence, rather than an option (detect rather than unsuccessful). The study of (Francis 2024) stands for the need to perceive the quality of audits, rather than their concept, since even if audits exceed the minimum level, they can be highly varied in terms of professionalism, risk, and resistance to accounting models (Francis, 2024). Moreover, audit quality not only considers the activities of the auditor, but also whether the accounts generated represent the basic economics of the audited organization (Francis, 2011). Consequently, another more encompassing definition of the concept of audit quality might be the degree to which an external audit decreases information risk with respect to financial reporting, utilizing expertise, risk, and ethics in a certain condition. Here, the major elements encompassing the definition refer to the process, the outcome, and the conditions.

Audits quality in the topic of audit research refers to different theoretical viewpoint:

1. The agent theory provides an appropriate conceptual framework, wherein the management (agent) could have self-serving actions, leading to variation in their knowledge the owners (principal). Thus, external audits, based on high quality, decrease administrative costs (Watts & Zimmerman, 1986).
2. Signaling and information economics theories examine the auditor's report and image of the audit firms as predictors of Financial Report Reliability. An appreciated auditor might propose improvements in the quality of the audits, lowering investment costs and restoring investor confidence (Daryaei et al., 2022).
3. The process perspective highlights the fact that there are several features of audit quality. These, according to Francis (2011), include audit-firm input factors (skills, expertise, and resource factors), audit process factors (professional reservations, audits, evidence gathering), audit output factors (audit report, information release), and 'other factors (governance, assurance, competition).

Thus, the concept of audit quality is an overall term that was formed in the course of interactions between the auditor, the user, and other factors. Recent studies show that there is no fundamental measure of quality in audits, but rather a web of factors and variables (AL-Qatamin & Salleh, 2020).

2.1.6.1 Audit quality dimensions

Even while following with the request to avoid specific points such as "efficiency, accuracy, and reliability," it is important to note the major relevant factors surrounding an audit and their influence on the quality of the exercise.

These elements also define the environment in which success or failure might be realized, auditor technical skill, lack of confidence in sector expertise, experience of audit staff, and team constancy also matter in terms of audit quality. Auditor expertise in certain sectors, in fact, helps in identifying specific risks in relation to their clients. Moreover, high popularity and size of the audit firm often show the level of ability and benefits in terms of quality, with loss of integrity being highly costly in big firms (Lu, 2020).

Efficient supervision, strong legal liability, and effective regulations must encourage high quality in the work of audit firms. If states have high quality regulatory structures, their audits tend to be of high quality, according to studies (Kalita & Tiwari, 2023).

The environment in which the audit sector operates affects outcomes related to quality. Factors such as the independence of the administration in the audited firm, the level of complexity, financial reporting, and the accuracy of management's opinion influence the risk environment and, consequently, the responsibility of the auditor. Those firms with poor internal control mechanisms or high financial assumptions, such as in cases involving excessive numbers, tend to put more pressure on auditors.

The emerging fields of advanced data analytics, artificial intelligence (AI), and other technological advances mean that the practice of auditing is facing change with the potential to influence audit quality. Recent literature points out the need for further research in understanding the influence of technological change on audit quality. Professional evaluation complexities, an increasing degree of complexity surrounding models of doing business, and globalized operations further increase an environment in which auditors must depend on professionalism, intelligence, and ethics.

These points illustrate that quality in audits cannot be distinguished from the environment in which audits take place. Factors such as the characteristics of auditors, company environments, risk of clients, regulation, and technology create the environment in which quality in audits occurs.

However, despite several decades of research on the audit quality, the following critical issues continue to develop (Francis, 2004):

1. The fact that there exists neither any universally recognized definition nor means of measurement with respect to quality, which has been preventing the validity of the studies, has remained limitation (Al-Qatamin & Salleh, 2020).
2. Moreover, according to the Kalita study it illustrates high-quality studies in systematic reviews tend to vary when it comes to matters of interest and methods, especially in lower-income countries. Audit quality influences and outcomes can vary between legal systems, legal systems (civil law versus common law), audit financial systems, and across diverse cultural settings. Studies in developing and emerging economies remain comparatively underexplored (Kalita & Tiwari, 2023).
3. To the audit professionals, the concept of audit quality demonstrates the importance of professional reservation, auditor expertise, constant training, robust quality-control processes, and a culture beneficial to management challenge and ethical behavior. The audit firms should value credibility as a strategic asset which is

connected with their concept of audit quality, while some might disagree that less visible factors-decision-making, disapproval, audit-team culture-might be as important as technical accuracy (Louis et al., 2022).

From the researcher point of view, audit quality is a multi-dimensional and dynamic construct that reaches far beyond the regulations of traditional perspectives of "acceptable versus inadequate." Auditor experience and confidentiality, specialized expertise and dissatisfaction audit process quality, risk management and leadership, and institutional setting, including regulation and technology change. High audit quality induces investor confidence, increases the effectiveness of financial sectors, and reduces information risk. However, defining, evaluating, and enhancing audit quality is forever a challenge for both professionals, regulators, and researchers. Developments in the future audit administrative, such as the increase in abundance of information analytics, internationalization of audit work, changing regulation, and greater organizational complexity, underscore the importance of enhancing our conceptions of audit quality as an evolving, adaptive process. Figure (2) presents how various important factors impact audit quality, such as organizational culture, effectiveness of the audit process, reliability and usefulness of audit reporting, skills of auditors, and external environment factors.



Figure (2): Audit Quality Framework (Al-Qatamin et al., 2020).

2.1.6.2 Audit Efficiency

Audit Efficiency refers to the ability of an auditor to conduct audits in an effective way with compliance to high professional standards. Efficiency is involved with avoiding duplication and enhancing audit procedures without contributing to quality. (Knechel et al, 2013) indicated that efficiency in auditing exists when auditors achieve a balance between precision and speed with the objective of completing the audit tasks within time

and economically. Efficiency is the most effective utilization of time and resources in conducting audit engagements. New technologies enable auditors to achieve more in less time, increasing overall productivity. Experts suggest that good audits enhance customer satisfaction and are cost-effective but must be controlled in a way to avoid time reductions with the give up of audit advanced (Arter, 2002). Efficiency, thus, is the economic and technical aspect of audit quality that ensures that the audit process is feasible and sustainable (Babalola et al., 2022).

Audit efficiency is more than saving time, it also involves optimizing the audit processes-avoiding unnecessary procedures and steps-while maintaining or improving the essential audit assessment. Performance auditing research has long focused on the "3 E" concepts-economy, efficiency, and effectiveness-as the essence of public sector audit performance (Yulisfan et al., 2025). Efficiency, as applied in the situation of private-sector audits, means attaining the same or a greater level of assurance with fewer hours or lower costs without impairing audit quality. Efficiency also requires audit firms to plan staffing guidelines and audit programs and manage processes so as to minimize non-productive time, avoid duplicate work that is not necessary, and ensure that the audit staff will be used where the risk is lowest (Radcliffe, 1998).

The rapid development of audit technology has been an important source of efficiency. Real-life research documents that the use of Technology-Based Audit Techniques (TBATs) relates to reduced days spent auditing and/or higher audit productivity. The use of technological devices, including data analytics, artificial intelligence (AI), machine learning, and technology enabled auditors to manage larger amounts of data, evaluate higher-risk populations, and provide additional knowledge with fewer traditional processes (Sarwo Edi et al., 2024). For example, an analysis of audits of companies registered on the Tehran Stock Exchange found that higher technological advancement, as measured by the frequency of digital-technology terms, was associated with greater audit efficiency (Sadeghian et al., 2024).

One essential issue is that efficiency gains cannot impact audit quality. In fact, the gains of technology and efficient procedures might result in audit firms reducing their hours or assigning fewer personnel to challenging tasks, which diminish the depth of analysis or lack of confidence in professionals. The relationship between audit efficiency and quality is so complicated, it demands competent monitoring, technological expertise,

and risk-based planning. More recently, it has been found in a study that auditor experience diminishes the positive impact of technology on audit quality, which means that in the absence of experienced personnel, technological efficiency might not be translated into enhanced audit reliability (Tinyase et al., 2025).

The COVID-19 epidemic accelerated the shift away from traditional auditing toward remote and hybrid audit approaches, offering new opportunities and challenges to audit efficiency. The evidence shows that remote audit work results in improved audit efficiency but with associated potential risks and human-resource consequences (Li et al., 2023). While remote audits decrease travel time, can deploy flexible staff, and facilitate regular audit processes, they require a robust IT infrastructure, competent remote management, and measures to secure data and evidence quality. This means that audit firms have to adopt working practices, communication models, and supervision arrangements so that gains in efficiency can be realized with audit quality maintained (Li et al., 2023).

Despite its importance, measuring audit efficiency remains difficult. Traditional alternatives include audit hours spent on every given assignment, audit days, audit costs, and audit fees to hours ratios. However, these measures do not consider the quality or risk availability, or value provided by the audit procedures. Some studies thus suggest that combined efficiency measures, including time, cost, risk managed, and audit outcomes, be implemented (Yulisfan et al., 2021). From the perspective of management, increased efficiency can lead to reduced audit fees, speedier audit completion, more profitable audit firms, and satisfied users-but only if the audit results are maintained or better. Efficiency-based promotions should be avoided by audit regulators and companies, for they may enable unqualified audits (Waresul Karim & van Zijl, 2013).

Audit efficiency is an essential part of modern audit practice, signaling the best use of time, money, and technical capabilities to provide high-quality audit services. This is more than just rapidity and expense savings, strategic human resource implementation involves effective use of modern tools, robust accountability, and a constant focus on audit quality. While technical developments and remote audit models create new opportunities for efficiency advantages, careful management will be required to avoid losing valuable assurance in favor of attractive performance. In this respect, efficiency and quality are not in contrast but complementary-a well-constructed audit process can be both efficient and exacting. Given that audit systems are becoming increasingly

complex and resource-constrained, developing robust, efficient audit systems is increasingly important in managing client demands and regulatory requirements.

Improving audit efficiency requires an in-depth strategy for audit firms and administrators, including investments in auditor training, the adoption and integration of appropriate technologies, the improvement of audit processes, enhanced accountability and control, and the acceptance of evolving audit services such as remote or hybrid work. Results from any future studies should examine long-term impacts on audit quality from efficiency-based audit models, explore the interaction between audit efficiency and auditor concerns, address how audit firms manage risks related to audits being "too efficient," and also the implications of efficiency specific to sectors, for example, public versus private sector auditing (Alsaif et al., 2025).

From the researcher point of view, efficiency considerations are particularly relevant in developing-country situations, where audit companies have to manage resource limitations, a less developed infrastructure of auditing, and increasing pressure by users. For instance, in Jordan, the integration of AI was found to significantly enhance audit efficiency, accuracy, and communication with clients, preventing complications such as poor infrastructure and ethical observance. Likewise, the auditing process found that proficiency, audit committee support, and independence significantly affected audit performance, with the implication that improvements in efficiency are attached to the institutional and regulatory environment in which the audits take place. Thus, audit efficiency cannot be separated from the local setting, regulations, auditor skill level, technology implementation, and cultural variables influence how effectively audits can be performed.

2.1.6.3 Audit Accuracy

Audit accuracy refers to the way audit reports and results are a true reflection of the financial condition of the customer (Mesioye et al. 2024). Accuracy determines if audit procedures detect and evaluate errors, misstatements, and fraud in financial reports. Accuracy refers to the correctness of audit outcomes, such as the identification of material mistakes and areas of risk. Mesioye et al. (2024) states that accuracy is crucial to the validity of financial reporting because investors, regulators, and other stakeholders make a decision using auditor accuracy. Furthermore, studies have shown that employing new technologies such as data

analytics enhances the accuracy of audit through the ability to test whole populations of data rather than depending on samples (Brown-Liburd et al., 2015).

Accuracy in auditing refers to the extent that precisely the outcomes of audit procedures reflect the real condition of the entity's financial situation and activities. Accuracy involves detection of all major incorrect information, criminal activity, effective analysis of audit data, appropriate risk assessments, and preparation of audit opinions reflecting with accuracy the underlying reality of the financial statements. It, therefore, has much significance to the audit process as relates to credibility and confidence in audited financial statements (Akther & Xu, 2020).

According to study (Darmawan, 2023), focusing only on detection without ensuring that correct evaluation and reporting are carried out may have negative impacts on the overall quality of the audit. From such a perspective, accuracy not only means showing out errors but making the right decisions and communicating effectively.

Technological developments have completely transformed the possibility for audit accuracy. Instead of traditional sampling, full-population data analytics enables auditors to evaluate entire transaction populations, hence reducing the risk of sampling and increasing detection capability (Freiman et al., 2022). For instance, AI-powered solutions for auditing can identify irregularities, structures, and unusual events that human auditors might not be able to recognize (Binh, 2025).

These techniques enable what might be called accuracy auditing, the ability to identify lower levels of risk and error, hence improving audit findings. Moreover, machine learning in combination with natural language processing enables auditors to analyze unstructured data, such as document text or account reports, in ways previously impossible (Mani, 2023).

In my opinion, as a consequence, audit companies will be capable of providing stronger assurance, increasing the accuracy of decisions and enhancing confidence among investors.

2.1.6.3.1 Audit accuracy challenges:

Despite developments in technology, various problems prevent audit accuracy (Tuma et al., 2020; Alnafisah, 2019; Binh, 2025):

1. Dependency on advanced tools may produce the wrong appearance of security, even very advanced algorithms can yield misleading results if the underlying data quality is low. Auditors should verify data integrity and maintain at least some degree of professionalism.
2. A lack of auditor expertise or knowledge related to new analytics produces risks of misinterpreting the output of analytics.
3. Ethical and cultural issues reduce accuracy, programs trained on historical data can become biased, which leads to blind spots in risk detection.

Moreover, auditing standards and legal structures could delay behind technology, which might result in opportunities in supervision and accountability (Celestin, 2020). Modern audit procedures are subject to an increased focus on risk-based approaches and regular auditing. In this, accuracy improves through the active identification of developing risks and real-time monitoring (Mani, 2023). Continuous auditing models provide constant assurance rather than periodic observations, which enhance an auditor's capability to find mistakes as they occur and thereby assure the accuracy of financial reports. Risk-based approaches will concentrate audit efforts and resources in those areas where the potential for inaccurate information is greatest, focusing on high-accuracy procedures where they are most needed (Shivram, 2025).

The accuracy of audit results has direct consequences for investors, regulators, management, and the wider community (Ogunsola et al., 2021):

1. Accurate audit results give correct data to make financial decisions, investment allocation, regulatory supervision, and management control.
2. Poor audits damage confidence among stakeholders, increase data imbalance, and may lead to investment mistakes or even legal implications.
3. Audit firms that achieve high accuracy can differentiate themselves in the competition by providing greater certainty and reputational advantage.
4. Increased audit accuracy supports financial institutions, cuts down systemic risk, and increases accountability.

The partnership model in human-machine collaboration in the audit setting, which emerges from the preceding topic of audit accuracy, is an area of interest in research as well, instead of simply using AI systems alone, the best approach in exploring the topic

would be the incorporation of insights from AI systems with knowledge, uncertainties, as well as domain knowledge (Rajagukguk & Harnovinsah, 2024).

Improvements in assurance models, such as continuous auditing and real-time assurance systems, hold promise for enhancing audit accuracy. In a case when audit technology is developing, auditors are given responsibility with the arrangement of assurance on a continuous basis rather than at a single point in time. This shift presents new questions regarding accuracy, how should auditors design and implement procedures to verify the accuracy of near-real-time data? What controls and standards of governance and audit evidence apply when audits use actual data sources, interactive analytics, and automatic detection of exceptions rather than periodic tests? Examining these issues will enhance our knowledge about how accuracy is maintained in new audit supply models and how audit firms' procedures must change to preserve confidence (Sewpersadh, 2025).

The study of (Leocádio et al., 2024) conducted within developed audit regimes may not capture the limitations implemented by countries with underdeveloped technology infrastructures, regulatory control, and auditor supply-side skills in countries where data systems are decentralized, internal controls or their documentation are weak, or auditor education is at an evolving stage, the association between accuracy and audit technologies can be substantially different. Cross-country studies can explore how organizational procedures, availability of technology, and size of audit firms influence the outcomes of audit accuracy.

From the researcher point of view, the future of audit accuracy research will be multidimensional, encompassing the exploration of human-machine collaboration, adaptation to changing audit models, consideration of organizational settings, and the arrangement of actual information over time. Auditing keeps evolving with data-driven and AI-enabled technologies, keeping direction and enhancing accuracy is essential. This demands detailed integration of new tools into audit processes and accountability systems.

2.1.6.4 Audit Reliability

Audit reliability refers to the degree to which users of audited accounts can rely and agree upon the auditing process and results. Reliability is stated to enhance public confidence within the finance sector by verifying financial information reported (Francis, 2011). Reliability further includes an auditor's independence, objectivity, and adherence to professional and ethical standards (IAASB, 2014). Reliability refers to the consistency and stability of audit results across multiple auditors, clients, and time periods. (Francis, 2011) suggested that defined processes enabled by digital platforms lead to greater consistency in audit performance. These advanced technologies limit subjective judgment by applying consistent analytical evidence across multiple activities. Reliable audits always have the right result on different responsibilities and situations and cause stakeholders to consider audit results accurate and independent (Njagi, 2023).

Reliability in auditing should be considered as a constant feature that comes from processes, controls, and the conditions in which the auditor operates, rather than an inflexible quality of audit outputs. In fact, input characteristics such as auditor skills, ethical attitude, and independence have much influence on audit reliability, as do process factors like audit methodology, technology utilization, and professionalism (Syalwa et al., 2024).

Auditor independence is considered one of the most substantial indicators of independent (Nguyen & Nguyen, 2020):

1. Independence prevents disadvantages and in turn increases objectivity, yielding valid audit results. According to research studies, auditor independence remains the most significant single variable that explains a change in financial report dependability, accounting for about 48 percent of variance among other components.
2. It is clear that legal protections and social practices that develop and enhance dependence, such as transfer policies, relationship separation regulations, business management structures, make important contributions to confidence.
3. Technical proficiency, professionalism, and methodological reliability together result in auditors' skills that are closely connected with auditors' independence.

Experimental study (Schreyer et al., 2021), on auditor decision prove that auditors' ability to perform procedures reliably depends both on their skill and organizational

conditions, such as supervision and mentoring. Auditors conducting consistent procedures, appropriateness of documentation of decisions, and challenging management statements lead to reliability because of a low risk of detection and enhanced investors' confidence. Another factor that affects reliability is the acceptance of technology. As audit tasks become more complex and large volumes of data become the standard, audit firms increasingly resort to data analytics, artificial intelligence, and continuous auditing systems. These can enhance by reducing human variability in routine tasks and providing more consistent information (El Filali & Harrag, 2025).

Audit reliability faces many threats, obstacles, and other critical factors that influencing audit reliability in Jordanian audit firms (Shachariyah et al., 2023; Issah et al., 2025):

1. Time pressure, a heavy workload, and auditing expense limits, for instance.
2. Associated with those behaviors that decrease the quality and, by extension, reliability of the audit, such as procedural absence, insufficient testing, or lower professionalism.
3. Weaker regulatory control, insufficient auditor experience, and limited technology adoption, thus affecting reliability in such contexts.
4. Structured audit programs, consistent documentation, external evaluations, and extensive internal reviews all contribute to its higher reliability. Moreover, the cultural dimension—ethics, professional indifference, attitude at the top—serves to affect how reliably auditors use standards across assignments.

Thus, reliability is linked to the settings in which audits take place. From a process from the perspective, reliability is improved through the routine application of standards in auditing, quality control systems, and/or cross- involvement evaluation. The scientific literature describes audit quality (and thereby audit reliability) in terms of inputs (auditor qualities), procedures (audit operation), and outputs (audit opinion, timeliness, detectability of misstatements) associated with the business situation (Detzen et al., 2021).

Collectively, efficiency, accuracy, and reliability form a multidimensional measure of audit quality. Efficiency ensures audits are completed on time and using as few resources as necessary; accuracy ensures audit evidence and findings are technically sound; and reliability ensures those who utilize them that audit results can be depended on to be accurate. This collective effort is aligned involving consumer and regulatory expectations, who require not only comprehensive audits but also efficient and reliable

processes. Furthermore, research indicates (Knechel, 2016), that advancements in audit technologies and methodologies improve directly these three dimensions, thereby improving overall audit quality. Studies (Yoon et al., 2015; Appelbaum et al., 2017), have emerged indicating a positive relationship between technological practice and audit quality. Automation increases accuracy and efficiency by reducing manual effort and accelerating audit processes. Data analytics improves accuracy and reliability by allowing for complete risk evaluation, identification of errors, and data-driven decisions. Furthermore, Francis (2011) demonstrated that audits conducted using systematic digital procedures are not only more effective, but also true to their origins.

From the researcher's point of view, audit quality refers to the degree to which the audit process and outcome are effective, accurate, and reliable, making the financial reports useful and credible. These factors combined provide a strong basis through which to evaluate the impact of technological as well as organizational advancements in auditing.

2.2 Section Two: Previous Studies

Arabic Studies

Study of (Alrabei et al, 2021) titled

“The Moderating Effect of Information Technology on the Relationship Between Audit Quality and the Quality of Accounting Information: Jordanian Auditors’ Perception”

The study tested the moderating role of Information Technology (IT) in relation to the correlation between audit quality and accounting information quality, focusing on the Jordanian auditors' perspective. By using a descriptive and analytical method through a questionnaire, the findings of the research have shown that IT greatly amplifies the relationship between key audit quality factors such as company size, audit fees, and international standards adherence and accounting information quality. The study recommends increasing the adoption of Information Technology in audit processes and collaboration between audit practices and international audit offices to improve audit quality and accounting information quality.

Study of (Noordin et al, 2022) titled***“The Use of Artificial Intelligence and Audit Quality: An Analysis from the Perspectives of External Auditors in the UAE”***

The study aimed to test the impact of Artificial Intelligence (AI) utilization on audit quality through the perspectives of external auditors in the United Arab Emirates (UAE).

The study's population included external auditors working in UAE audit firms, both international and local. A sample of professional auditors was selected from this population to take part in a survey-based research design. The study collects data primarily through a structured questionnaire. The study found that Artificial Intelligence would significantly enhance audit quality by enhancing data analysis, improving fraud detection, and increasing the accuracy of audit judgments while even improving efficiency due to a reduction in manual tasks. The study found that effective adoption would involve overcoming challenges on implementation costs, auditor training, and risks associated with over-dependence on technology.

The study recommends enhancing the Artificial Intelligence related training and technical infrastructure in audit firms, with a focus on developing the required digital skills of auditors for successful Artificial Intelligence adoption.

Study of (Rawashdeh and Bakhit, 2023) titled***“Exploring the Mediating Role of Willingness to Continue in Artificial Intelligence-Based Data Analytics Adoption in Audit Firms”***

The study aimed to investigate the determinants of auditors' acceptance of artificial intelligence-based data analytics in audit firms, with a particular emphasis on "willingness to continue collecting additional audit evidence" as a behavioral determinate of acceptance. The study tried to expand the Technology-Organization-Environment (TOE) theory by replacing the traditional "intention" with "willingness," contending that the latter variable better illustrates individual auditors' motivation and continued use of AI tools.

The study was conducted in Jordan in the auditing profession. The study population consists of auditors in Jordan auditing firms, and the study sample consists of (213) auditors. The study utilized a quantitative method called Structured Equation

Modeling (SEM) in examining direct and indirect (mediated) relationships between technological constructs like AIS complexity, technology integration, and compatibility.

The study found that "willingness" is a more accurate and dynamic measure of continued technology use than the traditional "intention" measure in TOE-based models.

The study recommended that audit firms should invest not only in technological infrastructure, but also in developing auditor interest and engagement. Firms are recommended to offer training programs, continuous professional support, and process redesign to facilitate auditors' ability and interest for using artificial intelligence tools.

Study of (Alotaibi et al, 2023) titled

“Assessing the Impact of Audit Software on Audit Quality: Auditors' Perceptions”

The study aimed to examine the auditors' perception on the influence of audit software on the audit quality, using two main dimensions of accuracy and efficiency. The study finds out whether the use of audit software improves auditors' ability to perform high-quality audits, as well as how their perceptions influence the adoption and success of such technologies in professional practice. The study was performed among auditors, with a focus on practicing auditors who use or are familiar with audit software in their work. The study was done in the context of audit firms, most likely in the Middle East, where the authors are based. The sample consisted of auditors who voluntarily participated in the survey, providing their perceptions and experiences with audit software usage.

The study collects data using a quantitative methodology, specifically a structured survey questionnaire. This method was appropriate because the study focused on attitudes and perceptions rather than actual performance data. Responses were statistically analyzed to identify patterns of agreement and evaluate overall perceptions of audit software's contribution to audit quality. The study found that revealed that the majority of auditors had positive perceptions of audit software, recognizing it as a valuable tool that improves auditing accuracy and efficiency. The study reported that automated features like data validation, analytical reviews, and consistency checks significantly reduce manual errors and improve reliability. The study also discovered that audit software saves time, allowing auditors to focus on higher-level analytical and evaluation tasks that add more value to the audit process.

Study of (Alshira'h et al, 2025) titled

“Determinants of audit quality in small and medium-sized enterprises adopting digital accounting systems: evidence from Jordan”

The study aims to assess how organizational and institutional factors such as relative advantage, compatibility, top management support, organizational readiness, and government support influence audit quality in Jordanian organizations embracing digital systems for accounting purposes. In this study, a quantitative analysis of a survey carried out among 454 auditing companies in Jordan produced 365 valid responses using PLS-SEM techniques. The study reveals key findings supporting the fact that each factor increases audit quality, with relative advantage being most dominant in application.

English Studies

Study of (Fedyk et al, 2022) titled

“Is Artificial Intelligence Improving the Audit Process?”

The study aimed to determine whether artificial intelligence is indeed improving audit quality, efficiency, and reliability in large auditing firms in the US. The study population was the big auditing firms, and the sample was based on multi-year data on Artificial Intelligence AI investments, financial reporting outcomes, and audit fees.

The study used quantitative research design using open-source financial and organizational data. The study found that firms that utilized more intensively in Artificial Intelligence had more audit accuracy, as corroborated by more detection of financial misstatements and better reliability of reporting. They also had lower audit costs, implying increased efficiency, as Artificial Intelligence automated routine tasks and released auditors to focus on complex judgments. The utilization of Artificial Intelligence AI also resulted in fewer audit errors, demonstrating how it helped achieve an improvement in performance and quality.

The study recommends that investing in Artificial Intelligence for the long term to continue efficiency gains and build trust in audit outcomes. And provided that regulators encourage technological advancements while maintaining audit quality standards. They provided additional study on the long-term effects of Artificial Intelligence AI on auditor roles, independence, and professional development.

Study of (Ogunsola et al, 2022) titled***“Developing an Automated ETL Pipeline Model for Enhanced Data Quality and Governance in Analytics”***

The study aimed to develop and experiment by automated Extraction, Transformation, and Loading (ETL) pipeline model for improved data governance and quality in analytics-driven organizations. The study intended to address the vulnerability of the existing manual ETL methods that are susceptible to human mistakes, inefficiency, and lack of good accountability through the suggestion of an automated model that can effectively process big, complex data with greater precision, transparency, and adherence to governance regulations.

The study population was data systems and analytics teams that took part in ETL processes, and the sample was a set of various datasets executed via manual and automated pipelines for comparison. The study adopted a Design Science Research (DSR) methodology to develop the ETL model, with open-source software and automation tools being used to design it. It was designed to handle multiple data sources, perform real-time transformations, and maintain governance compliance through audit trails and data accountability mechanisms.

The study concludes that autonomous ETL pipelines are necessary for businesses that seek to maintain high-quality, governed data environments, as they provide pragmatic efficiency and theoretical advancements in data governance models. The study recommend that the model be validated on various industries and coupled with cloud, machine learning, and other systems for adaptive error detection and scalability of application.

Study of (Saleh et al, 2023) titled***“Big Data Analytics and Financial Reporting Quality: Qualitative Evidence from Canada”***

The study aimed how the adoption and use of Big Data Analytics (BDA) affect financial reporting quality in the Canadian setting. The study provided effect of BDA on reporting reliability, accountability, and efficiency, rather than relying exclusively on theoretical or quantitative research. The study was conducted in Canada and the selected

samples were; accountants, auditors, and financial reporting professionals from various industries. The sample included a heterogeneous group of practitioners to obtain varied opinions on big data analytics adoption and implications. The study used a qualitative approach, employing semi-structured interviews that captured knowledge and topical analysis to identify developments and trends in responses.

The study found that BDA significantly improves financial reporting accuracy and reliability because real-time access to data enables professionals to detect and correct errors more efficiently. It also improves efficiency and productivity as data management activities are automated, releasing accountants' time for strategic analysis, it also found that BDA improve accountability and transparency. The study recommends that for effective governance frameworks, they should employ training, and regulatory frameworks for the use of big data tools in financial reporting.

Study of (Perdana et al, 2023) titled

“Prototyping and Implementing Robotic Process Automation in Accounting Firms: Benefits, Challenges, and Opportunities”

The study aimed to examine the real application and impact of Robotic Process Automation (RPA) in auditing and accounting processes, instead of theoretical discussions, to provide genuine, firm-level proof of how RPA works in real audit environments.

The study population consists of four audit firms; all are global conglomerates. The study sample includes audit managers, IT personnel, and automation developers who worked on RPA projects. The study uses an experimental multi-case design-science approach based on real automation implementations. The data collected through field observations, semi-structured interviews, process documentation reviews, Robotic Process Automation RPA testing, and post-implementation surveys. The study concluded that RPA increased effectiveness by reducing time spent on repeated audit procedures and improving accuracy via reduction of human error in data management. Robotic Process Automation RPA also increased audit reliability and accountability because automatic systems recorded their actions automatically.

The study recommends training auditors on Robotic Process Automation RPA monitoring, and establishing multidisciplinary teams of IT, audit, and compliance experts.

Study of (Emett et al, 2023) titled

“Auditing with Data and Analytics: External Reviewers' Judgments of Audit Quality and Effort”

The study aimed how the use of data and analytics (DA) in audits affects external reviewers' perceptions of audit quality and auditor work effort. The study was conducted in an experimental setting, with reviewers as external audit reviewers who have audit evaluation or quality inspection background. Such reviewers made up the study group, and the sample consisted of those who reviewed experimental audit files. The experimental audit files were designed to simulate real audit documents, both with and without data analytics tools utilized, in order to facilitate controlled comparison. The study concluded that the value of analytics varied depending on context—primarily in large-scale or risk detection audits, less in those which required specialized knowledge. The study recommended and urged authorities and audit firms to update audit quality assessment frameworks to include technology-driven processes. The study supported measures highlighting data accuracy, real-time assurances, and depth of analysis over outdated surrogates such as manual documentation.

Study of (Solanki et al, 2024) titled

“Robotic Process Automation and Audit Quality: A Comprehensive Analysis”

The study aimed to test how Robotic Process Automation (RPA) affects audit quality in terms of efficiency, accuracy, and reliability, the use the descriptive analytical approach.

The study population was audit firms and experts using or piloting robotic process automation RPA in their company. The research approach was used a thorough review of literature, professional reports, and audit firm case studies on RPA solution implementation. Using a qualitative approach, the authors looked at how robotic process automation RPA was implemented at varying levels of the audit process, such as data analysis, internal control assessment, and risk assessment.

The study found that robotic process automation RPA significantly improves audit efficiency by reducing time and cost associated with repetitive audit activities like data extraction, sampling, and validation and improves reliability and accuracy by reducing human error when handling large datasets.

The study recommends investing in RPA training and technical infrastructure to overcome resistance and increase acceptance levels. The study and replacing auditing human resources with RPA in a way that will enhance the quality of expertise.

Table NO (2-2) Summary of Previous Studies on the Relationship Between Technological Practices and Audit Quality.

NO	Study	Independent Variable	Dependent Variable	Results	Relevance to This Study
1	Solanki et al. (2024)	Automation	Audit Efficiency, Accuracy, and Reliability	RPA improves effectiveness through the automation of regular tasks, improves precision through the reduction of errors, and improves reliability through the consistency of audit results.	Emphasizes how automation technologies, particularly RPA, contribute directly to improving audit quality.
2	Perdana et al. (2023)	Automation (Robotic Process Automation – RPA)	Audit Efficiency and Reliability	The study confirms that RPA reduces delays on manual tasks, improves process efficiency, and improves the reliability and predictability of audit processes, in addition to highlighting the cost of implementation as well as organizational resistance.	Demonstrates the way automation technologies, such as RPA, improve audit effectiveness and reliability, in accordance with the emphasis on technology tools for audit quality.
3	Ogunsola et al. (2022)	Automation (Automated ETL Pipeline Model)	Accuracy and Efficiency	The study determined that automation of ETL processes improves the quality of data, lowers human error, improves efficiency, and strengthens governance in analytics firms.	illustrates how automation improves efficiency and accuracy, supporting the hypothesis that automated processes can improve higher audit and data quality.

NO	Study	Independent Variable	Dependent Variable	Results	Relevance to This Study
4	Emett et al. (2023)	Data Analysis	Reliability and Audit Accuracy	The study found that the use of data and analytics in auditing had implications for external reviewers' perceptions of audit quality. While reviewers accepted improvements in auditor reliability and accuracy, they were concerned about increases in auditor responsibilities without proportionate resultant quality benefits.	Highlights how data analysis technologies affect audit quality decisions, showing both benefits of accuracy and reliability and limitations of implementation.
5	Fedyk et al. (2022)	Automation (Artificial Intelligence)	Efficiency and Reliability	The study indicates that large US audit firms employing AI are less likely to be audited, charge lower audit fees, and are more effective in audits. Artificial intelligence use improved financial reporting consistency and increased general audit quality.	It shows how automation based on AI can make an audit more efficient and reliable, providing strong evidence of technology application necessity in auditing.
6	Saleh et al. (2023)	Data Analysis (Big Data Analytics)	Reliability and Accuracy	The study demonstrated how the application of Big Data Analytics in Canada improved the reliability and accuracy of financial reporting by improving decision-making, control, and accountability. Practitioners highlighted how BDA assists in error detection, enabling accurate reporting and improving reporting quality overall.	demonstrates the role of data analytics in improving reporting accuracy and reliability, with evidence to support the demand that advanced analytics improve audit quality outcomes.

NO	Study	Independent Variable	Dependent Variable	Results	Relevance to This Study
7	Rawashdeh and Bakhit (2023)	Data Analysis (AI-Based Data Analytics Adoption)	Efficiency and Reliability	The study revealed that auditors' ability to continue using AI-based data analytics greatly improved audit reliability and effectiveness. The results showed that consistent use of ADA led to more effective evidence collection, improved audit decision, and sustainable improvements in audit quality by focusing on "the desire to continue" rather than intention alone.	demonstrates the importance of data analytics use to improve audit efficiency and reliability, with a focus on behavioral determinants of long-term adoption of AI technologies in auditing.
8	Alotaibi et al. (2023)	Automation (Audit Software)	Accuracy and Efficiency	The study revealed that audit software improves the accuracy and effectiveness of audit procedures by reducing human errors, improving processes, and enabling more reliable outcomes. Auditors' observations confirmed that technology utilization leads to real-world improvements in audit quality.	Emphasizes how computerized applications, such as audit software, have a direct impact on efficiency and accuracy in contrast to implementing advanced technologies within auditing practice.
9	Noordin et al. (2022)	Automation (Artificial Intelligence)	Efficiency and Accuracy	The study discovered that UAE external auditors see AI increases audit effectiveness with automation of routine tasks and greater accuracy in the exception detection, thereby improving overall audit quality.	Highlights artificial intelligence automation for improved accuracy and efficiency, which is what determines the study's focus on best practices in technology improving audit quality.

NO	Study	Independent Variable	Dependent Variable	Results	Relevance to This Study
10	Alrabei et al. (2021)	Data analysis	Reliability	Information technology-enabled data analysis is known to greatly improve the dependability of accounting data by intensifying the positive effect of main audit factors of quality.	Both studies investigate the role of technology in Jordanian audit firms, one of them focusing directly on its impact on audit quality and another analyzing the impact of IT in mediating between audit quality and quality of accounting information.
11	Alshira'h et al. (2025).	Automation	Efficiency	That the finding that organizational readiness is a significant factor that improves the quality of audits is reflected by the impact of automation, an ingredient of readiness, directly improving the efficiency of the audit process.	In this study, the critical enablers, including management support and compatibility, which help Jordanian audit companies implement effectively the automation and data analytics technology.

2.3 What Distinguishes this study from Previous studies

This research also differentiates itself from previous studies by shifting its focus to the broader landscape of Jordanian auditing firms and exploring how different firms, not just the leading global ones, are adopting new technological practices to be competitive enough to meet international standards. This research also employs a different set of dimensions for both independent variables: automation and data analysis, as well as dependent variables: efficiency, reliability, and accuracy; in addition to creating a comprehensive theoretical framework that comprises six different models: Technology Acceptance Model, Resource-Based View, Audit Quality Theory, Diffusion of Innovation, Information Systems Success Model, and Contingency Theory. Moreover, this research also attempts to fill an important gap in local literature because, although studies on the topic of audit technology in the global environment are quite common, in the Jordanian environment, studies have traditionally been based on auditor independence or financial performance rather than the practical application of new technologies in auditing. This research attempts to specifically explore the impact of automation and data analytics in different firms in Jordan to understand how this technology can be used to overcome different infrastructural challenges to increase the overall credibility of financial reporting in Jordan.

Gaps in Jordanian Literature

Although global studies have widely explored the impact of audit technology practice, studies in the Jordanian context remain scarce. Most domestic studies focus on auditor independence, client pressure, or financial performance, with little attention given to technological practice integration. The previous table (2-2) presents a synthesis of key studies examining the independent variables of technology practice such as automation and data analytics in relation to various audit quality outcomes, highlighting each study's main findings and relevance to the current research context. This study addresses that gap by focusing specifically on Jordanian auditors' use of automation and data analytics, and how these affect audit outcomes across multiple firms and sectors.

Chapter Three

Methodology (Methods and Procedures)

3.1 Preface

This chapter outlines the research methodology used to investigate the effect of technological practices (Automation and Data analytics) on audit quality (Accuracy, Efficiency, Reliability) in Jordanian auditing firms. The validity and reliability of the study tool were assessed, and the study variables were outlined. Additionally, the chapter discusses the statistical analysis methods employed to analyze the collected data and the study procedures. This chapter presents an overview of the methodology used to conduct the study, which includes the study design, data sources, study population, and sample.

3.2 Study methodology

The study adopted a descriptive-analytical methodology, through describing the variables of the study, which include Technology Practices represented by (Automation and Data analytics) (independent variables) and Audit Quality represented by (Efficiency, Reliability, and Accuracy) (dependent variable). The study is considered a quantitative descriptive study, and explanatory research design is used: It uses a two-function research design: descriptive, providing an overview of technology practices represented by (automation and data analytics) as they are currently used in Jordanian auditing firms, and informative, attempting to investigate the cause-and-effect relationship between these technologies and the essential aspects of audit quality represented by (accuracy, efficiency, and reliability).It provides information about the level of application of the key variables and expresses them statistically using tables and numbers for further analysis and interpretation.

This approach will enable the identification of patterns, trends, and relationships in data, leading to a comprehensive understanding of the phenomenon under study. The descriptive approach was deemed appropriate for this study, and data had been collected through a questionnaire after ensuring its validity and reliability.

The results of this study help in developing strategies to improve Technology Practices and Audit Quality in audit firms in Jordan. It describes a current phenomenon in the real world, where descriptive statistical analysis will be used, hypotheses will be

tested to achieve its objectives, and changes and variations in the dependent variable due to changes in the independent variables.

3.3 Population and Sampling

The study population consists of all audit firms (327 firms) that have been operational for a minimum of one year, have a minimum of two administrative staff members, and have implemented strategic planning in their operations, including those employed by international audit firms. Demographic characteristics of the administrative staff members included (position, years of experience, professional qualifications, number of employees working at the company, target customer segment in the portfolio, systems used in auditing, and the usage of specialized knowledge analytics/robotic process automation specialists). So, the study population consists of accepted auditors (partners, managers, and associates) located in the capital, Amman. To select sample, random sample had been adopted, where representative sample size 196 person determined according to Sekaran statistical table (Sekaran & Bougie, 2010). So, 196 questionnaires were distributed to include all the sample, and (150) retrieved, and all of them were valid for statistical analysis, so the rate of retrieving was (76.5%).

3.4 Study variables

The measurement constructs, their original sources, and the number of items adopted in the current study are summarized in Table (3-1).

Table NO (3-1) Constructs Measurements and Measurement Sources

Constructs	Source	Items
Automation	(Dahiyat, 2022)	10
Data Analytics	(Davis, 1989)	11
Accuracy	(Al-Ateeq et al., 2022)	3
Efficiency	(Al-Ateeq et al., 2022)	3
Reliability	(Al-Ateeq et al., 2022)	4
Total	0	

3.5 Data Collection Instruments

To achieve the purposes of the study, data were collected from two Sources: The primary and secondary data are as follows:

Primary sources: which represented by a questionnaire distributed to all staff in audit firms in Jordan. This questionnaire occupied with gathering data on the level of Technology Practices and its impact on Audit Quality.

Secondary sources: which are represented by books, journals and others on the topic of Technology Practices as well as internet sources.

3.6 Study Instrument

The study developed a questionnaire by reviewing previous literature, such as:

(Dahiyat, 2022; Lutfi & Alqudah, 2023; Rozario & Issa, 2020; Emett, Kaplan, Mauldin, & Pickerd, 2023; Davis, 1989; Allbabidi, 2021; IAASB, 2014)

Referring to the questionnaire validation, which was sent to several academic members, including, for example, members from the Middle East University, Zarqa Private University and Petra University, where everyone agreed to the questionnaire and was satisfied with its content. Only very minor amendments were requested that did not affect the content of the results. This is true evidence that shows that the questionnaire had an impact on the credibility of the study.

The questionnaire consists of two sections for data collection. The first section includes personal and job-related information of the study participants. The second section consists of sets of items to measure the study variables as follows:

The First Dimension: Technology Practices: Automation: Items (B1 – B10).

The Second Dimension: Technology Practices: Data Analytics: Items (C1 – C11).

The Third Dimension: Audit Quality: Accuracy: Items: (D1 – D3).

The Fourth Dimension: Audit Quality: Efficiency: Items: (D4 – D6).

The Five Dimension: Audit Quality: Reliability: Items: (D7 – D10).

The questionnaire used a five-point Likert scale, where respondents provide their level of agreement or disagreement with each item. Each item is assigned a numerical weight representing the degree of agreement with the statement. The remaining responses fall within this range of scores from 1 to 5. The mean and relative weight are primarily

used to determine the level of agreement among the study sample regarding the questionnaire items and dimensions. As shown in Table (3-2) a statement that is strongly agreed upon is assigned a score of 5, while a statement that is strongly disagreed with is assigned a score of 1

Table NO (3-2) Five-point Likert Scale

Answer	Strongly disagree	disagree	Neutral	agree	Strongly agree
Grade	1	2	3	4	5

Then the cells have been identified along the five Likert scale (lower and upper limits) as follows:

- Arithmetic average was considered normal (default) is the answer (3) and represents a "neutral."
- The term has been calculated according to the following equation: higher weight minus the lowest weight range = $(5 - 1 = 4)$
- The division averages for answers to five degrees represent a degree of agreement (strongly agree, agree, neutral, disagree, strongly disagree).
- The length of the cell was calculated according to the following equation: Range \div number of levels = length of the cell $4 \div 3 = 1.33$
- Added value of the length of the cell (1.33) to the beginning of the scale (the lowest value in the scale, namely, (1)) to determine the upper limit for the first cell, and thus becomes the length of the cells as shown in Table (3.3):

Table NO (3-3) The length of the cells five Likert scale

Categories	Relative Importance Level
From (1.00) to less than (2.33)	Low
From (2.33) to less than (3.66)	Moderate
From (3.66) to (5.00)	High

Source: Develop by the researcher

3.7 Validity Test

3.7.1 Construct Validity

Then, Pearson's Principal Component factor analysis was carried out for all items included in the questionnaire. According to (Morale Vallejo, 2013) factor analysis helps to establish construct validity of what you are measuring. Moreover, factor loading value

below 0.4 should be removed. Table (3-4) below shows that all variables and variable items were valid, since their factor loading values were more than 0.4.

Table NO (3-4) Factors Loading for Dependent and Independent Variables

Variables	Factor 1	Extraction
Automation	0.954	0.911
Data Analysis	0.972	0.946
Accuracy	0.938	0.879
Efficiency	0.951	0.904
Reliability	0.953	0.909

Then, Pearson's Principal Component factor analysis was carried out for all paragraphs within each individual variable:

Table NO (3-5) Factors Loading for all paragraph within the questionnaire

Variable	Paragrap	Facto	Extractio	Variable	Paragrap	Facto	Extractio
Automatio n	B1	0.872	0.761	Data Analysis	C1	0.874	0.763
	B2	0.867	0.752		C2	0.826	0.682
	B3	0.859	0.737		C3	0.833	0.694
	B4	0.825	0.680		C4	0.739	0.546
	B5	0.825	0.681		C5	0.857	0.734
	B6	0.858	0.737		C6	0.829	0.688
	B7	0.852	0.726		C7	0.864	0.747
	B8	0.835	0.697		C8	0.825	0.681
	B9	0.836	0.699		C9	0.788	0.620
	B10	0.832	0.692		C10	0.825	0.680
Accuracy	D1	0.893	0.798		C11	0.814	0.662
	D2	0.870	0.756	Reliabilit y	D7	0.895	0.801
	D3	0.900	0.810		D8	0.938	0.880
Efficiency	D4	0.898	0.807		D9	0.806	0.649
	D5	0.858	0.736		D10	0.862	0.744
	D6	0.906	0.821				

Table (3-5) shows that all paragraphs within each individual variable items were valid, since their factor loading values were more than 0.4.

3.7.2 Internal Consistency of the Study Instrument

To test the internal Consistency of study tool, Cronbach's Alpha was used and the results revealed a Cronbach's alpha coefficient was (0.983) for all items, and values of (α) range 0.864 to 0.976, which refers the questionnaire is reliable (Sekaran and Bougie, 2019). The values of (α) of the study variables of the study were as in Table (3-6) below:

Table No (3-6) Reliability Tests of model variables

Variable	No. of Items	Reliability Coefficient (α)
Automation	10	0.956
Data Analysis	11	0.953
Technology Practices	21	0.976
Efficiency	3	0.865
Reliability	3	0.864
Accuracy	4	0.899
Audit Quality	10	0.955
General rate	31	0.983

Source: Develop by the researcher

3.8 Suitability of the Study Model for the Statistical Methods Used

In multiple linear regressions, it is beneficial to have a relationship between the independent factors and the dependent variable while reducing significant relationships between the independent variables. This would verify that the study's model is effective and that the results are valid. (Etaga et al., 2021). Thus, the following tests were carried out:

3.8.1 Normality test

Normality test was processed to explore that study data distributed normally, this achieved when the significant level of test is more than 0.05, mentioned test performed for all study model variables, the results as follows.

Table NO (3-7) The normality test of the study data

Variable	Kolmogorov – Smirnov (K-S)	df	Sig	Shapiro – Wilk (S-W)	df	Sig
Automation	0.230	150	0.000	0.863	150	0.000
Data Analysis	0.239	150	0.000	0.859	150	0.000
Accuracy	0.246	150	0.000	0.847	150	0.000
Efficiency	0.252	150	0.000	0.828	150	0.000
Reliability	0.251	150	0.000	0.846	150	0.000

Table (3-7) above shows that all values of tests (K-S & S-W) had a significant level less than 0.05, which gives clear evidence that all variables are not normally distributed. The current data can be relied upon for parametric tests despite their non-normality, as the Central Limit Theorem states that the distribution of sample means approaches a normal distribution with increasing sample size (typically $n \geq 30$ as an approximate minimum), with convergence improving gradually for larger n ; at $n=150$, the standard error of the mean ($SEM = \sigma/\sqrt{n}$) decreases sufficiently to justify the safe use of parametric models like t-tests or ANOVA in most cases. Upon statistical justification basis, this convergence makes the normality assumption less critical at $n=150$, especially if the distribution is not severely skewed, providing higher statistical power compared to non-parametric tests without substantial loss in accuracy. Numerous studies confirm that the central limit theory supports parametric approaches with medium to large samples ($n > 100$), reducing the impact of minor normality violations. (Gujarati, 2004, 109)

3.8.2 Multicollinearity Test

To test the existence of multicollinearity phenomena between model variables, Pearson correlation coefficients computed between independent (predicator) variables, the results of testing multicollinearity between independents variables are explained by correlation matrices and VIF test as follows:

Table NO (3-8) Correlation matrix for predictor variables

Variables	Automation	Data Analysis
Automation	1.000	0.939**
Data Analysis	0.939**	1.000

() Significant at 0.01**

The table (3-8) above shows that value of correlation coefficient occurred between (Automation) and (Data Analysis), was (0.939), which means there was a strong relationship between two variables. In the statistical literature the value (0.80) and more considered as an indicator of multicollinearity existence (Gujarati, (2004).

To ensure the above result, variance factor inflation (VIF) was computed, the results are in the following table.

Table NO (3-9) VIF for independent variables

Variable	VIF	Tolerance
Automation	8.476	0.118
Data Analysis	8.476	0.118

Table (3-9) shows above that all VIF values (8.476) were greater than (1) and less than (10). This gives evidence that there is no multicollinearity between independent variables, (Gujarati, (2004).

3.9 Statistical Approaches Used in the Study

3.9.1 Descriptive Statistics

The Statistical Package for Social Sciences (SPSS V.25) was used in this study to process the data obtained through the study tool, as follows:

1. **Frequencies and Percentages:** To describe the characteristics of the study sample and measure the relative frequency distributions.
2. **Mean:** To measure the average responses of the participants to the questionnaire items.
3. **Standard Deviation:** To measure the extent of dispersion of the responses around the mean.
4. **Relative Importance:** Determined when commenting on the means according to an adopted formula and according to a Likert five-point scale for alternative response for each item.

3.9.2 Inferential Statistics:

1. **Pearson Correlation Coefficient:** To verify the absence of perfect correlation between the study variables.
2. **Cronbach's Alpha:** To assess the reliability of the study tools.
3. **Kolmogorov-Smirnov Test:** To assess the normal distribution of the study variables.
4. **Variance Inflation Factor (VIF) and Tolerance:** To check the level of multicollinearity among the dimensions of the independent variable.
5. **Simple Linear Regression Analysis:** To determine the individual effect of each independent variable on the dependent variable.
6. **Multiple Regression Analysis:** To examine the impact of the independent variable dimensions depending on the dependent variable.

Chapter Four

Results of the Study

4.1 Introduction

In this chapter, the study presents the results obtained through data analysis from the study's sample responses. The analysis, include testing the effect of technological practices, measured by (automation and data analytics), on the audit quality, measured by (accuracy, efficiency, and reliability) in Jordanian auditing firms.

4.2 Description of the Study Sample Characteristics

The study sample characteristics are frequencies and percentages for both personal and professional data such as (position, years of experience, professional qualifications, number of employees working at the company, target customer segment in the portfolio, systems used in auditing, and the usage of specialized knowledge analytics/robotic process automation specialists). Table (4-1) below shows the analysis results for these characteristics.

Table NO (4-1) The Study Sample Professional data analysis

Characteristics	Categories	Frequency	Percentage
Position	Intern	21	14.0
	Staff	86	57.3
	Senior	22	14.7
	Supervisor	5	3.3
	Manager	9	6.0
	Senior manager/Partner	7	4.7
	Total	150	100
Years of experience	0 - 2 years	38	25.3
	3 - 5 years	89	59.3
	6 - 10 years	11	7.3
	11 – 15 years	6	4.0
	16 years and above	6	4.0
	Total	150	100
Professional qualifications	<i>Certified Public Accountant</i>	19	12.7
	<i>Chartered Financial Analyst</i>	9	6.0
	<i>Certified Investment and Financial Analyst</i>	-	-

Characteristics	Categories	Frequency	Percentage	
	<i>Association of Chartered Certified Accountants (UK-based qualification)</i>	8	5.3	
	<i>Certified Management Accountant</i>	19	12.7	
	<i>Certified Internal Auditor</i>	-	-	
	<i>Other</i>	9	6.0	
	<i>None</i>	86	57.3	
	Total	150	100	
Target customer %	Public sector %	26	17.3	
	Financial services %	48	32.0	
	Industrial %	26	17.3	
	Services %	29	19.3	
	Other %	21	14.0	
	Total	150	100	
Systems used in auditing	Alteryx	8	5.3	
	CaseWare	18	12.0	
	TeamMate	13	8.7	
	Interactive Data Extraction and Analysis	13	8.7	
	Audit Command Language	9	6.0	
	In-house	48	32.0	
	None	10	6.7	
	Other	31	20.7	
	Total	150	100	
	Is your company using specialized knowledge analytics/robotic process automation specialists?	Yes	103	68.7
		No	47	31.3
Total		150	100	

Data in Table (4-1) shows that the largest percentage of the participants was from the staff, with a total of 57% of whole sample. Senior auditors follow at 14.7%, while interns take 14.0%. Supervisors formed least portion 3.3% of the sample. Additionally, managers take 6.0% and senior managers/partners amount to 4.7%. The distribution reflects the

predominance of the staff-level respondents, and therefore, their input will have improved interaction to the study and the objectives forward into action.

Regarding the Years of experience variable, the majority of the study sample falls within the category of "3 - 5 years," with a percentage of 59.3%, which is the highest among the other Years of experience groups. This is followed by individuals in the "0 - 2 years" category, with a percentage of 25.3%. Those in the "6 - 10 years" category come next, for 7.3%. Finally, individuals in the "11 – 15 years " and "16 years and above" category have the lowest percentage in the study sample, at 4%.

Table (4-1) shows that the majority of respondents' professional qualifications among audit firm employees, 57.3%, hold no professional qualification. Respondents holding Certified Public Accountant (CPA) and Certified Management Accountant (CMA) certifications each represent 12.7%, while Chartered Financial Analysts (CFA) 6.0%, and individuals with Association of Chartered Certified Accountants (ACCA) 5.3%. Other qualifications make up 6.0%. This shows that while a noteworthy portion of the workforce lacks formal professional qualifications, the rest hold considerable certifications critical for audit quality and expertise, focusing on a need for continued professional development to boost overall competency and performance.

Table (4-1) shows that data on target customers for audit firms indicates that the largest sector is the financial services sector, consists 32.0% of customers. After that, services appear at 19.3%, the public sector and industrial sector both appear at 17.3%, while other sectors at 14.0%. This highlights the diversified customer base of audit firms, with a strong weight on financial services displaying regulatory and compliance demands in this industry, even though serving a well-adjusted mix of public, industrial, and various other sectors.

Table (4-1) shows systems used in auditing displays that 32.0% of firms use in-house systems, making it the utmost communal choice. Other audit firms' software systems include CaseWare (12.0%), TeamMate and Interactive Data Extraction and Analysis (each 8.7%), Alteryx (5.3%), and Audit Command Language (6.0%). Almost 6.7% report using no audit-specific systems, and 20.7% use various other tools. This indicates a mixture of customized internal solutions and popular commercial audit software, focusing on the diversity in technological tools across audit firms to boost audit quality and efficiency.

The data shows that 68.7% of firms are using specialized knowledge analytics or robotic process automation (RPA) specialists, which reflects a robust adoption of advanced technologies in audit processes. This tendency brings into line with recent findings that RPA implementations in audit firms improve efficiency, decrease costs, advance audit quality, and free human resources from repetitive tasks. Nevertheless, challenges like initial investment costs and resistance to change remain, highlighting the importance of strategic planning and governance frameworks to maximize the benefits of automation in auditing practices.

4.3 Descriptive Analysis of Study Variables

In order to achieve the desired objectives of this study, the study developed a questionnaire that distributed to staff of the big four audit firms in Jordan, the study variables were described computing means and standard deviations of their responses.

4.3.1 Description of the Independent Variables (Technology Practices)

The description of the independent variable and its dimensions are shown in the following table no (4-2) below:

Table NO (4-2) Arithmetic mean and standard deviations of the responses of the study subjects on the dimensions of Technology Practices.

Item No.	Dimensions	Means	Standard Deviation	Relative Important	Rank
1	Automation	3.882	1.111	High	2
2	Data Analysis	3.967	1.075	High	1
The overall mean for Technology Practices		3.925	1.076	High	

Table (4-2) above shows that Data Analysis has the first rank and represents a high degree of importance with (mean value 3.967). While Automation is high degree of importance with (mean value 3.882) The overall mean is (3.925) reflecting high importance of Technology Practices.

Estimations of the relative importance of the Relative advantage dimension, the mean values and standard deviations values of their responses were calculated. The results are shown in Table (4-3).

Table NO (4-3) Mean and standard deviations of the responses of the study variables on the dimension of Automation

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
B1	Bots and other computer-aided audit procedures are used as an automated data collection and preparation.	3.832	1.290	High	7
B2	Matching, confirmations, and other advanced techniques are used in our automated operations.	3.819	1.350	High	9
B3	The automation has been incorporated into our audit software and worksheets.	3.886	1.317	High	5
B4	Our audits typically use fully automated tests as opposed to sampling.	3.758	1.392	High	10
B5	Automation reduces human error in audited documentation.	4.020	1.230	High	2
B6	Consider the advantages of automation as outweighing its disadvantages	3.926	1.289	High	3
B7	Our organization provides a structured path towards utilizing robotic process automation and computer-aided audit tools.	3.899	1.318	High	4
B8	Our audit team employs advanced automated processes and methodologies to enhance the quality and efficiency of the auditing process in general.	3.872	1.329	High	6
B9	Computer-aided audit technology and robotic process automation improve the effectiveness of audit and reduce time	3.827	1.376	High	8
B10	Automated systems are considered more useful and convenient to use.	4.054	1.205	High	1
General average for Automation		3.882	1.111	High	

Table (4-3) shows that the general average of Automation is (3.882) with standard deviation (1.111) and high relative importance. The Paragraph B10 (Automated systems are considered more useful and convenient to use) with mean value (4.054), and high

relative importance, while paragraph B4 (Our audits typically use fully automated tests as opposed to sampling) is last with mean value (3.758) and high relative importance.

The descriptive analysis of the study sample dimension shows participants' estimations of the relative importance of the Data Analysis dimension, the mean scores and standard deviations values of their responses were computed, and the results are shown in Table (4-4) below.

Table NO (4-4) Arithmetic mean and standard deviations of the responses of the study subjects on the dimension of Data Analysis

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
C1	Auditors employ data analytics to detect errors, evaluate areas of concern, and improve the efficiency of the audit process overall.	3.847	1.446	High	11
C2	Auditors use visual reports and queries to monitor customer processes within the firm, helping to communicate complex information in a readily comprehensible manner, facilitating better understanding, and maintaining auditable documents.	3.933	1.329	High	6
C3	Data analytics results reveal risks and guide measurement procedures.	3.987	1.247	High	5
C4	The client's organizational financial planning is used in an analytical context during the audit procedure.	4.081	1.214	High	1
C5	Apply statistical and time-series analysis over multiple time periods.	3.920	1.260	High	9
C6	Audit Data Analytics identifies anomalies that would not be found by other conventional procedures.	3.853	1.320	High	10
C7	The use of Audit Data Analytics is documented and evaluated as part of involvement quality assurance	3.926	1.266	High	7
C8	Data analytics improve audit quality.	4.060	1.279	High	3

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
C9	Data analytics enhance audit reliability.	4.073	1.331	High	2
C10	General data analytics assist auditors in detecting fraud and irregularities as they identify unusual developments, highlight differences, and provide deep insights into financial interactions and dealings.	4.007	1.251	High	4
C11	Technological requirements such as utility and accessibility influence auditors' decisions with respect to how to use and utilize data analytics in auditing because these factors determine the tools' accessibility, efficiency, and overall effectiveness	3.926	1.390	High	7
General average for Data Analysis		3.967	1.075	High	

Table (4-4) shows that mean for all paragraphs average of Data Analysis is (3.967) with standard deviation is (1.075) and high relative importance. The Paragraph C4 (The client's organizational financial planning is used in an analytical context during the audit procedure) has the highest mean (4.081), and high relative importance, while paragraph C1 (Auditors employ data analytics to detect errors, evaluate areas of concern, and improve the efficiency of the audit process overall) is last with mean (3.847) and high relative importance.

4.3.2 Description of the Dependent Variable (Audit Quality)

The description of the Dependent variable and its dimensions can be based on the study questions, as shown in the following table (4-5).

Table NO (4-5) Arithmetic mean and standard deviations of the responses of the study subjects on the dimensions of Audit Quality.

Item No.	Dimensions	Means	Standard Deviation	Relative Important	Rank
1	Accuracy	3.944	1.140	High	2
2	Efficiency	4.002	1.132	High	1
3	Reliability	3.909	1.173	High	3
General average for Audit Quality		3.952	1.099	High	

Table (4-5) above shows that Efficiency has the first rank and represents a high degree of relative importance (mean 4.002). While Reliability is in last rank and also represents high degree of relative importance (mean 3.909). The overall mean (3.952) reflecting high importance of Audit Quality.

A. Accuracy

The sample participants' estimations of the relative importance of the accuracy dimension, the mean values and standard deviations of their responses were computed. The results are shown in Table (4-6) below.

Table NO (4-6) The mean and standard deviations of the responses of the study subjects on the Accuracy.

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
D1	Using automation or audit data analytics reduces the need for post-issue adjustments.	3.839	1.344	High	3
D2	Automated/analytical procedures improve correct error detection.	4.040	1.234	High	1
D3	With the help of these tools (Automation and data analytics), we can get more complete and reliable evidence.	3.947	1.278	High	2
General average for Accuracy		3.944	1.140	High	

Table (4-6) shows that the general mean of Accuracy is (3.944) with standard deviation (1.140) and high relative importance. Paragraph D2 (Automated/analytical procedures improve correct error detection) is first with mean value (4.040), and high relative importance, while paragraph D1 (Using automation or audit data analytics reduces the need for post-issue adjustments) is last with mean value (3.839) and high relative importance.

B. Efficiency

The sample participants' estimations of the relative importance of the efficiency dimension, the mean values and standard deviations of their responses were computed. The results are shown in Table (4-7) below.

Table NO (4-7) the mean and standard deviations of the responses of the study subjects on the efficiency.

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
D4	Automation and Audit Data Analytics helps to minimize the time taken on repetitive tasks.	3.959	1.308	High	3
D5	The use of automation and data analysis tools facilitates the search process on time and within the allocated budget.	3.987	1.309	High	2
D6	Real-time analysis speeds up the evaluation and decision-making process.	4.034	1.209	High	1
General average for Efficiency		4.002	1.132	High	

Table (4-7) above shows that the mean average of Efficiency is (4.002) with standard deviation (1.1321) and high relative importance. The Paragraph D6 (Real-time analysis speeds up the evaluation and decision-making process) is first with mean value (4.034), and high relative importance, while paragraph D4 (Automation and Audit Data Analytics helps to minimize the time taken on repetitive tasks) is last with mean value (3.959) and high relative importance.

C. Reliability

The sample participants' estimations of the relative importance of the reliability dimension, the mean values and standard deviations of their responses were computed. The results are shown in Table (4-8) below.

Table NO (4-8) The mean and standard deviations of the responses of the study subjects on the reliability.

Item No.	Paragraph	Means	Standard Deviation	Relative Important	Rank
D7	The use of automation and data analysis makes the audit process more consistent.	3.813	1.387	High	4
D8	Data analytics and automation increase the predictability and accountability of audit procedures, resulting in reliable outcomes.	3.852	1.347	High	3
D9	Data analysis helps improve auditors' ability to make accurate and valid judgments in various audit assignments.	4.000	1.297	High	1
D10	Implementing robotic process automation reduces inconsistencies in audit performance, thereby enhancing confidence in outcome verification.	3.960	1.325	High	2
General average for Reliability		3.909	1.173	High	

Table (4-8) above shows that the mean value of Reliability is (3.909) with standard deviation (1.173) and high relative importance. Paragraph D9 (Data analysis helps improve auditors' ability to make accurate and valid judgments in various audit assignments) is first with mean value (4.000), and high relative importance, while paragraph D8 (Data analytics and automation increase the predictability and accountability of audit procedures, resulting in reliable outcomes) is last with mean value (3.852) and high relative importance.

4.4 Hypothesis Testing Results

4.4.1: The main hypothesis H0:

The study uses the multiple regression analysis to test the main hypothesis that state H0: There is no statistically significant effect at the level $0.05 \geq \alpha$ of technological practices measured by (automation and data analysis) on audit quality measured by (Accuracy, Reliability, Efficiency) in Jordan auditing firms. Table no (4-9) below shows the result of testing the main hypothesis.

Table NO (4-9) multiple liner Regression result of main hypothesis H0

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Audit Quality	0.942	0.888	582.981	0.000	Automation	0.229	0.080	2.876	0.005
					Data Analysis	0.738	0.082	8.986	0.000

*Significant at 0.05 level.

The model summary table above shows that R², the coefficient of determination about (88.8%) of the variation in (Audit Quality) is explained by the model, while ANOVA (F-test) tests the acceptability of the model from a statistical perspective, and it is a useful test of the model's ability to explain any variation in the dependent variable (Audit Quality). The significance value of the F statistic (F=582.981) is (Sig F = 0.000) less than 0.05, which means that the effect of independent variables aggregated is significant.

Moreover, the coefficients of the regression line states that the (Automation) has a significant effect on Audit Quality, where coefficient equals (0.229) is significant with (t= 2.876) and (Sig t =0.005) less than 0.05, (Data Analysis) has a significant effect, where coefficient equals (0.738) is significant with (t= 8.986) and (Sig t = 0.000).

This leads to reject null hypothesis and accept the alternative one that states “There is a statistically significant effect at the level $0.05 \geq \alpha$ of technological practices measured by (automation and data analysis) on audit quality measured by (Accuracy, Reliability, Efficiency) in Jordan auditing firms”.

4.4.2 The sub Hypothesis Results

First sub-hypothesis H0-1

First sub-hypothesis H0-1 state that: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Efficiency in Jordan auditing firms. Table no (4-10) below show the result of testing the first sub hypothesis.

Table NO (4-10) *Simple liner Regression result of first sub-hypothesis H0-1

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Efficiency	0.869	0.756	457.989	0.000	Automation	0.886	0.041	21.401	0.000

The model summary in table no (4-10) above reports that R², the coefficient of determination is about (75.6%) of the variation in (Efficiency) is explained by the model.

The significance value of the F statistic (F= 457.989) is (Sig F = 0.000) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line states that the (Automation) has significant effect on Efficiency, where coefficient equals (0.886) is significant with (t= 21.401) and (Sig t =0.000) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states “**There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Efficiency in Jordan auditing firms**”.

Second sub-hypothesis H0-2

Second sub-hypothesis H0-2 state that: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Reliability in Jordan auditing firms. Table no (4-11) below shows the result of testing the second sub hypothesis.

Table NO (4-11) *Regression result of second sub-hypothesis

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Reliability	0.885	0.783	533.768	0.000	Automation	0.934	0.040	23.103	0.000

The model summary table above reports that R², the coefficient of determination is about (78.3%) of the variation in (Reliability) is explained by the model.

The significance value of the F statistic (F= 533.768) is (Sig F = 0.000) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line states that the (Automation) has significant effect on Reliability, where coefficient equals (0.934) is significant with ($t=23.103$) and ($\text{Sig } t=0.000$) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states “**There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Reliability in Jordan auditing firms**”.

The third sub-hypothesis H0-3 state that: **There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Accuracy in Jordan auditing firms.** Table no (4-12) below shows the result of testing the third sub hypothesis.

Table NO (4-12) *Simple Regression result of third sub-hypothesis

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Accuracy	0.856	0.733	406.757	0.000	Automation	0.879	0.044	20.168	0.000

The model summary in table no (4-12) above reports that R², the coefficient of determination about (73.3%) of the variation in (Accuracy) is explained by the model.

The significance value of the F statistic ($F=406.757$) is ($\text{Sig } F=0.000$) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line state that the (Automation) has significant effect on Accuracy, where coefficient equals (0.879) is significant with ($t=20.168$) and ($\text{Sig } t=0.000$) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states “**There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Automation on audit Accuracy in Jordan auditing firms**”.

The fourth sub-hypothesis H0-4

The fourth sub-hypothesis state that: **There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit**

Efficiency in Jordan auditing firms. Table no (4-13) below shows the result of testing the four-sub hypothesis.

Table NO (4-13) * Simple Regression result of fourth sub-hypothesis

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Efficiency	0.908	0.825	696.651	0.000	Data Analysis	0.956	0.036	26.394	0.000

The model summary in table no (4-13) shows that R², the coefficient of determination is about (82.5%) of the variation in (Efficiency) is explained by the model.

The significance value of the F statistic (F= 696.651) is (Sig F = 0.000) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line state that the (Data Analysis) has significant effect on Efficiency, where coefficient equals (0.956) is significant with (t= 26.394) and (Sig t =0.000) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states, “**There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Efficiency in Jordan auditing firms**”.

The fifth sub-hypothesis H0-5

The fifth sub-hypothesis state that: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Reliability in Jordan auditing firms. Table no (4-14) below shows the result of testing the fifth sub hypothesis.

Table NO (4-14) *Simple Regression result of fifth sub-hypothesis

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Reliability	0.916	0.839	772.579	0.000	Data Analysis	0.999	0.036	27.795	0.000

The model summary table shows that R², the coefficient of determination about (83.9%) of the variation in (Reliability) is explained by the model.

The significance value of the F statistic ($F = 772.579$) is ($\text{Sig } F = 0.000$) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line states that the (Data Analysis) has significant effect on Reliability, where coefficient equals (0.999) is significant with ($t = 27.795$) and ($\text{Sig } t = 0.000$) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states, **“There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Reliability in Jordan auditing firms”**.

Sixth sub-hypothesis H0-6

Sixth sub-hypothesis state that: There is no statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Accuracy in Jordan auditing firms. Table no (4-15) below shows the result of testing the sixth sub hypothesis.

Table NO (4-15) *Simple Regression result of sixth sub-hypothesis

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Accuracy	0.872	0.760	469.483	0.000	Data Analysis	0.925	0.043	21.668	0.000

The model summary in table no (4-15) above shows that R^2 , the coefficient of determination is about (76.0%) of the variation in (Accuracy) is explained by the model.

The significance value of the F statistic ($F = 469.483$) is ($\text{Sig } F = 0.000$) less than 0.05, which means that the effect of independent variable is significant.

Moreover, the coefficients of the regression line state that the (Data Analysis) has significant effect on Accuracy, where coefficient equals (0.925) is significant with ($t = 21.668$) and ($\text{Sig } t = 0.000$) less than 0.05.

This leads to reject null hypothesis and accept the alternative one that states **“There is a statistically significant effect at the level $0.05 \geq \alpha$ for the technology practice measured by Data Analysis on audit Accuracy in Jordan auditing firms”**

Chapter Five

Discussion of Findings and Recommendation

5.1 Introduction

In this chapter, the results are discussed in light of the statistical analysis of the sample respondents' answers to the study variables dimensions. The study aim is to identify the effect of technological practice measured by (Automation, Data Analysis) on the audit quality measured by (accuracy, efficiency, and reliability) in Jordanian auditing firms.

5.2 Descriptive Results Discussion

1. Position:

The results show that the largest percentage of the participants was from the staff, with a total of 57% of whole sample. Senior auditors follow at 14.7%, while interns take 14.0%. Supervisors formed least portion 3.3% of the sample. Additionally, managers take 6.0% and senior managers/partners amount to 4.7%. The distribution reflects the predominance of the staff-level respondents, and therefore, their input will have improved interaction to the study and the objectives forward into action.

2. Years of Experience:

The analysis revealed that, for the study sample, the largest proportion of respondents had between 3 and 5 years of experience, at 59.3%. Respondents with 0 to 2 years of experience constituted 25.3% of the sample, while employees falling within the range of 6 to 10 years of experience represented 7.3%, and those in the range of 11 to 15 years and those with 16 or more years each constituted 4.0% of the sample. This relatively high level of professional experience among respondents may be attributed to emphasis by Jordanian auditing firms on employing highly skilled personnel and their efforts to recruit and retain experienced auditors as a key resource for organizational success and goal achievement.

3. Academic and Professional Qualifications:

The analysis of professional qualifications reflects a multidimensional field among audit professionals. A clear majority of respondents, 57.3%, have no formal professional certification. In contrast, a strong minority, 42.7%, has specialized credentials, the largest

composition being the Certified Public Accountant (CPA) and Certified Management Accountant (CMA) at 12.7% each. Next in the order are the Chartered Financial Analyst (CFA) and Other Qualifications at 6.0% each and Association of Chartered Certified Accountants (ACCA) at 5.3%. This is descriptive of a profession segmented by formal credentialing. The high proportion of not holding any certification could suggest that most of the participants rely on academic and professional experiences. However, the strong representation of demanding yet internationally recognized certifications such as the CPA and CMA among a sizeable minority highlights the established importance of these certifications in ensuring audit quality, technical practice, and professional credibility. These findings indicate a critical opportunity through which firms and professional organizations could bridge this gap with targeted development programs, thus increasing overall industry standards and competencies.

4. Number of firm staff at the company

The distribution of audit firm size, measured as the number of employees, is concentrated in the medium-large categories. Specifically, the largest single segment of firms (33.3%) falls into the size category between 101 and 150 staff. This is complemented by sizeable portions of both smaller and larger firms, 22.0% of firms have 50 or fewer employees, and 21.3% have more than 200 employees. Firms with 51-100 and 151-200 employees are smaller in segments at 11.3% and 12.0%, respectively. This distribution suggests a diversified market structure for the audit quality, with the prominence of established, medium to large firms that are potentially capable of undertaking large audit engagements due to their increased human resource capacity. At the same time, the strong presence of firms at both the lower end (≤ 50 employees) and the upper end (> 200 employees) indicates a competitive landscape that encompasses firms that can cover a wide range of client types, from small and medium-sized firms to large corporate entities. The dominance of firms with more than 100 employees underlines a mature sector in which scale, and possibly a wider range of specialized services and internal expertise, is a common feature.

5. Target customer segment in the portfolio

Analysis of the primary customer sectors served by audit firms shows that the high concentration falls within the financial services industry, which is the largest sector at

32.0%. This is followed by the services sector, accounting for 19.3%, while the public and industrial sectors take equal importance at 17.3% each. The remaining clients fall under "Other" at 14.0%. This distribution evidence a diversified but strategically focused client portfolio. The dominant target in the financial services sector underlines its importance to the audit industry, probably due to high regulatory demands, complex reporting standards, and essential high demand for assurance services in this sector. The balanced involvement with public, industrial, and general services sectors indicates that audit firms are able to diversify their practice to avoid overdependence on any one single industry, building resilience in practice. This diverse customer reflects the adaptability of audit firms in serving different regulatory environments and other operational complexities within the economy.

6. Systems used in auditing

The findings indicate a strong affinity towards customized technological solutions, as in-house audit systems are the most common tool, used by 32.0% of firms. Commercial software adoption is fragmented, with CaseWare being the leading choice at 12.0%. A significant 20.7% of the firms utilize various other tools, while 6.7% perform without any focused audit software. This pattern underlines a strategic multiple in the profession's technological approach. The dominance of the in-house systems shows the priority given to individualized tools appropriate to specific firm processes and client portfolios. Simultaneously, the confidence in commercial and other diverse software reflects current involvement with specialized, tested applications to ensure analytical accuracy and compliance. The findings cumulatively suggest that audit firms actively consider an interesting balance between customization and standardization as means toward the enhancement of audit quality and efficiency.

7. Using specialized knowledge analytics/robotic process automation specialists

The findings from the data also demonstrate a dominant trend of technology practice integration, with 68.7% of audit firms having personnel with analytical specialist skills or Robotic Process Automation. This indicates that a majority of firms from this industry recognize and are aware of the advantages that provided with advanced technology, including efficiency enhancement, improvement in audit quality, and automation of

administrative tasks. On a separate perspective, it also demonstrates that a third of firms are yet to benefit from this technology practice due to high costs of integration.

5.3 Discussion of Study Variables Analysis Results

5.3.1 Discussion of Technology Practice

The descriptive results showed that the respondents have constantly high perceptions towards the importance of technology practices within Jordanian audit firms. The range of average outcomes for technological practice dimensions ranges between 3.88 and 3.97, indicating high relative importance in all dimensions. Among those, Data Analysis ranked first with the highest mean score of 3.97, while Automation achieved a mean of 3.88. The overall mean value for technological practice was 3.92, supporting these auditors attach considerable importance to the role of technology in enhancing audit quality.

These findings reflect a growing recognition among Jordanian auditing experts regarding the strategic importance of technology for improving accuracy, efficiency, and reliability, all dimensions that define audit quality. The high ranking of Data Analysis can be explained by a number of factors, the possibility of enhancing auditors' analytical depth, support for full-population testing, enhancement of abnormality detection, and increased precision in judgments about audits. Data analytics also facilitate real-time insight generation, which promotes better-informed and timely decision-making, reduces misstatements, and reinforces the confidence of stakeholders.

Regarding the second dimension of technology practice. The strong perceived importance of Automation indicates that firms acknowledge the added value of automating repetitive and rule-based audit procedures. Automation reduces human error, accelerates the process, and standardizes workflows to free auditors to perform higher-order analytical tasks. Audit firm integration of automation tools within existing organizational systems ensures more consistent and reliable audit outcomes, which can enhance the credibility of their services.

The greater significance on both technology practice dimensions suggests that Jordanian audit firms consider technology as increasingly critical for their future competitiveness and survival.

This corresponds to international settings where the adoption of digital facilities significantly enhances audit quality and organizational performance. Results of the study also reveal that a number of challenges, such as a lack of financial resources, weak IT infrastructures, shortage of analytical competencies, and skilled personnel, can hinder the ultimate benefits that can be extracted from technology.

Besides that, competitive forces in audit setting strengthen the need for implementing advanced technological solutions. Firms are increasingly under pressure to adopt automation and data analytics if they want to remain relevant in the market, offer high quality services and answer the demands of clients and the industry as a whole. In other words, the high relative importance assigned to Automation and Data Analysis in this study corroborate that Jordanian audit firms regard technology as being not just an operational tool but an integral component in the process of enhancing audit quality. These findings confirm that technology-enabled auditors improve accuracy by reducing errors, enhance efficiency by minimizing manual work, and increase reliability through standardized, data-driven audit testing.

5.3.2 Discussion of Audit Quality Results:

The descriptive analysis indicated that there was a high overall relative importance of the dependent variable 'Audit Quality', with an average mean of 3.95, meaning that there was a strong approval among participants about the importance of having a high level of audit quality among audit firms operating in Jordan. Analysis for the three dimensions—Accuracy, Efficiency, and Reliability—also indicated very high importance, with average responses ranging from 3.909 to 4.002.

Among these audit quality advantages, Efficiency positioned at the top with the highest mean value of 4.002, emphasizing that respondents highly appreciate the importance of efficient auditing processes as an attribute enhancing overall audit performance. It highlights auditors' realization about the importance of improving efficiency and thus making more time for higher-level risk analysis by auditors, as they believe it will help them to meet deadlines.

Accuracy established at the second position with a very high mean value of (3.944), emphasizing its importance within the context of obtaining, at a reliable audit judgment with precision. It was recognized that accuracy plays a fundamental role within the scope

of reliable audit judgments within an increasingly more complex financial reporting environment. The fact that accuracy utilizes a relatively high position on average indicates an increased sense of appreciation about its importance within the scope of improving audit credibility and arriving at a correct interpretation based on audit procedures.

Reliability with an average response of 3.909 attained a high degree of relative importance. This gathers the auditors' perspective that there should be consistency and predictability with regard to various audit processes. The high degree of perception on reliability emphasizes the need for auditors to act predictably and have verifiable evidence that ensures consistency in audit outcomes.

Furthermore, a high mean value on all three aspects shows that there is a significant level of awareness, experience, and abilities on the part of Jordanian audit firms with regard to implementation of best practices that would improve the quality of audits. This can be explained based on the expertise and experience of auditors, familiarity with advanced methods of conducting audits, as well as dependence on outside knowledge and assistance with a view to enhancing the audit quality framework. It can be seen that there have been efforts at these audit firms to continue applying these best practices with regard to organizational performance and compliance with rules and regulations.

5.4 Discussion of Study Hypothesis Results

Based on the result of hypothesis testing, table no (5-1) below include a summary of these results.

Table No (5-1) Summary of the results of the study hypotheses testing

Hypothesis	Result
H0 There is no significant effect of technological practices measured by (automation and data analysis) on audit quality measured by (Accuracy, Reliability, Efficiency) in Jordan auditing firms	Hypothesis Rejected
H0-1 There is no significant effect of the technology practice measured by	Hypothesis Rejected

Hypothesis	Result
Automation on audit Efficiency in Jordan auditing firms	
H0-2 There is no significant effect for the technology practice measured by Automation on audit Reliability in Jordan auditing firms	Hypothesis Rejected
H0-3 There is no significant effect for the technology practice measured by Automation on audit Accuracy in Jordan auditing firms	Hypothesis Rejected
H0-4 There is no significant effect for the technology practice measured by Data Analysis on audit Efficiency in Jordan auditing firms	Hypothesis Rejected
H0-5 There is no significant effect for the technology practice measured by Data Analysis on audit Reliability in Jordan auditing firms	Hypothesis Rejected
H0-6 There is no significant effect for the technology practice measured by Data Analysis on audit Accuracy in Jordan auditing firms	Hypothesis Rejected

The result of hypothesis testing revealed that all the null research hypotheses were rejected and the alternative ones are accepted, which confirms there is a statistically significant impact of technological practices, measured by (Automation and Data Analysis), on audit quality measured by (Accuracy, Efficiency, and Reliability). This result presents some empirical evidence, which confirms that the use of technology practice and analysis techniques plays an important role in enhancing audit quality in Jordanian audit firms.

The rejection of the main study null hypothesis and the acceptance of the alternative one means that technological practices have a significant and positive impact on overall audit quality. The finding indicates that audit firms employing both automation and data analytics (have better capabilities for providing high-audits quality) with greater accuracy, shortening the audit cycle, and maintenance audit consistency. It can be noted that there is recognizing among audit firms in Jordan about the need for employing modern technologies in auditing to remain competitive and align with international auditing standards.

The sub-hypotheses associated with Automation emphasize its importance with regard to varying dimensions of audit quality. That Automation significantly improve audit efficiency due to reduced timescales associated with generating repetitive processes and limited manual interventions. Also, it expected that its effect on varying dimensions of audit reliability relates to error-free processes and an emphasis on standardization, which potentially impacts on stability and consistency surrounding audit outputs. Additionally, there are effects associated with accuracy due to rule-based processing and support for comprehensive testing enabled by automation.

Equally, the rejection of the sub-hypotheses about Data Analysis establishes that analytical tools have an important role in enhancing audit quality. Data analysis has an impact on auditor efficiency as it enabled auditors to analyze large volumes of data very fast. Data analysis is impact on audit reliability emerged clearly via its efficiency in identifying patterns, inconsistencies, and tendencies that might be disregarding via conventional sample analysis. The positive impact on accuracy shows clearly that analytical tools have an important role in assisting with full population testing, enabling auditors to gain a better understanding of financial statements and hence raise audit accuracy.

These research findings are backed by the results of previous studies done on auditing and information systems. A number of previous studies efforts have empirically determined that automation and data analytics together have significantly raised the efficacy and audit quality of auditing decisions (Eulerich et al. 2023; Sirois et al., 2016). As demonstrated in previous studies, factors like technological practice, analytical skills, and automation-based systems have substantially improved audit efficacy and enabled more reliable and precise financial analysis (Noori Doabi et al., 2025). Previous studies efforts have reiterated the

demanding roles played by senior management commitment, organizational readiness, and perceptions about efficiency and usefulness brought about by technological advancements for accelerated adoption and implementation of technology-intensive auditing practices which aligned with this study (Munthe et al., 2025). The study findings are consistent with previous research efforts and have reinforced these advancements in technology, particularly automation and data analytics, play a pivotal role as enablers for audit quality (Munthe et al., 2025; Noori Doabi et al., 2025).

Moreover, this study on the issue of technology availability and audit adoption relates that companies with access to suitable technological tools are more likely to adopt more modern auditing approaches, leading to better outcomes. Furthermore, it has been revealed that cost savings, simplicity, and the efficiency created via technological advancements encouraged people to turn more and more to automated and data-based audit techniques. All these findings match perfectly with the ones obtained from the current study work, as they have clearly supported that automation and data analysis significantly impact various audit quality factors operating within Jordanian audit firms.

In conclusion, based on the hypothesis testing outcomes, there is conclusive evidence that technology practices, or more specifically automation and data analysis, are driving factors with high capabilities for improving the audit quality measured by (accuracy, reliability and efficiency).

5.5 Results:

Based on the study hypothesis testing results, the study concludes the following results:

1. There is a positive impact of using technological practice on the quality of the auditing process in Jordanian auditing firms.
2. There is a positive impact of using automation on the accuracy, efficiency, and reliability of the auditing process in Jordanian auditing firms.
3. There is a positive impact of using data analysis on the accuracy, efficiency, and reliability of the auditing process in Jordanian auditing firms.

5.6 Recommendations:

Based on the above findings, the study recommends the audit firm in Jordan to:

1. **Improve technological practices:** Auditing firms need to adopt advanced technology to strengthen their auditing processes. Technological practices have a positive impact on the quality of auditing. Auditing firms need to adopt advanced technology, including cloud accounting and AI-based auditing applications.
2. **Invest in automation and data analytics:** Auditing firms need to invest more in automation and data analytics. Both automation and data analytics have a positive impact on the accuracy of auditing processes. Auditing firms need to adopt automation-based auditing systems.
3. **Emphasize the importance of training and further research:** Auditing firms need to emphasize the importance of further research on technology, automation, and data analytics to maximize the benefits of these aspects on their auditing processes.

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Appendices

Appendices (1): Questionnaire



Department of Financial and Accounting Sciences, College of Business

Respondent's sibling or brother:

Peace and mercy of God.

In order to fulfill the requirements for receiving a master's degree in accounting from Middle East University, the researcher is currently working on a scientific study titled: "The Effect of Technology Practices on Audit Quality in Jordan Auditing Firms."

Since the accuracy of your responses will determine the study's findings, we kindly ask that you take the time to carefully complete the questionnaire. Please be aware that your responses are private and will only be utilized in conjunction with scientific studies.

We are very respectful of you and are grateful.

Part one: Demographic information

Please indicate your answers for the below questions:

- Position?

Intern
Staff
Senior
Supervisor
Manager
Senior Manager/Partner

- Number of auditing years of experience?

0–2
3–5
6–10
11–15
16

- Professional Qualifications such as (CPA), (CFA) or (CMA), etc.?

Certified Public Accountant

Chartered Financial Analyst

Certified Investment and Financial Analysis

Association of Chartered Certified Accountants (UK-based qualification)

Certified Management Accountant

Certified Internal Auditor

Other

None

- Number of employees working at the company?

≤10 staff
11–50
51–200
200+

- Target customer segment in the portfolio

Public sector % ____
Financial services % ____
Industrial % ____
Services % ____
Other % ____

- Systems used in auditing?

Alteryx
CaseWare
TeamMate
Interactive Data Extraction and Analysis
Audit Command Language
In-house
None
Other

- Is your company using specialized knowledge analytics/robotic process automation specialists?

(Yes/No)

1= Strongly Disagree 2= Slightly Disagree 3=Neutral 4= Slightly Agree 5= Strongly Agree		1	2	3	4	5
The First Dimension: Technology Practices: Automation						
NO		1	2	3	4	5
B1.	Bots and other computer-aided audit procedures are used as an automated data collection and preparation.					
B2.	Matching, confirmations, and other advanced techniques are used in our automated operations.					
B3	The automation has been incorporated into our audit software and worksheets.					
B4.	Our audits typically use fully automated tests as opposed to sampling.					
B5.	Automation reduces human error in audited documentation.					
B6.	Consider the advantages of automation as outweighing its disadvantages					
B7.	Our organization provides a structured path towards utilizing robotic process automation and computer-aided audit tools.					
B8.	Our audit team employs advanced automated processes and methodologies to enhance the quality and efficiency of the auditing process in general.					
B9.	Computer-aided audit technology and robotic process automation improve the effectiveness of audit and reduce time					
B10.	Automated systems are considered more useful and					

	convenient to use.					
The Second Dimension: Technology Practices: Data Analytics						
NO		1	2	3	4	5
C1	Auditors employ data analytics to detect errors, evaluate areas of concern, and improve the efficiency of the audit process overall.					
C2	Auditors use visual reports and queries to monitor customer processes within the firm, helping to communicate complex information in a readily comprehensible manner, facilitating better understanding, and maintaining auditable documents.					
C3	Data analytics results reveal risks and guide measurement procedures.					
C4	The client's organizational financial planning is used in an analytical context during the audit procedure.					
C5	Apply statistical and time-series analysis over multiple time periods.					
C6	Audit Data Analytics identifies anomalies that would not be found by other conventional procedures.					
C7	The use of Audit Data Analytics is documented and evaluated as part of involvement quality assurance					

C8	Data analytics improve audit quality.					
C9	Data analytics enhance audit reliability.					
c10	General data analytics assist auditors in detecting fraud and irregularities as they identify unusual developments, highlight differences, and provide deep insights into financial interactions and dealings.					
C11	Technological requirements such as utility and accessibility influence auditors' decisions with respect to how to use and utilize data analytics in auditing because these factors determine the tools' accessibility, efficiency, and overall effectiveness					
The Third Dimension: Audit Quality: Accuracy						
NO		1	2	3	4	5
D1	Using automation or audit data analytics reduces the need for post-issue adjustments.					
D2	Automated/analytical procedures improve correct error detection.					
D3	With the help of these tools (Automation and data analytics), we can get more complete and reliable evidence.					
The Fourth Dimension: Audit Quality: Efficiency						
NO		1	2	3	4	5
D4	Automation and Audit Data Analytics helps to minimize the time taken on repetitive tasks.					

D5	The use of automation and data analysis tools facilitates the search process on time and within the allocated budget.					
D6	Real-time analysis speeds up the evaluation and decision-making process.					
The Five Dimension: Audit Quality: Reliability						
NO		1	2	3	4	5
D7	The use of automation and data analysis makes the audit process more consistent.					
D8	Data analytics and automation increase the predictability and accountability of audit procedures, resulting in reliable outcomes.					
D9	Data analysis helps improve auditors' ability to make accurate and valid judgments in various audit assignments.					
D10	Implementing robotic process automation reduces inconsistencies in audit performance, thereby enhancing confidence in outcome verification.					

Appendices (2): SPSS out put

RELIABILITY

/VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.956	10

RELIABILITY

/VARIABLES=Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.953	11

RELIABILITY

/VARIABLES=Q22 Q23 Q24

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.865	3

RELIABILITY

/VARIABLES=Q25 Q26 Q27

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.864	3

RELIABILITY

/VARIABLES=Q28 Q29 Q30 Q31

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.899	4

RELIABILITY

/VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded ^a	0	0
	Total	150	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.983	31

Correlations

Variables	Automation	Data Analysis
Automation	1.000	0.939**
Data Analysis	0.939**	1.000

(**) Significant at 0.01

Variable	VIF	Tolerance
Automation	8.476	0.118
Data Analysis	8.476	0.118

Tests of Normality

Variable	Kolmogorov – Smirnov (K-S)	df	Sig	Shapiro – Wilk (S-W)	df	Sig
Automation	0.230	150	0.000	0.863	150	0.000
Data Analysis	0.239	150	0.000	0.859	150	0.000
Accuracy	0.246	150	0.000	0.847	150	0.000
Efficiency	0.252	150	0.000	0.828	150	0.000
Reliability	0.251	150	0.000	0.846	150	0.000

Frequencies

Statistics						
		Position	Number of auditing years of experience	Professional Qualifications such as (CPA), (CFA) or (CMA), etc.	Number of employees working at the company	Target customer segment in the portfolio
N	Valid	150	150	150	150	150
	Missing	0	0	0	0	0

Statistics			
		Systems used in auditing	Is your company using specialized knowledge analytics/robotic process automation specialists
N	Valid	150	150
	Missing	0	0

Frequency Table

Position					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Intern	21	14.0	14.0	14.0
	Staff	86	57.3	57.3	71.3
	Senior	22	14.7	14.7	86.0
	Supervisor	5	3.3	3.3	89.3
	Manager	9	6.0	6.0	95.3
	Senior manager/Partner	7	4.7	4.7	100.0
	Total	150	100	100	

Number of auditing years of experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0–2	38	25.3	25.3	25.3
	3–5	89	59.3	59.3	84.6
	6–10	11	7.3	7.3	91.9
	11–15	6	4.0	4.0	95.9
	16+	6	4.0	4.0	100.0
	Total	150	100	100	

Professional Qualifications such as (CPA), (CFA) or (CMA), etc.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<i>Certified Public Accountant</i>	19	12.7	12.7	12.7
	Chartered Financial Analyst	9	6.0	6.0	18.7
	Certified Investment and Financial Analyst	-	-	-	-
	<i>Association of Chartered Certified Accountants (UK-based qualification)</i>	8	5.3	5.3	24.0
	<i>Certified Management Accountant</i>	19	12.7	12.7	36.7
	<i>Certified Internal Auditor</i>	-	-	-	-
	Other	9	6.0	6.0	42.7
	None	86	57.3	57.3	100.0
	Total	150	100	100	

Number of employees working at the company					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	≤ 50 staff	33	22.0	22.0	22.0
	51 – 100 staff	17	11.3	11.3	33.3
	101 – 150 staff	50	33.3	33.3	66.6
	151 – 200 staff	18	12.0	12.0	78.6
	More than 200 staff	32	21.3	21.3	100.0
	Total	150	100	100	

Target customer segment in the portfolio					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public sector %	26	17.3	17.3	17.3
	Financial services %	48	32.0	32.0	49.3
	Industrial %	26	17.3	17.3	66.6
	Services %	29	19.3	19.3	85.9
	Other %	21	14.0	14.0	100.0
	Total	150	100	100	

Systems used in auditing					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alteryx	8	5.3	5.3	5.3
	CaseWare	18	12.0	12.0	17.3
	TeamMate	13	8.7	8.7	26.0
	Interactive Data Extraction and Analysis	13	8.7	8.7	34.7
	Audit Command Language	9	6.0	6.0	40.7
	In-house	48	32.0	32.0	72.7
	None	10	6.7	6.7	79.3
	Other	31	20.7	20.7	100.0
	Total	150	100	100	

Is your company using specialized knowledge analytics/robotic process automation specialists?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	103	68.7	68.7	68.7
	No	47	31.3	31.3	100.0
	Total	150	100	100	

Descriptives

Descriptive Statistics				
Item No.	Paragraph	Means	Standard Deviation	N
B1	Bots and other computer-aided audit procedures are used as an automated data collection and preparation.	3.832	1.290	150
B2	Matching, confirmations, and other advanced techniques are used in our automated operations.	3.819	1.350	150
B3	The automation has been incorporated into our audit software and worksheets.	3.886	1.317	150
B4	Our audits typically use fully automated tests as opposed to sampling.	3.758	1.392	150
B5	Automation reduces human error in audited documentation.	4.020	1.230	150
B6	Consider the advantages of automation as outweighing its disadvantages	3.926	1.289	150

B7	Our organization provides a structured path towards utilizing robotic process automation and computer-aided audit tools.	3.899	1.318	150
B8	Our audit team employs advanced automated processes and methodologies to enhance the quality and efficiency of the auditing process in general.	3.872	1.329	150
B9	Computer-aided audit technology and robotic process automation improve the effectiveness of audit and reduce time	3.827	1.376	150
B10	Automated systems are considered more useful and convenient to use.	4.054	1.205	150
General average for Automation		3.882	1.111	150
C1	Auditors employ data analytics to detect errors, evaluate areas of concern, and improve the efficiency of the audit process overall.	3.847	1.446	150
C2	Auditors use visual reports and queries to monitor customer processes within the firm, helping to communicate complex information in a readily comprehensible manner, facilitating better understanding,	3.933	1.329	150

	and maintaining auditable documents.			
C3	Data analytics results reveal risks and guide measurement procedures.	3.987	1.247	150
C4	The client's organizational financial planning is used in an analytical context during the audit procedure.	4.081	1.214	150
C5	Apply statistical and time-series analysis over multiple time periods.	3.920	1.260	150
C6	Audit Data Analytics identifies anomalies that would not be found by other conventional procedures.	3.853	1.320	150
C7	The use of Audit Data Analytics is documented and evaluated as part of involvement quality assurance	3.926	1.266	150
C8	Data analytics improve audit quality.	4.060	1.279	150
C9	Data analytics enhance audit reliability.	4.073	1.331	150
C10	General data analytics assist auditors in detecting fraud and irregularities as they identify unusual developments, highlight differences, and provide deep insights into financial interactions and dealings.	4.007	1.251	150
C11	Technological requirements such as	3.926	1.390	150

	utility and accessibility influence auditors' decisions with respect to how to use and utilize data analytics in auditing because these factors determine the tools' accessibility, efficiency, and overall effectiveness			
General average for Data Analysis		3.967	1.075	150
D1	Using automation or audit data analytics reduces the need for post-issue adjustments.	3.839	1.344	150
D2	Automated/analytical procedures improve correct error detection.	4.040	1.234	150
D3	With the help of these tools (Automation and data analytics), we can get more complete and reliable evidence.	3.947	1.278	150
General average for Accuracy		3.944	1.140	150
D4	Automation and Audit Data Analytics helps to minimize the time taken on repetitive tasks.	3.959	1.308	150
D5	The use of automation and data analysis tools facilitates the search process on time and within the allocated budget.	3.987	1.309	150
D6	Real-time analysis speeds up the evaluation and decision-making process.	4.034	1.209	150
General average for Efficiency		4.002	1.132	150

D7	The use of automation and data analysis makes the audit process more consistent.	3.813	1.387	150
D8	Data analytics and automation increase the predictability and accountability of audit procedures, resulting in reliable outcomes.	3.852	1.347	150
D9	Data analysis helps improve auditors' ability to make accurate and valid judgments in various audit assignments.	4.000	1.297	150
D10	Implementing robotic process automation reduces inconsistencies in audit performance, thereby enhancing confidence in outcome verification.	3.960	1.325	150
General average for Reliability		3.909	1.173	150
Valid N (listwise)				150

Regression

Main hypothesis H0

Dependent variable	R	R ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Audit Quality	0.942	0.888	582.981	0.000	Automation	0.229	0.080	2.876	0.005
					Data Analysis	0.738	0.082	8.986	0.000

*Significant at 0.05 level.

Sub-hypothesis H01

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Efficiency	0.869	0.756	457.989	0.000	Automation	0.886	0.041	21.401	0.000

Sub-hypothesis H02

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Reliability	0.885	0.783	533.768	0.000	Automation	0.934	0.040	23.103	0.000

Sub-hypothesis H03

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Accuracy	0.856	0.733	406.757	0.000	Automation	0.879	0.044	20.168	0.000

Sub-hypothesis H04

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Efficiency	0.908	0.825	696.651	0.000	Data Analysis	0.956	0.036	26.394	0.000

Sub-hypothesis H05

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Reliability	0.916	0.839	772.579	0.000	Data Analysis	0.999	0.036	27.795	0.000

Sub-hypothesis H06

Dependent variable	r	r ²	F	Sig F	Regression Coefficients				
					Independent variable	B	Std. error	T	Sig t
Accuracy	0.872	0.760	469.483	0.000	Data Analysis	0.925	0.043	21.668	0.000

Names of arbitrators:

- 1- Dr. Ahmad Marie**
- 2- Dr. Ayman Khaza'leh**
- 3- Prof. Asma'a Amarneh**
- 4- Dr. Hussam Haddad**
- 5- Dr. Osama Sha'ban**

Names of offices:

- 1- Ernst & Young - Jordan**
- 2- Forvis Mazars - Jordan**
- 3- PricewaterhouseCoopers - Jordan**