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The impact of artificial intelligence on tax compliance through the mediating role of electronic auditing

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This study aimed to demonstrate the impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance through the mediating role of electronic auditing. The research method used in this study was the descriptive analytic technique, to describe and analyze the phenomenon of the study, which is the effect of artificial intelligence on tax compliance through the mediation of electronic auditing and its relevance to the Jordanian tax authorities. The targeted study population was 205 auditors comprising the directorate of first commercial, directorate of second commercial, directorate of industrial and directorate of services of the income and sales tax department. These are the persons who represent the parties with special knowledge and experience in tax auditing issues. Because of the restricted number of people in the research, an extensive survey technique was applied to choose the study sample. The sample for this research study became the population amounting to 205 people in the Director of Large Taxpayer and medium Tax Payer Department of Income and Sales Tax. SPSS V. 20 was used to process and analyze all the data employing several statistical techniques. In line with the stated objectives, the study established important conclusions where the first was the presence of a significant effect of artificial intelligence on tax compliance through the influential electronic auditing variable. This means to emphasize the significance and function of technologies and AI in the sphere of electronic auditing and to develop their potential in organizing the tax processes and increasing the level of tax compliance. The first systematic suggestions stress the fact that improvements and modernization of the IT environment within the scope of tax departments is needed in order to ensure sufficient support for electronic auditing and artificial intelligence, and to equip the latter with suitable tools and big data analysis software.

1. Introduction

In light of successful technological innovations, the AI technologies have turned into an indispensable tool employed in the electronic auditing processes such as combating fraud and tax evasion. This is done through the constant and recurrent evaluation of information, data, activities and tasks with regard to the evaluation of the accuracy and the validity of the financial tax data. Various new technologies available allow effectively performing the optical analysis of the enormous amount of data within a very short time and, moreover, recognize various suspicious patterns and tendencies that may be invisible to the traditional analysis. Electronic auditing is also complemented by the use of artificial intelligence in improving different forms of auditing, detecting any form of suspicious activities or taxpayers' non-compliance which may lead to fraud in different financial and tax related activities (Lehner et al., 2022; Alkhawaldeh et al., 2024). Thus, utilizing the dimensions

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of artificial intelligence such as genetic algorithms, neural networks, intelligent agents, and machine learning, tax compliance was investigated with the mediating of electronic auditing.

1.1 Problem Statement and Questions

The operations of tax authorities are characterized by an increasing number and diversity, which enhances the opportunities for taxpayer tax evasion. Earlier, many of these authorities' procedures were not easily controlled because their human methods resembled AI tools, but once AI and its tools came into the picture, controlling these authorities has become easier due to skillfulness, accuracy, and fast response of AI tools. These are convenient features that enable the head office officials of these authorities to oversee the specifics of their tax activities and provide alerts in case there are any signs of illicit occurrences. Electronic auditing can be viewed as the counterpart of the artificial intelligence's continuous identification of cases of non-compliance among taxpayers, thus working in parallel with any tax collection process that may take place at any given time within the authorities or throughout the internet. Thus, these authorities should and must harness and reap the advantages of artificial intelligence systems to define the rate of taxpayers' non-compliance given the use of technology in auditing.

Thus, the study problem is embodied in the following questions:

1. Is there a statistically significant impact at the significance level ($\alpha \leq 0.05$) of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance?
2. Is there a statistically significant impact at the significance level ($\alpha \leq 0.05$) of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on electronic auditing?
3. Is there a statistically significant impact at the significance level ($\alpha \leq 0.05$) of electronic auditing on tax compliance?
4. Is there a statistically significant impact at the significance level ($\alpha \leq 0.05$) of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance through the mediating role of electronic auditing?

1.2 Objectives of the Study

The study aims to achieve the following objectives:

1. To identify the impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance.
2. To identify the impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on electronic auditing.
3. To identify the impact of electronic auditing on tax compliance.
4. To identify the impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance through the mediating role of electronic auditing.

1.3 Hypotheses of the Study

Based on the study's problem questions, the hypotheses are as follows:

1. **Main Hypothesis H_{01}**: There is no statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance.

2. **Main Hypothesis H_{02}**: There is no statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on electronic auditing.

3. **Main Hypothesis H_{03}**: There is no statistically significant impact of electronic auditing on tax compliance.

4. **Main Hypothesis H_{04}**: There is no statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance through the mediating role of electronic auditing.

2. Theoretical perspective and the proposed study

Artificial intelligence as a theoretical intellectual entry: Artificial intelligence is the newest innovation in the developing technological age that is considered to garner a great deal of interest, particularly in the different facets of the developed nations. Thus, there have been a number of approaches trying to seek a definite characterization of the artificial intelligence, which can be viewed as the concept that has only started being applied from the accounting standpoint recently. Currently, there is no fixed definition in its regards but a general agreement among scholars regarding a single parameter to define it, which is that Ai is a branch of knowledge that is concerned with how to fashion computer machinery that might generate human-like intelligence (Copeland, 2018). Hence, (Elaine, 2017) presented Artificial Intelligence as a way of how to cause the machines to accomplish the tasks that are assigned to them better than people and how to make systems have basic thinking and actions as those of people. In regard to (Eletter, 2018; Ismaeel et al., 2023), they described it as a system associated with

designing and applying algorithms for data analysis, learning, and interpretation. Through logical discovery, it makes an overall coordination and organization of several learning techniques and probability theories. In More Classes, it discusses how one can build computer technology that would be capable of doing things similar to what the human mind does; teach, walk, pretend, and decide.

Some have even gone so far as to say that it's the process of creating new ideas by modelling human thought processes in computers and basing cutting-edge software on the data and information that underpins information systems. This is the method by which a person's intelligence can be codified into a set of algorithms, a set of data systems, and a set of programming languages (Yu et al., 2018). In order to further clarify how AI differs from previous technologies, Hamm and Klesel (2021) proposed five definitions:

1. Its capacity to resolve intricate issues, allowing it to tackle difficulties that were previously inconceivable.
2. Computational methods that mimic human actions, suggesting that AI is a reflection of human intelligence.
3. Considering various elements of intelligent functions, their link with intelligence is the third point.
4. Its foundation on well-known technology.
5. It draws on external data sources for learning, as is customary with artificial intelligence.

2.1 Intellectual Characteristics of Artificial Intelligence

In the presented problems artificial intelligence is unique and innovative in terms of Intellectual Property, for the given problems it needs no complete information, it can think and perceive, learn as well as understand from past experiences, adapt old experiences for new problems and employ trial and error to explore other matters and it is also capable of quick response in these problems. It is also capable of solving complicated and delicate cases and situations wherein there is a lack of information in finding out the relative significance of the facets of the provided cases. Thus, there is a description of these intelligent systems as capable of imagining, creating, understanding and perceiving visual matters in order to provide information for manager’s decisions (Al-Lawzi, 2012; Ahmad et al., 2024). Therefore, artificial intelligence includes the following types:

1. Expert Systems
2. Neural Networks
3. Genetic Algorithms
4. Intelligent Agents

2.2 Electronic Auditing: Definition and Importance - A Theoretical Approach

Electric auditing was defined based on the meaning that Abdullah and Mustafa ,(2017) gave to it, and it is a general sort of auditing that implies the use of information technologies in the process of planning, control, and documentation in order to fulfill the tasks of protection of the assets of the economic unit, the effective usage of resources, and the achievement of the set goals and the guarantee of the accuracy of the financial data As stated by (Yakhlef & Tarchi , 2020), electronic auditing can be defined as the deployment of auditing systems through information technology, replacing manual operations in an attempt to contribute to the fulfillment of auditing process objectives, as fast and efficiently as possible. The significance and relevance of electronic auditing are clear in ensuring the enhancement of the image and profession of auditors and the enhancement of the efficiency and effectiveness of auditing in an organization. It improves the ease with which the auditors can employ safe auditing methods and standards, especially in cases of continuum and permanency, and also the creation of a database that includes tables, tasks, and audit activities which would be time saving and less demanding on the part of the auditor. Furthermore, the importance of electronic auditing is highlighted in its role in activating the auditor's role and participation in the areas of information technology environment control. This increases the ability to detect errors, reduce system manipulation, and address problems and deviations that may occur (Ben Al-Din, 2014).

2.3 Tax Compliance: Definition and Intellectual Importance

Tax compliance has been described as the ability of taxpayers and other entities that are expected to pay taxes to do so in compliance with the existing laws. This entails the taxpayer enrolling in that system, reporting taxes due at the correct time and in the right manner, and ensuring complete reporting for record-keeping purposes, alongside making tax payments on time (Income and Sales Tax Department, 2023). Tax compliance also partners with the concept of the taxpayer (taxpayer) performing obligations set out by the law. To some extent, tax laws entail the provision of several duties like any other legal provisions. Such obligations include, but are not limited to, registration with the tax authorities, filing tax returns in accordance with legal requirements and within statutory time frames, payment of due taxes, provision of information and records, keeping accounts, and cooperating with the tax authorities (Al-Zaqeba et al., 2018). This can be explained by the prevention of fines given to the taxpayers under the current systems and regulations on tax compliance. Compliant taxpayer does not face the kind of penalties that would otherwise accrue from partial or complete noncompliance (Trifan et al., 2023). Revenue bodies continually seek to optimize compliance from taxpayers to accomplish various goals through raising awareness of taxation, helping taxpayers, releasing guidance, etc. In the same regard, these authorities assess and review the accounts of taxpayers in accordance with risk parameters for categorization of taxpayers by risk as dictated by various relative standards that capture

the behavior and general compliance of taxpayers. Thirdly, for tax purposes, authorities put into practice penalties and fines and criminalize certain deeds done for the objective of tax evasion (Cechovsky, 2018).

2.4 Role of Artificial Intelligence in Tax Compliance in the Jordanian Tax Department

In light of the analyzed definitions of the study variables and their significance, researchers identify the usefulness of AI in the Jordanian tax department. Electronic auditing primarily complements AI systems in identifying suspicious behaviors in financial transactions and in processing and analyzing financial information and transactions with the aid of machine learning and data analysis. Whenever such a pattern is observed, the audit teams and other relevant authorities are alerted hence can quickly act to check on compliance hence curb any tax fraud. Also, electronic auditing is involved in the reviewing and assessing the system and procedure of applying smart technologies to identify the compliance of taxpayers. This also denotes, as stated by the researchers, the relevance and purpose of employing technology and artificial intelligence in electronic auditing activities and in the development of their function in managing taxes and increasing the degree of compliance. AI also helps in making audit processes more effective by helping analyze tax data, improving data quality that is used in audits, and offering accurate and unambiguous electronic records. It also helps detect tax violations better and provides more reliable tax results and analyses, identify potential risks, design efficient audit strategies, and increase the accountability and trust in tax activities.

Practical Aspect

- **Study Methodology:** According to the given objectives of the study, the descriptive-analytical method was applied. This is one of the frequently applied models in field research because it assists in describing the phenomenon of interest. In this case, it involves understanding artificial intelligence and its effect on the compliance of taxes, given the fact that auditing is electronic. This process allows for comprehending the environment and changing factors to obtain the study-related outcomes, and for determining the recommendations and suggestions as the studied results in the form of solutions.

- **Study Population:** The study sample consisted of 205 respondents consisting of auditors from GT's Large Taxpayers Directorate and Medium Taxpayers Directorates, which include First Commercial Directorate, Second Commercial Directorate, Industrial Directorate, and Service Directorate, income and sales tax department. These auditors are quite operational and even specialized in issues to do with tax auditing.

Study Sample

Since the study is sample-based research, the method of survey was employed in order to meet the study sample from the pool of study population due to the limitation of its size. Therefore, the sample mirrors the population and consists of 205 participants selected from the Large Taxpayers Directorate of Income and Sales Tax Department and the Medium Taxpayer Directorate.

Targeted Analysis Unit

The target population for the study was all the revenue authority employees in the Large Taxpayers Directorate and the Medium Taxpayers Directorates namely; First Commercial Directorate, Second Commercial Directorate, Industrial Directorate, Service Directorate of Income and Sales Tax Department. This includes section heads and all the heads of departments within the taxpayer, audit sensitive, collection, and decision authorization division. The filled questionnaires were administered electronically among the study sample, and all the 205 questionnaires were recovered electronically. Thus, 169 usable questionnaires were received in response to the research study, which gives a response rate of 82.4%.

Reliability Test of the Study instrument

The study instrument reliability test seeks the level of agreement by the study sample in responding to the items in the study instrument in Table 1. The fairness of the study tool was checked using the Cronbach Alpha Coefficient. Using the Coefficient Alpha, the value attained was 0. 70 (70%) or higher, higher the percentage value nearer to 100% reflect the reliability of the study instrument (Sekaran & Bougie, 2016).

Table 1
Internal Consistency Coefficient (Cronbach Alpha) Values for Study Instrument Items

Number	Dimension	# of Paragraphs	Cronbach Alpha
1	Genetic Algorithms	6	0.743
2	Neural Networks	6	0.770
3	Intelligent Agents	6	0.710
4	Machine Learning	6	0.782
5	Artificial Intelligence	24	0.816
7	Tax Compliance	9	0.843
8	Electronic Auditing	6	0.731
	Study instrument	40	0.825

Table 1 illustrates the internal consistency of the overall study tool as well as each of the dimensions and variables within the study tool, where Cronbach's Alpha values above (0. 70). The Cronbach's Alpha coefficient values of the dimensions of Artificial Intelligence were calculated as; (0. 710- 0. 782) for total scale, and (0. 816). Likewise, for the Tax Compliance variable, the Cronbach's Alpha coefficient values varied around 0. 843, whereas for the Electronic Auditing variable, it was around 0. 731. In addition, the calculated Cronbach's Alpha value for all the items using the study tool was (0.825). This shows the validity of the study instrument and the appropriateness of using it in analyzing the findings as well as the hypotheses being tested.

Multiple Linear Regression Test, Variance Inflation Factor, and Allowed Variance.

Multicollinearity is a condition whereby there exists a problem of correlation between two or more independent variables in the multivariable models. This results in a change of the model estimates which are no longer correct and do not depict the actual situation hence making the estimation results inconsequential in decision making. The manifestation of this issue is characterized by very high values of the coefficient of determination (R2), and consequently a rise of the correlation coefficient (R), which gives an unrealistic estimate and might result in wrong decisions.

To establish the existence of multicollinearity of the study variables (independent variables), the Pearson Correlation Coefficient was used given the fact that it is among the common measure of correlation coefficients to check for multicollinearity. Any value of the coefficient less than (0. 80) gives an assurance that multicollinearity does not exist in the study model, and vice versa (Gujarati, 2004). The following table presents the results of the multiple linear regression test to assess the multicollinearity problem: The following table presents the results of the multiple linear regression test to assess the multicollinearity problem:

Table 2
Pearson Correlation Coefficient Values for Testing the Multicollinearity Problem

Variable	Genetic Algorithms	Neural Networks	Intelligent Agents	Machine Learning
Genetic Algorithms	1.000			
Neural Networks	0.535**	1.000		
Intelligent Agents	0.558**	0.510**	1.000	
Machine Learning	0.569**	0.527**	0.582**	1.000

(**) Significant at the 0.01 level

It is also clearly seen that the conditions of multicollinearity are not applicable in the study model since the correlation coefficient ranges from (0. 510 – 0. 582) among the dimensions of the independent variable as shown in the table below; Thus, the maximum correlation coefficient was defined for the "intelligent agents" and "machine learning" variables.

To ensure the reliability of the previous result, the value of Variance Inflation Factor (VIF) and Tolerance were determined for each of the study variables, namely, independent variables. VIF values and Tolerance between (1- 10) and (0.1 - 1.0) respectively depict the non-existence of multicollinearity problems in the study model. The following table shows the values of the VIF and Tolerance: The following table shows the values of the VIF and Tolerance:

Table 3
Variance Inflation Factor and Tolerance Values for Testing Multicollinearity Problem

Variable	VIF	Tolerance
Genetic Algorithms	1.795	0.557
Neural Networks	1.629	0.614
Intelligent Agents	1.784	0.561
Machine Learning	1.839	0.544

The findings presented in Table 3 also reveal that there is no problem of multicollinearity in the study model as all the Variance Inflation Factor (VIF) values lie in the range of (1.629 – 1.839) regarding the sub-constructs of the independent variable. The allowed variance values that were expected were ranging from (0.544 – 0.614).

Statistical Procedures Used:

The study employed parametric tests to analyze the data and test hypotheses, using the Statistical Package for the Social Sciences (SPSS). The following statistical tools were utilized:

1. Percentages and frequencies: Used to describe the personal or demographic data of the study sample.
2. Mean, standard deviation, rank, and relative importance: Utilized to understand the opinions of the study sample regarding the study variables and the level of interest of the researched organization. The relative importance was determined based on the arithmetic means and according to the Likert five-point scale for alternative responses for each item, using the following formula:

$$\text{Relative importance}=\frac{\text{Maximum limit for the alternative - Minimum limit for the alternative}}{\text{Number of levels}}=\frac{1-5}{3}=1.33$$

The levels are expressing the degree of agreement as follows:

High - 5.00 to 3.67, Medium - 3.66 to 2.34, Low - 1.00 to 2.33

3. Simple Linear Regression Analysis: to test the third main hypothesis.

4. Multiple Linear Regression Analysis: to test the first and second main hypotheses.

5. Path Analysis through the software (Amos) supported by (SPSS): to test the fourth main hypothesis.

Data Analysis and Hypothesis Testing

1. Descriptive Analysis of Study Variables:

Table 4 gives the profile of the participants in the study which are the auditors drawn from the directorates of major taxpayers and middle taxpayers of the Income and Sales Tax Department. By the following representation, the study sample indicates that male participants are (66.3%) while female participants are (33.7%. This could be attributed to the nature of the tax auditing work which may demand a lot of time, focus, effort, working beyond working hours, field work and intensive client interaction which may be less appealing to the female gender. There is also substantiated information that 49.1% of the study sample and residents of the studied areas are from 35 – less than 45 years old, which is consistent with the fact that tax auditing work requires time for post-academic study to gain knowledge and skills in the profession. The study sample is relatively well-educated, and the majority, namely 89.3% of the participants have at least a Bachelor's degree. This shows that tax auditors have the necessary scientific knowledge to exercise in auditing tasks. Additionally, (49.7%) of the study sample are accountants, thus ensuring they are scientifically knowledgeable regarding accounting and auditing issues. This we discuss in detail as influenced by the percentage of accountants and the close link between auditing and the accounting profession. I also found out that auditors comprised the largest percentage of the study sample at 75.7% while managers comprised the smallest percentage at 1.8%. This distribution resembles the organizational structure in workplaces since some positions warrant greater authority than others. This is true because auditors are employees empowered to perform tax audits hence the high frequency. Also, a major part of the study sample does not possess any professional certificates as it was established to be (78.1%). This may be as a result of the tasking nature of carrying out tax auditing tasks thus would not afford them the opportunity of pursuing professional certifications.

Table 4

Description of the Personal Data of Study Participants from Respondents

Variable	Category	Repeats	Percentage
Gender	Male	112	66.3
	Female	57	33.7
Age	Less than 25 years old	9	5.3
	25 - less than 35 years old	23	13.6
	35 - less than 45 years old	83	49.1
	45 years old and older	54	32.0
Educational Qualification	Bachelor's degree	151	89.3
	Master's degree	10	5.9
	Doctorate	5	3.0
	Other	3	1.8
Academic Specialization	Accounting	84	49.7
	Business Administration	21	12.4
	Finance and Banking	26	15.4
	Law	19	11.2
	Economics	17	10.1
	Other	2	1.2
Occupation	Manager	3	1.8
	Department Head	18	10.7
	Section Chief	12	7.1
	Auditor	128	75.7
	Other	8	4.7
Number of Professional Certificates	One Certificate	24	14.2
	Two Certificates	10	5.9
	More than Two Certificates	3	1.8
	None	132	78.1
Total		169	%100

The Mean, SD, and perceived importance of the independent variables, its dimensions, tax compliance, and electronic auditing among the auditors of the directorates for senior and medium-sized taxpayers of the Income and Sales Tax Department. The ultrasound results depict a highly positive response from the auditors towards the application of artificial intelligence with an average response of (3.743) and standard deviation of (0.384). The analysis found all the dimensions having high relative importance; however, the highest mean was noticed in the intelligent agent's dimension which has a value of 3.785 with the standard deviation of 0.530, while on the same context the lowest mean was also identified in the machine learning dimension which has the value 3.714 only with standard deviation of 0.576 only. In addition, the responses of the auditors in the

directorates of senior taxpayers and medium-sized taxpayers of the Income and Sales Tax Department for the tax compliance interest shows a high mean score of (3.808) and standard deviation of (0.448). Also, similarly as in the case of the independent variable, there was a high score concerning the level of interest in electronic auditing with an average of (3.841) and a standard deviation of (0.493).

Table 5
Means and Relative Importance of Study Variables and Their Dimensions

Variable	Mean	Standard deviation	Rank	Relative Importance
Genetic Algorithms	3.752	0.501	2	High
Neural Networks	3.721	0.537	3	High
Intelligent Agents	3.785	0.530	1	High
Machine Learning	3.714	0.576	4	High
Artificial Intelligence	3.743	0.384	-	High
Tax Compliance	3.808	0.448	-	High
Electronic Auditing	3.841	0.493	-	High

3. Hypothesis Testing

The six main hypotheses were the hypotheses being tested by the study. These hypotheses basically sought to determine the direct causal relationship between the independent variable: Artificial Intelligence and its related dimensions with the dependent variable: Tax compliance as moderated by the Electronic Auditing variable, and a direct causal relationship between the Electronic Auditing variable and the dependent variable Tax Compliance. Furthermore, it was also designed to examine the mediating variable, which is Electronic Auditing, in the relationship between the independent variable of Artificial Intelligence and the dependent variable of Tax Compliance.

To confirm hypotheses from study, Simple and Multiple Linear Regression analyses as well as Path analysis (Amos) were deployed. undefined

Main Hypothesis 1 (H_{01}): *There is no statistically significant impact at a significance level ($\alpha \leq 0.05$) of Artificial Intelligence and its dimensions (Genetic Algorithms, Neural Networks, Intelligent Agents, and Machine Learning) on Tax Compliance.*

Table 6
Impact of Artificial Intelligence on Tax Compliance

Dependent Variable	Independent Variable	Unstandardized Coefficients		Standardized Coefficients		
		Coefficient B	Standard error	Coefficientβ	Computed T	Sig. T
Tax Compliance	Genetic Algorithms	0.395	0.053	0.402	7.507	0.000
	Neural Networks	0.258	0.054	0.243	4.772	0.000
	Intelligent Agents	0.219	0.053	0.220	4.124	0.000
	Machine Learning	0.171	0.050	0.184	3.395	0.001
Correlation coefficient R			Coefficient of determination R^2	Computed F	Sig. F	
0.859			0.738	115.785	0.000	

Table 6 displays the results of the multiple regression study for the influence of artificial intelligence on tax compliance, where the correlation coefficient (R) value was 0.859, demonstrating a positive association between artificial intelligence and tax compliance. The coefficient of determination (R2) was 0.738, implying that artificial intelligence explains 73.8% of tax compliance variance. The F-value was 115.785 at a significance level of Sig.=0.000, confirming the significance of the regression at a significance level of ($\alpha \leq 0.05$), showing a statistically significant influence of artificial intelligence on tax compliance.

With a computed T-value of 7.507 and a significance threshold of Sig.=0.000, the coefficient (B) for "Genetic Algorithms" in the coefficients table was 0.395, suggesting a statistically significant impact of genetic algorithms on tax compliance. Similar to this, the "Neural Networks" coefficient (B) was 0.258, showing a statistically significant effect of neural networks on tax compliance, with a computed T-value of 4.772 and a significance level of Sig.=0.000. With a computed T-value of 4.124 and a significance level of Sig.=0.000, the coefficient (B) for "Intelligent Agents" was 0.219, suggesting a statistically significant impact of intelligent agents on tax compliance. In addition, the "Machine Learning" coefficient (B) was 0.171, showing a statistically significant impact of machine learning on tax compliance with a computed T-value of 3.395 and a significance level of Sig.=0.001.

These findings lead to the rejection of the null hypothesis H01 and acceptance of the alternative hypothesis, which reads as follows: “There is a statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance at a significance level of ($\alpha \leq 0.05$)”.

H_{02}: *Artificial intelligence, including its dimensions of genetic algorithms, neural networks, intelligent agents, and machine learning, does not have a statistically significant effect on electronic auditing at a significance level of ($\alpha \leq 0.05$).*

Table 7
Impact of Artificial Intelligence on Electronic Auditing

Dependent Variable	Independent Variable	Unstandardized Coefficients		Standardized Coefficients		
		B Coefficient	Standard error	β Coefficient	Computed T	Sig. T
Electronic Auditing	Genetic Algorithms	0.230	0.088	0.206	2.626	0.009
	Neural Networks	0.288	0.090	0.239	3.203	0.002
	Intelligent Agents	0.140	0.088	0.124	1.584	0.115
	Machine Learning	0.256	0.084	0.242	3.046	0.003
R Correlation coefficient			Coefficient of determination R^2	Computed F		Sig. F
0.662			0.438	31.919		0.000

The effects of artificial intelligence on electronic auditing are examined in Table 7 using multiple regression analysis. The correlation coefficient (R) value of 0.662 shows that there is a positive association between artificial intelligence and electronic auditing. With a coefficient of determination (R^2) of 0.438, artificial intelligence can account for 43.8% of the variance in electronic auditing. The regression's significance was confirmed at a significance level of $\alpha \leq 0.05$, with an F-value of 31.919 at Sig.=0.000. This suggests that artificial intelligence has a statistically significant impact on electronic auditing.

With a computed T-value of 2.626 and a significance level of Sig.=0.009, the coefficient (B) for "Genetic Algorithms" in the coefficients table was 0.230, suggesting a statistically significant impact of genetic algorithms on electronic auditing. Similar to this, the "Neural Networks" coefficient (B) was 0.288, showing a statistically significant impact of neural networks on electronic auditing, with a computed T-value of 3.203 and a significance level of Sig.=0.002. On the other hand, the "Intelligent Agents" coefficient (B) was 0.140, showing no statistically significant influence of intelligent agents on electronic auditing, with a computed T-value of 1.584 and a significance level of Sig.=0.115. Furthermore, the estimated T-value of 3.046 and the significance level of Sig.=0.003 for the "Machine Learning" coefficient (B) of 0.256 show that machine learning has a statistically significant impact on electronic auditing. The alternative hypothesis, which reads, "There is a statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on electronic auditing at a significance level of ($\alpha \leq 0.05$)", is accepted in light of these findings and the null hypothesis, H02, is rejected.

H_{03}: *Electronic auditing has no statistically significant effect on tax compliance at a significance level of ($\alpha \leq 0.05$).*

Table 8
Impact of Electronic Auditing on Tax Compliance

Dependent Variable	Independent Variable	Unstandardized Coefficients		Standardized Coefficients		
		B Coefficient	Standard error	β Coefficient	Computed T	Sig. T
Tax Compliance	Electronic Auditing	0.655	0.046	0.744	14.387	0.000
R Correlation coefficient			Coefficient of determination R^2	Computed F	Sig. F	
0.744			0.553	206.987	0.000	

The effects of electronic auditing on tax compliance are examined using simple regression analysis in Table (8). The correlation coefficient (R) value of 0.744 indicates a favorable association between electronic auditing and tax compliance. With a coefficient of determination (R2) of 0.553, electronic auditing accounts for 55.3% of the variation in tax compliance. At a significance level of $\alpha \leq 0.05$, the regression's significance was confirmed by the F-value of 206.987 at Sig.=0.000, suggesting a statistically significant impact of electronic auditing on tax compliance. With a computed T-value of 14.387 and a significance threshold of Sig.=0.000, the coefficient (B) for "Electronic Auditing" in the coefficients table was 0.655, suggesting a statistically significant impact of electronic auditing on tax compliance. These findings support the acceptance of the alternative hypothesis, which reads, "There is a statistically significant impact of electronic auditing on tax compliance at a significance level of ($\alpha \leq 0.05$)", and the rejection of the null hypothesis, H_{03}.

H_{04}: *Through the mediating role of electronic auditing, there is no statistically significant impact of artificial intelligence with its dimensions (genetic algorithms, neural networks, intelligent agents, and machine learning) on tax compliance at a significance level of ($\alpha \leq 0.05$).*

The fourth key hypothesis was analyzed in order to ascertain the mediating role of electronic auditing on the relationship between tax compliance and artificial intelligence. The findings are as follows:

Table 9
Results of Path Analysis to Examine the Direct and Indirect Effect of Artificial Intelligence Dimensions on Tax Compliance with Electronic Auditing as A Mediating Variable.

Variable	Direct effect		Indirect effect		Total effect	
	Artificial intelligence	Electronic auditing	Artificial intelligence	Electronic auditing	Artificial intelligence	Electronic auditing
Electronic auditing	**1.049**	**-**	**-**	**-**	**1.049**	**-**
Tax compliance	**1.079**	**0.122**	**0.128**	**-**	**1.207**	**0.122**

Table 9 depicts that direct significant effect of artificial intelligence on electronic auditing attained (1.049), whereas on tax compliance it attained (1.079) and on the other hand, direct significant effect of artificial intelligence attained (0.122) on tax compliance through electronic auditing.

Thus, Table 9 demonstrates that for the indirect effect of the study independent variable artificial intelligence on tax compliance with the presence of mediating variable electronic auditing was reached (0.128), it indicates the significant role of mediating variable in the relationship between the study independent variable and dependent variable where the total impact of the study independent variable artificial intelligence on the dependent variable tax compliance, with the presence of the mediating variable electronic auditing reached (1 Thus, electronic auditing is deemed as a partial mediator.

This supports the postulation on the effect of artificial intelligence on tax compliance through the positive effect of electronic auditing as a mediating variable. Therefore, it can be said that there is an indirect effect of artificial intelligence on tax compliance with the presence of electronic auditing as a mediating variable, and thus the null hypothesis (H04) can be rejected, and the alternative hypothesis, which states that: Thus, given the research hypothesis and null hypothesis: 'H1: Artificial intelligence has a statistically significant positive effect on tax compliance through the mediating-role of electronic auditing', the statement: 'Therefore, it can be concluded that there is a statistically significant impact at a significance level ($\alpha \leq 0.05$) of artificial intelligence on tax compliance through the mediating role of electronic auditing'.

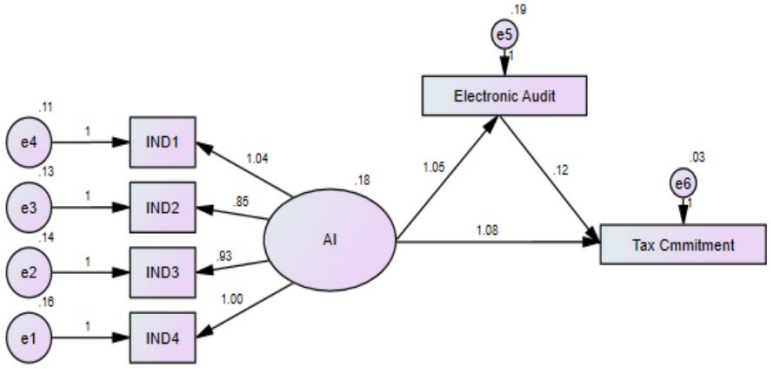

Fig. 1. Main Hypothesis Four

4. Results and Recommendations

4.1 Results

The study reached the following results:

1. Senior tax auditors and organizations of mid-sized taxpayers handling the Income and Sales Tax Department show great interest in artificial intelligence. In all the dimensions, the mean was relatively high- the highest mean was recorded in the dimension of smart agents, followed by the dimension of algorithmic genes, then the dimension of neural networks and the lowest mean noted in the machine learning dimension hence depicting a higher perception of the importance of artificial intelligence technologies among the tax auditors into the SCM operations. These technologies are helpful in updating the examination and analysis of pertinent data and tax information, refining the probability of taxes, and comprehending sophisticated patterns in data.

2. This research explains the level of interest that senior tax auditors and medium-sized taxpayers in the Income and Sales Tax Department have in tax compliance. This may suggest an up-to-date profession taxing itself more aware of its obligations to respect the laws on taxation and legislation as well as avoid the loopholes of the law as pertains to taxation and incurring legal and financial recourse costs.

3. Future work in electronic auditing favored a higher level of interest among the senior tax auditors originating from the Income and Sales Tax Department besides the middle size of the taxpayers. This shows that the tax auditors are more interested in using technology in the field of tax auditing and they have realised that it plays a great role in enhancing their efficiency and rate of auditing, the voluntary adoption of technology in tax compliance, the enhancement of efficient procedures in tax compliance and legal compliance with tax laws, monitoring and analyzing data as well as identifying pat- terns and trends.

4. It is also established that the appellant has a statistically significant effect on tax cooperation where the results are scaled up and observed in relation to artificial intelligence and all shades of it including, genetic algorithms, neural

networks, intelligent agents, and machine learning. This basically emphasizes the role of artificial intelligence techniques and the possibility of raising the level of tax compliance and advances in the practice of taxation. Such techniques are useful in analyzing taxes and getting to handle difficult tax models, arriving at correct conclusions on tax compliance, and when it comes to similar patterns, it is easy to detect complex tax issues and helps a lot in automated tax checks and monitoring where chances of human error are eliminated. Besides, it further optimizes the change integration prospective for tax legislation and the anticipated correspondingly precise compliance tax models.

5. Artificial intelligence influences electronic auditing confidently, as it is revealed that artificial intelligence has a statistically significant impact on GA, NN, and ML, but does not have impact on IA. This underlines the use of artificial intelligence approaches for the improvement of the electronic auditing work. These techniques help to work with large amounts of data concerning electronic audit and tax and to receive accurate data about subtleties of differentiation and detection in financial function, as well as to optimize the reaction of the artificial intelligence system to changes and constantly increase the efficiency of the artificial intelligence system.

6. Electronic auditing is found to have a significant effect on tax compliance and hence the need to embrace technological changes as well as technology in the enhancement of the auditing processes as well as compliance to taxes. Electronic auditing contributes to the enhancement of the organizational auditing process to boost effectiveness by auditors scanning sizable data and identifying deviations efficiently. It also helps in analyzing patterns and abnormality in performance, hence, help in early detection of tax risks and help operation to be accurate hence consistency of information making the delivery of reports on tax compliance accurate and complete. Also, electronic auditing enhances the provision of strong and reliable electronic records, validates processes, and enhances the levels of transparency.

7. It establishes a statistically significant effect of artificial intelligence on tax compliance through the mediating role of electronic auditing, making a point of appreciating the significance and the use of technology and artificial intelligence in supporting the process of electronic auditing and bringing out the potentiality in the improvement of the organizational structure of tax operation for boosting tax compliance levels. AI also propels the efficiency of audit processes by analyzing the particulars provided in the field of taxation, strengthening the quality of data that comprises the auditing processes, offering exact and auditable electronic data. This makes it easier to detect cases of tax evasion, enhance the validity of the tax outcomes and the analysis done, assess possible risks, formulate efficient auditing approaches, and boost the levels of accountability and credibility of the tax operations.

4.2 Recommendations

- Develop and present training sessions in the area of application of contemporary technology and artificial intelligence in auditing and taxation matters, and particulars on how to utilize technology in tax operations.
- Upgrade and further the IT system which would enable the support which is required for auditing electronically and using artificial intelligence, and for offering better tools and software for analyzing the tax information proficiently.
- To ensure the security of tax data and other important details is enhanced, adopt strict and complex security mechanisms and policies.
- To rectify this, perform periodic reviews on the efficiency of the technologies and artificial intelligence in enhancing audits and tax compliance and areas that need rectification.

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