



The effect of using data analytics technology on the evaluation of the internal control system—case study of a sample of auditors-

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Abstract:

This study aims at knowing the effect of using data analytics technology DAT on the evaluation of the internal control. To do so, we tested the hypotheses through a field study on a sample of auditors. Findings show that the use of DAT in auditing leads to exact evidences in a brief period. This allows the ideal evaluation of the internal control system.

Key words: auditing; control; technology; data analysis; evidences.

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729

Introduction:

The world is living a rapid development of Information and Communication Technologies ICTs. This brought about various transformations and changes to the companies mainly in their styles of receiving and providing data in their various phases of activities and transactions due to the advantages of ICTs in making complex calculations and to their big operational capacity in a brief period with little effort. Moreover, they hugely reduce the mistakes.

The DAT manifests in the use of simple software that can be adapted to the specificities of the operational companies and make them hugely rely on DAT in exchanging data and information through nets and communication channels to save time and

effort. The companies install an internal controlling system ICS to protect their assets and guarantee the good functioning of the execution of the policies and dictations of the higher administration. Hence, the companies focus on the implementation of ICS increased taking into consideration the use of ICTs. In this context, because auditing is meant to check the accounting work of the company, the auditors must cope with the technological development in the field of accounting data processing through the reliance on ICTs in analyzing the data provided by the company under auditing.

Problematic of the study:

Based on what has been said about DAT and due to the importance of the ICS, we find ourselves obliged to grapple with a paramount question that can be stated as



follows: what is the effect of using DAT by the auditor on the evaluation of ICS? In this line, some sub-questions arise such as:

- What is meant by DAT and the evaluation of ICS?
- Is there a difference in the use of DAT by the members of the study sample?
- Is there a difference in the evaluation of ICS by the members of the study sample?

Hypotheses of the study:

To answer these questions, we hypothesize that:

1. There are no significant differences in using DAT by the auditors at significance level 5%.
2. There are no significant differences in the evaluation of ICS by the auditors at significance level 5%.
3. There is no significant effect of using DAT on the evaluation of ICS by the auditors at significance level 5%.

Importance of the study:

Upon presenting the problematic of the study, we can say that the importance of the study lies within the fact that it attempts to know and show the effect of using DAT and the evaluation of ICS through showing the importance of using technology in auditing.

Aims of the study:

This study aims at:

- Integrating the scientific, professional, and cultural dimensions in the plans made by the individuals and companies that aim at achieving the modern objectives.
- Showing the importance of installing ICTs and ICS in the Algerian companies in order to strengthen their competitive abilities.
- Showing the contribution of DAT in the evaluation of ICS inside the companies.
- Showing the readiness of auditing offices to deal with DAT in the Algerian context.

Methodology of the study:

In order to achieve the aims of the study, we used the descriptive and analytical methods. We relied on the 1st to explain the theoretical background of DAT and the

evaluation of ICS, and on the 2nd in the practical section to check the status-quo of applying DAT in the evaluation of ICS by the auditors.

Literature review:

- **The study of Asherif Ismail Othman Sherif “Information technology and its role in the development of internal controlling system”:** It aimed at knowing the internal control styles used by the Sudanese universities and their ability to maintain their resources in the light of the use of ICTs. Findings showed a positive relation between ICTs and the development of ICS. Moreover, the use of ICTs in ICS is better than not using it to protect the resources of the universities. In addition, they help get information in due time (Asherif Ismail, 2021, p. 68).
- **The study of Mosbah Jellab & al Hachemi Debdouche “concepts about modern ICTs”:** the authors aimed at knowing the modern ICTs and the various fields of their use. They used the descriptive method to narrate the sides of the study. Findings show that ICTs became a fundamental element in the strategies of the states, organizations, and individuals. In addition, they are a necessary tool to build the structures of the institutions and the societies (Mosbah & Debdouche, 2019, p. 08).

Outline of the study:

The study is made up of 02 main chapters. The 1st is about defining the study variables through presenting the various concepts related to the use of DAT and the evaluation of ICS. As for the 2nd, it is about discovering the views of the members of the study sample regarding the interaction with the study variables through testing the hypotheses after checking the validity of the questionnaire.

1. The theoretical background of DAT and the evaluation of ICS:

1.1 The concept of DAT:

1.1.1 Definition of information:

Information are defined as the data processed in a suitable way to give a full meaning for a given user which enables him to use them in the ongoing and future processes of decision taking (Qacem, 2004, p. 13).

1.1.2 Definition of DAT:

DAT or information technology is defined as the set of the material and human components, measures, and software that collect, process, and present data in order to support the process of decision making and the management of the company (Laudin C. & Laudon P., 2012, p. 22).

1.1.3 Advantages of using DAT in auditing:

There are various advantages for the use of DAT in the process of auditing such as:

- Allowing the presentation of a high prediction about the estimation of the financial lists under auditing.
- Increasing the rate of discovering mistakes, fraud, and deception.
- Allowing the development of the techniques used in the estimations related to the opportunities of the continuity of the company (Glen L. & Alles, 2016, p. 50).

1.2 The concept of ICS:

It can be defined as the organizational plan and the other scales designed to achieve a set of goals such as the protection of the assets of the company, testing the reliability and validity of the accounting data, encouraging efficient work, and increasing the commitment to the policies of the higher administration (Assahan, Nour, & Abu al Hassan, 1989, p. 263). In addition, it can be defined as the activities of controlling the policies and measures adopted by the company to guarantee the execution of the dictations of the higher administration. It relies mainly on checking the operational performance and describes the tasks and specialties of each member of the

organization in order to separate the duties and prohibit the occurrence of wrong behaviors (Addaghim, 2017, p. 11).

2. Field study of DAT and the evaluation of ICS:

2.1 Assessment of the study tool:

2.1.1 Population of the study:

We consider the population of the study as the people who work in auditing and accounting expertise in the Wilaya of Adrar. They are aware about the concept of information technology and ICS. This is in order to yield the best measurement of the study.

2.1.1.1 Designing the questionnaire:

After defining the goal of the questionnaire that is knowing the views of the members of the study sample regarding the use of DAT in the evaluation of ICS, we wrote its statements and questions based on previously used questionnaires in other related researches. The questionnaire includes various types of questions; some cover specific values and others are in categories. In addition, some other questions are quantitative, ordinal, and nominal.

2.1.1.2 Section one: personal information:

This section includes questions about the ages, scientific qualifications, and experience of the informants.

2.1.1.3 Section two: DAT

This section includes 15 questions that aim at knowing the status-quo of using DAT. They are divided into 3 parts that are: input technology, processing technology, and output technology.

2.1.1.4 Section three: evaluation of ICS:

This section includes 5 questions that aim at knowing the status-quo of the evaluation of ICS. They are in one part.

2.1.2 Validity of the study axes:

The following table shows the validity of the study axes:

Table 01: the validity of the study axes:

	Axes	Correlation coefficient	Significance level
1	The use of DAT	0.890	0.000
2	Evaluation of ICS	0.956	0.000

Source: prepared by the authors relying on the outcomes of SPSS

Table 01 shows that the correlation coefficient between the average of the axis of the use of

DAT and the axis of the evaluation of ICS from the axes of the study and all the statements of



the questionnaire is between 0.890 and 0.953. This indicates the existence of a strong correlation between the axes. Moreover, the significance level of the axes is less than 0.05 which means that the axes are valid to what they have been designed.

2.1.3 Consistency of the statements of the questionnaire:

Table 02: Consistency of the statements of the questionnaire with Cronbach’s Alpha.

All the statements of the questionnaire	Number of statements	Cronbach’s coefficient
	20	0.900

Source: prepared by the authors relying on the outcomes of SPSS

From table 02, we see that the coefficient of Cronbach’s Alpha is 0.900 and indicates a strong consistency. Thus, the table shows the quality of the questionnaire, its good measurement of the statements of the questionnaire, and the equal understanding of the study sample in a way that the understanding of the sample is the understanding meant by the authors.

2.2 Statistical analysis of the data of the questionnaire:

For a comprehensive study of the questionnaire, the authors saw the necessity of dividing the statistical analysis into two main sections. The 1st is about the descriptive analysis of the study variables while the

Consistency means that if the study tool is reused with the same sample in the same circumstances, the same results shall be found. Hence, the results can be reliable and generalized on the statistical population. The authors made the consistency test using Cronbach’s Alpha.

second is about testing the hypotheses through the main tests of the inferential statistics.

2.2.1 The descriptive analysis of the study variables:

The range is used to determine the length of the cells in Likert’s 5 points scale. The range between the bigger and lower degrees of the questionnaire has been calculated ($5-1=4$). To get the length of the cell, the value (4) had been divided on the degrees of the scale (5), i.e. $4/5=0.8$. Then, we added this value (0.8) to the lower degree of the questionnaire (1). The following table shows the length of the category and its trend.

Table 03: The weighed arithmetic mean of the degrees of the questionnaire:

Degree	The weighted arithmetic mean of the answers	Answers
1	From 1 to 1.80	Strongly disagree
2	From 1.81 to 2.6	Disagree
3	From 2.61 to 3.4	Neutral
4	From 3.41 to 4.2	Agree
5	From 4.21 to 5	Strongly agree

Source: prepared by the authors

In this study, we used Likert’s 5 points scale for the analysis of the questionnaire and the answers in 5 degrees as follows:

Table 04: The degrees of Likert’s 5 points scale

Answer degree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	01	02	03	04	05

Source: prepared by the authors

Descriptive analysis of the axis of DAT:

This axis is made up of 3 statements. It is analyzed descriptively through the arithmetic mean, standard deviation, trend, and Sig of Student Test as shown in the following table:

Table 05: the descriptive data of the axis of DAT

Statement	Arithmetic mean	Standard deviation	Trend	Sig
Input technology	4.106	0.461	Agree	0.000
Processing technology	3.890	0.610	Agree	0.000

Output technology	4.051	0.543	Agree	0.000
axis	4.017	0.458	Agree	0.000

Source: prepared by the authors relying on the outcomes of SPSS

From table 05, we see that the arithmetic mean of the axis of DAT is 4.017 with a standard deviation of 0.458 according to Likert’s 5 point scale. The trend of the answers of the members of the sample is “agree”. Hence, we can say that the level of applying by the members of the study sample is acceptable. The Sig is 0.000 which is less than the significance level 0.05. This means that

there is almost a full agreement by the members of the sample about the application of DAT in the auditing process.

Statistical analysis of the axis of the evaluation of ICS:

This axis has only one statement. It is analyzed descriptively through the arithmetic mean, standard deviation, trend, and Sig of Student Test as shown in the following table:

Table 06: the descriptive data of the axis of the evaluation of ICS:

Statement	Arithmetic mean	Standard deviation	Trend	Sig
	3.632	0.693	Agree	0.000

Source: prepared by the authors relying on the outcomes of SPSS

We see from table 06 that the arithmetic mean of the axis of the evaluation of ICS is 3.632 with a standard deviation of 0.693 according to Likert’s five points scale. The trend of the answers of the members of the sample is “agree”. Hence, we can say that the level of applying the concepts of the evaluation of ICS by the study sample is acceptable. The Sigis 0.000 which is less than the significance level 0.05 which means that there is an almost full agreementby the

members of the sample about the application of the concepts of the evaluation of ICS in auditing.

2.2.2 Testing the study hypotheses:

Before determining the inferential statistical tests that shall be used in testing the hypotheses, we must determine whether the data obtained from the questionnaire are naturally distributed through the test of Kolmogorov-Smirnow. Findings of the test are shown in table 10:

Table 7: Results of the natural distribution test

Axes	Kolmogorov-Smirnow	
	Sig	Statistics
The use of DAT	0.200	0.122
The evaluation of ICS	0.200	0.166

Source: prepared by the authors relying on the outcomes of SPSS 23.

We notice from the table that the significance levels of each axis are 0.200 and 0.200 which are more than 0.05. Hence, the data of the studied sample are naturally distributed.

2.2.2.1 Testing the 1st main hypothesis:

The 1st hypothesis says that there are no significant differences in using DAT by the auditors at significance level 5%. In this context, the following sub-hypotheses arise:

1st sub-hypothesis

There are no significant differences in using DAT by the auditors according to the age at significance level 0.05.

We use ANOVA to test this hypothesis which requires the equivalence of the variance, and the test of homogeneity of variances. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:

Table 8: Variance analysis to test the 1st sub-hypothesis of the 1st main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	0.163	2	0.081	0.372	0.693



Inside the groups	6.139	28	0.219		
total	6.302	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 8, we see that $F= 0.372$ and the Sig is 0.696 which is morethan the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in using DAT by the auditors according to the age.

2nd sub-hypothesis:

There are no significant differences in using DAT by the auditors according to the

Table 9: Variance analysis to test the 2nd sub-hypothesis of the 1st main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	0.334	2	0.167	0.784	0.466
Inside thegroups	5.968	28	0.213		
total	6.302	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 9, we see that $F= 0.784$ and the Sig is 0.466 which is morethan the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in using DAT by the auditors according to the scientific qualification.

3rd sub-hypothesis:

scientific qualification at significance level 0.05.

We use ANOVA to test this hypothesis. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:

There are no significant differences in using DAT by the auditors according to the acquired experience at significance level 0.05. We use ANOVA to test this hypothesis. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:

Table 10: Variance analysis to test the 3rd sub-hypothesis of the 1st main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	0.577	2	0.192	0.908	0.450
Inside thegroups	5.724	28	0.212		
total	6.302	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 10, we see that $F= 0.908$ and the Sig is 0.450 which is morethan the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in using DAT by the auditors according to the acquired experience.

2.2.2.2 Testing the 2nd main hypothesis:

The 2nd hypothesis says that there are no significant differences in the evaluation of ICS by the auditors at significance level 5%.In

this context, the following sub-hypotheses arise:

1st sub-hypothesis:

There are no significant differences in the evaluation of ICS by the auditors according to the age at significance level 0.05.

We use ANOVA to test this hypothesis. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:



Table 11: Variance analysis to test the 1st sub-hypothesis of the 2nd main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	1.061	2	0.530	1.112	0.343
Inside the groups	13.347	28	0.477		
total	14.408	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 11, we see that $F = 1.112$ and the Sig is 0.343 which is more than the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in the evaluation of ICS by the auditors according to the age.

2nd sub-hypothesis:

There are no significant differences in the evaluation of ICS by the auditors according

to the scientific qualification at significance level 0.05.

We use ANOVA to test this hypothesis. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:

Table 12: Variance analysis to test the 2nd sub-hypothesis of the 2nd main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	0.701	2	0.350	0.716	0.498
Inside the groups	13.307	28	0.490		
total	14.408	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 12, we see that $F = 0.716$ and the Sig is 0.498 which is more than the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in the evaluation of ICS by the auditors according to the scientific qualification.

3rd sub-hypothesis:

There are no significant differences in the evaluation of ICS by the auditors according to the acquired experience at significance level 0.05.

We use ANOVA to test this hypothesis. The variances and samples that had been withdrawn were arbitrary and independent. Hence, we can carry on the analysis of the variance. The following table shows this analysis:

Table 13: Variance analysis to test the 3rd sub-hypothesis of the 2nd main hypothesis

	Total sum of squares	Degree of freedom	Mean of the Total sum of squares	Statistical index F	Sig
Between the groups	1.442	2	0.481	1.001	0.407
Inside the groups	12.965	28	0.480		
total	14.408	30			

Source: prepared by the authors relying on the outcomes of SPSS

From table 13, we see that $F = 1.001$ and the Sig is 0.407 which is more than the significance level 0.05. Hence, the authors have an evidence to accept the null hypothesis which says that there are no significant differences in the evaluation of ICS by the auditors according to the acquired experience.

2.2.2.3 Testing the 3rd main hypothesis:

The 3rd hypothesis says that there is no significant effect of using DAT on the evaluation of ICS by the auditors at significance level 5%. To test this hypothesis, we used the test of the simple linear regression analysis as shown in the following table:



Table 14: Results of testing the effect of DAT on the evaluation of ICS

Dependent variable	Correlation coefficient	Determination coefficient	F value	Constant value	Regression coefficient	Sig	Standard error
Evaluation of ICS	0.710	0.505	29.551	-0.683	1.074	0.000	0.198

Source: prepared by the authors relying on the outcomes of SPSS

The results show a statically significant effect of DAT on the evaluation of ICS at significance level 0.05. The correlation coefficient reached 0.710 while the determination coefficient reached 0.505, i.e. 50.5% of the change in the evaluation of ICS is the outcome of the change in the level of the attention given to DAT and confirms the significance of the effect of DAT on the evaluation of ICS. The value of F is 29.551 which is significant at significance level 0.05. This disconfirms the 3rd main hypothesis. Hence, we can refuse the null hypothesis that says that there is no significant effect of using DAT on the evaluation of ICS by the auditors at significance level 5%.

Thus, from the table, the constant value of the regression model reached -0.683 which is a value that does not change with the change of DAT. As for the slope of the equation of the linear regression, it reached 1.074 which means that the change in DAT with one degree will change 1.074 of the regression equation with a standard error of 0.198. Because the level of the significance level is 0.000, we can say that there is significant effect of the use of DAT on the evaluation of ICS by the auditors with a forecasting equation that can be stated as follows:

$$Y = (1.074 \times \text{DAT}) - 0.683 + 0.198$$

i.e. $0.198 + 0.683 - (\text{DAT}) \cdot 1.074 =$ (the evaluation of ICS).

Hence, we accept the alternative hypothesis that says that there is a significant effect of using DAT on the evaluation of ICS by the auditors at significance level 5%.

3. Conclusion:

This study aimed at showing the relation between the use of DAT and the evaluation of ICS. Based on the problematic of the study that revolves around the nature of the effect of DAT in the various processes of evaluating ICS, we surveyed a sample of auditors in order to find out to what extent

the scientific concepts of information technology and internal control are understood. Base on what has been said, we presented the main components of the study that are the use of DAT as an independent variable and the evaluation of ICS as a dependent variable. Our findings show that:

- There are no significant differences in the use of DAT by the auditors. Through the sub-hypotheses, we find that there is generally an application of the concepts of DAT.
- There are no significant differences in the evaluation of ICS by the auditors through the sub-hypotheses, we find that there is generally an application of the concepts of the evaluation of ICS.
- There is a significant effect of the use of DAT on the evaluation of ICS by the auditors. This answers the problematic of the study that wanted to know whether there is an effect of the use of DAT on the evaluation of ICS. Thus, we get a new variable (DAT) that can be added to another set of variables which together form the basis of the evaluation of ICS.

Based on the findings of the research, we recommend:

- Enlarging the use of digitalization in the various phases of the evaluation of ICS.
- Digitalizing the process of input, processing, and output of the data.
- Making feedback for the data using the technological tools.

Horizons of the study:

In the end, this study does not provide a complete and final vision about the use of DAT in the evaluation of ICS due to the novelty of the concept of the use of DAT, the wide concept of ICS, and the possibility of studying it from various angles. Consequently, this topic needs other complementary researches to fill in the gaps. The authors see that the studies related to computer science, digital control, and the significant contents that are

difficult to measure better complement this study.

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