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Evaluation of the effectiveness of the multi-source data exploration approach in enhancing the quality of the analytical review

-A Case study of Hikma Pharma Algeria for the years 2017 to 2022-

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Abstract

This study aims to demonstrate the importance of using the multi-source data exploration approach in analytical review procedures using the most important modern quantitative methods of multi-linear regression. To this end, the researcher touched on the procedural concepts of the study variables and this theoretically, and then applied the aforementioned methods in the applied aspect to the Pharma Foundation Algeria.

Through this study, the researcher concluded that analytical procedures are one of the most important methods of gathering evidence in the audit that enables the external auditor to focus on important aspects that require further detailed auditing

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procedures. as well as the suitability of a multi-source data exploration approach using a multi-linear regression method that delivers accurate results by comparing predicted values with actual counterparts and identifying possible deviations and focusing on their aspects.

Keywords: analytical procedures, auditing, multi-linear regression, multi-source data

1. INTRODUCTION

The second half of the last century has seen a widespread use of external audit analytical procedures The application and effectiveness of the latter varies according to the type of data examined, Thus, the external auditor is faced with the fundamental problem of determining the type of data to be subjected to the analytical examination process, especially in large enterprises with multiple activities, which prompts the auditor to choose between the subjection of the Examination and analysis of disaggregated multi-source data related to each individual activity, Or examine the enterprise's aggregate data as a whole by selecting quantitative methods appropriate to the analysis process.

The multiple regression method is one of the most important modern quantitative methods of analytical auditing and is used to predict one of the items or balances of financial accounts and compare them with their actual counterparts. This is to verify or detect the relationships between audited financial statements, as well as to build a model for estimating expectations and this to verify the authenticity of the data and to make no material misrepresentations based on simulation and exploration methodologies.

Based on the foregoing, the problems of the study can be formulated as follows:

- What is the importance of multi-source data exploration in analytical review?

To include the following sub-questions:

- What are the most important methods of analytical procedures in the audit?
- How effective is the analytical review using multi-source data?
- How good and accurate are the results of the multi-source data forecasting method applied to the Hikma Pharma Algeria Society?

1.1Study hypotheses:

From the nature of the study's problems and its main objectives, the research assumptions can be worded as follows:

- **Hypothesis H_0**: The external auditor's use of multi-source disaggregated data in the application of analytical audit methods is more accurate and effective than its use of the enterprise's aggregate data as a whole.

- **Alternative imposition H_1**: The external auditor's use of multi-source disaggregated data in the application of analytical audit methods is less accurate and effective than its use of the enterprise's aggregate data as a whole.

1.2 Objectives of the study:

Through this paper, we aim to:

- Clarify the importance of the use of multi-source data exploration in the implementation of the analytical examination process, based on the actual data of the Foundation for the Governance of Pharma Algeria;
- Assessing multiple regression as one of the modern quantitative methods of analytical review;
- Analyze the results of the forecast reached using the multi-source data of the company in question and compare it with its actual counterparts to detect possible deviations and judge the quality of the methods used.

1.3Study methodology:

To answer the problems of the study as well as to test the validity of the hypotheses formulated in this framework, the descriptive curriculum has been relied on in relation to the theoretical aspect of the study by reviewing accounting and auditing literature and statistical models.

In order to drop the study on the actual and practical realities of the Algerian Society, the Pharma Society for the Pharmaceutical Industries was selected as a model for applying what has been addressed in theory and producing results on the importance of using a multi-source data exploration approach in the implementation of the analytical examination process based on the actual data of the same institution.

1.4Previous studies:

The most important studies related to study variables can be summarized in chronological order according to the following schedule:

Study of: Kenneth W. Stringer "A Statistical Technique For Analytical Review", 1975	
Problems and objectives of the study	The researcher presented a general discussion on the statistical method - regression analysis - in the field of analytical review, where the researcher used the results of the regression analysis to estimate the amount of misrepresentation found in a given balance calculation and at a given period, more accurately and compared this diversion to the amount specified for relative importance
results of the study	If the amount of distortion exceeds the fixed ceiling of relative importance, this indicates the need for additional audit procedures by the external auditor. This method has proven its effectiveness through the results of the study reached.
Study of : **Eija Koskivaara, " Artificial Net Works For Analytical Review In Auditing", 2004**	
Problems and objectives of the study	Check the effectiveness of the method of artificial neural networks as an analytical measure in enhancing the quality of the audit process, by building the researcher an information system based on this method based on monthly accounting data as initial input
results of the study	Based on her knowledge of similar studies, the researcher concluded that the use of artificial neural networks works to achieve the following objectives: - Detection of material misstatement in the financial statements; - Support the principle of continuity; - Identify problems of financial hardship; - Reduction of detailed tests...
Study: Samir Aboul Fotouh Saleh and others," improving the Quality of Financial reporting using Data Mining", 2016.	
Problems and objectives of the study	Study and analyze the nature and objectives of the quality of financial reports and clarify the method of data mining.
results of the study	The study found that the model of artificial neural networks outperformed the graded regression model in predicting future cash flows. Data mining has improved the quality of financial reporting by providing more accurate information on future cash flows.

2. Theoretical framework of the study:

2.1<u>The concept of data mining</u>:

Many institutes and professional organizations have recognized the importance and necessity of the data mining approach, as it has been considered one of the most important methods used in data analysis according to the American Institute of Certified Accountants. while the IAA Institute of Internal Auditors considered this technique as one of the four priority research in the field of auditing, as pointed out by the same institute in its publication entitled: framework for the analysis of internal audit data issued in 2014: [1]

- It is the responsibility of the external auditor to adopt an effective and integrated data mining technique;

- ❖ The need for the contribution and interest of the sector of researchers and academics to spread the culture of data mining and encourage work on its application;
- ❖ Increase the quality of the audit process through the use of data analysis and mining techniques;
- ❖ Eliminate any potential duplication in data mining operations.

The data mining technique is defined as one of the methods and methods of exploration and analysis and can be considered as one of the most important forms of knowledge necessary to solve specific problems and in certain areas, where depending on the methods of data mining can be conceived and formulated model for prediction. the latter has an improved methodology for searching for hidden knowledge in enterprise databases[2].

Therefore, we conclude that the process of prospecting is carried out only through the availability of multiple databases that are analyzed electronically through the formulation of these data in the form of statistical models to predict their future values. this helps the external auditor to obtain more accurate results to ensure a sound view of the reality of the audited financial statements as well as to judge whether they are sound and free from material misstatement.

2.2The concept of multi-source data:

ISA No. 520 makes it clear that analytical procedures are more effective when applied to the financial statements of the individual sectors of the operation or components of the financial statements than to the financial statements of the organization as a whole.

More broadly, the American Institute of Certified Public Accountants defined multi-source big data as a collection of structured and unstructured financial and non-financial data that comes from inside and outside the organization[3].

It should also be noted that, in order to arrive at an accurate forecast sufficient to identify material misstatement that may exist in the audited financial statements, the external auditor shall take into account the following:

- Taking into account the division and division of data in time and according to activity, as the methods of analytical review are more effective if applied to the financial statements of each activity or institutional branch separately, monthly data are often more effective in analysis than annual data. for example, the comparison of

production lines or branches is more effective than the analysis of the total data of the parent organization;

- The accuracy and reliability of the data that are the basis for the prediction process;
- Exploitation of financial and non-financial statements;

Analysis and estimation of expectations based on multi-source data: Studies in this area have confirmed that quantitative models, which are built on a detailed basis of data, have achieved a lower level in the estimation error boxes than their counterparts that use aggregate data in the analysis.

2.3The most important methods of analysis of multi-source data:

Modern quantitative methods such as time series and logistic regression as well as artificial neural networks are the most important prediction models that rely on multi-source data as independent variables in the construction of their models, and the method of multiple regression is the most important of these methods to be used in various research fields, and it aims to study the relationship between two variables. one of them followed Dependent Variableand more independent variables by using the following mathematical relationship:

$$Yi = a + \beta 0 + b_1 x_1 + BPX\ xx + \cdots + BMXM + \varepsilon i$$

Whereas:

- Y : Represents the dependent variable (the item whose value is to be predicted).
- $\sum_{i=1}^{n} (X_{11}, X_{21})$ These are independent variables.
- εi=The value of the random error.
- **a**= It's a constant value.
- B1, B2 = regression coefficients for independent variables.

The process of calculating multiple linear regression is more complex than the simple method, in which the value of the dependent variable is calculated and its values are predicted by two or more independent variables.

In addition, when using the multiple linear regression method, the following conditions must be met: [4]

- The relationship between dependent variables and independent variables is linear;
- The data should follow the normal distribution;
- The values of the dependent variable must be at least the ordered level.

- The independent variables that are neglected in the model have a mean zero effect, as follows: [5]

$$\mathrm{E}\,(\varepsilon) = 0$$

$$\mathrm{E}\,(\varepsilon i) = \mathrm{E}\begin{bmatrix}\varepsilon 1\\ \varepsilon 2\\ \varepsilon 3\\ .\\ \varepsilon n\end{bmatrix} = \begin{bmatrix}E(\varepsilon 1)\\ E(\varepsilon 2)\\ E(\varepsilon 3)\\ .\\ E(\varepsilon n)\end{bmatrix} = \begin{bmatrix}0\\ 0\\ 0\\ .\\ 0\end{bmatrix}$$

- Homoscedasticity for different random boundaries, and this is enough to dimension the situation in which the errors follow changes in the values of the variables explained, that is, the errors are not related to each other, and that the result of an experiment does not affect the rest of the results, where these two hypotheses can be written on the following matrix:

$$\mathrm{E}(\varepsilon\varepsilon)' = E\begin{bmatrix}\varepsilon_1\\ \varepsilon_2\\ \varepsilon_3\\ .\\ \varepsilon n\end{bmatrix}[\varepsilon_1\ \varepsilon_2 \dots \dots \varepsilon n]$$

$$= \text{and}\begin{bmatrix}\varepsilon_1^2 & \varepsilon_1\varepsilon_2 \dots & \varepsilon_1\varepsilon n\\ \varepsilon_2\varepsilon_1 & \varepsilon_2^2 \dots & \varepsilon_2\varepsilon n\\ \varepsilon n\varepsilon_1 & \varepsilon n\varepsilon_2 \dots & \varepsilon_n^2\end{bmatrix}$$

2.4Concept of analytical Review:

The analytical procedures are defined by the American Institute of Certified Public Accountants International Auditing Standard N°56|**1988**| as[6]" the process of evaluating financial information with the aim of judging the reasonableness of the relationships between financial and non-financial statements."

It should be noted that the term analytical procedures was introduced by the United States of America in 1988 instead of the term analytical review contained in the sections of Review statement No. 54 ISA No. in 1970, where analytical procedures were considered one of the most important tests that an auditor is required to perform in order to obtain sufficient and appropriate evidence.

The American Institute of Certified Public Accountants, through its issuance of the aforementioned international auditing standard N°56, confirmed that the

evidence that an external auditor may obtain during his or her examination mission is provided only through the following two types of procedures:

- **A detailed review, including operations and balances;**
- **Analytical audit procedures for financial and accounting statements.**

The draft International Auditing Standard **ISA.No.520, which** replaced **IFAC's International Audit Directive No. 12 of 1988, defines** analytical procedures as[7]:" an assessment of financial information by examining the expected relationships between financial and non-financial information, it also includes inquiries about specific fluctuations and relationships that are not in line with the relevant financial information, or that deviate significantly from the expected amounts."

We note that this definition is somewhat complementary to the American Institute of Certified Public Accountants ' SAS N° 56, issued in 1988, but this benefit focused on the purpose of the procedure, while International Audit Standard **ISA.No.520, in addition to** the objective of analytical procedures, focused on possible methods and methods of examination and analysis**.**

The importance of using analytical procedures in auditing:

In addition to the above, the use of analytical procedures in auditing achieves the following advantages:

- ✓ **Reduction in the volume of material tests:** In examining certain items in the financial statements, the auditor encounters two situations: Either to intensify or reduce the volume of material tests, the second case in the absence of material misrepresentations or unusual fluctuations of the items and accounts audited;
- ✓ **Reduce the cost of the audit task**: Analytical procedures are the least expensive compared to other audit tests because they rely on the analysis of the components of the financial statements without the auditor going to the company being audited[8].
- ✓ **Understanding the client's field of work (the institution being audited)**: Auditors use analytical procedures to obtain data about the organization's activity and field of work, which helps them build the examination program and plan the audit process properly, as well as compare unaudited financial items and data with their counterparts in previous years[9].

- ✓ **Contribute to the detection of unusual deviations and fluctuations:** some methods of analytical procedures help the auditor to detect material misrepresentations in the financial statements, if any, by comparing some accounts of the financial statements with those of previous years, in which the auditor may use horizontal and vertical financial analysis methods, financial ratios, or using other modern quantitative methods.
- ✓ **Assessing the ability of the institution to continue:** There are many reasons that lead to the failure of the institution to continue its activity, due to several reasons, including what is financial, including what is related to the organizational and operational side in addition to other internal and external reasons, and therefore it is the auditor's responsibility to doubt the continuity of the exploitation of the institution based on the previous indicators. conduct a series of procedures and gather sufficient and appropriate evidence on this subject, as set out in IAS 570.

It should be noted that many research and academic studies have dealt with the subject of analytical procedures and their effectiveness in the examination of accounts and financial data, where some researchers in this field have used a technique to collect the rate of **error of the first type** (error **ι) and error of the second type** (error **ιι**) these were discovered within the analytical examination procedures, reflecting the typical error rates of the analytical procedures in practice, as shown in the following table:

Table (1): Error rates used in analytical audit procedures for previous research

Loebbecke & Steinbert	Wilson& Colbert	Wheeller & Pany	Green & Choi	
34,57%	6,9%	58,4%	15,09%	**the rate of error I.**
73%	85,63%	26,1%	21,95%	**the rate of error II.**
107,57%	92,53%	84,5%	37,04%	**The total error rate**

Source : Busta, Bruce & Weinberg Randy (1998), Using Benford's Law And Neural Networks As a Review Procedure, Managerial Auditing Journal, Vol N° 02.

It is worth mentioning that these methods and methods are employed in all the basic stages of the audit task from the planning stage of the examination task to the final stage - expressing opinion - as follows:

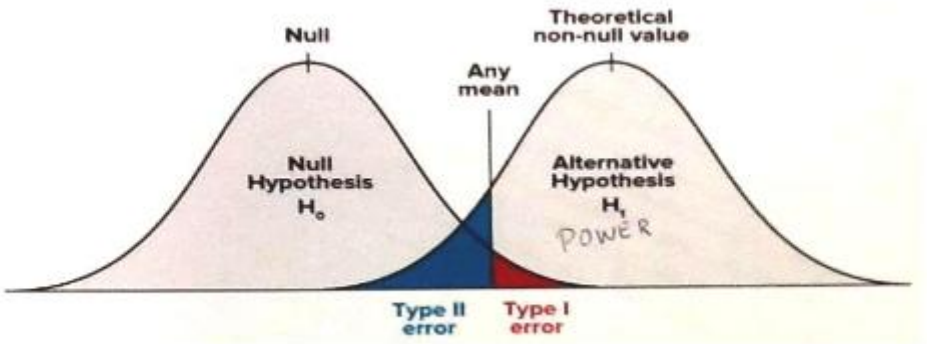
- The planning stage of the audit;
- The stage of the audit;
- The final stage of the audit.

The implementation of analytical procedures at the various stages of the audit allows understanding of the scope of work of the audited organization, detecting material errors and also helps to assess the viability of the organization. it should be noted that these procedures are applied in the forecasting of some balances and compare them with their actual counterparts to determine deviations, which generates two types of signals, namely:

- **First: Analytical screening procedures refer to additional investigations of audited account balances;**
- **Second: Analytical screening procedures do not refer to additional investigations into audited account balances.**

Both of the above cases may involve error in the auditor ' s decision, if the audited financial statements are free of errors and the external auditor ' s report to the contrary (**error type I)**, or the auditor ' s determination of the validity and credibility of the financial statements when they contain undiscovered material errors (**error type II).**
From the foregoing, the previous cases can be represented in the following format:

Figure (1): Error of I type and error of II type



Source: Siham Kerdudi, Role of Analytical Review in Improving the Performance of the Audit Process under the Use of Information Technology - Case Study of Salt Refining Complex for Biskara, PhD thesis on Small and Medium Enterprise Management, Faculty of Economic, Commercial and Management Sciences, Biskara University, 2014-2015, p. 128.

2.5Advantages of using multi-source data in analytical audit:

Multiple regression and time series are the ultimate forms of multi-source data, since when segmented into variable views for equal and consecutive periods of time with constant measurement module and recording method, these views are a time series that can be analyzed with high confidence in the analysis results[10].

Many auditors go on to analyse multi-source and large data in the analytical examination process for forecasting and analysis purposes, so that both **Alles and Grey** consider that there are many advantages of this technique in the audit process[11]:

-High predictive capacity to forecast audited financial statements;

-Provide significant opportunities to identify potential fraudulent activities;

-Increases the likelihood of detecting fraud and misinformation;

-It offers the potential to develop more predictive models about continuity imposition.

In addition to the above, the external auditor uses many variables or transactions to achieve accurate results of interest. The most important areas of audit in which this technique is used are:

-Supporting the auditor's opinion on predicting client continuity: Most studies indicate that quantitative and technological models such as neural networks, decision tree, regression, classification and prediction are among the most important methods of analysis and data exploration[12];

-Error detection, fraud and fraud: Using logistical regression with financial ratios is a means of detecting financial fraud by comparing financial account balances for several periods of time, as logistical regression can convert large amounts into accurate and easy-to-understand ratios[13];

-Increasing the efficiency of the audit process: Many studies in this area confirm that modern quantitative methods such as association models, regression and neural networks raise the level of the audit process. These methods help to detect unusual deviations in the audited financial statements and also contribute to the good planning of the analytical examination process and thus reduce the extent, procedures and cost of the audit process;

Overall, the data exploration process is based on the comprehensive analysis function rather than the analytical samples, which provides testing and analysis of most financial transactions.

3. Applied aspect:

3.1 Introduction to the Foundation for the Wisdom of Pharma Algeria:

Hakma Pharma Algiers is a limited liability company founded on the date of: 21/06/2000 by its trade name HIKMA PHARMA ALGERIE, under the fiscal identification number: NIF: 000016001226379000000 with a capital of: 9.977.812.000.00 DJ, the area of activities 15-16 Sitawalia - Algiers. The most important activities of this institution are as follows:

- ❖ semi-pharmaceutical products industry;
- ❖ Pharmaceutical Products Industry;
- ❖ food supplement industry;
- ❖ Exploitation of pharmaceutical registration decisions.

The most important products of Pharma Algeria and its sales for 2021 are as shown in the following table:

Table No. (02): The Most Important Products of Pharma Algeria and its Sales for 2021

Product	**Amoclan**	**Remsima**	**Zomax**	**Unisia**	**Ciprolan**
Sales for year 2021	22.816.896 DZD	5.746.155 DJ	5.252.466 DZD	5.050.578 DZD	4.953.522 DZD

Source: Hikma Group's annual report for years: 2018, 2019, 2020, 2021.

3.2Introduction to study variables:

Our study relied on the multiple regression method of forecasting sales amounts for the pharmaceutical products of the institution under consideration. The Foundation's annual reports show that among the most important factors affecting the results of its activity:

-The growing demand for some pharmaceutical products, especially those related to antibiotics, especially in the light of the coronavirus pandemic;

-Prices of certain pharmaceutical products that are not subject to supply and demand law, such as other products, but are priced at rated prices, which affects the profitability of certain products whose production requires special heavy burdens in the absence of the raw material locally;

-The management of the Foundation is keen to fulfill its obligations in the maturity period and provide orders for its products in the appropriate time (especially in the

circumstances of the coronavirus pandemic), which generates an abundance of liquidity...

According to the foregoing, we have identified some explanatory variables (Xi) which we believe have an impact on the Y variant selected in the Foundation's sales of pharmaceutical products, while the independent variables are:

3.2.1 Sales revenue is adjusted to the value of certain physical fixtures (equipment and machines), so that they are coded as (X1): This rate explains the operating efficiency of this type of installation ", since the low proportion prompts the need to seek additional activity for exploitation, However, the decrease in this proportion indicates that this type of installation is almost completely decimated. which requires the Foundation to provide this type of installation again, In other words, this ratio shows an enterprise's efficiency in using its fixed assets and the high proportion indicates the efficiency and quality of the use of available productive capacity[14];

3.2.2 Net profit rate to total installations, coded as(X2):

This indicator reflects the efficiency of the enterprise's management in making profits from its total investments, as the higher this rate is a positive indicator of the management's efficiency in using its assets holdings.

3.2.3 Adjusted total equity to total installations, to be coded as(X3):

This rate represents the extent to which the institution in question relies on its own funding;

3.2.4 Ratio of current installations to current liabilities, coded as(X4):

This ratio measures the extent to which the institution under examination is able to meet its obligations within the maturities. Generally speaking, the most acceptable ratio in this aspect is 2, but this depends on some factors such as:

- Nature and type of enterprise's activity;
- Averaging this reference ratio for enterprises operating in the same sector,..

3.3 Statistical models used:

In order to achieve the study's objectives and test its assumptions, in particular to verify the efficiency and effectiveness of the use of multi-source data exploration and its effectiveness in analytical review, in application of the Wise Pharma Pharmaceutical Products Foundation, we have applied the multi-linear regression model, through which we aim to predict the values of the Y variable (enterprise sales)

depending on a range of independent variables (X1,X2,X3,..). The explanation for the phenomenon is based on the following formule:

$$Yi = a + B0 + B_1X_1 + B_2X_2 + \cdots + BmXm + \varepsilon i$$

Since:

- Y: Represents the affiliate variable (the item to be predicted in the enterprise's sales).
- $\sum_{i=1}^{n} (X_{11}, X_{21})$ represent independent variables.
- ε i: Represents the random error value.
- a= is a fixed value.
- B1, B2 = regression factors for independent variables

3.4 Stages of application of statistical model:

In our paper, we relied on the use of the statistical package (SPSS). 20) In the implementation of the statistical model, where one affiliate variable was used (Y) The sales of the institution in question, 4 interpreted variables of the model were introduced (X1,X2,X3,X4), where the independent variables of the statistical study model were estimated at rates representing some of the financial ratios previously discussed, the study also included annual views from 2017 to 2022, as represented in the following table:

Table No. (03): Financial ratios of 2017-2022 study variables of Hikma Pharma Algeria.

Years / Ind. variables	2017	2018	2019	2020	2021	2022
X1= Fixed asset turnover rate	4293	4253	592	548	713	773
X2= asset return rate (Economic productivity)	0,22	0,9	6,56	1,73	0,95	4,02
X3= Equity-to-asset ratio	45	37	32	30	30	31
X4= Trading Ratio	171	143	127	115	114	116

Source: Prepared by researchers

3.4.1 Ensure the availability of normal distribution conditions for study variables:

Shapiro- Wilk test researchers were used to ensure that the normal distribution conditions for all study variables were available In the case of samples of no more than 50 sightings, this test is used. Thus, in this part of the applied study relied on this

method to test the normal distributions of the autonomous variables of the model results as shown in the table below:

Table No. (04): Natural Distribution Test for Study Variables

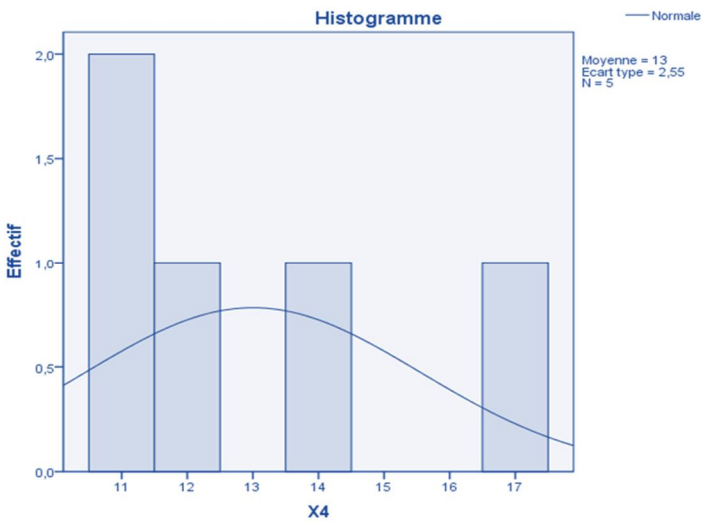
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistique	ddl	Signification	Statistique	ddl	Signification
X1	,222	5	,200*	,925	5	,563
X2	,257	5	,200*	,792	5	,069
X3	,270	5	,200*	,835	5	,152
X4	,253	5	,200*	,854	5	,207
y	,309	5	,133	,769	5	,044

المصدر: مخرجات SPSS.20

Analysis of the results of the S-W test shows that all model variables track natural distribution, as the levels of morale (S-W) must be greater than the researcher's morale level of 0.01, and therefore all calculated morale level values are greater than the morale level specified in the researcher's study model.

Thus, the values of the model variables can be represented as shown in the following format:

Figure No. (02): Representation of natural distribution of study variables



Source: spss . 20

3.4.2 Linear correlation measurement between study variables:

The following table shows that there is a statistically significant correlation between all variables, as follows:

Table No. (05): Natural Distribution Test for Study Variables

X4	X3	X2	X1	Y	
,492	,483	-,605	-,862	1.000	Y
-0,815	-0,805	0,5	1.000	_	X1
0,560	-0,354	1.000	_	_	X2
0,999	1.000	_	_	_	X3
1.000	-	_	_	_	X4

Source: Prepared by the researcher based on the SPSS.20 .

The relationship between the first variable and the second variable is a fairly high positive correlation of 0.594 and a statistical function of 0.01.

-The relationship between the first variable and the third variable is a high inverse correlation of -0.805 and a statistical ratio of 0.01.

-The relationship between the first variable and the fourth variable is a high inverse correlation of -0.815 and a statistical ratio of 0.01.

-The relationship between the second and third variable is an inverse correlation of -0.354 and a statistical function at 0.01.

-The relationship between the second and fourth variable is a high positive correlation of 0.560 and a statistically high correlation of 0.01.

-The relationship between the third and fourth variable is a high positive correlation of 0.999 and a statistically high correlation of 0.01.

It follows from the foregoing that fixed asset turnover and the same rate of return on assets (economic returns) have a negative impact on wise Pharma's sales growth, while equity-to-asset ratios as well as trading ratio have a positive impact on the growth of the enterprise's sales.

The following table also shows the correlation factors (R) and identification (R2) as follows:

Table No. (06): Correlation Coefficients **(R)** and Identification **(R2)**

Modèle	R	R-deux	R-deux ajusté	Erreur standard de l'estimation
1	1,000[a]	1,000	.	.

a. Valeurs prédites : (constantes), X4, X2, X1, X3
b. Variable dépendante : y

Source: SPSS.20 's

From the above table we note that there is a very high multiple association with: 1.000a, as well as the correct R2 determination factor, i.e. independent variables explain 100% of changes in the model. This means that the financial ratios adopted as independent variables are: Fixed asset turnover rate, asset return rate (ER), equity-to-asset ratio and trading ratio fully explain the enterprise's sales trend.

3.4.3 Demonstration analysis and model morale measurement:

The following table represents the variance analysis measuring the model's overall morale level as follows:

Table No. (07): Measurement of morale levels of study variables

ANOVA[b]

Modèle	Somme des carrés	Ddl	Moyenne des carrés	F	Sig.
Régression	1284	4	3210	47.35	0.001.[b]
Résidu	270	0	.		
Total	-345	4			

a. Valeurs prédites : (constantes), X4, X2, X1, X3
b. Variable dépendante : y

Source: SPSS.20 's .

From the table we note that the F value is equal to **47,35** which is a statistical function at an estimated level of **1%.** This is because the probability value referred to as Sig is equal to **0.001** and is less than **0.01** and therefore the regression model is moral, i.e. there is at least one regression factor different from zero.

3.4.4 Measurement of various multiple linear regression factors of the study model:

The following table also illustrates the various model transactions as follows:

Table No. (08): Multiple linear regression factors of the study model

Modele	Coefficients non standardisés		Coefficients standardisés	T	Sig.	Statistiques de colinéarité	
	A	Erreur standard	Bêta			Tolérance	VIF
[1] (Constante)	695189	.422		1.307	0.147		
X1	98579.000	.527	.101	1.404	.005	.907	1.047
X2	99811.000	.047	.157	3.083	.002	.902	1.036
X3	308354.000	.069	.503	7.902	.000	.919	1.088
X4	99479.000	.058	.169	4.103	.001	.907	1.088

a. Variable dépendante : y

Source: SPSS.20

The previous table shows the standard and non-standard regression factors, standard error, test value (t) with the probability value of tests (statistical indication), Variance Inflation Factor and tolerance transactions.

VIF= 1/Tolerance

Which shows that there is no problem of linear multiplicity between variables where inflation factors were less than 3, and from the table above we draw the following results:

- The value of the steady regression α is equal 695189 , the value of the β1 regression coefficient is 98579000, which is a statistical function because the probability value of the indicator Sig is less than 0.01, i.e. the degradation coefficient is statistically.
- The value of the β2 regression coefficient is equal to 99,811,000 which is a statistical function because the probability value of the indicator Sig is less than 0.01, i.e. the degradation coefficient is statistically.
- The value of the β3 regression coefficient is equal to the 348354000 which is a statistical function because the probability value of the indicator Sig is less than 0.01, i.e. the degradation coefficient is statistically.
- The value of the β4 regression coefficient is equal to 99479000 which is a statistical function because the probability value of the indicator Sig is less than 0.01, i.e. the degradation coefficient is statistically.

The same table also helps to obtain the following regression formula:

$$Y= 695189 + 98579000\ X_1 + 99811000\ X_2 + 308354000 X_3 + 99479000 X_4$$

3.4.5 Prediction of Y Variable Values:

In order to compare the projected 2022 sales values with their actual values, we present the following table:

Table No. 09 : Comparison of Actual Values with Expected

Actual sales values for 2022		Forecast values for 2022 sales
January	2 410 635 240,63	
February	1 305 303 302,96	
March	2 239 982 221,25	
April	1 392 455 041,80	
Mai	1 129 455 241,50	
June	1 993 122 138,26	
July	1 221 785 105,70	
August	1 325 297 955,03	
Sebtember	1 832 777 727,29	
October	1 026 372 332,03	
November	2 096 789 548,68	
December	1 311 455 127,75	
Total	19 285 430 982,87 DZD	17 976 100 689DZD

Source: From the researcher's preparation based on the output of the extracted regression equation.

Through the above table, we note a significant convergence between the values predicted and their actual counterparts, which indicates the quality of the multiple regression model as a method of modern quantitative analytical procedures that allows for the disclosure of material misrepresentations in the financial accounts of the enterprise, as well as the assessment of its financial situation and prediction of its continuity of activity. and therefore draw from the results of the table above the validity and sincerity of the sales item to converge its values with its expectations by indicating the financial ratios adopted as independent variables that the study model has demonstrated their morale in interpreting the dependent variable (sales).

4. **Conclusion**:

Based on the foregoing, the external auditor must use analytical audit methods at all stages of his mission to enhance the quality and effectiveness of the examination process. The following results have also been reached:

- The quality and efficiency of the multi-linear regression method in the forecasting process, given the convergence of the values expected by this method with its actual 2022 counterparts to the institution in question;

- ❖ Analytical audit methods are one of the most important methods of gathering evidence in the audit process, depending on a range of quantitative methods based on prediction and comparison;
- ❖ The multiple linear regression method is one of the most important modern quantitative and statistical methods in the analytical review process, which in building its model is based on a set of independent variables derived from the study sample;
- ❖ Predicting the use of multi-source linear regression based on data yields more accurate results than the use of the enterprise's aggregate data as a whole;

It is preferable to use multi-source data-based analytical examination in multi-activity institutions so as to allow the researcher to compare it with the reliance on aggregate data.

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