

# Analytical Auditing Methods and their Role in Improving the Performance of the Accounting Audit Process using Statistical Regression Models

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**Abstract:** *The process of obtaining audit evidence takes most of the effort and time spent by the auditor, so the auditor tends to rationalize this process by determining the sufficient amount of evidence that must be examined in order to support his opinion on the financial statements of the economic unit. the auditor seeks to improve the performance of the audit process by rationalizing the audit planning as well as field work and preparing the report. This research aims to find operational research that contributes to performing the audit process with the least possible cost, time and effort and with the greatest effectiveness.*

**Keywords:** Audit, Analytical Procedures, Operations Research, Effectiveness

## 1. Introduction

Auditing in the modern era has witnessed a remarkable development in terms of function, as it was limited in its beginnings to examining and verifying the accuracy of data and detecting errors. Then it developed to keep pace with economic, industrial and commercial and the new internal structure of economic units, as the auditing profession became concerned with serving all parties and concerned with providing each party with the information that concerns it. This required the presence of highly qualified and capable expert cadres that rely on the use of modern methods that help raise the quality of the auditing process. The quality of the auditing process is linked to the degree of the auditor's commitment to the recognized auditing standards and the rules and ethics of professional conduct during the performance of the auditing process, and to exerting the necessary professional care, in order to narrow the expectations gap and reduce auditing risks to the lowest possible level by using appropriate auditing methods and means.

The auditor uses analytical auditing methods because it helps identify and diagnose potential and relatively important problems at the lowest costs which depend on analyzing the relationships, ratios and trends between the financial data of the economic unit compared to previous periods or other similar economic units operating in the same field, through several different methods ranging from simple comparisons of the financial statements of the economic unit being audited to complex analyses that use advanced statistical techniques such as regression analysis and time series analysis to identify any unexpected fluctuations, while working to determine the reasons for these expectations.

Many modern ideas and innovations have developed as a result of economic and social transformations, the auditors have increasingly relied on the use of analytical auditing techniques in order to improve the performance of the auditing process.

Based on the above, the fundamental question can be formulated as follows:

- Does using analytical auditing have a role in improving the performance of the auditing process?

## 2. Research Hypothesis

- The proper application of analytical auditing achieves the objective of the auditing and ensures the efficiency of the auditing process.
- The auditor's uses of analytical auditing techniques helps him identify and then diagnose potential problems, thus increasing the efficiency of the auditing process.
- The uses of analytical auditing methods facilitates the auditor's work and saves time, effort and cost.

### The Concept of Analytical Auditing

It is one of the important and accurate auditing methods used by the auditor to identify the indicators of the economic unit, and to know the strengths and weaknesses on the basis of which he performs more detailed tests in examining the operations and accounts in which he finds indicators that do not match the comparative indicators. For the analytical auditing many definitions. Some focus in their definition on its objectives, and others focus on its methods, and there are those who combine the two in their definition. So (Arlette Wilson) defined it as comparing the book values of the financial statements with the expected values that the auditor estimates to determine the reasonableness of these values [1].

As for the American Auditing Standard No.56, it defined analytical auditing as the study of relationships and trends and the evaluation of financial and operating data by studying the possible relationships between the financial data with each other, for the purpose of identifying the accounts in which there is a distortion, and judging the reasonableness of the relationships between the financial and non - financial information [2].

While International Standard on Auditing No.520 defined it as the analysis of important ratios and indicators and the investigation of fluctuations and relationships that are inconsistent with other related information, or that deviate from the predicted amounts, and it also includes studying the relationships between related financial and non - financial information [3].

Based on the previous definitions, it is clear that the term analytical auditing means a set of analytical procedures that include the following points :

- Comparing the expected balances with those reported in the financial statements in order to identify the differences between .
- Detecting unusual changes in account balances .
- Evaluating the relative importance of those differences and deviations in order to determine the extent of confidence in the auditing or analytical examination and the extent of the possibility of expanding to conduct additional detailed tests .
- Providing evidence of the reasonableness of the accounts and balances, and their consistency with each other on the one hand, and with the prevailing circumstances on the other hand.

Analytical procedures are used in the auditing process primarily for the following purposes [4]

- Risk assessment procedures to gain an understanding of the economic unit being audited and its environment .
- Reducing significant risks at the assurance level to an acceptably low level .
- Ensuring a comprehensive view of the economic unit when preparing the audit report at the end of the auditing process. ‘

**2.1 Types of analytical auditing procedures**

The extent to which analytical procedures are useful as audit evidence depends on the audit developing expectations for restricted account balances or ratios based on accounting balances, regardless of the type of analytical procedure used. There are five main types of analytical auditing procedures, which are [5]:

**2.1.1 Comparing the information of the economic unit with the information of the activity in which it operates:**

According to this procedure, the auditor compares the information of the economic unit included in its financial statements with the information included in the financial statements of other economic units at the level of the activity in which it operates. This is done using the bases for measuring the direction of information or by comparing financial ratios or otherwise.

**2.1.2 Comparing the information of the economic unit with its corresponding information in previous periods:**

According to this procedure, the balances and indicators of the year under auditing are compared with their counterparts for the previous year or years for the same unit, which is an analytical procedure for trends in these balances or financial indicators.

**2.1.3 Comparing the actual information of the economic unit with the planned information for the same fiscal year:**

According to this type of analytical procedures, the auditor conducts a comparison between the actual financial items for the current year and the expectations of the economic unit under auditing for these items, while examining the accounts that show differences that do not conform to the auditor’s expectations, as these differences may indicate the possibility of distortions in these accounts.

**2.1.4 Comparing the economic unit information with the auditor’s expectations:**

In this type of analytical procedures, the auditor performs calculations to arrive at the expected values of some balances in the financial statements in light of their relationship to some other accounts and balances, which are based on some historical trends for those balances, then he compares the results of these analytical procedures with the economic unit information, and after that he determines the balances that require auditing and collecting all the evidence related.

**2.1.5 Comparing the economic unit information with expectations using non - financial information:**

The auditor use non - financial information to estimate the value of certain accounts, then compares what he has reached with the actual results, where, for example, the rate (wage/hour) can be relied upon to estimate the cost of factory workers, wages in industrial economic units, and similarly, the estimated cost of sales can be reached through the average cost of the total production unit and the sales volume.

**2.2 Timing of using analytical procedures in the auditing process**

The timing of using and implementing analytical auditing procedures is done at all stages of the auditing according to the circumstances surrounding the auditing process, as well as the auditor's objective in implementing these procedures, but most of the procedures are done after preparing the financial position statement since these tests are considered essential and the interest is usually around the account balances. The auditor can use analytical auditing procedures at any stage of the three auditing stages as shown in the following table:

**Table 1:** Use of analytical examination procedures in the audit process

Auditing process stage	objective	Nature of procedures used
Preparing the auditing program	<ul style="list-style-type: none"> <li>• Understanding the economic unit's activity</li> <li>• Assessing the possibility of errors in the unaudited financial statements</li> <li>• Setting materiality limits</li> <li>• Identifying high - risk audit areas</li> <li>• Determining the economic unit's ability to continue its activity</li> </ul>	<ul style="list-style-type: none"> <li>• Trend analysis</li> <li>• Indicator analysis of economic unit information</li> <li>• Comparative analysis of economic unit information with those of other similar units and industry averages</li> </ul>

	<ul style="list-style-type: none"> <li>• Planning the nature, timing and scope of auditing procedures</li> </ul>	
Perform basic tests	Obtaining evidence to confirm or certify individual account balances or reduce detailed testing	Analysis of indicators based on direct relationships between individual accounts
Preparing and presenting the audit report	Confirm or ratify conclusions reached regarding the truth and fairness of the financial statements.	<ul style="list-style-type: none"> <li>• Trend analysis and financial ratio analysis of individual accounts</li> <li>• Trend analysis of financial statement data</li> </ul>

### 2.3 Methods of implementing the analytical auditing

The analytical auditing depends on the use of operations research, which is considered the most powerful tool of scientific research due to its objectivity and certainty, and its accuracy that is unparalleled in descriptive methods based on verbal analysis.

#### 2.3.1 Financial Analysis Methods

There are various financial analysis methods that can be used by accountants. He must choose the method that helps him identify the activity of the economic unit being auditing, and identify the difficulties and risks that may face it in the future. This greatly helps in identifying the consistency of the relationships between the balances of the financial statements on the one hand, and on the other hand, identifying the relationships between financial and non - financial information. The financial analysis methods are:

##### 2.3.1.1 Trend and change analysis method

Trend and change analysis is one of the most common analytical procedures methods, it is called dynamic analysis. Its main benefit is focused on knowing the direction of development of financial statement elements. Through the analysis, the behavior of a specific item of the financial statements can be followed over several years by comparing it with the base year, in order to know the extent of stability or decline in this item. This type of analysis method helps in revealing some of the qualitative characteristics of a specific variable in order to identify variables that cannot be shown when making a limited comparison between the current and previous period [6].

##### 2.3.1.2 Financial ratios analysis method

The financial ratios analysis method is considered one of the most important and famous analytical procedures methods used by auditors during the planning stages of the auditing process and during the final auditing stage of the financial statements, as this method helps in understanding most of the financial situations and events taking place in the economic unit, and in identifying aspects in which there may be some problems that require additional analysis, or require the use of additional auditing procedures [12] [14].

There are a large number of financial ratios that can be calculated, but the auditor chooses the most important ones in accordance with the objective of the auditing process he is conducting. No matter how many types of financial ratios there are, there are some commonly used ratios that can be divided into the following groups:

- **Liquidity ratios:** This group of ratios aims to measure net working capital and show the presence or absence of a balance between short - term debts and their corresponding current assets, as well as the speed at which current assets are converted into ready liquidity. To measure this, the auditor calculates the general, quick and immediate liquidity ratios.

- **Activity ratios:** Activity ratios measure the effectiveness of the economic unit in exploiting its available resources and managing its assets. Activity ratios are effective in helping the auditor identify accounts that may contain material distortions. These ratios include fixed and current asset turnover rates, and average collection and settlement periods.
- **Debt ratios:** These ratios provide a measure of the financial risks that the economic unit may face and that are generated by debts. These ratios also provide information about the financial solvency of the unit in the long term, and they provide the auditor with an important indicator of the unit's ability to continue. These ratios include the external financing ratio, the interest earning rate, and the financial independence ratio.
- **Profitability ratios:** Profitability ratios are indicators of the economic unit's ability to generate profits from its sales or from its available assets. The auditor is interested in analyzing these ratios to determine any unusual deviations in these ratios that may potentially hide errors or distortions in the accounts that make up these ratios, which represent the commercial return, economic return, and financial return ratio.

##### 2.3.1.3 Regression analysis method

The regression analysis method is considered one of the most widely used analytical auditing methods in practical reality. It attempts to determine the relationship between a specific account balance (dependent variable) and other account balances (independent variables), in order to test the reasonableness of the actual book balance of any element of the financial statements, by comparing it with the expected value of the same element. The balance is considered reasonable if it does not exceed the limits of the forecast error [7].

##### 2.3.1.3.1 Advantages of using regression analysis method

Using regression analysis method in performing the audit process has the following advantages [9]:

- Enabling the auditor to perform a better examination, as this method has objectivity and specific mathematical rules .
- Helping the auditor understand and study the nature of the operations and activities of the institution being audited .
- Finding the best reconciling trend line for a group or series of observations .
- Reducing forecasting errors .

The auditor also uses regression analysis method to achieve three main objectives, which are [11]:

- Describing the form of the relationship between the independent variables and the dependent variable .
- Estimating the average value of the dependent variable corresponding to the actual or expected values of the independent variables .

- Interpreting the change in the values of the dependent variable in terms of the change in the values of the independent variables in order to express a neutral technical opinion on the extent of the truthfulness and fairness of the financial statements.

### 2.3.1.3.2 Regression Models

The auditor uses regression models to estimate the value of the dependent variable in terms of the values of the independent variables, through the regression equation that can take one of the known mathematical forms such as the polynomial form or the exponential function or the logarithmic function depending on the nature of the relationship between the variables under study, but the most famous and widespread forms of the regression function in practical applications is the linear regression function [14] [12].

The regression models through which statistical analysis of economic phenomena can be conducted differ according to the relationship between the dependent variable and the independent variables, and in general, regression models are divided into two main types :

- **Linear regression models:** which are based on estimating the linear mathematical relationship that links two or more variables, and it is divided depending on the number of variables included in the mathematical model of regression into simple linear regression models and multiple linear regression models .
- **Nonlinear regression models:** This type of regression is represented by a curved line, it mean one of the independent variables is raised to a power other than the positive integer, or is multiplied or divided by another variable.

### 2.3.1.4 Time series analysis method

The time series analysis method depends on comparing the financial balances and indicators subject to auditing and verification with the expected balances and indicators based on the results derived from the time series analysis of those balances. Thus, the accountant can identify deviations from actual balances, track them, and determine their reasonableness.

#### a) The importance of time series analysis in the auditing process

The importance of studying time series by the auditor is summarized in the following: [14 :]

- Identifying the nature of changes that occur in account values during a specific period of time .
- Determining the cycles in which the values of the accounts subject to auditing changed .
- Diagnosing the reasons that led to the change in account values and explaining them .
- Estimating what changes will occur in account values in the future in light of what happened in the past.

#### b) Components of the time series

The time series of any variable consists of the elements that affect that variable, and they are useful in determining its behavior in the past as well as the future. These elements are characterized by fluctuations and changes that may be seasonal, cyclical, or random, in addition to the direction of

the path of development of the variable in general, meaning that the components of the time series can be limited to the following elements:

- **General trend (T):** refers to the general movement of the time series up or down over a long period of time despite the fluctuations present in it, it mean the direction of the phenomenon studied in the long term, whether by increase or decrease [6 .]
- **Seasonal changes (S):** are the changes that occur regularly in successive time units and that result from the influence of external factors, it mean they represent short - term fluctuations that are repeated at the same pace every year [5 .]
- **Cyclical changes (C):** are the changes that may occur according to successive, equal or different time periods, and these changes cannot be discussed in economic sciences except in the case of a recurrence period exceeding a full year, and they are similar to seasonal changes except that they occur in periods relatively longer than seasonal periods. [4]
- **Random changes (I):** are the changes that occur as a result of accidental or emergency causes that are often not taken into account due to irregular factors such as wars, diseases, etc., and they express irregular fluctuations that result from emergency conditions that cannot be predicted or their scope of influence determined [8].

#### c) Methods of determining the general trend of time series

The auditor seeks to analyze time series in order to reach an appropriate method for estimating and measuring changes in the balances of the accounts subject to auditing and thus studying their relationship to the surrounding conditions by eliminating the effects of the four influential factors, especially the general trend.

There are several methods used by the auditor to determine the general trend of the time series, including :

- The smoothing method:** This method is done by drawing a straight line consistent with the points of the historical curve of the time series, which is a method that depends on the skill of the person drawing the straight line. After drawing the straight line, its equation is found through two points on it, and the equation of the straight line is the equation of the general trend [16 .]
- The two - half - series average method:** This method is used if the auditor concludes that the data can be represented by a straight line, as this method is based on dividing the time series into two equal parts, then finding the arithmetic mean of the values of the variable (y) and the arithmetic mean of the values of time (t) for each part, after which the two middle points are determined on a perpendicular landmark to represent two points of a straight line that shows the general trend of the series: [8 .]
- The moving average method:** This method is summarized by finding moving averages with a length appropriate to the time series, which results in another time series of moving averages, and the effect of the general trend in it is more apparent than the original time series, then the general trend is estimated [11 .]
- The least squares method:** The least squares method is considered one of the most widely used methods in

application. It is a mathematical method by which the accountant can reconcile the general trend line of the data, taking into account the following conditions [8]:

- The sum of the deviations of the true values of y from the trend values is zero .
- The sum of the squares of the deviations of the true values from the trend values is as small as possible .

The least squares method is based on finding the equation of the regression line of the value of the phenomenon (y) on time (t) and it is called the general trend equation and it is  $y=a+bt$ : [6]:

### 3. The Applied Aspect

The questionnaire tool was used to complete the analytical aspects of the study topic, and it was distributed to the auditors of the study sample. The questionnaire was collected, unpacked and analyzed using the statistical package (SPSS) and using appropriate statistical tests in order to reach valuable indications and indicators that support the study topic.

#### 3.1 Study community and sample

The study community consists of a group of auditors, estimated at 1908 auditors. From this selected group, the questionnaire was distributed to 200 auditors, 170 of which were retrieved. a retrieval rate of 85%.

**Table 2:** Stability coefficient of study fields according to Cronbach's alpha method

Sequence	Domain	Paragraphs	Reliability Coefficient
1	Steps for using analytical auditing techniques	1 - 10	83.5%
2	The importance of using analytical auditing techniques	11 - 20	87.7%

The table above shows that the highest stability rate was for the second field related to the importance of the auditor’s use of analytical auditing methods at 87.7%, followed by the first field related to the steps of using analytical auditing methods at 83.5%. These results indicate that these rates are good and meet the purposes of scientific research.

#### 3.2 Statistical methods used

Based on the nature of the study and what it requires in terms of careful selection of the data analysis method, especially the optimal use of statistical methods that are compatible with the study methodology and analysis of the results reached, and after unpacking and analyzing the questionnaire through the statistical analysis program, some descriptive statistical methods were used to identify the characteristics and features of the study community structure in a simplified and sometimes brief manner. These methods are :

- Cronbach's alpha test to determine the stability of the study tool and the credibility of the sample's opinions .
- Arithmetic averages and standard deviations of the study sample individuals' answers .
- t - test for the mean of one sample (One Sample Test) for the study hypotheses for the study paragraphs.

#### 3.3 Questionnaire stability

We used the Cronbach's alpha equation to determine the stability of this study, and the final stability coefficient value reached 88%, which is a good stability coefficient that meets the purposes of scientific research .

As for the paragraph stability coefficient, the results were as shown in the following table:

#### 3.4 Analysis of the results and tests of the study hypotheses

In this paragraph, the answers of the study sample individuals to the questions of the axes that make up the questionnaire will be identified, analyzed, and these results will be linked to the study questions and objectives.

##### 3.4.1 Analysis of the paragraphs of the first axis

The paragraphs of the first axis will be analyzed by calculating the arithmetic mean and standard deviation, and determining the score of each paragraph of the first axis, which can be explained through the following table:

**Table 3:** Trend of phrases of steps for using analytical auditing methods

Number	Paragraph	Arithmetic mean	Standard Deviation	Score
Using the auditors for analytical auditing methods Steps				
1	The auditor uses analytical auditing techniques at the beginning of the audit process to assist him in planning the audit process.	3.63	0.54	High
2	Analytical auditing techniques help the auditor compare the actual values with the expected values of financial statement items.	3.85	0.77	High
3	In the event of any deviations in the actual values from the expected values, the auditor shall search for their causes and work to analyze and evaluate them.	3.80	0.76	High
4	Analytical tests are used by the auditor for some items or elements in the income statement and the balance sheet to achieve the audit objectives.	2.81	1.07	Middle
5	Analytical auditing techniques are used by the auditor at the end of the audit to assist him in evaluating the effectiveness of the substantive tests that have been performed.	3.85	0.82	High
6	Analytical procedures help the auditor evaluate the validity of the results reached.	3.78	0.92	High

7	Analytical procedures help the auditor detect material errors and irregularities that may exist in the financial statements.	3.56	0.87	High
8	The auditor uses simple analytical methods such as financial ratio analysis and studying changes more than advanced analytical methods such as time series.	3.72	0.96	High
9	Analytical auditing techniques help identify areas where fraud and manipulation risks exist.	3.62	0.85	High
10	Analytical auditing techniques are used to identify items and accounts that require further examination and auditing.	3.74	1.04	High

The above table indicates that the trends of the study sample were significant towards all paragraphs except the fourth paragraph. The general arithmetic mean of the responses of the study sample members to all paragraphs of the first hypothesis reached (3.64), which is a high arithmetic mean that shows the importance of these paragraphs from the point of view of the study sample members. The relative decrease in the standard deviation numbers for the answers to these paragraphs indicates the homogeneity of the opinions of the sample members regarding the steps of using

the accounting manager for analytical auditing methods that help him identify and then diagnose potential problems.

**3.4.1.1 Testing the validity of the second hypothesis results**

In order to test the validity of the first hypothesis, we used the t - test for the mean of one sample (One Sample Test), and the results of the study were as shown in the following table:

**Table 4: The second hypothesis test results**

T calculated	difference between the two means	Significance	Arithmetic mean	Standard deviation	Test confidence interval		Test result
					lowest	highest	
6.338	0.45	0.000	3.51	0.55	0.26	0.54	acceptance

The above table indicates that the significance level (0.000) is less than its value (0.05), and since the decision rule is to accept the hypothesis if the significance value is less than (0.05) and reject it if the significance value is greater than (0.05), and thus the hypothesis is accepted. This means that the use of analytical auditing methods helps in identifying and then diagnosing potential problems, and thus increasing the efficiency of the auditing process.

**3.4.2 Paragraphs of the second axis**

The paragraphs of the second axis will be analyzed by calculating the arithmetic mean and standard deviation, and determining the score of each paragraph of the first axis, which can be explained through the following table:

**Table 5: Trend of the expressions of the importance of using analytical review methods**

Number	Paragraph	Arithmetic mean	Standard Deviation	Score
The importance of using analytical auditing techniques				
1	The use of analytical auditing methods leads to improving the quality of auditor services provided to the economic unit.	3.90	0.91	High
2	Using the analytical auditing method contributes to raising the efficiency and effectiveness of the review process.	3.91	0.84	High
3	Analytical procedures help the auditor to provide recommendations to the management of the economic unit under auditing in order to avoid bankruptcy and thus continuity.	3.56	0.97	High
4	The auditor's reliance on analytical auditing methods achieves greater accuracy in auditing procedures to achieve audit objectives.	3.59	0.93	High
5	Analytical auditing techniques contribute to reducing audit risks that affect the auditor's opinion.	3.67	0.88	High
6	Analytical auditing techniques help increase transparency and fairness in the presentation of financial statements.	3.46	0.98	High
7	Analytical auditing techniques contribute to the detection and disclosure of errors and material misstatements in the financial statements.	3.99	0.96	High
8	The results of the auditor's use of analytical auditing techniques narrow the gap in expectations between the auditor and the parties benefiting from his report.	3.72	0.98	High
9	The use of analytical auditing techniques contributes to ensuring the development of the quality and type of performance of the auditing process by auditors.	3.20	0.93	High
10	Analytical auditing techniques help the auditor to work with integrity and objectivity, free from outside influences.	3.40	0.99	High

The above table shows that the trends of the study sample were high towards all paragraphs, and the general arithmetic mean of the responses of the study sample members to all paragraphs of the first hypothesis reached (3.64), which is a high arithmetic mean that shows the importance of these paragraphs from the point of view of the study sample members. The relative decrease in the standard deviation

numbers for the answers to these paragraphs indicates the homogeneity of the opinions of the sample members about the importance of using modern auditing methods and their role in facilitating the work of the auditor and saving time, effort and cost.

**3.4.2.1 Testing the third hypothesis results**

In order to test the validity of the first hypothesis, we used the t - test for the mean of one sample (One Sample Test),

and the results of the study were as shown in the following table:

**Table 6:** The third hypothesis test results

T calculated	difference between the two means	Significance	Arithmetic mean	Standard deviation	Test confidence interval		Test result
					lowest	highest	
3.84	0.33	0.000	3.38	0.83	0.16	0.46	acceptance

The results of the table above show that the significance level (0.000) is less than its value (0.05), and since the decision rule is to accept the hypothesis if the significance value is less than (0.05) and reject it if the significance value is greater than (0.05), and thus the hypothesis is accepted, this means that the use of analytical review methods leads to improving the quality of performance of the review process.

**4. Discussions**

Analytical auditing contributes to identifying the indicators of the economic unit, and knowing the strengths and weaknesses on the basis of which the auditor performs more detailed tests in examining the operations and accounts in which he finds indicators that are not consistent with the previous indicators in the activity of the economic unit, or the indicators shown by the planning budgets that were prepared before the actual implementation, and is used to help the auditor plan the timing and extent of the audit procedures that must be performed, also used as basic procedures when its use has a greater impact and effectiveness than detailed tests to reduce the risks of discovery to the lowest possible level, is also used as a comprehensive view of the financial data in the stage of preparing and presenting the audit report, the good use of analytical auditing methods requires the availability of specialized knowledge in the field of accounting, mathematics and statistics and the availability of professional and technical expertise for the auditor, the auditor performing analytical auditing procedures on a sample of operations or accounts and the absence of material fluctuations indicates a low probability of the existence of major material errors or violations in the study community, and thus analytical auditing methods provide strong evidence supporting the truthfulness and fairness of the presentation of the accounts within whose scope the examination and verification procedures were implemented, analytical auditing methods help reduce the cost of performing the audit process It allows for identifying weaknesses that require additional procedures to verify their validity, and also allows for identifying strengths that do not require additional procedures. Relying on operations research in performing the audit process leads to the auditor being reasonably certain of the validity and fairness of the financial statements. In addition, it involves seeking the help of experts and consultants from specialists to confront the difficulties and problems that may arise when applying operations research.

**References**

- [1] Abdulrahman, D. M. (2022). The role of external audit in limiting creative accounting practices in light of international standards from the point of view of certified accountancy experts in Iraq as a model. *Journal of Economics and Administrative Sciences*, 28 (131), 238 - 251.
- [2] Aladnane, D. M. H. (2007). USING STATISIRICAL MOTHEDE FOR DEVELOPMENT TAXATION INVESTIGATION. *Journal of Administration and Economics*, 32 (66).
- [3] Chiulli, R. (2018). *Quantitative analysis: An introduction*. Routledge.
- [4] Crewson, P. (2006). *Applied statistics handbook*. AcaStat Software, 1, 103 - 123.
- [5] Fomby, T. B., Hill, R. C., & Johnson, S. R. (2012). *Advanced econometric methods*. Springer Science & Business Media.
- [6] Hayslett, H. T. (2014). *Statistics*. Elsevier.
- [7] Hussain, M., Islam, M. M., Gunasekaran, A., & Maskooki, K. (2002). Accounting standards and practices of financial institutions in GCC countries. *Managerial Auditing Journal*, 17 (7), 350 - 362.
- [8] Lane, D., Scott, D., Hebl, M., Guerra, R., Osherson, D., & Zimmer, H. (2003). *Introduction to statistics*. David Lane.
- [9] Meng, C., Abdullah, D. F., Khatib, S. F., & Idris, N. (2024). Assessing the impact of intellectual capital on audit quality within the audit market dynamics. *Environment and Social Psychology*, 9 (5).
- [10] Sahrawi, Faris, & Zaarour. (2021). Use of analytical review methods to improve the audit process. case study of the subsidiary company Al - Ziban - Industrial Compound Qantara. *Journal of Development Research and Studies - Revue Recherches et Etudes en Développement -*, 8 (1), 165 - 181.
- [11] Seber, G. A., & Lee, A. J. (2012). *Linear regression analysis*. John Wiley & Sons.
- [12] Şen, C. G., Baraçlı, H., Şen, S., & Başlıgil, H. (2009). An integrated decision support system dealing with qualitative and quantitative objectives for enterprise software selection. *Expert Systems with Applications*, 36 (3), 5272 - 5283.
- [13] Siam, Z. A., & Al Thaher, O. T. The Extent of Extracted Financial Indicators from Financial Statements, Contribution in Rationalizing Investment Decision by the Jordanian Commercial Banks.
- [14] van Elst, H. (2013). Foundations of descriptive and inferential statistics. arXiv preprint arXiv: 1302.2525.
- [15] Weaver, K. F., Morales, V. C., Dunn, S. L., Godde, K., & Weaver, P. F. (2017). *An introduction to statistical analysis in research: with applications in the biological and life sciences*. John Wiley & Sons.
- [16] Eimers, P. W. A. (2002). The use and effectiveness of analytical review in auditing: a field study.