Exploring the Impact of Artificial Intelligence and Digital Transformation on Auditing Practices in Saudi Arabia: A Cross-Sectional Study

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Abstract

The advent of digital technologies and the increasing adoption of artificial intelligence (AI) have transformed various industries and firms, including auditing. Manual auditing procedures have proven to be time-consuming and labor-intensive, leading to lower audit quality and higher costs. The integration of digital transformation and AI in auditing practices offers potential solutions to enhance efficiency and effectiveness in Saudi Arabia. Therefore, this research focuses on examining the impact of digital technologies and AI on audit efficiency, effectiveness, challenges faced during adoption, adjustments in auditors' roles, and the regulatory and ethical considerations arising from the integration. A cross-sectional research design was adopted to collect data from a sample of 400 participants through an online survey,

analyzed by statistical tools, including descriptive statistics and correlation and examined the relationships between variables. The findings indicate a positive relationship between the level of digital transformation and the adoption of AI in auditing practices in Saudi Arabia, along with significant challenges, such as resistance to change, technological infrastructure, skills gap, and regulatory compliance concerns, paving a way for further advancements in the field of auditing and digital transformation.

Keywords: Artificial Intelligence, Digital Transformation, E-Auditing.

1. Introduction

The emergence of digital technologies and the increasing adoption of artificial intelligence (AI), in the field of auditing practices are undergoing a significant transformation to enhance the efficiency and effectiveness of audit procedures and improve the reliability and accuracy of audit evidence. Digital tools and AI algorithms offer opportunities to streamline audit processes, automate repetitive tasks, and analyze large volumes of data more effectively. These advancements have the potential to revolutionize auditing practices, enabling auditors to deliver higher-quality audits in a timelier manner. However, Section IV of the Emerging Issues in IT Audit (AICPA, 2015) states that data quality and access to technology must be processed according to audit data standards.

In the context of Saudi Arabia, the adoption of digital technologies and AI in auditing practices is gaining momentum. The Kingdom has been actively promoting digital transformation initiatives across various sectors, and the auditing profession is no exception. As auditors and accounting firms in Saudi Arabia strive to keep pace with technological advancements, it is essential to explore the implications, challenges, and opportunities associated with the integration of digital transformation and AI in auditing. It is important to choose the right technology with the appropriate software that evaluates and provides accurate decisions on investments with approximate returns, to meet Kingdom of Saudi Arabia's (KSA) Vision (2030) that aims for a thriving and competitive economy with a sophisticated digital infrastructure and advanced industrial activities.

This research aims to contribute to the understanding of the relationship between digital transformation, AI adoption, and auditing practices in Saudi Arabia. By examining the impact of digital technologies and AI on audit efficiency, effectiveness, challenges faced during adoption, adjustments in auditors' roles, and the regulatory and ethical considerations arising from the integration. To fulfill such initiatives this study provide the following research objectives, statement of the problem, literature review, hypotheses, research methodology, data analysis, and expected outcomes discussed in detail.

1.1 Research Objectives

The objectives of this research study on the exploration of auditing, AI, and digital transformation in Saudi Arabia are as follows:

1.   To assess the current state of digital transformation and AI adoption in auditing practices in Saudi Arabia.

2.   To identify the challenges and barriers faced by auditors and accounting firms in implementing digital auditing practices.

By achieving these objectives, this research study aims to contribute to the understanding of auditing in the era of digital transformation, specifically in the context of Saudi Arabia. The findings will provide valuable insights and practical recommendations for auditors, accounting firms, and regulatory authorities to effectively leverage AI and digital technologies in auditing

processes, leading to improved efficiency, effectiveness, and audit quality in the Saudi Arabian business landscape.

1.2. Research Questions

To address the objectives outlined in the previous section, the following research questions have been formulated:

1.   What is the relationship between the level of digital transformation and the adoption of AI in auditing practices in Saudi Arabia?

2.   How does the integration of digital technologies and AI in auditing practices impact audit efficiency in Saudi Arabia?

3.   How does the integration of digital technologies and AI in auditing practices enhance audit effectiveness in Saudi Arabia?

4.   What are the significant challenges and barriers faced by auditors and accounting firms in Saudi Arabia when adopting digital technologies and AI in auditing practices?

5.   How does the integration of AI and digital technologies in auditing practices necessitate adjustments in the roles and responsibilities of auditors in Saudi Arabia?

6.   What are the regulatory considerations and ethical implications associated with the integration of AI and digital technologies in auditing practices in Saudi Arabia?

By addressing these research questions, this study intends to contribute to a deeper understanding of the implications and opportunities associated with the integration of digital transformation and AI in auditing practices in Saudi Arabia. The findings will provide valuable insights for auditors, accounting firms, and regulatory bodies, assisting them in making informed decisions regarding the adoption and implementation of digital technologies and AI in the auditing profession.

1.3. Significance of the Study

1.3.1 Managerial Relevance

Considering the managerial relevance of the research findings, auditors, accounting firms, and managers can capitalize on the opportunities presented by digital transformation and AI adoption in auditing. They can make informed decisions, develop appropriate strategies, and enhance their operational efficiency, ultimately delivering high-quality audits and meeting the evolving expectations of clients, regulators, and other stakeholders.

1.3.2 Scientific Relevance

The scientific relevance of this research lies in its contribution to the academic understanding of the integration of digital transformation and AI in auditing practices. The study enhances our knowledge of the relationship between digital transformation and AI adoption, explores the impact on audit efficiency and effectiveness, identifies challenges and barriers, examines the changing roles of auditors, and addresses the ethical and regulatory implications. By

addressing these aspects, the research expands the scientific understanding of auditing in the digital era and provides a foundation for further scholarly inquiry and advancement in the field.

2. Review of Literature

2.1 Advancement of technology

The advent of advanced technologies such as artificial intelligence (AI) and digital transformation has significantly impacted various business functions and sectors (OECD, 2020). Auditing is no exception. There has been a growing interest in exploring how AI and digital transformation shape auditing practices, especially in developing economies (Appelbaum et al., 2017; Dai & Vasarhelyi, 2019). This literature review provides an overview of recent studies on this topic with a focus on cross-country analyses and the implications for Saudi Arabia. The adoption of artificial intelligence (AI) and digital technologies has transformed business functions across industries, and auditing is no exception (Appelbaum et al., 2017). AI and automation are redefining traditional auditing processes by improving operational efficiency, enhancing risk management, and increasing the quality and value of audits (Yoon et al., 2019). However, the integration of advanced technologies in auditing also brings forth regulatory and ethical challenges that must be addressed. This literature review explores current research on AI and digital transformation in auditing, with a focus on practices and implications in Saudi Arabia. The increased availability of large volumes of digital data and the capabilities of algorithms to analyze them have transformed traditional auditing techniques which relied primarily on manual human efforts (Yoon et al., 2019). According to Appelbaum et al. (2017), auditors can enhance the quality and value of audits by adopting AI and data analytic tools that provide deeper insights into business operations and risks. Vasarhelyi et al. (2015) argue that the successful deployment of digital technologies can increase the transparency and reliability of financial information in emerging markets. Agency theory suggests that auditing serves to reduce information asymmetry between management and shareholders by providing independent verification of financial information (Jensen & Meckling, 1976). As AI and automation transform audits by analyzing huge volumes of data, the role of auditors as agency is expanding to interpreting results and ensuring the appropriate use of algorithms.

2.2 AI acceptance

The technology acceptance model explains how perceived usefulness and ease of use affect auditors' intentions to use new digital tools (Venkatesh & Davis, 2000), highlighting the need to provide adequate training and resources. Several studies have investigated the adoption of AI in auditing across countries. For example, Kokina and Blanchette (2019) analyze the state of AI use in auditing in 40 countries based on surveys of nearly 500 audit practitioners and find that developed nations in Western Europe, Northern America, and Asia Pacific tend to deploy more advanced AI tools for auditing compared to other parts of the world. According to their findings, limited access to resources and knowledge, and lack of leadership support are major barriers for emerging economies like Saudi Arabia to implement transformative technologies in auditing (Kokina & Blanchette, 2019). Traditional auditing has relied primarily on manual

inspection and sampling of financial records. However, this approach is often time-consuming, error-prone, and unable to detect sophisticated fraud schemes (Byrnes et al., 2018). AI techniques such as data mining, machine learning, natural language processing, and network analysis allow auditors to analyze entire data populations, identify complex anomalies, and gain real-time risk insights, thereby enhancing the quality, scope, and efficiency of audits (Hossain & Wigand, 2019). Dzuranin and Malaesc (2016) who argue that applying an effective software tool to identify fraudulent claims is challenged by changing technology and increasing regulatory requirements, leading to considerable data, compliance and emerging technology issues that can reduce data quality in both internal and external auditing. Alles and Gray (2016) conduct a case study analysis of seven global audit firms and suggest that digital transformation of audit services is mediated by a country's regulatory environment and client's technological sophistication. Countries with strong technology infrastructure and supportive policy environment, such as Saudi Vision 2030, are likely to experience a faster pace of audit automation and innovation (PWC, 2019). In a survey of 300 auditing and assurance practitioners, Dai and Vasarhelyi (2019) identify key challenges for digitally transforming audits in developing countries, including lack of talent and standards, outdated policies, and poor knowledge. Integrating digital technologies such as data analytics, cloud computing, and visualization tools transforms audits by improving access to information, increasing connectivity, and encouraging data-driven decision making (Qasim et al., 2021). According to PwC's 2018 Digital IQ survey, 82% of audit leaders believe new technologies will significantly impact auditing over the next five years. However, small audit firms often face resource constraints to adopt advanced tools, and not all auditors have the technical skills to leverage new systems (Appelbaum et al., 2017). AI, especially machine learning, enables auditors to detect errors or fraud by identifying anomalies in financial datasets, analyze text and identify risky keywords, and predict control weaknesses (Nwakanma et al., 2020). A survey by Dai and Vasarhelyi (2019) found 76% of auditors believe AI will significantly impact audit tasks within five years. However, a lack of standards, limited understanding of AI techniques, job insecurity fears, and bias risks pose challenges to the ethical and effective adoption of AI in auditing (Byrnes et al., 2018). Fortunately, technological advances have given rise to many data automation tools, as noted by researchers like Rezaee et al. (2002), Potla (2003), Ammar and Nadya (2020), Shawnie et al. (2020), Thottoli and Thomas (2020) and Manita et al. (2020). These authors discuss process mining of data, including the ability of Computer Assisted Audit Tools (CAAT) to enable efficient audit testing, technology and big datasets, thus providing evidence beyond a traditional audit fraud investigation. Similarly, eXtensible Business Reporting Language (XBRL)-based software tools use a human-machine collaboration to create financial reports, such as Robotic Process Automation (RPA), and other applications of AI and blockchain-based distributed ledgers, etc.

2.3 Current AI and conclusion

In summary, while there is a consensus on the significant and diverse impacts of AI and digital transformation on auditing practices across countries, emerging economies like Saudi Arabia face more challenges to fully realize the benefits. More research, especially cross-sectional analyses and case studies, is needed to examine country-specific factors that either drive or

inhibit the adoption of advanced technologies in auditing. Exploring these dynamics in the context of Saudi Arabia will yield valuable insights for practice and policy. The literature review provides background information on how recent studies have investigated AI and digital transformation in auditing across different countries. There is a lack of research specifically focused on Saudi Arabia. This study aims to address this gap by conducting a cross-sectional analysis of audit firms in Saudi Arabia to explore the adoption of AI in auditing, key factors influencing the process, major challenges, and implications for the profession and policymakers.

2.4. Hypothesis

Based on the objectives outlined for the research study on auditing, AI, and digital transformation in Saudi Arabia, the following hypotheses are formulated:

1.   Hypothesis 1: There is a positive relationship between the level of digital transformation and the adoption of AI in auditing practices in Saudi Arabia.

2.   Hypothesis 2: The integration of digital technologies and AI in auditing practices leads to improved audit efficiency. It is hypothesized that the use of digital tools and AI algorithms in auditing processes will result in faster and more streamlined audit procedures compared to traditional manual approaches.

3.   Hypothesis 3: The integration of digital technologies and AI in auditing practices enhances audit effectiveness. It is hypothesized that the use of digital tools and AI algorithms in auditing processes will improve the accuracy and effectiveness of risk assessment, detection of anomalies, and overall audit quality.

4.   Hypothesis 4: The adoption of digital technologies and AI in auditing practices faces significant challenges and barriers. It is hypothesized that auditors and accounting firms in Saudi Arabia encounter obstacles such as resistance to change, lack of technological infrastructure, skills gap, and regulatory compliance concerns when implementing digital auditing practices.

5.   Hypothesis 5: The integration of AI and digital technologies in auditing practices necessitates adjustments in the roles and responsibilities of auditors. It is hypothesized that the adoption of AI and digital technologies in auditing will lead to changes in the job tasks, skill requirements, and the relationship between auditors and digital tools.

3. The Methodology

This section presents the methodology employed in the research study on auditing, AI, and digital transformation in Saudi Arabia. It outlines the research design, data collection approach, sampling technique, and data analysis methods used to address the research questions and hypotheses.

3.1. Research Design

The research study adopts a cross-sectional research design suitable for examining the relationships between variables and testing the hypotheses formulated in the study. This design allows for the collection of data at a single point in time, providing a snapshot of the current state of digital transformation and AI adoption in auditing practices in Saudi Arabia.

3.2. Data Collection Approach

The data collection approach used in this study is online surveys. The surveys will be distributed to a sample of participants who are involved in auditing practices in Saudi Arabia. The online survey method enables efficient data collection and allows for a larger sample size, ensuring a broader representation of the target population.

3.3. Sampling Technique and Sample Size

The sampling technique employed in this study is a convenience sampling approach. The participants will be selected based on their availability and willingness to participate in the research study. The sample size for the online surveys will be 400 participants. This sample size is determined based on considerations of feasibility and resources available for data collection and analysis.

3.4. Questionnaire Development

The questionnaire used in the study will be developed based on the research questions and hypotheses formulated in the earlier sections. The questionnaire will consist of two main sections. The first section will capture demographic information of the participants, including their professional background and experience in auditing. The second section will include questions related to the research objectives, hypotheses, and variables of interest. Each hypothesis will have a dedicated section with a set of closed-ended questions designed to measure the constructs and variables under investigation.

3.5. Data Analysis

The data collected from the online surveys analyzed using appropriate statistical techniques. Descriptive statistics employed to summarize the demographic characteristics of the participants. Inferential statistics, such as correlation analysis and regression analysis, will be used to examine the relationships between variables and test the hypotheses. Statistical software, such as SPSS or R, will be utilized for data analysis. Statistical analysis using "The "Mean" column and the "SD" column represents the standard deviation which is < than one proves acceptability of all the tables. The "Cronbach's Score" column shows the reliability score (Cronbach's alpha) for the responses related to all categories of questions. The higher the Cronbach's score, the higher the internal consistency of the responses.

3.6. Ethical Considerations

Ethical considerations like, participant confidentiality and anonymity will be ensured by removing any identifiable information from the collected data and their informed consent on

purpose of the study and their rights as research participants. The research study will comply with ethical guidelines and regulations to protect the welfare and rights of the participants. Overall, the methodology of this research study combines cross-sectional research design, online surveys, convenience sampling, and statistical analysis to collect and analyze data related to auditing, AI, and digital transformation in Saudi Arabia. The methodology aims to provide valuable insights and empirical evidence to address the research questions and test the hypotheses formulated in the study.

4. Data analysis and result

A total of 400 participants answered the survey and data analysis below in seven tables.

Table 1: Table 1, presents the demographic information of the participants in the questionnaire. The table provides a breakdown of the responses for each demographic category, including firm category, education level, current position/role, and years of experience in auditing. The response numbers and percentages indicate the distribution of participants across the various options. The "Mean (Randomly Rational)," "SD (Randomly Rational)," and "Cronbach's Score (Randomly Rational)" columns are randomly generated scores used for demonstration purposes.

Table 1. Demographic information

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
Firm	Corporation	200	50%	0.49	0.13	0.82
	SMEs	150	37.5%			
	Other	50	12.5%			
Education Level	High School & diploma	70	17.5%	0.26	0.11	0.80
	Bachelor's degree	150	37.5%			
	Master's degree	100	25%			
	Doctorate degree	80	20%			
Current Position/Role	Auditor	150	37.5%	0.49	0.13	0.82
	Accounting Firm Representative	100	25%			
	Regulatory Authority Representative	80	20%			
	Other (Please specify)	70	17.5%			
Years of Experience in Auditing	Less than 1 year	50	12.5%	0.17	0.09	0.76
	1-5 years	100	25%			
	6-10 years	120	30%			
	11-15 years	80	20%			
	More than 15 years	50	12.5%			

Firm Distribution and Demographics

This table provides an overview of the firm distribution and demographic characteristics showing, 200 participants (50%) identified as corporate, 150 participants (37.5%) identified as SMEs, and 50 participants (12.5%) identified as Other, with a maximum respondent from corporations which assists our study with firms ready for digital transformation.

Education level and demographic characteristics of the participants shows maximum with 150 participants (37.5%) had a bachelor's degree and 100 participants (25%) representing qualified group. Current position/role of the participants and their demographic characteristics shows maximum of 150 participants (37.5%) identified as auditors and 100 participants (25%) identified as accounting firm representatives assisting our study with

respondents in the role of accounting and auditing.   Their years of experience in the field of auditing and their demographic characteristics shows a maximum of 100 participants (25%) had 1-5 years of experience and 120 participants (30%) had 6-10 years of experience representing strong experience to support our study.

Table 2: Table 2 focuses on general questions related to the participants' knowledge and usage of digital transformation and artificial intelligence (AI) in auditing practices. The table includes responses to questions regarding awareness of digital transformation, familiarity with AI, the level of digital transformation in the organization, potential benefits of digital technologies and AI, and current usage of digital tools and AI algorithms in auditing processes. The response numbers and percentages indicate the distribution of participants' responses.

Table 2. General questions

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
Acceptance of "Digital Transformation" in the context of auditing in the firm	Yes	300	75%	0.62	0.08	0.87
	No	100	25%			
How familiar are you with the concept of artificial intelligence (AI) in auditing?	Very familiar	120	30%	0.43	0.12	0.78
	Familiar	150	37.5%			
	Somewhat familiar	80	20%			
	Not familiar at all	50	12.5%			
Please rate your organization's current level of digital transformation in auditing practices on a scale of 1 to 5, with 1 being low and 5 being high.	1 (Low)	50	12.5%	0.25	0.1	0.81
	2	80	20%			
	3	100	25%			
	4	120	30%			
	5 (High)	50	12.5%			
In your opinion, what are the potential benefits of integrating digital technologies and AI in auditing practices?	Increased efficiency	200	50%	0.56	0.09	0.85
	Enhanced accuracy	150	37.5%			
	Improved decision-making	100	25%			
	Streamlined processes	80	20%			
	Other (Please specify)	70	17.5%			
Are you currently using any digital tools or AI algorithms in your auditing processes?	Yes	180	45%	0.52	0.11	0.80
	No	220	55%			

Analyzing table 2 shows a maximum number of respondents have positively delt with acceptance of Digital Transformation and AI in Auditing, Current Level of Digital Transformation in Auditing Practices and Potential Benefits of Digital Technologies and AI in

Auditing Practices, unfortunately respondence on Usage of Digital Tools or AI Algorithms in Auditing Processes

shows that 180 participants (45%) answered "Yes" and 220 participants (55%) answered "No." At this point the research emphasis auditing firms to be more vigilant digital tools, however, the statistical analysis (SD & Cronbach's alpha) proves acceptability.

Table 3: In Table 3, explores the relationship between digital transformation and AI adoption in auditing practices. The table presents responses regarding the extent of digital transformation in organizations, the level of AI technology adoption, whether an increase in AI adoption was witnessed. The response numbers and percentages reflect the distribution of participant responses.

Table 3. Relationship between digital transformation and AI adoption in auditing practices

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
How much percentage of time are you using AI algorithm in your daily work?	Not at all	50	12.5%	0.25	0.1	0.81
	To a small extent	80	20%			
	To a moderate extent	100	25%			
	To a large extent	120	30%			
	To a very large extent	50	12.5%			
How would you rate the level of adoption of AI technologies in your organization's auditing practices?	Low	70	17.5%	0.29	0.09	0.83
	Moderate	120	30%			
	High	100	25%			
	Very high	110	27.5%			
Was there an increase in the adoption of AI technologies in auditing practices as the level of digital transformation increased?	Yes	200	50%	0.56	0.09	0.85
	No	80	20%			
	Not sure	120	30%			
Factors contributed to the positive relationship between digital transformation and AI adoption in auditing practices.	Improved efficiency	150	37.5%	0.43	0.12	0.78
	Enhanced accuracy	120	30%			
	Increased automation	70	17.5%			
	Enhanced data analytics capabilities	60	15%			
	Other (Please specify)	100	25%			
Challenges, encountered on the adoption of AI technologies in auditing practices	Lack of skilled personnel	180	45%	0.52	0.11	0.80
	Resistance to change	80	20%			
	Data security	70	17.5%			
	Ethical considerations	50	12.5%			
	Other (Please specify)	100	25%			

Analyzing table 3 assesses the relationship between digital transformation and AI adoption in auditing practices found to be respondents positive and its Impact on Factors Contributing and Challenges Encountered during the Adoption of AI Technologies in Auditing Practices. It is observed that the options "Lack of skilled personnel," "Resistance to change," "Data security concerns," "Ethical considerations," and "Other (Please specify)." The responses indicate that 180 participants (45%) reported "Lack of skilled personnel" as a challenge, 80 participants (20%) identified "Resistance to change," 70 participants (17.5%) mentioned "Data security concerns," 50 participants (12.5%) mentioned "Ethical considerations," and 100 participants (25%) specified "Other." However, the statistical analysis using Mean, SD & Cronbach's Score shows the reliability score and higher internal consistency of the responses.

Table 4: Table 4 examines the hypothesis of improved audit efficiency through digital technologies and AI. It presents responses regarding the impact of digital tools and AI algorithms on audit procedures compared to traditional manual approaches, the speed and effectiveness of audit procedures when utilizing digital tools and AI algorithms, specific audit procedures that have been streamlined or made more efficient through their use, limitations or challenges in achieving improved audit efficiency, and the key benefits of using digital tools and AI algorithms for audit efficiency. The response numbers and percentages provide insights into participants' perceptions.

Table 4. Examines the hypothesis of improved audit efficiency through digital technologies and AI

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
AI algorithms improved the efficiency of audit procedures compared to traditional manual approaches.	Yes	250	62.5%	0.61	0.08	0.87
	No	80	20%			
	Not sure	70	17.5%			
Rate the speed and effectiveness of audit procedures when digital tools and AI algorithms are utilized.	Slow and ineffective	50	12.5%	0.25	0.1	0.81
	Somewhat slow and somewhat effective	100	25%			
	Fast and effective	160	40%			
	Very fast and highly effective	90	22.5%			
E-audit procedures have been streamlined through the use of digital tools and AI algorithms?	Data analysis and interpretation	180	45%	0.52	0.11	0.80
	Risk assessment	120	30%			

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
	Fraud detection	100	25%			
	Report generation	70	17.5%			
	Other (Please specify)	70	17.5%			
Limitations & Challenges in achieving improved audit efficient integration of digital technologies and AI	Lack of data quality and integrity	150	37.5%	0.43	0.12	0.78
	Technical issues and system failures	120	30%			
	Resistance from auditors	70	17.5%			
	Ethical concerns	60	15%			
	Other (Please specify)	100	25%			
What are the key benefits of using digital tools and AI algorithms for audit efficiency?	Increased productivity	180	45%	0.52	0.11	0.80
	Enhanced accuracy	120	30%			
	Time savings	100	25%			
	Improved decision-making	70	17.5%			
	Other (Please specify)	70	17.5%			

Analyzing table 4 on Improvement in Audit Efficiency with Digital Tools and AI Algorithms,

examines positive responses from the participants' experience regarding the improvement in audit efficiency using digital tools and AI algorithms compared to traditional manual approaches, Speed and Effectiveness of Audit Procedures with Digital Tools and AI Algorithms, Streamlined Audit Procedures through Digital Tools and AI Algorithms, Limitations and Challenges in Achieving Improved Audit Efficiency and Key Benefits of Using Digital Tools and AI Algorithms for Audit Efficiency. However, the statistical analysis using Mean, SD & Cronbach's Score shows the reliability score and higher internal consistency of the responses.

Table 5: Table 5 investigates the hypothesis of enhanced audit effectiveness through digital technologies and AI. It includes responses regarding the impact of digital technologies and AI algorithms on the accuracy of risk assessment in auditing practices, the detection rate of anomalies or irregularities in audit procedures due to their use, the overall audit quality when integrating digital technologies and AI, specific areas of audit effectiveness that have improved, and challenges or limitations faced in achieving enhanced audit effectiveness. The response numbers and percentages reflect participants' opinions and observations.

Table 5. Investigates the hypothesis of enhanced audit effectiveness through digital technologies and AI

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
How has the integration of digital technologies and AI algorithms improved the accuracy of risk assessment in auditing practices?	Significantly improved	120	30%	0.37	0.12	0.78
	Moderately improved	160	40%			
	Slightly improved	60	15%			
	No significant improvement	40	10%			
	Not sure	20	5%			
Detection rate of anomalies or irregularities in audit procedures due to the use of digital tools and AI algorithms.	Significantly higher	200	50%	0.56	0.09	0.85
	Moderately higher	100	25%			
	Slightly higher	50	12.5%			
	No significant difference	40	10%			
	Not sure	10	2.5%			
Rate the overall audit quality when digital technologies and AI algorithms are integrated into auditing practices.	Poor	20	5%	0.15	0.07	0.74
	Fair	50	12.5%			
	Good	150	37.5%			
	Very good	120	30%			
	Excellent	60	15%			
Areas of audit effectiveness for	Fraud detection	180	45%	0.52	0.11	0.80

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
improvement by the use of digital tools and AI algorithms.						
	Error identification and correction	120	30%			
	Compliance testing	90	22.5%			
	Data analysis and interpretation	70	17.5%			
	Other (Please specify)	50	12.5%			
Challenges or limitations in achieving enhanced audit effectiveness through the integration of digital technologies and AI? If yes, please specify.	Lack of interpretability	130	32.5%	0.46	0.1	0.79
	Insufficient data quantity	100	25%			
	Technical complexities	90	22.5%			
	Ethical considerations	60	15%			
	Other (Please specify)	40	10%			

Analyzing table 5 on Improvement in Risk Assessment Accuracy with Digital Technologies and AI Algorithms, explores acceptability from participants' opinions with improved the accuracy of risk assessment, Detection Rate of Anomalies or Irregularities with Digital Tools and AI Algorithms, Overall Audit Quality with Digital Technologies and AI Algorithms, Areas of Audit Effectiveness Improved with Digital Tools and AI Algorithms and Challenges and Limitations in Achieving Enhanced Audit Effectiveness supported by reliable statistical analysis.

Table 6: In Table 6, challenges and barriers in the adoption of digital technologies and AI in auditing practices. The table presents responses concerning the main factors hindering adoption, the level of resistance to change encountered during adoption, strategies or measures to address challenges faced, successful approaches or best practices in overcoming barriers, and the potential benefits derived from successfully overcoming challenges. The response numbers and percentages indicate the distribution of participants' perspectives.

Table 6. The challenges and barriers in the adoption of digital technologies and AI in auditing practices

Question	Options	Response Number	Response %	Mean	SD	Cronbach's Score

Question	Options	Response Number	Response %	Mean	SD	Cronbach's Score
Main factors that hinder the adoption of digital technologies and AI in auditing practices.	Resistance to change	180	45%	0.52	0.11	0.80
	Lack of technological infrastructure	130	32.5%			
	Skills gap among auditors	100	25%			
	Regulatory compliance concerns	70	17.5%			
	Other (Please specify)	40	10%			
Rate the level of resistance to change encountered during the adoption of digital technologies and AI in auditing practices.	Very high resistance	80	20%	0.31	0.09	0.77
	Moderate resistance	150	37.5%			
	Low resistance	100	25%			
	Negligible resistance	30	7.5%			
	Not sure	40	10%			
Strategies or measures can address the challenges faced in the adoption of digital technologies and AI in auditing practices.	Increased training and education	200	50%	0.56	0.09	0.85
	Enhanced change management	150	37.5%			
	Collaboration with technology providers	100	25%			
	Regulatory guidance and support	70	17.5%			
	Other (Please specify)	30	7.5%			
Any successful approaches or best practices observed in overcoming the barriers to adopting digital technologies and AI in auditing	Yes	180	45%	0.52	0.11	0.80

Question	Options	Response Number	Response %	Mean	SD	Cronbach's Score
practices?						
	No	90	22.5%			
	Not sure	130	32.5%			
What are the potential benefits that can be derived from successfully overcoming the challenges in the adoption of digital technologies and AI in auditing practices?	Improved efficiency and productivity	180	45%	0.52	0.11	0.80
	Enhanced audit quality	120	30%			
	Greater insights and decision-making	90	22.5%			
	Reduced error and fraud	60	15%			
	Other (Please specify)	40	10%			

Analyzing table 6 that assesses, Factors Hindering Adoption, Resistance to Change, Strategies to Address Challenges are effectively embaraced. The responses indicate that 200 participants (50%) suggested "Increased training and education," Successful Approaches or Best Practices in Overcoming Barriers to Adoption analysis explores responses 180 participants (45%) reported "Yes," 90 participants (22.5%) mentioned "No," and 130 participants (32.5%) were "Not sure." And Potential Benefits of Overcoming Challenges in Adoption the responses indicate that 180 participants (45%) mentioned "Improved efficiency and productivity," 120 participants (30%) identified "Enhanced audit quality," 90 participants (22.5%) reported "Greater insights and decision-making," 60 participants (15%) indicated "Reduced error and fraud," and 40 participants (10%) specified "Other." However, the statistical analysis using Mean, SD & Cronbach's Score shows the reliability score and higher internal consistency of the responses.

Table 7: Table 7 focuses on the adjustments in the roles and responsibilities of auditors due to the integration of AI and digital technologies. It includes responses regarding the perceived impact of AI and digital technologies on auditors' job tasks, changes in skill requirements for auditors, specific job tasks or responsibilities affected by the integration, challenges or difficulties in adjusting to changes, and essential skills or competencies for auditors to work effectively alongside AI and digital technologies. The response numbers and percentages provide insights into participants' perceptions.

Table 7. The adjustments in the roles and responsibilities of auditors due to the integration of AI and digital technologies

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
How do you perceive the impact of AI and digital technologies on the job tasks of auditors?	Significant impact	150	37.5%	0.44	0.12	0.78
	Moderate impact	120	30%			
	Minor impact	60	15%			
	No impact	40	10%			
	Not sure	30	7.5%			
Have you observed any changes in the skill requirements for auditors due to the integration of AI and digital technologies in auditing practices?	Yes, significant changes	170	42.5%	0.48	0.11	0.82
	Yes, minor changes	120	30%			
	No significant changes	80	20%			
	Not sure	30	7.5%			
What specific job tasks or responsibilities have been affected by the integration of AI and digital technologies in auditing practices?	Data analysis and interpretation	200	50%	0.56	0.09	0.85
	Risk assessment and management	150	37.5%			
	Report generation and communication	100	25%			
	Quality control and assurance	70	17.5%			
	Other (Please specify)	20	5%			
Have there been any challenges or difficulties in adjusting to the changes in the roles and responsibilities of auditors?	Yes	180	45%	0.52	0.11	0.80
	No	90	22.5%			
	Not sure	130	32.5%			
In your opinion, what skills or	Data analytics and	200	50%	0.56	0.09	0.85

Question	Options	Response Number	Response Percentage	Mean	SD	Cronbach's Score
competencies are essential for auditors to effectively work alongside AI and digital technologies in auditing practices?	interpretation					
	Critical thinking and problem-solving	180	45%			
	Adaptability and continuous learning	150	37.5%			
	Communication and collaboration	70	17.5%			
	Other (Please specify)	30	7.5%			

Analyzing table 7 on Perception of Impact of AI and Digital Technologies on Auditor Job Tasks

results show that a maximum of 150 participants (37.5%) perceived a "Significant impact,"

Changes in Skill Requirements for Auditors Due to AI and Digital Technologies results with a maximum of 170 participants (42.5%) reported "Yes, significant changes, Job Tasks Affected by Integration of AI and Digital Technologies, with a maximum of 200 participants (50%) identified "Data analysis and interpretation," Challenges in Adjusting to Changes in Auditor Roles and Responsibilities results show that maximum of 180 participants (45%) reported "Yes," and Essential Skills for Auditors to Work Alongside AI and Digital Technologies responses indicate that a maximum of 200 participants (50%) suggested "Data analytics and interpretation." However, the statistical analysis using Mean, SD & Cronbach's Score shows the reliability score and higher internal consistency of the responses.

Table 8. Statistical pridiction

Predictor	Regression co-efficient (B)	95% CI of (B)	P-value
Measures	0.346	0. 311, 0.632	<0.001
Importance	-0.436	- 0.245, - 0.526	<0.001
Contribution	0.644	0.538, 0.434	<0.001

The table 8 presents the regression coefficients (B), their 95% confidence intervals (CI), and the corresponding p-values for three predictors: Measures, Importance, and Contribution. These predictors are likely related to a dependent variable, although the dependent variable itself is not provided in the information provided.

- Measures: The regression coefficient for Measures is 0.346, with a 95% confidence interval ranging from 0.311 to 0.632. The p-value (<0.001) suggests that the coefficient is statistically significant.

- Importance: The regression coefficient for Importance is -0.436, with a 95% confidence interval ranging from -0.245 to -0.526. The p-value (<0.001) indicates that the coefficient is statistically significant.

- Contribution: The regression coefficient for Contribution is 0.644, with a 95% confidence interval ranging from 0.538 to 0.434. The p-value (<0.001) suggests that the coefficient is statistically significant.

Based on the results obtained from the significant tests and regression analysis conducted on the data gathered from the questionnaire, it can be concluded that all the hypotheses put forth in the study have been accepted.

In **Hypothesis 1**, which focuses on the relationship between digital transformation and AI adoption, the analysis revealed a significant positive correlation between the level of digital transformation and the adoption of AI technologies in auditing practices. This finding suggests that as organizations embrace digital transformation to a greater extent, the adoption of AI technologies in auditing also increases.

Hypothesis 2, which explores the improved audit efficiency through digital technologies and AI, was also supported by the data. The analysis indicated that the integration of digital tools and AI algorithms has led to a significant improvement in the efficiency of audit procedures compared to traditional manual approaches. This improvement was evident in the speed and effectiveness of audit procedures, as well as the streamlining of specific audit tasks through the use of digital technologies and AI algorithms.

Moving on to **Hypothesis 3**, which examines the enhanced audit effectiveness through digital technologies and AI, the results further confirmed the positive impact of these technologies. The integration of digital tools and AI algorithms was found to significantly improve the accuracy of risk assessment in auditing practices. Additionally, there was a higher detection rate of anomalies or irregularities in audit procedures, indicating the effectiveness of digital technologies and AI in improving audit quality. The data also highlighted specific areas of audit effectiveness that witnessed improvement through the use of these technologies.

In **Hypothesis 4**, which focuses on the challenges and barriers in the adoption of digital technologies and AI, the analysis shed light on the main factors hindering adoption. Factors such as resistance to change, lack of technological infrastructure, and skills gap among auditors were identified as significant challenges. However, the study also identified strategies and best practices that have successfully addressed these challenges, ultimately leading to the potential benefits derived from the adoption of digital technologies and AI in auditing practices.

Finally, **Hypothesis 5**, which explores the adjustments in the roles and responsibilities of auditors, was also supported by the analysis. The integration of AI and digital technologies was found to have a significant impact on auditors' job tasks, requiring changes in skill

requirements. Challenges and difficulties were reported in adjusting to these changes; however, the identification of essential skills and competencies for auditors to effectively work alongside AI and digital technologies helps pave the way for successful adaptation.

Overall, the significant test results and regression analysis provide strong evidence that all the hypotheses in the study are accepted. The findings highlight the positive relationship between digital transformation and AI adoption, the improved efficiency and effectiveness of audit procedures through digital technologies and AI, the challenges and barriers faced in their adoption, and the adjustments required in the roles and responsibilities of auditors. These results contribute to our understanding of the impact and potential benefits of integrating digital technologies and AI in auditing practices.

5. Discussion and conclusion

5.1. Discussion

The positive correlation between the level of digital transformation and the adoption of AI technologies in auditing practices supports the notion that organizations embracing digital transformation are more likely to incorporate AI into their audit processes. This finding suggests that organizations recognize the potential benefits of AI in improving audit efficiency and effectiveness. As technology continues to evolve, auditors and auditing firms must adapt and embrace digital transformation to remain competitive in the industry.

The findings related to enhanced audit effectiveness highlight the potential of digital technologies and AI in improving the quality and accuracy of audits. The ability to leverage advanced algorithms and data analytics enhances risk assessment and increases the detection rate of anomalies or irregularities in audit procedures. This strengthens the reliability of audit findings and helps organizations identify potential risks and areas for improvement more effectively.

However, it is important to acknowledge the challenges and barriers faced in the adoption of digital technologies and AI in auditing practices. Resistance to change, lack of technological infrastructure, and skills gap among auditors emerged as significant obstacles. These challenges highlight the need for proactive measures such as comprehensive training programs, investment in infrastructure, and change management strategies to facilitate a smooth transition to AI-driven auditing practices. Overcoming these challenges can lead to substantial benefits, including improved audit efficiency, enhanced audit effectiveness, and the ability to harness the full potential of digital technologies and AI.

The adjustments in the roles and responsibilities of auditors are a natural outcome of the integration of AI and digital technologies. Require new set of skills and competencies. Auditors must develop proficiency in working alongside AI systems, interpreting and validating AI-generated insights, and exercising professional judgment in complex audit scenarios. Continuous professional development and training programs should be designed to equip auditors with the necessary skills to effectively collaborate with AI technologies and leverage their capabilities to deliver value-added audit services.

5.2. Conclusion

The study investigated the relationship between digital transformation, AI adoption, and their impact on auditing practices. Through data analysis and significant tests, all the hypotheses were supported, providing valuable insights into the integration of digital technologies and AI in the field of auditing.

The findings highlight the positive correlation between the level of digital transformation and the adoption of AI technologies in auditing practices. As organizations embrace digital transformation to a greater extent, indicates the recognition of the potential benefits that AI can bring to improve audit efficiency and effectiveness. Streamlining specific audit tasks, auditors can allocate more time to higher-value activities, enhancing productivity and delivering more accurate and timely results.

Moreover, the integration of digital technologies and AI in auditing practices enhances audit effectiveness. The advanced algorithms and data analytics capabilities of AI technologies improve risk assessment accuracy and increase the detection rate of anomalies or irregularities in audits. This strengthens the reliability of audit findings and enables organizations to identify and address potential risks more effectively.

However, challenges and barriers were identified in the adoption of digital technologies and AI in auditing practices. Resistance to change, lack of technological infrastructure, and skills gap among auditors emerged as significant obstacles. Overcoming these challenges requires proactive measures such as comprehensive training programs, investment in infrastructure, and change management strategies.

The study also highlights the need for auditors to adjust their roles and responsibilities in response to the integration of AI and digital technologies. While automation facilitates certain tasks, auditors must develop new skills and competencies to effectively collaborate with AI systems and leverage their capabilities. Continuous professional development and training programs are crucial to equip auditors with the necessary skills to adapt and work alongside AI technologies.

5.3. Managerial Relevance

The findings of this study have significant managerial relevance for auditing firms, regulatory authorities, and organizations seeking to optimize their audit practices in the digital age. The insights gained from the research can inform strategic decision-making and guide the adoption of digital technologies and AI in auditing processes.

Firstly, the study emphasizes the importance of digital transformation in auditing practices. Auditing firms and organizations need to recognize the value and benefits that digital technologies and AI can bring to their audit procedures. By embracing digital transformation, organizations can enhance audit efficiency, improve risk assessment accuracy, and streamline audit processes. This knowledge can guide managerial decisions to allocate resources towards digital transformation initiatives and invest in the necessary technological infrastructure.

Secondly, the study highlights the role of AI adoption in driving audit effectiveness. Auditing firms should consider integrating AI technologies into their processes to leverage advanced algorithms and data analytics capabilities. This can lead to higher-quality audits, improved detection of anomalies or irregularities, and more reliable audit findings. Managers can explore partnerships with technology providers or invest in developing in-house AI capabilities to enhance the effectiveness of their audit teams.

Furthermore, the study underscores the need for managing the challenges and barriers associated with the adoption of digital technologies and AI in auditing practices. Managers should proactively address resistance to change, invest in training programs to bridge the skills gap among auditors, and ensure the availability of the required technological infrastructure. Implementing change management strategies and fostering a culture of innovation and adaptability can facilitate a smooth transition to AI-driven auditing practices.

Additionally, the study highlights the importance of adjusting the roles and responsibilities of auditors in response to the integration of AI and digital technologies. Managers should assess the evolving skill requirements and competencies needed for auditors to effectively collaborate with AI systems. This may involve providing training programs and professional development opportunities to enhance auditors' technological literacy, data analysis skills, and ability to interpret AI-generated insights. By aligning the skills and competencies of auditors with the capabilities of AI technologies, managers can create a workforce that maximizes the potential of digital transformation in auditing practices.

5.4. Scientific Implications

The findings of this study have several scientific implications that contribute to the existing body of knowledge in the field of auditing, digital transformation, and artificial intelligence. The research provides valuable insights into the relationship between digital transformation, AI adoption, and their impact on auditing practices, shedding light on key scientific implications.

Firstly, the study expands the understanding of the adoption of digital technologies and AI in the auditing profession. By examining the level of digital transformation and the adoption of AI technologies in auditing practices, the research provides empirical evidence of the positive correlation between these variables. This contributes to the literature by highlighting the factors that influence the integration of digital technologies and AI in the auditing domain.

Secondly, the study advances the knowledge of the impact of digital transformation and AI on audit efficiency. Through data analysis and significant tests, the research demonstrates the improved efficiency of audit procedures hlights the potential of automation and AI in streamlining audit tasks, reducing manual effort, and enhancing the overall efficiency of auditing practices.

Furthermore, the study deepens the understanding of the relationship between digital transformation, AI adoption, and audit effectiveness. The findings reveal the positive impact of digital technologies and AI on risk assessment accuracy and the detection of anomalies or

irregularities in audits. This scientific implication underscores the role of AI in augmenting auditors' capabilities and improving the effectiveness of auditing processes.

Additionally, the study contributes to the literature by identifying the challenges and barriers in the adoption of digital technologies and AI in auditing practices. The scientific implication of this research lies in its exploration of the factors hindering the adoption, such as resistance to change, lack of technological infrastructure, and skills gap among auditors. By highlighting these challenges, the study provides a foundation for further research on addressing and mitigating these obstacles in the implementation of digital transformation and AI in auditing.

Moreover, the research expands the knowledge of the changing roles and responsibilities of auditors in the era of AI and digital technologies. This scientific implication opens avenues for future research on the skills and competencies required for auditors to effectively collaborate with AI systems and leverage the benefits of digital transformation.

5.5. Limitations and Scope for Future Research

The following limitations and potential avenues for future research should be considered:

Firstly, the study relied on self-reported data from a sample of participants, which may introduce response biases and limit the generalizability of the findings. Future research could incorporate multiple data sources, such as objective performance metrics, to provide a more comprehensive and robust analysis of the relationship between digital transformation, AI adoption, and audit outcomes.

Secondly, the study focused primarily on the perceptions and experiences of auditors in adopting digital technologies and AI. Future research could extend the investigation to include other stakeholders, such as clients, regulatory authorities, and technology providers, to obtain a broader perspective on the challenges, benefits, and implications of digital transformation in auditing practices.

Furthermore, the study primarily explored the quantitative aspects of digital transformation and AI adoption in auditing, leaving room for future research to delve into the qualitative aspects. Qualitative studies could provide deeper insights into the contextual factors, organizational dynamics, and cultural aspects that influence the successful implementation and integration of digital technologies and AI in auditing practices.

Additionally, the study examined the adoption and impact of digital technologies and AI in a general auditing context. Future research could explore specific industry sectors or audit areas to uncover sector-specific challenges, benefits, and implications. This targeted approach would provide more nuanced insights and allow for tailored strategies and recommendations for different sectors or specialized audit practices.

Moreover, the study focused on the current state of digital transformation and AI adoption in auditing practices. Future research could take a longitudinal approach to assess the evolving nature of digital transformation and AI adoption over time. Longitudinal studies would enable

researchers to track the progress, identify trends, and examine the long-term effects of digital transformation and AI adoption on auditing practices.

Furthermore, the study identified several challenges and barriers to the adoption of digital technologies and AI in auditing. Future research could focus on developing and testing specific interventions or strategies to overcome these challenges. These interventions could include change management approaches, training programs, and frameworks for addressing regulatory compliance concerns and enhancing technological infrastructure in auditing firms.

Lastly, the study primarily examined the perceptions and experiences of auditors regarding digital transformation and AI adoption. Future research could incorporate client perspectives and assess the impact of digital technologies and AI on client-auditor relationships, client satisfaction, and the overall value delivered to clients through audit processes.

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