The Impact of the Use of Artificial Intelligence on the Development of External Audit Efficiency in Jordanian Mining and Extractive Corporations

Ali Mustafa Magablih[1]

[1] Irbid National University, Jordan

Correspondence: Ali Mustafa Magablih, Irbid National University, Jordan.

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Abstract

This study aims to identify the impact of the use of artificial intelligence on the development of external audit efficiency in Jordanian public shareholding and mining and extractive companies. The sample of the study consisted of (56) external auditors in (13) Jordanian mining and extractive corporations. The descriptive approach and analytical approach were also used for its occasion in achieving the objectives of the study. The data was processed statistically using arithmetic averages and multiple regression analysis.

The study found a statistical impact of artificial intelligence on the development of external audit efficiency in Jordanian mining and extractive corporations, and the existence of a statistical impact of artificial intelligence, represented in: (Planning, carrying out control tests and basic tests of operations, carrying out analytical procedures and detailed tests of balances, auditing subsequent events and future commitments prior to the issuance of the auditor's report) in improving all dimensions of governance (effective governance framework, disclosure and transparency, shareholder equality, responsibilities of the Board of Directors, role of stakeholders) in mining companies and extraction companies in Jordanian Public Shareholding.

In light of the results of the study, it recommended that the total reliance on artificial intelligence be made easier for auditors, which has a high positive impact.

Keywords: artificial intelligence, external audit, mining and extractive companies, Jordanian public shareholding

1. Introduction

The increase in cases of fraud and manipulation of financial statements by departments has led to many material losses for users of financial statements from different places, especially with the growing ability of the departments of organizations to exploit gaps in accounting standards applied in different parts of the world and use them in order to present financial statements in a manner that serves their interests, which has led to radical changes in the audit profession and practice and the development of audit methods and procedures to suit the size of responsibility and complexity. From this absolute importance of quality audit has emerged as the requirement of all users of financial statements. It has become necessary for the auditor to increase attention to carry out the audit process with the highest possible quality in order to achieve the highest scores. Credibility on his report, and companies seek to ensure that their financial statements are reliable, which requires the audit to be carried out with the highest level of quality.

Technological development has led to the introduction of information technology in all fields, so that the use of technology has become a competitive advantage among some organizations that distinguishes it from their counterparts. Accounting and auditing science has also been affected like other fields, but it must be borne in mind that the objectives of systems and audit objectives are the same. They are not affected by the way data is operated, whether manual or electronic. Also, the scope of audit does not change under the electronic operation of data, but the method of auditing and collecting evidence may vary completely. This difference may be due to different procedures for collecting, tabulating and storing accounting information.

From this point of view, the importance of the quality of audit emerged as it is the demand of all users of the financial statements. The auditor has to increase the interest in implementing the audit process with the highest

possible quality in order to add the highest degree of credibility to his report. This study was interested in identifying the impact of the use of artificial intelligence on the development of external audit efficiency in Jordanian.

2. Study Problem and Questions

Mining and extractive companies are experiencing rapid growth with regard to the use of information technology in general and the use of technology in auditing in particular; As the mining and extractive sector is considered one of the leading sectors in the use of technology, as mining and extractive companies are trying to derive their competitive strength through complete reliance on electronic business and differentiation in the field of information technology, which prompted mining and extractive companies to use artificial intelligence in order to develop and introduce the audit profession. The process and its impact on achieving confidence, credibility and transparency in the financial data and information provided to stakeholders. The audit profession is an economic and social profession that aims to provide service to others on the basis of mutual trust between the providers of this service and the relevant bodies of authors and users of financial statements. Thus, improving the quality of internal audit is a common interest of all parties; this requires managements in mining and extractive companies to pay attention to the quality of the audit process to clear their responsibilities to stakeholders.

With regard to mining and extractive companies, many auditors in these companies have worked to develop a type of services to meet the great development taking place in the concept of governance in line with the requirements of comprehensive auditing on all activities in the company, through several modern methods to measure audit work and evaluate a percentage of Risks, follow-up of the transfer of information in a good way, and disclosure of the company's policies through which the right decisions can be taken, and given the important impact of the application of the rules of corporate governance in improving the quality of auditing, as the commitment to applying these rules provides in directing the efforts of the management and its decisions towards the benefit of the owners and the company in general. The study is due to the lack of information and research on the impact of using artificial intelligence on developing the efficiency of external auditing in Jordanian mining and extractive corporations. The problem of the study can be expressed by asking the following main question:

Main question: Is there a statistical effect at the level of indication ($0.05 \geq \alpha$) of artificial intelligence on the development of external audit efficiency in Jordanian mining and extractive corporations?

This question has sub-questions, which are:

(1) Sub-question I: Is there a statistical effect at the level of indication ($0.05 \geq \alpha$) of expert systems on the efficiency of external auditing in Jordanian mining and extractive corporations?

(2) Second sub-question: Is there a statistically significant effect at the level of semantication ($0.05 \geq \alpha$) of automatic learning on the efficiency of external auditing in Jordanian public shareholdings mining and extractive companies?

(3) Third sub-question: Is there a statistical impact at the level of significance ($0.05 \geq \alpha$) with regard to the responsibilities of the Board of Directors to guard external audit in Jordanian Mining and Extractive Corporations?

2.1 Objectives of the Study

This study aims to identify the impact of artificial intelligence on the development of external audit efficiency in Jordanian mining and extractive companies, and under this main objective includes the following sub-goals:

(1) Identify the level of application in Jordanian mining and extractive companies for artificial intelligence technologies.

(2) Knowing the impact of the use of artificial intelligence on the development of external audit efficiency in Jordanian mining and extractive corporations.

(3) Enrich the theoretical framework on the topics of artificial intelligence and external auditing.

2.2 Study Hypotheses

To achieve the objectives of the study, the following hypotheses have been formulated:

Main Hypothesis (H0): There is no statistically significant impact at the level of indication ($0.05 \geq \alpha$) of IQ on the development of external audit efficiency in Jordanian public shareholdings mining and extractive companies.

Sub-hypothesis I (H0-1): There is no statistically significant impact at the level of indication ($0.05 \geq \alpha$) of expert systems on the efficiency of external auditing in mining and extractive companies in Jordanian Public Shareholdings

Sub-hypothesis II (H0-2): There is no statistically significant impact at the semantic level ($0.05 \geq \alpha$) of automatic learning on the efficiency of external auditing in Jordan Public Shareholding Mining and Extractive Companies

Sub-hypothesis III (H0-3): There is no statistically significant impact at the significance level ($0.05 \geq \alpha$) with respect to the responsibilities of the Board of Directors over external auditing in Jordan Public Shareholding and Mining and Extractive Companies

2.3 Previous Studies

2.3.1 Study (Omware, Atheru& Jagongo, 2020) Entitled

"Corporate Governance and Financial Performance Of Selected Commercial Banks Listed at Nairobi Securities Exchange In Kenya"

The study aimed to identify corporate governance factors and the financial performance of commercial banks listed on the Nairobi Stock Exchange in Kenya. Specifically, it also aimed to know the effects of board size and board independence, board member education level, and the racial composition and gender diversity of board members on financial performance, where the company's performance was measured using return on equity, return on assets and net interest margin. CROSS-SECTIONAL AND ANALYTICAL RESEARCH WAS DESIGNED IN THIS STUDY. The study was applied to 11 commercial banks listed on the Nairobi Stock Exchange in Kenya. Targeted sampling was used to obtain sample representation for the entire population. In this case, 5 out of 11 bank CEOs were interviewed. Surveys were distributed to CEOs and senior management of the banks sampled. The content of the data collection tool was validated by ensuring that each element of the questionnaire and interview table addresses the specific contents and objectives of the study. The statistical package was used for sociologists and Spearman correlation coefficients and multiple regression analysis were applied to quantify the relationship and predict financial performance respectively. Accordingly, the study found that there is a statistically significant impact on board size, board autonomy, board member education level, gender diversity, and ethnic composition on the financial performance of listed commercial banks to a large extent.

2.3.2 Study (Abdulselam & Dembel, 2019) Entitled

"The Effect of Corporate Governance Mechanism on the Financial Performance of Microfinance Institutions Evidence from Ethiopian Microfinance Institutions"

The study aimed to identify the impact of corporate governance attributes on the financial performance of micro-finance institutions. An explanatory research design with a mixed research approach was used to conduct the study. Of the 12 micro-finance institutions legally registered with the National Bank of Egypt operating in the management of Addis Ababa city, 7 micro-finance institutions were deliberately selected to investigate the impact of corporate governance variables such as the size of the Board of Directors, the educational qualifications of the Board of Directors, the experience of the Board of Directors in the financial sector, the frequency of Board meetings, the size of the Board Audit Committee and the independence of the Board of Directors on the financial performance of MFIs measured by return on equity and operational self-sufficiency. In addition to key interpretive variables, control variables such as the size of MFIs, leverage, and the age of MFIs have also been included in the study variables. Primary and secondary data were used as primary data related to plate characteristics was collected through the questionnaire and secondary data was obtained from NBE and AEMFI. The team's six-year data from 2010-2015 was analyzed for seven micro-finance institutions. The results of the decline showed that the size of the board, the educational qualifications of the board of directors, the frequency of meetings, the independence of the board of directors, and the age of micro-finance institutions have a positive and important relationship with financial performance. While the expertise of the Board of Directors in the financial sector and the size of the Board Audit Committee has a statistically negative correlation to the financial performance of MFIs. The leverage and size of MFIs have little impact on the financial performance of MFIs. Based on the experimental result of the study.

2.3.3 A Study (Sari, 2018) Entitled

"Audit Specialization and Audit Quality: The Role of Client's Business Strategy"

This study aimed to identify the nature of modifying work strategies with the client in audit offices according to the relationship between the auditors of specialists and the quality of the audit. The study followed the descriptive approach, by developing a questionnaire and distributing it to a sample of auditors specialized in the field of audit. After conducting statistical analysis, it was found that the auditor's specialization negatively affects These test results support the low cognitive gap hypothesis.

2.3.4 Study (Misganaw, 2016) Entitled

"Factors Determining Effectiveness of Internal Audit in Ethiopian Commercial Banks"

This study aimed to find out the factors that determine the impact of internal audit in Ethiopia's commercial banks, and on the main procedures of internal auditors in those banks. The researcher used the method of mixed research (quantitative and qualitative research methods), as 147 questionnaires were tested and distributed to a sample of internal auditors in those banks, and analyzed using the statistical analysis program (SPSS), while the qualitative research method relied on conducting personal interviews with the directors of internal audit bodies in these banks and reviewing some selected documents.

A series of results were reached, the most important of which are: the independence of internal audit, the efficiency and effectiveness of its working group, in addition to the management's support for them, according to statistics, had the strongest impact on the performance of internal auditors in terms of their role in improving the organizational performance in the bodies. In this regard, the independence of internal audit, the efficiency and effectiveness of the team of internal auditors, and administrative support are among the most prominent factors that determine and affect internal audit in commercial banks in Ethiopia. At the end of this study, the researcher recommended the need to pay attention to the issue of developing both the accredited audit body and cooperating with them in order to promote the culture of internal audit, in addition to adopting computer internal audit software as a new method in the workflow.

Finally, internal audit plays an important and prominent role in helping any commercial company achieve its goals and objectives, in terms of workflow and effective management. Therefore, institutions that rely mainly on internal audit in their work and management are better able to diagnose the risks and failures they may face.

2.3.5 Study (Clara & Chen, 2015) Entitled

"Comparison between traditional and Electronic nominal own audit teams performed an audit for fraud"

This study aimed to test and study the interaction between audit and audit teams in companies in an electronic way. Where the analytical descriptive approach was used, and in order to achieve the goal of the study, the researcher selected a team of 11 auditors from four (4) different companies. The researcher conducted a comparison between electronic and traditional brainstorming audits to reduce issues of manipulation, fraud and fraud. The study found that fraud and manipulation of traditional audits appear due to the lack of news in some auditors and therefore the process of artificial intelligence is considered the best in such operations, and the study recommended similar studies to be conducted in other sectors.

3. Study Methodology

This study is based on the analytical descriptive approach by describing the phenomenon for the subject of the study, and analyzing its data using a questionnaire to study the role of the use of artificial intelligence in developing the efficiency of external auditing in Jordanian mining and extractive corporations. The data was studied and analyzed, the study variables were compared and its hypotheses tested using SPSS, and then the results and recommendations of the study were explained.

3.1 Study Community

The study community includes all auditors in Jordanian public shareholding and mining and extractive companies and includes 13 mining and extractive joint stock companies in the Jordanian financial market.

3.2 Study Sample

The study sample consisted of all auditors in Jordanian mining and extractive corporations, and the study sample was selected in a comprehensive survey method, where the questionnaire was distributed to all auditors in mining and extractive corporations in the Jordanian financial market.

3.3 Stability of the Study Tool

The stability of the tool means the possibility of obtaining the same data when re-study using the same study tool on the same individuals under one similar circumstance. The researcher measured the stability of the tool after dividing it into two scales, in order to measure the stability of each scale separately, and for the tool as a whole using the internal consistency scale (Cronbach Alpha), for the answers of the sample of the study obtained, the statistically acceptable value of this scale (70%) and above.

Table 1. Cronbach Alpha consistency coefficients for fields of study and instrument as a whole

The dimension	Number of paragraphs	Cronbach Alpha
Planning	10	0.81
Implementation of control tests and basic tests of operations	7	0.85
Implementation of analytical procedures and detailed tests of balances	9	0.83
The process of auditing subsequent events and future commitments before issuing the auditor's report	7	0.80
artificial intelligence procedures	33	0.82
Effective governance framework	5	0.87
Disclosure and transparency	5	0.85
Equality between shareholders	5	0.84
Board Responsibilities	5	0.83
The role of stakeholders	3	0.79
Governance	23	0.84
The tool as a whole	56	0.86

The table shows that Cronbach Alpha coefficients for the AI Action Scale ranged from (0.80-0.85) was the highest after "implementation of control tests and basic process tests", the lowest after "the audit of subsequent events and future commitments before the issuance of the auditor's report", the Cronbach Alpha coefficient for the AI Action Scale (0.82), All stability coefficients are high and acceptable for study purposes, as the stability coefficient (Cronbach alpha) is considered acceptable if it exceeds (0.70). This confirms the consistency between the paragraphs of the fields of study and the reliability and reliability of it to conduct statistical analysis of the study.

3.4 Multicollinearity Test

The strength of the General Linear Model depends on the hypothesis of the independence of each independent variables. If this condition is not achieved, the variables are not independent, the tolerance factor for each independent variable has been calculated, and then the Variance Inflation Factor VIF was found for each independent variable, noting that the VIF value must be less than (10) for the independent variable in question, and that the allowable variation test value must be greater than (0.10), and the table shows the results of this test.

Table 2. Multiple linear correlation test results between independent variables

The dimension	Tolerance	VIF
Planning	0.609	1.641
Implementation of control tests and basic tests of operations	0.507	1.970
Implementation of analytical procedures and detailed tests of balances	0.496	2.018
The process of auditing subsequent events and future commitments before issuing the auditor's report	0.408	2.453

The previous table shows that the values of the Variation Inflation Coefficient (VIF) of all independent variables were greater than (1) and less than (10), and the Tolerance test values are greater than (0.10), indicating that there is no problem of multiple linear correlation between the study variables.

4. Statistical Methods Used in Data Analysis

To analyze the data of the questionnaire paragraphs, the Statistical Packages Program for Social Sciences (SPSS) was used. The study used several statistical methods in order to employ the data to achieve the objectives of the study. The following are the most important methods used:

(1) Descriptive statistical methods: Descriptive statistical methods were used in order to obtain general readings about the characteristics, composition of the study sample, and its distribution. Among the descriptive statistical methods that were used are: repetitive distribution, percentages, and computational medium, which was used to

determine the level of artificial intelligence and governance procedures in mining and extractive corporations, and each paragraph of the questionnaire, and therefore their items are classified according to their degree of importance according to their mathematical averages. The standard deviation was also used to measure the dispersion of answers to the arithmetic averages of the different resolution.

(2) Stability test: This test was used to verify the internal consistency of the study instrument as one of the indicators of its stability, by calculating the Cronbach Alpha coefficient of the approved study sample responses, and the statistically acceptable value of this factor is (70%) and more.

(3) Multiple Regression Analysis: To detect the impact of the independent variable as a whole on the dependent variable.

Table 3. The arithmetic averages and standard deviations of the dimensions of AI procedures in mining and extractive companies in Jordanian public shareholdings (n=78)

The dimension	SMA	standard deviation
planning	4.21	0.24
Implementation of control tests and basic tests of operations	4.02	0.38
Implementation of analytical procedures and detailed tests of balances	4.20	0.26
The process of auditing subsequent events and future commitments before issuing the auditor's report	4.19	0.24

It is noted from the table that the arithmetic averages of the opinions of the members of the study sample on the level of artificial intelligence procedures in the Jordanian public shareholding and mining and extractive companies ranged from (4.02-4.21), Where the level of planning came in first place with the highest arithmetic average of (4.21) and a high degree, and in second place came after the implementation of analytical procedures and detailed tests of balances with an arithmetic average (4.20) and a high degree, and in third place came after the audit of subsequent events and future commitments before the issuance of the auditor's report with an arithmetic average (4.19) and to a high degree. While the lowest arithmetic averages after the implementation of control tests and basic tests of operations are with an arithmetic average of (4.02) and a high degree. The arithmetic average level of AI procedures in Jordan’s mining and extractive corporations as a whole was (4.16) and to a high degree.

Normative averages and deviations and relative importance (order) of post-planning paragraphs in Jordan Public Shareholding and Mining and Extractive Companies.

The standard averages and deviations for each planning level paragraph are presented in the Jordanian Public Shareholding and Mining and Extractive Companies, where the results were shown in Table 4.

Table 4. Arithmetic averages and standard deviations of paragraphs related to the level of planning in mining and extractive companies in Jordanian public shareholdings (n=78)

The dimension	SMA	standard deviation
Artificial intelligence is used in preparing the audit schedule.	4.31	0.57
The interim and final audit plan is drawn up electronically or using information technology	4.13	0.63
Artificial intelligence is used to assess and estimate business risks and rank them as high, medium, and low risk.	4.22	0.75
Artificial intelligence is used to estimate the relative importance of risks	4.01	0.75
Artificial intelligence has contributed to the company achieving the highest levels of efficiency and operational effectiveness.	4.19	0.67
Deviations can be identified by the information provided by the company when implementing plans	3.96	0.86
The e-audit planning process is flexible to adapt to changes that may occur in the company.	4.26	0.59
The electronic audit planning process contributes to revealing the impact of the multiple financial threats facing the company	4.41	0.52
The electronic audit planning process helps the company's management in rationalizing investment decisions in a way that reduces the risks associated with it to a minimum.	4.17	0.63
The e-audit planning process reduces costs for obtaining and analyzing information in the company.	4.40	0.54

The table shows that the arithmetic averages of sample members' approval of paragraphs related to the level of planning in Jordanian mining and extractive corporations ranged from (3.96-4.41), Paragraph (8), which states that "the process of planning for electronic audit contributes to the detection of the impact of multiple financial threats to the company" came in first place with an arithmetic average (4.41), a standard deviation (0.52) and to a high degree, In the last place, paragraph (6), which states that "deviations can be determined by the information provided by the company when implementing the plans" with an arithmetic average (3.96) and a standard deviation (0.86) and a high degree, and the arithmetic average of the level of planning in the Jordan Public Shareholding and Mining and Extractive Companies as a whole reached a whole (4.21) and to a high degree.

Standard averages, deviations and relative importance (order) of paragraphs after the level of implementation of control tests and basic tests of operations in Jordan Public Shareholding and Mining and Extractive Companies.

The following is the presentation of the standard averages and deviations for each paragraph of the level of implementation of control tests and basic tests of operations in the Jordanian mining and extractive corporations, where the results were shown in the table.

Table 5. Arithmetic averages and standard deviations of paragraphs related to the level of implementation of control tests and basic tests of operations in Jordanian mining and extractive corporations (n=78)

The dimension	SMA	standard deviation
The application of artificial intelligence procedures systems leads to achieving a kind of control over all the company's activities.	4.00	0.58
AI methods and tools are used for the purposes of understanding the internal control environment and its procedures	3.76	0.82
Artificial intelligence is used to check the appropriateness of the internal control design.	3.87	0.69
Artificial intelligence tools and methods are used in carrying out staged tests of operations to verify the existence and occurrence of the financial process.	4.28	0.75
The use of advanced control technology systems contributes to affecting the level of control	4.14	0.64
The process of artificial intelligence and electronic follow-up of data provided by periodic reports affects the level of oversight.	4.18	0.66
Artificial intelligence tools and techniques are used in the implementation of process progress checks to verify the posting and summarization of the financial process.	3.94	0.84

The table shows that the arithmetic averages of the consent of the sample members to the paragraphs related to the level of implementation of control tests and basic tests for operations in Jordanian mining and extractive corporations ranged from (3.76-4.28), Paragraph (4), which states that "artificial intelligence tools and methods shall be used in the implementation of phased tests of operations to verify the existence and occurrence of the financial process" came in first place with an arithmetic average (4.28) and a standard deviation (0.75) and to a high degree, In the last place, paragraph (2), which states that "artificial intelligence methods and tools shall be used for the purposes of understanding the internal control environment and its procedures" with an arithmetic average of (3.76), a standard deviation (0.82) and a high degree, and the arithmetic average of the level of implementation of control tests and basic tests of operations in Jordan's mining and extractive corporations as a whole (4.02) and a high degree.

Normative averages and deviations and the relative importance (order) of paragraphs after the level of implementation of analytical procedures and detailed tests of stocks in Jordanian public shareholding and mining and extractive companies.

The following is the presentation of the standard averages and deviations for each paragraph of the level of implementation of analytical procedures and detailed tests of stocks in the Jordanian mining and extractive corporations, where the results were shown in the table.

Table 6. Computational averages and standard deviations of paragraphs related to the level of implementation of analytical procedures and detailed tests of stocks in Jordanian mining and extractive corporations (n=78)

The dimension	SMA	Standard deviation
Artificial intelligence is used in carrying out the analytical and financial procedures for the operations of the audit analyst firm.	4.32	0.61
Artificial intelligence systems are used to perform analytical procedures in order to determine the extent of possible misstatements in the financial statements.	4.15	0.81
Artificial intelligence is used to carry out detailed checks for balances in order to verify its accuracy	4.12	0.66
The results obtained from the implementation of the AI process are evaluated to measure the impact of analytical procedures on it	4.24	0.61
Analytical procedures contribute to the development of initial expectations of the AI process during the implementation phase	4.21	0.49
Analytical procedures help to obtain evidence for the artificial intelligence process, which is the main purpose of this stage.	4.15	0.36
Analytical procedures contribute to the identification of the AI sample through the use of appropriate statistical methods or certain accounting models.	4.21	0.41
Analytical procedures contribute to the implementation of pre-prepared plans through the use of artificial intelligence to analyze and understand the internal work environment.	4.22	0.42
Electronic technologies are used in the implementation of control tests in the final and final examination of the accounts planned to be audited.	4.17	0.38

The table shows that the arithmetic averages of consent of sample members to paragraphs related to the level of implementation of analytical procedures and detailed tests of stocks in Jordanian mining and extractive corporations ranged from (4.12-4.32), Paragraph (1), which states that "Artificial intelligence shall be used in the implementation of the analytical and financial procedures of the operations of the company Audit Analyst" came first with an arithmetic average (4.32) with a standard deviation (0.61) and to a high degree, in the last place, paragraph (3), which states that "artificial intelligence shall be used in the implementation of detailed tests of balances in order to verify their accuracy" with an arithmetic average (4.12) and a standard deviation (0.66) and a high degree, and the arithmetic average of the level of implementation of analytical procedures and detailed tests of balances in Jordan's mining and extractive corporations as a whole (4.20) and a high degree.

Normative averages, deviations and relative importance (arrangement) of paragraphs after the level of the audit of subsequent events and future commitments prior to the issuance of the auditor's report in the Jordanian Public Shareholding and Mining and Extractive Companies.

The standard averages and deviations for each paragraph of the level of the audit of subsequent events and future commitments before the issuance of the auditor's report in the Jordanian Public Shareholding and Mining and Extractive Companies are presented, where the results were shown in the table.

Table 7. Arithmetic averages and standard deviations of paragraphs related to the level of the audit of subsequent events and future commitments prior to the issuance of the auditor's report in the Jordanian Public Shareholding and Mining and Extractive Companies (n=78)

The dimension	SMA	Standard deviation
AI procedures assist in testing for potential and contingent obligations.	4.27	0.45
The use of financial ratios related to artificial intelligence helps to reach objective reports related to the financial procedures under audit.	4.22	0.42
The use of financial ratios contributes to evaluating financial information and accounting lists by including electronic analytical audit procedures.	4.35	0.51
The use of financial ratios helps prove the sufficiency of evidence collected regarding financial and non-financial information through electronic reports.	4.10	0.31
Artificial intelligence procedures contribute to judging the validity of all financial information, and comparing the current results with the results of the previous financial period.	4.32	0.52
Analytical procedures help in verifying the reasonableness of financial ratios, data contained in statements and accounting information.	4.00	0.39
Artificial intelligence procedures help determine the impact of financial change when moving from one method to another or from one accounting principle to another.	4.10	0.47

The table shows that the arithmetic averages of the approval of the sample members on the paragraphs related to the level of the audit of subsequent events and future obligations prior to the issuance of the auditor's report in the Jordanian Mining and Extractive Corporations ranged from (4.00-4.35). Paragraph (3), which states that "the use of financial ratios contributes to the evaluation of financial information and accounting statements by ensuring electronic analytical audit procedures" ranked first with an arithmetic average (4.35) and a standard deviation (0.51) and to a high degree, Finally, paragraph (6), which states that "analytical procedures help verify the reasonableness of the financial ratios and statements contained in the accounting statements and information" with an arithmetic average (4.00), a standard deviation (0.39) and a high degree, and the arithmetic average of the level of the audit of subsequent events and future obligations prior to the issuance of the auditor's report in the mining and extractive corporations as a whole (4.20) reached a high degree.

Normative averages and deviations and the relative importance of governance dimensions in Jordanian public shareholding and mining and extractive companies.

The arithmetic averages and standard deviations were calculated the dimensions of governance in the Jordanian public shareholding and mining and extractive companies and each of its dimensions, represented in: (effective governance framework, disclosure and transparency, equity among shareholders, responsibilities of the Board of Directors, and the role of stakeholders), where the results were shown in the table.

Table 8. Arithmetic averages and standard deviations of the dimensions of artificial intelligence procedures in mining and extractive companies in Jordanian public shareholdings (n=78)

The dimension	SMA	Standard deviation
Effective governance framework	4.23	0.23
Disclosure and transparency	4.29	0.32
Equality between shareholders	4.28	0.36
Board Responsibilities	4.21	0.37
The role of stakeholders	4.36	0.26

It is noted from the table that the arithmetic averages of the opinions of the members of the study sample on the level of governance in the Jordanian mining and extractive corporations ranged from (4.21-4.36), where the level of the role of stakeholders ranked first with the highest arithmetic average of (4.36) and to a high degree. Second place came after disclosure and transparency with an arithmetic average (4.29) and a high degree, and in third place came after equality between shareholders with an arithmetic average (4.28) and a high degree, and then came after the effective framework of governance with an arithmetic average of (4.23) and a high degree. While the lowest arithmetic averages for the dimension of the responsibilities of the Board of Directors with an arithmetic average of (4.21) and a high degree. The arithmetic average level of governance in Jordanian public shareholding and mining and extractive companies as a whole was (4.27) and to a high degree.

Normative averages and deviations and the relative importance (order) of paragraphs after the level of disclosure and transparency in Jordanian public shareholding and mining and extractive companies.

The following is the presentation of the standard averages and deviations for each paragraph of the level of disclosure and transparency in the Jordanian public shareholding and mining and extractive companies, where the results were shown in the table.

Table 9. Arithmetic averages and standard deviations of paragraphs related to the level of disclosure and transparency in mining and extractive companies in Jordanian public shareholdings (n=78)

The dimension	SMA	Standard deviation
The company determines the necessary powers for employees to make decisions related to their business.	4.54	0.50
The company's work procedures are clear	4.35	0.51
The company's management reflects the applicable laws and regulations for all employees.	4.36	0.56
The company's management shall provide the information in a fair and clear manner to all auditors in a timely manner and without delay.	4.05	0.27
The employees of the company spend the official working hours in the performance of their duties and jobs	4.14	0.42

It appears from the table that the arithmetic averages of approval of the sample members on the paragraphs related to the level of disclosure and transparency in Jordanian mining and extractive companies PJSCs ranged from (4.05-4.54), where paragraph (1), which states that "the company shall determine the necessary powers for employees to make decisions related to their business," came in first place with an arithmetic average (4.54) and a standard deviation (0.50) and to a high degree. Finally, paragraph (4), which stipulates that "the management of the company shall provide information in a fair and clear manner to all auditors in a timely manner and without delay" with an arithmetic average (4.05) and a standard deviation (0.27) and to a high degree. The arithmetic average level of disclosure and transparency in the mining and extractive companies in Jordan Public Shareholdings as a whole (4.29) and to a high degree.

Normative averages and deviations and the relative importance (order) of paragraphs after the level of equality between shareholders in Jordanian public shareholding and mining and extractive companies.

Here is the presentation of the standard averages and deviations for each paragraph of the level of equality between shareholders in mining and extractive companies in Jordanian public shareholdings, where the results were shown in the table.

Table 10. Arithmetic averages and standard deviations of paragraphs related to the level of equality between shareholders in mining and extractive companies in Jordanian public shareholdings (n=78)

The dimension	SMA	Standard deviation
The performance standards provided by the implementation of corporate governance increase the confidence of the dealers in the financial market in the company's shares as an attractive investment tool	4.18	0.39
The rights of minority shareholders are protected from exploitative practices with effective means of compensation	4.26	0.86
Shareholders' rights are protected by accounting disclosure of their private dealings	4.22	0.71
Shareholders are informed of any unusual operations that could lead to an impact on the company	4.28	0.72
The application of governance helps shareholders obtain periodic and disclosed information in accordance with the legislation in force	4.46	0.57

The table shows that the arithmetic averages of approval of respondents to paragraphs related to the level of equality between shareholders in mining and extractive companies in Jordanian public shareholdings ranged from (4.18-4.46). Paragraph No. (5), which states, "All employees are treated without discrimination," came in the first place, with an arithmetic mean (4.46) and a standard deviation (0.57), with a high degree, and in the last place, Paragraph No. (1), which states that "the company's management seeks to reward employees Distinguished in a fair manner" with an arithmetic mean (4.18) and a standard deviation (0.39) and a high degree, and the arithmetic mean of the level of equality between shareholders in the Jordanian mining and extractive corporations as a whole was (4.28) and at a high degree.

Normative averages and deviations and relative importance (arrangement) for paragraphs after the level of responsibilities of the Board of Directors in Jordan Public Shareholding and Mining and Extractive Companies.

The following is the presentation of the standard averages and deviations for each paragraph of the level of responsibilities of the Board of Directors in the Jordanian Mining and Extractive Corporations, where the results were explained.

Table 11. Arithmetic averages and standard deviations of paragraphs related to the level of responsibilities of the Board of Directors in Jordan Public Shareholding and Mining and Extractive Companies (n=78)

The dimension	SMA	Standard deviation
Representatives of the company's management and departments participate in setting the rules for budget expenditure	4.06	0.76
The company's regulations and instructions explain the tasks and duties of each employee in the company	4.01	0.90
The company prepares the budget spending rules to achieve its vision, mission and objectives	4.29	0.56
The company reviews, develops and amends the corporate governance guide from time to time and whenever necessary. the need.	4.31	0.61
The company uses the budget effectively in accordance with its improvement and development plan	4.36	0.51

It appears from the table that the arithmetic averages of the sample members' approval of the paragraphs related to the level of responsibilities of the board of directors in the Jordanian mining and extractive corporations ranged

between (4.01-4.36), where paragraph No. (5) States that "the company employs the budget effectively according to a plan." "Improvement and Development" came in the first place with an arithmetic mean (4.36) and a standard deviation (0.51) and a high degree, and in the last place was Paragraph No. (2), which states "the company's regulations and instructions clarify the tasks and duties of each employee in the company" with a mean (4.01) and a standard deviation (0.90) with a high degree, and the arithmetic mean of the level of the responsibilities of the board of directors in the Jordanian mining and extractive corporations as a whole was (4.28), and at a high degree.

5. Discuss the Results

Discuss the findings related to the main hypothesis which states: "There is no statistically significant impact at the AI insignificant level (0.05≥α) on the development of external audit efficiency in Jordanian public shareholdings mining and extractive companies."

The results showed that there is a statistically significant impact at the level of indication (0.05≥α) of artificial intelligence on the development of external audit efficiency in Jordanian public shareholding and mining and extractive companies from the point of view of internal auditors.

This result explains that economic institutions must change the way they provide services to employees and customers in a way that keeps pace with the tremendous and rapid development witnessed by the ICT sector, which plays an important role in achieving the objectives of the organization, and since auditing is very important for organizations, information technology must be employed towards auditing. AI procedures save time, effort, and cost for organizations, and given the board's need for financial reporting by auditors at multiple times, making it easier to complete operations.

Discuss the results related to the first sub-hypothesis which states: "There is no statistically significant impact at the significance level (0.05≥α) of expert systems in Jordan's mining and extractive corporations."

The results showed that there is a statistically significant impact at the significance level (0.05≥α) of artificial intelligence in improving expert systems with regard to the effective governance framework in Jordanian public shareholdings mining and extractive companies.

The result is explained in light of the fact that the use of artificial intelligence, which uses modern and sophisticated devices that is not traditional, reduces the risk of operation, and controls and detects errors and fraud in the information provided to it, making this comply with the law without violating it. Therefore, the economic institution is in a stable legal position before the state government and stakeholders, which is in agreement with an effective framework for governance.

Discuss the results related to the second sub-hypothesis which states: "There is no statistically significant impact at the semantic level (0.05≥α) automatic learning in Jordan Public Joint Stock Mining and Extractive Companies."

The results showed that there is a statistically significant role at the significance level (0.05≥α) of artificial intelligence in improving governance in relation to technical learning in Jordan's mining and extractive corporations.

This result is explained in light of the fact that artificial intelligence makes every individual in the economic institution responsible for himself and mastering his work, in which there is no corruption or intentional risks, which increases credibility and fairness, affecting the disclosure of financial information in full transparency, which increases the quality of accounting information, and this works to follow the company a clear system and rules for all employees, and this raises the efficiency and effectiveness of performance in the economic institution.

Discuss the findings regarding the third sub-hypothesis which states: "There is no statistically significant role at the significance level (0.05≥α) with respect to the responsibilities of the Board of Directors in the Jordan Public Shareholding and Mining and Extractive Companies."

The results showed that there is a statistically significant impact at the significance level (0.05≥α) of artificial intelligence in improving governance with respect to the responsibilities of the Board of Directors in Jordan's public shareholding and mining and extractive companies.

This finding explains that the use of artificial intelligence provides the Board of Directors with flawless financial reports, through which the Board of Directors can take appropriate measures in a timely manner to use the company's resources with the highest efficiency and effectiveness. Thus, developing the company and achieving its goals, and the Board of Directors can build future expectations for the company's projects and plans on sound foundations and information.

6. Recommendations

In light of the findings in this study:

(1) Urge workers in mining and extractive companies to rely entirely on artificial intelligence and facilitate this on auditors, which have a positive impact on and to a high degree.

(2) Enhance auditors' awareness of the importance of using information technology in the audit process, and its impact on obtaining high-quality evidence.

(3) The enrollment of auditors in specialized courses and continuously in the field of information technology, so that their efficiency and capabilities are appropriate and in line with the development of new programs.

(4) Facilitate auditors' access to the hardware and software of the artificial intelligence process, so that he can easily carry out the artificial intelligence process.

(5) Urging companies to pay attention to governance, and modifying it to achieve the interest of the story of the rights of their owners and other beneficiaries.

(6) Require companies to appoint non-executive members within the board to limit the utilitarian behavior that executive management can practice

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