

The role of using artificial intelligence mechanisms in achieving the quality of evidence for auditors Using a method (TOPSIS)

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Abstract:

This study aims to understand the importance of artificial intelligence in achieving the quality of evidence for auditors using the fuzzy logic method (TOPSIS) to rank preferences with the ideal solution, which relies on expert opinion to rank possible alternatives. Three criteria closely related to the role of using artificial intelligence mechanisms in achieving the quality of evidence (C1 Relevance factor, C2 Sufficiency factor, C3 Timeliness factor) have been adopted. And five alternatives (A1 risk, A2 cost of obtaining evidence, A3 source of evidence, A4 eligibility of evidence, A5 audit quality), and through the cause-and-effect relationship, the study concluded that "the factor of good timing" is the most influential factor in using artificial intelligence to achieve the quality of evidence with the greatest impact value. (0.523).

Keywords: Artificial Intelligence; Account Portfolios; Evidence; Quality of Evidence.

1. INTRODUCTION

With the emergence of economic globalization, countries around the world found themselves facing many challenges, chief among them the need to develop their accounting systems to achieve a balance between local and international requirements, and to enhance the accounting environment to activate and ensure the success of these systems. This has led these countries to adopt a business environment primarily based on technology and its uses and applications, which has reflected on most business sectors, especially auditors, as they are a primary source of providing decision-makers with

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necessary information. This has imposed on them the necessity to acquire new skills and experiences that enable them to employ these technological techniques in achieving the goals of companies and society. With the increasing importance of artificial intelligence in auditing processes, contributing to the provision of technologies that help update and develop the auditing process, and through the modern devices, tools, and innovative methods it contains, there will be a change in the role of auditors. This change will affect their methods of gathering evidence, handling data, analyzing, and interpreting it, which in turn impacts the quality of auditing.

And from the above, the following issue can be raised:

What is the role of using artificial intelligence in achieving the quality of evidence using the fuzzy logic method (TOPSIS)?

And to answer the study's problem, we propose the following hypothesis: There is an impact of factors (A1 risk, A2 cost of obtaining evidence, A3 source of evidence, A4 eligibility of evidence, A5 audit quality) in achieving the quality of proof evidence using artificial intelligence.

Research objectives: We aim to achieve the following objectives through addressing this topic:

- Understanding the national factors and alternatives influencing the quality of evidence using artificial intelligence;
- Identifying the degree of influence of each factor in achieving the quality of evidence using artificial intelligence.

Research Methodology:

In order to achieve the study's objectives, the methodologies adopted in economic and financial studies were utilized. Accordingly, the descriptive method was relied upon to highlight the most important concepts and tools, and the approaches related to the subject and to be familiar with them. The statistical method was used in the practical aspect. In this context, the "TOPSIS" method, which relies on expert opinion and its mathematical analysis to reach the desired results, was employed.

2. the theoretical aspect

2.1 Artificial Intelligence Techniques (Electronic Auditing)

The use of artificial intelligence (AI) techniques can help reduce

audit risks related to issuing an incorrect opinion or failing to detect substantial errors in the internal control system or financial data due to relying on a limited sample of the statistical population. The importance of AI techniques lies in their ability to examine the entire statistical population, regardless of its size. This enables auditors to identify abnormal or suspicious operations that would be challenging to discover when using a sample. Increased efficiency is considered a significant benefit of AI in auditing, allowing auditors to achieve higher levels of assurance with less time and effort. Instead of spending long hours auditing contracts, machines can do it in record time, allowing auditors to save time and dedicate more time to crucial aspects that machines cannot achieve, such as communicating with clients, building strong relationships, and better understanding their needs (Saputra, 2016).

2.2 Audit Risks

In the initial stages of accepting an audit engagement, accountants must evaluate the client. The acceptance of the engagement depends relatively on the outputs of assessing the client's business risks. The initial impression gathered about the client aids in determining acceptable audit risks. However, if there is a low level of acceptance risk, it does not necessarily indicate a low level of acceptable audit risks. Other factors related to the matter must also be considered. On the other hand, accepting an audit engagement with a client who poses high acceptance risks and high business risks is not considered when determining acceptable audit risks. Business risks and acceptance risks are not part of the risk model because accountants are not responsible for achieving a high level of assurance. Instead, they suffice in achieving reasonable assurance about the absence of material misstatements in the financial statements and in exercising the necessary professional care required by the audit task. All these risks contribute to an increase in their fees. (Hackenbrack & W Robert, 1997, pp. 481–499)

2.3 Audit Quality

Most of the studies conducted by researchers have utilized various approaches to define audit quality. Some have correlated audit quality with the external auditor's likelihood of detecting errors in financial statements. Others have linked audit quality to the extent of compliance with professional

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standards. Meanwhile, a third group has connected audit quality with achieving the objectives of all parties involved in the auditing process.

(De Angelo) was among the pioneers who linked audit quality to the principle of the external auditor discovering errors in financial statements. Audit quality was defined as "the probability of the auditor detecting a breach in the client's accounting system and reporting it," (koligor, 2007) reflecting the auditor's increased ability to detect accounting errors and enhance independence.

In 1988, Palmrose defined audit quality as "the degree of credibility provided by the external auditor to users of financial statements." (Salehi, 2010) This definition aligns with the objective of the external audit process, emphasizing that audit quality is the likelihood of financial statements being free from errors and violations that affect their credibility (koligor, 2007).

2.4 Fuzzy TOPSIS theory

The American "Lotfi Zadeh" is considered the first to establish fuzzy theory in 1965 through his research (Fuzzy sets: inform control), where he addressed the idea that the existence of a fuzzy set provides a comfortable starting point for building a conceptual framework that closely parallels, and in a broader sense, the framework used in conventional sets. Moreover, it extends beyond that by offering a wider perspective in the applied field. Fuzzy theory imposes strict mathematical constraints and can be viewed as a linguistic model that fits fuzzy relationships. The use of this theory grew in the 1970s, especially in Japan, in the industrial field.

Fuzzy logic, in its broad sense, is a logical system based on the generalization of classical (Boolean) binary logic, aimed at reasoning under uncertain conditions. This type offers numerous solutions to real-world problems and provides an effective and reasonable description compared to other techniques that rely on the concept of classical sets. (Abbott & Doucouliagos, 2003, pp. 89-97)

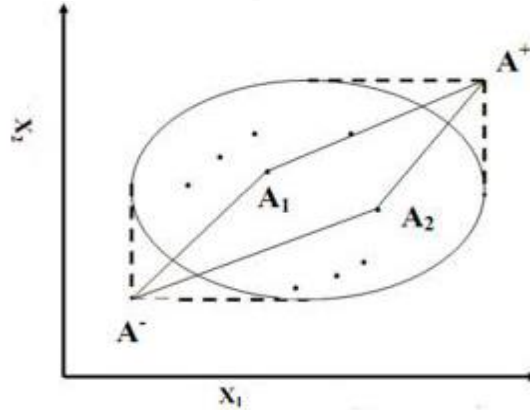
2.5 The fuzzy set

The fuzzy set consists of a set of ordered pairs, where we consider (X) whose values range between zero and one as a subset of the set of real numbers (R), and it is called the membership function and is given by the following relation:

$$U_{\tilde{A}}(X)$$

The basic concept of TOPSIS is that the best alternative among the options is the one with the shortest distance to the ideal positive solution, while the farthest distance represents the negative solution. Therefore, before using the TOPSIS algorithm, it is necessary to determine the best and worst solutions for the problem to be studied, as illustrated in the following figure:

Fig N⁰(01):The distance between the positive solution and the negative solution



Source : (Balioti, 2018, p. 342).

A^+ : The positive ideal solution

A^- : The negative ideal solution

3. Applied Study

To verify the validity of the main hypothesis or refute it, the researcher selected five experts in accountancy, based on whom three criteria strongly related to the role of artificial intelligence in achieving the quality of evidence were adopted. Through these, the following dimensions were extracted: (C1 Relevance Factor, C2 Sufficiency Factor, C3 Timeliness Factor), and four alternatives (A1 Risk, A2 Cost of Obtaining Evidence, A3 Source of Evidence).

3.1 Steps of the fuzzy TOPSIS algorithm

We will address the methodological steps of the fuzzy TOPSIS algorithm, which determines the best alternative according to the proposed criteria to understand the role of artificial intelligence in achieving the quality of evidence. Accordingly, MDL (Modified Digital Logic) weights are used to compare with all studied criteria that follow the philosophy of fuzzy logic

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with the TOPSIS method to reach the ideal alternatives, through the following steps: (Ataeian & Darbandi, pp. 112-122)

3.1.1 Weight calculation MDL(Modified Digital Logic)

The weights are assigned as follows:

$$W_j = \frac{P_j}{\sum_{j=1}^n P_j}$$

Accordingly, the decision matrix can be given as follows:

Table N⁰(01) :Decision Matrix1

	Alternatives				
Dimensions	A1	A2	A3	A4	A5
C1	Medium High	Very Low	Very High	Medium High	Medium Low
C2	Very Low	Medium	Medium	Very Low	High
C3	High	Medium Low	Medium Low	Very High	Low

Source: Prepared by the researcher

Table N⁰(02) :Decision Matrix1

Linguistic Expression	Triangular fuzzy numbers
Very good	(8,9,10)
Good	(7,8,9)
Middle Good	(5,7,8)
Fair	(4 ,5,6)
Middle poor	(2,3,5)
poor	(0,2,3)
Very Poor	(0,0,2)

Source: Prepared by the researcher

Table N⁰(03) :Decision matrix by experts

criteria	Alternatives	Decision -makers		
		D1	D2	D3
A1	C1	Very Good	Good	Middle Good
	C2	Middle Good	Fair	Very Good
	C3	Good	Middle Good	Middle Good
A2	C1	Good	Very Good	Fair
	C2	Good	Fair	Good
	C3	Middle Good	Good	Very Good
A3	C1	Very Good	Middle Good	Good
	C2	Very Good	Middle Good	Very Good
	C3	Fair	Fair	Middle Good
A4	C1	Good	Middle Good	Middle Good
	C2	Good	Very Good	Very Good

	C3	Good	Fair	Middle Good
A5	C1	Middle Good	Very Good	Middle Good
	C2	Fair	Good	Good
	C3	Good	Very Good	Very Good

Source: Prepared by the researcher

Table N⁰(04) :Value Decision Matrix2

criteria	Alternatives	Decision -makers		
		D1	D2	D3
A1	C1	(8,9,10)	(7,8,9)	(5,7,8)
	C2	(5,7,8)	(4 ,5,6)	(8,9,10)
	C3	(7,8,9)	(5,7,8)	(5,7,8)
A2	C1	(7,8,9)	(8,9,10)	(4 ,5,6)
	C2	(7,8,9)	(4 ,5,6)	(7,8,9)
	C3	(5,7,8)	(7,8,9)	(8,9,10)
A3	C1	(8,9,10)	(5,7,8)	(7,8,9)
	C2	(8,9,10)	(5,7,8)	(8,9,10)
	C3	(4 ,5,6)	(4 ,5,6)	(5,7,8)
A4	C1	(7,8,9)	(5,7,8)	(5,7,8)
	C2	(7,8,9)	(8,9,10)	(8,9,10)
	C3	(7,8,9)	(4 ,5,6)	(5,7,8)
A5	C1	(5,7,8)	(8,9,10)	(5,7,8)
	C2	(4 ,5,6)	(7,8,9)	(7,8,9)
	C3	(7,8,9)	(8,9,10)	(8,9,10)

Source: Prepared by the researcher

3.1.2 Compute the aggregated fuzzy ratings for alternatives and the aggregated fuzzy weights for criteria.

The the aggregated fuzzy rating $X_{ij} = (a_{ij}, b_{ij}, c_{ij})$

Of i^{th} alternative w.r.t j^{th} Criterion is obtained as follows: (Neelima, Ravi, & Patil, 2017, pp. 342-347)

$$W_j = (W_{j1}, W_{j2}, W_{j3})$$

$$W_{j1} = \min_K \{W_{j1}^K\}$$

$$W_{j2} = \frac{1}{K} \sum_{K=1}^K = W_{j2}^K$$

$$W_{j3} = \max_K \{W_{j3}^K\}$$

Accordingly, the matrix of ambiguous decision-making would be as follows:

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Table N⁰(05) :fuzzy decision matrix

Criteria	Alternatives	Decision -makers			
		D1	D2	D3	$W_{j1} = \min_K \{W_{j1}^K\}$ $W_{j2} = \frac{1}{K} \sum_{K=1}^K W_{j2}^K$ $W_{j3} = \max_K \{W_{j3}^K\}$
A1	C1	(8,9,10)	(7,8,9)	(5,7,8)	(5. 8. 10)
	C2	(5,7,8)	(4 ,5,6)	(8,9,10)	(4. 7. 10)
	C3	(7,8,9)	(5,7,8)	(5,7,8)	(5. 7,33. 9)
A2	C1	(7,8,9)	(8,9,10)	(4 ,5,6)	(4. 7,33 .10)
	C2	(7,8,9)	(4 ,5,6)	(7,8,9)	(4. 7. 9)
	C3	(5,7,8)	(7,8,9)	(8,9,10)	(5. 8. 10)
A3	C1	(8,9,10)	(5,7,8)	(7,8,9)	(5. 8. 10)
	C2	(8,9,10)	(5,7,8)	(8,9,10)	(5. 8,33 .10)
	C3	(4 ,5,6)	(4 ,5,6)	(5,7,8)	(4. 5,67. 8)
A4	C1	(7,8,9)	(5,7,8)	(5,7,8)	(5. 7,33. 9)
	C2	(7,8,9)	(8,9,10)	(8,9,10)	(7. 8,67. 10)
	C3	(7,8,9)	(4 ,5,6)	(5,7,8)	(4. 6,67. 9)
A5	C1	(5,7,8)	(8,9,10)	(5,7,8)	(5. 7,67. 10)
	C2	(4 ,5,6)	(7,8,9)	(7,8,9)	(4. 7. 9)
	C3	(7,8,9)	(8,9,10)	(8,9,10)	(7. 8,67. 10)

Source: Prepared by the researcher

3.1.3 Determining linguistic variables according to the fuzzy conversion scale in order to compare all alternatives for each criterion.

Table N⁰(06) :Matrix of linguistic variables according to the fuzzy transformation scale

Fuzzy numbers	Linguistic Variables
(0,0,0,1)	Very Low
(0,0,1,0,3)	Low
(0,1,0,3,0,5)	Medium Low
(0,3 ,0,5, 0,7)	Medium
(0,5 ,0,7, 0,9)	Medium High
(0,7 ,0,9, 1)	High
(0,9 ,1, 1)	Very High

Source: Prepared by the researcher

Accordingly, the fuzzy decision matrix would be Accordingly, the fuzzy decision matrix for the alternatives according to each criterion is as follows: (Mohammadi & Aryaeefar, pp. 150-159)

Table N⁰(07) :Fuzzy decision matrix for alternatives according to each criterion

	Standards (weights)		
Alternative	C1	C2	C3
A1	(0,5 ,0,7, 0,9)	(0,0,0,1)	(0,7 ,0,9, 1)
A2	(0,0,0,1)	(0,3 ,0,5, 0,7)	(0,1,0,3,0,5)
A3	(0,9 ,1, 1)	(0,3 ,0,5, 0,7)	(0,1,0,3,0,5)
A4	(0,5 ,0,7, 0,9)	(0,0,0,1)	(0,9 ,1, 1)
A5	(0,1,0,3,0,5)	(0,7 ,0,9, 1)	(0,0,1,0,3)

Source: Prepared by the researcher

3.1.4 Determining the fuzzy weights related to the factors

Table N⁰(08) :Fuzzy weight matrix

	Standards (weights)			
Alternative	C1	C2	C3	Wj=(Wj1, Wj2, Wj3)
A1	(0,5 ,0,7, 0,9)	(0,0,0,1)	(0,7 ,0,9, 1)	(0 ,0,53 ,1)
A2	(0,0,0,1)	(0,3 ,0,5, 0,7)	(0,1,0,3,0,5)	(0,26,0 ,0,7)
A3	(0,9 ,1, 1)	(0,3 ,0,5, 0,7)	(0,1,0,3,0,5)	(0,1 ,0,6 ,1)
A4	(0,5 ,0,7, 0,9)	(0,0,0,1)	(0,9 ,1, 1)	(0 ,0,56 ,1)
A5	(0,1,0,3,0,5)	(0,7 ,0,9, 1)	(0,0,1,0,3)	(0 ,0,43 ,1)

Source: Prepared by the researcher

And thus, the weights of the criteria are as follows:

Table N⁰(09) :Weights of the standards

A1	A2	A3	A4	A5
(0 ,0,53 ,1)	(0,26,0 ,0,7)	(0,1 ,0,6 ,1)	(0 ,0,56 ,1)	(0 ,0,43 ,1)

Source: Prepared by the researcher

3.1.5 The ambiguous decision matrix

$$= \max_j \{C_{ij}\} C_{ij}$$

$$= \min_j \{a_{ij}\} a_j^-$$

Table N⁰(10) :The ambiguous decision matrix

	A1	A2	A3	A4	A5
C1	(5. 8. 10)	(4. 7,33 .10)	(5. 8. 10)	(5. 7,33. 9)	(5. 7,67. 10)
C2	(4. 7. 10)	(4. 7. 9)	(5. 8,33 .10)	(7. 8,67. 10)	(4. 7. 9)
C3	(5. 7,33. 9)	(5. 8. 10)	(4. 5,67. 8)	(4. 6,67. 9)	(7. 8,67. 10)
C_j^* a_j^-	$=10C_1^*$	$=10C_2^*$	$=10C_3^*$	$=10C_4^*$	$=4a_5^-$

Source: Prepared by the researcher

3.1.6 Calculating the fuzzy decision matrix

This is done by dividing the columns of the fuzzy decision matrix

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values (A1,A2,A3,A4) On value C_j^* And dividing the column value(A5) On value a_j^- (Indahingwati, Wajdi, & Susilo, pp. 109-114)

Table N⁰(11) :Standard fuzzy decision matrix

	A1	A2	A3	A4	A5
C1	(0,5. 0,8. 1)	(0,4. 0,733 .1)	(0,5. 0,8. 1)	(0,5. 0,733. 0,9)	(0,8. 0,52. 0,4)
C2	(0,4. 0 .7. 1)	(0,4. 0,7. 0,9)	(0,5. 0,833 .1)	(0,7. 0,867. 1)	(1. 0,71. 0,44)
C3	(0,5. 0,733. 0,9)	(0,5. 0,8. 1)	(0,4. 0,567. 0,8)	(0,4. 0,667. 0,9)	(0,57.0,46. 0,4)
C_j^* a_j^-	$=10C_1^*$	$=10C_2^*$	$=10C_3^*$	$=10C_4^*$	$=4a_5^-$

Source: Prepared by the researcher

3.1.7 Weighted fuzzy decision matrix calculation

Let's assume we have a set of weights for each criterion

$W_j=(W_j1, W_j2, W_j3)$ for $j = 1,2,3 \dots, n$

We multiply each column of the fuzzy decision matrix by its associated weight. One of the elements of the new matrix is: (Abeda Al-Sultan & Khan, pp. 35-41)

$$V_{ij}^- = r_{ij}^- \times W_j^-$$

Fig N⁰(02):The Weight matrix

$$V_{ij}^- = \begin{pmatrix} w1 \times r11 & w2r21 & w3r31 & \dots & \dots & \dots & \dots & \dots & wnrn1 \\ w1 \times r12 & w2r22 & w3r32 & \dots & \dots & \dots & \dots & \dots & wnrn2 \\ w1 \times r11 & w2r21 & w3r31 & \dots & \dots & \dots & \dots & \dots & wnrn3 \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ w1 \times r1m & w2r2m & w3r3m & \dots & \dots & \dots & \dots & \dots & wnrnm \end{pmatrix}$$

Source: Prepared by the researcher

Table N⁰(12) :Weights of the standards

	A1 (0 .0,53 .1)	A2 (0,26.0 .0,7)	A3 (0,1 .0,6 .1)	A4 (0 .0,56 .1)	A5 (0 .0,43 .1)
W_j	W1	W2	W3	W4	W5

Source: Prepared by the researcher

We are lifting weights (W1, W2, W3, W4, W5) In the corresponding columns of the matrix.

$$X \times Y = \begin{pmatrix} a1 \\ b1 \\ c1 \end{pmatrix} \times \begin{pmatrix} a2 \\ b2 \\ c2 \end{pmatrix} = \begin{pmatrix} a2a2 \\ b1b2 \\ c1c2 \end{pmatrix}$$

Thus, the weight matrix is as follows:

Table N⁰(13) :Weight matrix

	A1	A2	A3	A4	A5
C1	(0 .0,42. 1)	(0,10. 0 .0,7)	(0,05. 0,48. 1)	(0 .0,41. 0,9)	(0 .0,22. 0,4)
C2	(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,5. 1)	(0 .0,48. 1)	(0 .0,30. 0,44)
C3	(0. 0,38. 0,9)	(0,13. 0. 0,7)	(0,04. 0,34. 0,8)	(0 .0,37. 0,9)	(0 .0,19. 0,4)

Source: Prepared by the researcher

4. The calculation of the ideal fuzzy positive and negative solution is as follows

$$\begin{aligned}
 &= V_1^*, V_2^*, V_3^* \dots \dots \dots V_n^* A^* \\
 &= \max_{j=1} \{V_{ij}\} V_j^* \\
 &= V_1^-, V_2^-, V_3^- \dots \dots \dots V_n^- A^- \\
 &= \min_{j=1} \{V_{ij}\} V_j^-
 \end{aligned}$$

Table N⁰(14) :The positive and negative fuzzy solution

	A1	A2	A3	A4	A5
C1	(0 .0,42. 1)	(0,10. 0 .0,7)	(0,05. 0,48. 1)	(0 .0,41. 0,9)	(0 .0,22. 0,4)
C2	(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,5. 1)	(0 .0,48. 1)	(0 .0,30. 0,44)
C3	(0. 0,38. 0,9)	(0,13. 0. 0,7)	(0,04. 0,34. 0,8)	(0 .0,37. 0,9)	(0 .0,19. 0,4)
A*	(0 .0,42. 1)	(0,13. 0. 0,7)	(0,04. 0,34. 0,8)	(0 .0,48. 1)	(0 .0,30. 0,44)
A ⁻	(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,48. 1)	(0 .0,37. 0,9)	(0 .0,19. 0,4)

Source: Prepared by the researcher

4.1 compute the distance from each alternative to the fuzzy solution positive as follows (Vahdani, Mousavi, & Tavakkoli-Moghaddam, pp. 4257–4269)

$$= \sum_{j=1}^n d(V_{ij}, A^*) d_j^*$$

$$d(x, y) = \sqrt{(a1 - a2)^2 + (b1 - b2)^2 + (c1 - c2)^2}$$

Table N⁰(15) :The distance from each alternative to the positive fuzzy solution

		A1	A2	A3	A4	A5
C1		(0 .0,42. 1)	(0,10. 0 .0,7)	(0,05. 0,48. 1)	(0 .0,41. 0,9)	(0 .0,22. 0,4)
C2		(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,5. 1)	(0 .0,48. 1)	(0 .0,30. 0,44)
C3		(0. 0,38. 0,9)	(0,13. 0. 0,7)	(0,04. 0,34. 0,8)	(0 .0,37. 0,9)	(0 .0,19. 0,4)
A*		(0 .0,42. 1)	(0,13. 0. 0,7)	(0,04. 0,34. 0,8)	(0 .0,48. 1)	(0 .0,30. 0,44)
$d(V_{ij},A^*)$	A1	0	0,03	0,35	0,17	0,12
	A2	0,05	0,1	0,37	0	0
	A3	0,14	0	0	0,21	0,15

Source: Prepared by the researcher

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4.2 compute the distance from each alternative to the fuzzy solution Negative as follows

$$= \sum_{j=1}^n d(V_{ij}, A^-) d_j^-$$

$$= \sqrt{(a1 - a2)^2 + (b1 - b2)^2 + (c1 - c2)^2} d(x, y)$$

Table N⁰(16) :The distance from each alternative to the negative fuzzy solution

		A1	A2	A3	A4	A5
C1		(0 .0,42. 1)	(0,10. 0 .0,7)	(0,05. 0,48. 1)	(0 .0,41. 0,9)	(0 .0,22. 0,4)
C2		(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,5. 1)	(0 .0,48. 1)	(0 .0,30. 0,44)
C3		(0. 0,38. 0,9)	(0,13. 0 .0,7)	(0,04. 0,34. 0,8)	(0 .0,37. 0,9)	(0 .0,19. 0,4)
A ⁻		(0. 0,37. 1)	(0,10. 0 .0,63)	(0,05. 0,48. 1)	(0 .0,37. 0,9)	(0 .0,19. 0,4)
$d(V_{ij}, A^{-})$	A1	0,05	0,07	0	0,04	0,03
	A2	0	0	0,02	0,21	0,15
	A3	0,11	0,1	0,35	0	0

Source: Prepared by the researcher

4.3 compute the closeness coefficient for alternative

select the option with closest to 1

$$C_j = \frac{d_j^-}{d_j^- + d_j^*} C$$

Table N⁰(17) :The distance from each alternative to the negative fuzzy solution

	C1	C2	C3	C4	C5	d_i^*
A1	0	0,03	0,35	0,17	0,12	0,67
A2	0,05	0,1	0,37	0	0	0,52
A3	0,14	0	0	0,21	0,15	0,5

Source: Prepared by the researcher

Table N⁰(18) :The distance from each alternative to the positive fuzzy solution

	C1	C2	C3	C4	C5	d_i^-
A1	0,05	0,07	0	0,04	0,03	0,19
A2	0	0	0,02	0,21	0,15	0,38
A3	0,11	0,1	0,35	0	0	0,55

Source: Prepared by the researcher

4.4 Arranging alternatives

Table N⁰(19) :Arranging alternatives

	d_i^*	d_i^-	$C_j = \frac{d_j^-}{d_j^- + d_j^*} C$	The arrangement
C1	0,67	0,19	0,220	3
C2	0,52	0,38	0,422	2
C3	0,5	0,55	0,523	1

Source: Prepared by the researcher

Through the previous table, it becomes clear that the symbol " $C_j = \frac{d_j^-}{d_j^- + d_j^*}$ " It represents the degree of influence of each factor affecting the achievement of the quality of evidence using artificial intelligence. Based on the cause-and-effect relationship, the "timing factor" is the most important influencing factor for evaluation with a value of (0.523), while the "adequacy factor" is the second most important requirement with an estimated value of (0.422). The "relevance factor" is the least important with an estimated value of (0.220). Regarding the prioritization of requirements, they are:

This analysis clarifies to Algerian executives, experts, officials, and professionals the importance of making the most appropriate decision regarding the significant attention to Factor "A3" due to its positive impact on other factors to achieve the quality of evidence using artificial intelligence in Algeria.

If the value " $C_j = \frac{d_j^-}{d_j^- + d_j^*}$ " is positive in this case, the factor is classified in the cause group and directly affects others (direct impact), and the higher the value, the more it affects others. Factors "A1," "A2," "A3," "F4," and "F5" are classified in the cause group.

If the value " $C_j = \frac{d_j^-}{d_j^- + d_j^*}$ " is negative in this case, these factors are classified as the impact or effect group. In our current study, there is no factor from the effect group, as one factor affects all the other factors.

5. CONCLUSION

This study primarily aimed to examine and analyze the use of artificial intelligence in achieving the quality of evidence in Algeria from the perspective of experts and professionals in the country. The reality of the auditor profession in Algeria still suffers from significant problems and difficulties that have been a formidable barrier to the development of this profession and keeping pace with its counterparts in developed countries. Therefore, it can be said that the effectiveness of any tool depends on the fertility of the environment in which it is practiced. Consequently, it was necessary for the state to provide the appropriate climate and environment to

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achieve a qualitative leap in this field. In this regard, the study reached a number of important findings, which are as follows:

- ✓ External auditing is one of the essential mechanisms for creating a more competitive business environment, provided it maintains independence and keeps up with technological developments.
- ✓ The effectiveness of the auditor profession in Algeria largely depends on the surrounding environment, as well as the commitment to the concept of quality in performing the external audit task in its various stages, which is effective in enhancing the laws and regulations related to the profession, foremost among them the adoption of what is known as electronic auditing that relies on artificial intelligence mechanisms.
- ✓ Working towards disclosure and transparency by ensuring a minimum level of financial and accounting information, which can only be achieved through the necessity of using advanced programs in the auditing process to increase the reliability of the provided information.
- ✓ AI technologies allow auditors to conduct digital transactions in a transparent, secure, and auditable manner, facilitating the completion of financial audits and reducing the risks associated with manual auditing.
- ✓ The main problems in the process of auditors applying the proposed role to activate artificial intelligence technologies lie in the rigidity of Algerian auditing standards and the lack of expertise and professional skills among auditors.
- ✓ Artificial intelligence offers a blend of functions derived from various disciplines and applications, which can lead to the integration of auditing processes, thereby increasing the efficiency and effectiveness of the evidence obtained by the auditor.

Recommendations :

- ✓ Raising awareness about the importance of using artificial intelligence in the auditing process due to its significant potential in achieving the quality of evidence, which in turn increases the reliability of the provided information.
- ✓ The regulatory bodies responsible for organizing and setting standards must develop new criteria for examining and regulating the reliance

on artificial intelligence technologies for analytical purposes in external audit procedures.

- ✓ Encouraged the regulatory bodies of the auditing profession in Algeria to introduce an auditing standard that includes guidelines on how to deal with modern artificial intelligence technologies, which ensures the objectivity and quality of the auditing process and guarantees the development of evidence in auditing.

It is impossible to develop and improve the profession of auditor in Algeria without providing a suitable environment for practicing the profession. This can only be achieved by taking into account the institutional factors influencing it through intensifying efforts to provide that, foremost among which is adopting artificial intelligence programs used in the auditing process in developed countries due to their significant importance in achieving the quality of evidence, which positively reflects on the quality of the audit.

In conclusion, it can be said that it has become more necessary than ever to work seriously to provide the appropriate environment for adopting the concept of electronic auditing. Without preparing the suitable groundwork for it, these concepts cannot find their way to implementation and achieve the desired goals.

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