The Impact of Adopting Artificial Intelligence Technology on the Accounting Profession Benefits and Challenges with a Field Study of Accountants in Algeria

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Abstract

This study aims to assess the impact of artificial intelligence (AI) technology on the accounting profession in Algeria. The study is divided into two parts: a theoretical section, which clarifies and defines the key terms related to the research, and outlines the main benefits of AI technology in the accounting field, as well as the major challenges that may arise when applying AI technologies in various institutions; and an empirical section, which involves a survey conducted with a group of professionals (certified accountants, auditors, accounting experts, and corporate accountants).

The study reached several conclusions, the most notable being that the adoption of AI technology in Algerian institutions is still in its early stages. Moreover, the application of AI techniques in accounting faces several challenges in Algeria, despite the significant benefits that could be realized if the proper conditions were met. It was also found that AI does not eliminate the role of the accountant but rather enhances it by improving the efficiency of accounting tasks. The study further recommends the need to train and qualify accountants in the use of AI technologies to keep pace with the advancements in the accounting field. It also emphasizes the importance of fostering collaboration between IT researchers and accountants and calls for educational and training institutions to integrate AI theories into their curricula to equip students with the necessary skills to work in a technologically advanced environment.

Keywords: Artificial intelligence, AI technologies, accounting profession, accountants.

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Introduction

In the modern business and financial environment, there has been significant development in information and communication technology, as well as the exchange of knowledge and information. This has encouraged companies worldwide to keep up with technological advancements to maximize the quality of their services. As a result, many companies have adopted artificial intelligence (AI) technologies across their administrative, financial, and accounting sectors. This adoption has led to major changes in how tasks are performed, particularly in accounting, which has benefited greatly from AI technology. These developments have raised several key questions, including:

Main Research Question

What is the impact of AI technology on the accounting profession in Algeria?

Sub-questions

- What is artificial intelligence?
- What is the accounting profession?
- What are the benefits of applying AI technologies in accounting?
- What challenges and risks might the accounting profession face due to the widespread adoption of AI applications?
- Will the role of the accountant disappear, and will smart accounting programs render accountants obsolete?
- What solutions are needed to address the negative impacts and risks of AI?

1. Theoretical Framework of the Study

1.1 Definition of Artificial Intelligence

Artificial intelligence is defined as the ability of machines to replicate human cognitive functions, such as problem-solving, learning, and pattern recognition, which enables them to make predictions used to facilitate decision-making (Stancu & Duţescu, 2021, p. 751). AI refers to systems programmed to think and perform activities typically associated with human intelligence, including knowledge acquisition and application. It also involves the capacity to control and understand relationships and generate original ideas (KWARBAI & OMOJOYE, 2021, p. 80). Moreover, AI refers to computer systems' ability to simulate neural functions, engage in deep learning, and learn autonomously from acquired information and experiences. It involves decision-making based on knowledge, deriving conclusions, and accumulating knowledge and experience to improve performance and achieve goals. AI is an emerging and interdisciplinary field covering areas such as management, informatics, logic, mathematics, and more (Jin, et al., 2022, p. 570). In essence, AI combines software and hardware as an alternative to human intelligence, capable of solving complex business problems using expert systems instead of human experts, and applying

machine intelligence instead of human intelligence. AI has a significant impact on decision-making by providing more accurate and reliable information (Askary, Abu-Ghazaleh, & Tahat, 29 Aug 2019, p. 03).

1.2 Importance of Artificial Intelligence

The importance of AI in our lives can be summarized as follows:

- AI simulates human intelligence and skills, representing one of the most significant achievements made by humans to assist in various areas of life.
- AI offers numerous benefits that have led to its widespread use across sectors such as navigation (digital maps), medicine, education, law, accounting, auditing, and more.
- AI applications have become indispensable in daily life, with technologies such as smartphones, smart TVs, calculators, virtual reality glasses, and gaming applications being readily available to everyone.
- AI is considered the language of the future, and mastering it is essential to avoid being classified as technologically backward or illiterate.

1.3 Types of Artificial Intelligence

AI can be categorized into three types based on the level of intelligence machines have achieved (El Asad, 2023, p. 168):

- **Narrow AI or Weak AI**: This is the simplest form of AI, programmed to perform a specific task in a particular environment. Its behavior is reactive to certain situations, and it can only function within the specific conditions it was designed for. An example is IBM's "Deep Blue," which defeated world chess champion Garry Kasparov in 1996.
- **General AI or Strong AI**: This level of AI reaches the point where machines can simulate human intelligence. Examples include self-driving cars and chatbot systems.
- **Super AI**: This refers to AI that surpasses human intelligence. Although still in experimental stages, it is expected to be achieved in the future (Lehmr, 2021, p. 97).

1.4 Definition of the Accounting Profession

Accounting is the process used to provide a clear picture of a company's financial situation, including its profits or losses, cash flow, and the current value of its assets and liabilities. It also determines which areas of the company generate actual profits (Rayan Smith, 2022). The accounting profession involves the essential and challenging task of recording, classifying, and analyzing various financial data of a specific company. This process provides reliable and credible information about the company's financial situation to interested parties (such as investors, government agencies, and financial institutions) (Belaid & Ben Hawass, 2024, p. 1040).

1.5 Definition of Artificial Intelligence in Accounting

The United States was the first to apply artificial intelligence (AI) technology in accounting, significantly enhancing the value of AI in accounting and financial management since then. With the implementation of AI technology in accounting and taxation tasks, the development of AI applications in the financial sector has accelerated, providing reliable technical support for more efficient accounting operations (Jin et al., 2022, p. 570).
In general, AI in accounting can be defined as the ability of computers and software to perform numerous accounting tasks, automate repetitive manual functions, and reduce human error rates, thereby improving the speed and accuracy of report and accounting information analysis compared to traditional accounting methods (Desouki, 2023). A study by Shteiwi Abdul (2023, p. 4) emphasized that the application of AI in accounting has a positive impact and that accountants should embrace AI, as it is likely to become a key component in all businesses soon. The study also clarified that AI in accounting aims to enhance traditional accounting methods through smart technology and software.

1.6 Fields of AI Application and Its Use in Accounting

According to a study by Hasan (2022, p. 451), AI is applied in the following areas of accounting:

1. **Expert Systems (ES):**

These are computer programs that mimic human thinking processes in different situations by storing human knowledge and experience to solve specific problems. In accounting, expert systems are classified into several areas:

- **Auditing:** Expert systems improve audit quality, assess risks, and evaluate internal controls. They are used to verify transaction values and detect fraud. Two main types of ES are used in auditing: one supports the audit process itself, and the other supports company estimates. Human oversight is necessary to ensure accuracy, quality, and consideration of non-technical factors like ethics and legal context.

- **Financial Accounting**: ES can assist in designing financial statements, processing invoices, evaluating standards, achieving financial objectives, managing revenues and expenses, and handling taxes. AI helps in making sound decisions by enabling better financial planning and efficient resource allocation.

- **Management Accounting**: In management accounting, ES enhances financial analysis and control systems. These systems can provide guidelines for inventory monitoring, cost analysis, data analysis, risk prediction, project management, and offer financial recommendations to improve operations.

2. **Decision Support Systems (DSS):**

DSS are adaptive, computer-based systems designed to assist decision-making by offering alternative choices for intelligent decision-making. In accounting, DSS helps analyze financial data, predict future outcomes, manage costs, measure company performance, and provide strategies to improve financial and strategic decision-making.

3. **Machine Learning (ML) and Deep Learning (DL):**

ML allows computers to learn, think, and act with minimal human intervention, while DL, a subset of ML, involves teaching computers to think using structures inspired by the human brain. In accounting, ML enables accountants to analyze financial data, identify patterns, and predict risks, while DL automates tasks such as inventory control and contract review.

4. **Fuzzy Logic:**

Fuzzy logic simulates human reasoning in decision-making by dealing with partial truths and degrees of certainty. It is a valuable tool for accountants to handle uncertainties and complex problems, providing optimal decision-making in rapidly changing environments.

5. **Artificial Neural Networks (ANNs):**

6.
ANNs mimic the human brain's processing of tasks. They differ from expert systems as they learn from examples and can develop beyond given input-output examples, similar to human reasoning processes.

7. **Hybrid Systems:**

Hybrid systems combine various AI techniques, including intelligent models and algorithms, to solve complex problems. These systems enhance the efficiency and accuracy of accounting operations, though human accountants must still possess analytical and interpretive skills.

8. **Genetic Algorithms:**

Genetic algorithms are AI methods used to solve complex problems more efficiently than humans. They retain learning processes and support decision-making faster and more effectively.

9. **Intelligent Agents:**

Intelligent agents are software entities that act on behalf of users, autonomously interacting with systems or other agents. They are programmed with rules and can adapt their behavior and learn new facts.

10. **Robotics:**
Robots, mechanical machines capable of performing programmed tasks, are equipped with sensors, control systems, and power units to execute specific operations. In accounting, robotic process automation (RPA) is the most flexible and effective way to automate repetitive tasks such as auditing and reviewing.

1.7 Key Smart Technologies Impacting Accounting References include Bobja (2022, p. 92) and Marah & Toulib (2022, p. 30).

Year	Major Innovations and Smart Technologies Impacting Accounting
1943 - 1950	- Foundation of Neural Networks Science
	- The term "Robotics" coined by Isaac Asimov

Year	Major Innovations and Smart Technologies Impacting Accounting
1950 - 1965	- The term "Artificial Intelligence" and programming language LISP coined by John McCarthy
	- First use of computers in accounting / First small computer (PDP-8)
1965 - 1980	- Creation of the Internet / Invention of the VisiCalc spreadsheet program
	- Launch of the first cellular network (1G)
1980 - 1995	- First personal computer by IBM / First tablet by Grid Pad
	- Creation of Microsoft Office Suite / Launch of the World Wide Web by CERN
	- Major advancements in AI, including: Machine Learning, Case-Based Reasoning, Algorithms, Data Mining, Web Crawlers, Virtual Reality, etc.
1995 - 2000	- Launch of Wi-Fi technology / Founding of Google
2000 - 2015	- Launch of social networks / Launch of Gmail service
	- Use of AI in business / LG launched its smartphone
	- Launch of Siri by Apple and Google Now by Google to answer questions, provide recommendations, and perform actions
	- Emergence of cryptocurrency, digital currency Bitcoin / Blockchain technology / Big data
	- Launch of cloud computing for business by IBM / Machine Learning (ML)
	- Blue Brain initiative to simulate the human brain in detail
	- Cybersecurity
2015 to present day	- Virtual Reality (VR) becomes widely accessible / Facial recognition technology
	- Integration of Blockchain with the Internet of Things / Robotic Process Automation (RPA)
	- Announcement of Google Duplex service
	- Launch of 5G technology

Source: Prepared by the researcher based on Nour El-Houda Merah and Mohamed Touilb, *The Future of the Accounting Profession in Light of Digital Transformation Technologies – Blockchain as a Model*, *Journal of Economic Fields*, Vol. 05, Issue 01, 2022, p. 30. And Souad Boubeja, *Artificial Intelligence: Applications and Reflections*, *Journal of Economics, Finance, and Business*, Vol. 06, Issue 04, 2022, p. 92.

1-8 Notable AI-Driven Accounting Programs: Many companies and institutions have adopted AI technology in their financial and accounting sectors due to the benefits and impact of these technologies on the quality of their financial and accounting activities. Below are the most notable AI-supported accounting programs (Sokharawi & Almi, November 29-30, 2023, pp. 10-11):

- **XERO**: A program that performs many accounting tasks, including bookkeeping. Xero uses AI to analyze financial data and provide useful recommendations for managing accounts and finances. It currently has over 3 million subscribers worldwide.

- **SAP CONCUR**: Part of the SAP family, a leader in expense management. It's an integrated platform for managing expenses and invoices, automating daily operations. Around 700 organizations use this program to enhance management systems.

- **WAVELET**: A program that accelerates decision-making processes, integrates various systems in a short time, and enables business operations management. It currently has 51,000 users.

- **FINANCIO**: A program designed for smart businesses, automating and simplifying accounting tasks. It's aimed at small business owners in Malaysia, catering to the Malaysian market's requirements, with about 25,700 users.

- **BECON SYSTEMS**: An accounting program designed to be as simplified as possible, built with automation and AI. The company currently has 35,000 users.

- **ZOHO**: A platform headquartered in India with a suite of programs capable of automating institutional accounting operations. The company has 50 million users globally.

- **ESKER**: Known for its AI-based programs designed to automate corporate accounting processes, including procurement, accounts payable, and accounts receivable. It has over 600,000 users in more than 50 countries.

- **QuickBooks**: Uses AI to analyze accounting data and provide users with useful recommendations for making sound financial decisions.

- **E FLOW AND Medius**: Cloud-based programs that automate invoice and purchase order processing, providing automatic data capture and seamless integration with enterprise resource planning (ERP) systems. They offer clients full electronic data exchange capabilities.

- **E-Invoice**: An electronic invoicing program provided by OZEDI for businesses and software industries in Australia and New Zealand to help promote and facilitate the adoption of electronic invoices directly between senders and receivers.

- **Kofax RPA**: A system for setting up robots that automate data capture, coding, invoice verification, and related processes, routing these data to ERP systems to verify payments, aimed at reducing costs, delays, and errors.

1-9 AI's Contribution to Enhancing the Accounting Profession AI technology has brought many benefits to the accounting profession, making these smart technologies capable of performing various accounting tasks, such as (Belaid & Ben Hawas, 2024, pp. 1042-1043):

1. **Automation of Routine Accounting Tasks**: Automating routine accounting tasks is one of the most significant impacts of AI on the accounting profession. This automation has enhanced efficiency, accuracy, and speed while reducing the need for human interventions, allowing accountants to focus on other tasks. For example, Optical Character Recognition (OCR) technology can scan and process invoices faster with fewer errors.

2. **Providing Predictive Analytical Insights**: AI's ability to handle large amounts of data has enabled accountants to gain deeper insights into financial information. Advanced AI algorithms can detect patterns in financial data and offer predictive insights into cash flow trends, budget variances, and potential financial risks.

3. **Automating and Analyzing Tax Processes**: AI analyzes various financial statements to identify tax deductions and credits, saving time and helping companies reduce tax liabilities. It also detects errors and fraud in tax filings to ensure compliance with regulations and maximize tax savings.

4. **Fraudulent Transaction Detection**: AI-powered fraud detection systems can analyze large amounts of financial records and data, identifying irregular patterns and unusual cases that may indicate fraudulent activity or other financial irregularities. This allows accountants to monitor financial transactions more efficiently and improve the accuracy and efficiency of their services.

1-10 Risks and Challenges Accountants May Face with the Domination of AI Technology Despite the widespread and rapid proliferation of AI technology, which has captured the attention of everyone, extending from replacing human labor to gradually becoming part of everyday life, the development of smart programs used in accounting has led to a complete transformation in operational systems, greatly diminishing the use of traditional accounting methods. However, this does not come without several threats that accompany the application of these smart technologies in accounting practices. The most significant are summarized below (Randa Osama, 2022):

- The main ongoing debate in institutions across all sectors is that technology will enhance human intelligence, providing quick access to accounting information and improving all methods of management, control, training, and self-diagnosis to achieve optimal outcomes in accounting processes. With the advancement of these technologies, the deep integration of AI into the accounting profession has become evident, posing a significant challenge. While technological progress eliminates some traditional accounting jobs, it simultaneously creates new ones.

- The adoption of modern AI technologies in accounting presents significant threats to practitioners due to the immediate and accurate processing offered by AI. This has led to growing

concerns about the potential replacement of human capital by modern technologies in the accounting profession.

- Negative aspects of relying on AI technologies in accounting include the high costs of purchasing, maintaining, and updating AI-supported accounting systems. Additionally, there is a risk of stunting the knowledge base of novice accountants, alongside the competitive risk of using such systems and updates by rivals (Omoteso, 2012, p. 8491).

- Although AI technologies are efficient and reliable in accounting practices, they are incapable of emulating certain human skills, such as creativity, emotional intelligence, the ability to express oneself, and interpersonal communication (Bizarro Pascal & Dorian Margaret, 2017).

- While companies can realize substantial benefits by adopting AI technologies in their accounting practices, they also pose serious threats, such as the potential replacement or complete elimination of most human resources in the profession (Doshi, Balasingam, & Arumugam, 2020, pp. 880-881). A 2015 study by Oxford University confirmed this by stating that there is a 95% probability that accountants could lose their jobs to machines (Mohammad Suleiman et al., 2020, p. 479).

- The continuous changes in accounting and tax laws require constant adjustments and updates to AI-based accounting and tax systems to ensure compliance with evolving government regulations (Zhuowen, 2018, p. 1821).

- One of the challenges facing the use of AI technologies in accounting is the shortage of skilled and specialized labor with advanced knowledge and skills to work with these modern technologies, which may require significant financial investment in training (Mohammad Suleiman et al., 2020, p. 486).

- Despite being considered a new technology, AI brings problems and challenges to the accounting profession. AI could lead to a higher unemployment rate for lower-level accountants and pose high risks of data breaches, raising the demands on financial and accounting practitioners (Jin et al., 2022, p. 570).

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2. Practical Framework of the Study

After inputting the data into the IBM SPSS V23 statistical software, it was analyzed using several tools from descriptive and inferential statistics as follows:

2-1 Descriptive Statistics Tools:

Several descriptive tools were used to analyze the responses of the study sample members, including:

- **Absolute and relative frequencies:** This method is suitable for categorizing and presenting data clearly and simply. These frequencies were used to determine how often the different categories of personal variables were repeated, representing them in frequency tables to describe the study sample.

- **Pearson Correlation Coefficient:** This coefficient was used to measure the degree of correlation and study the relationship between two variables. It was also used to calculate the internal consistency of the questionnaire items and their construct validity.

- **Central Tendency Measures:** By calculating the average of each item in the questionnaire, the responses of the study sample members and their agreement with each statement were assessed.

- **Dispersion Measures:** The standard deviation was calculated to determine how dispersed the responses were from their mean. The smaller the value, the more concentrated the responses were around the means.

- **Alpha Cronbach Test:** This test was used to assess the reliability of the questionnaire items.

2-2 Inferential Statistics Tools:

- **Normality Test:** The Kolmogorov-Smirnov test was used to determine the type of data distribution.

- **T-Test for a Single Sample:** This test was used to assess whether the average level of agreement reached or exceeded the midpoint (3), or fell below it. It was also employed to verify the significance of the mean for each statement in the questionnaire.

- **Independent Sample Test:** This test was used to detect differences in cases where the questions provided two answer options.

- **One-Way ANOVA Test:** This was applied to examine whether there were statistically significant differences in the attitudes of the sample members.

- **Regression Model:** Regression analysis was used to test hypotheses concerning the impact of independent variables on the dependent variable by finding a linear equation for the independent variables in terms of the dependent variable and calculating how these variables relate to each other.

2-3 Validity and Reliability of the Study Questionnaire

To ensure the accuracy and credibility of the questionnaire and to reliably base the results on it, it was necessary to measure both its validity and reliability.

2-3-1 First Section: Validity of the Questionnaire

The validity of a questionnaire refers to its ability to measure what it was designed to measure and to achieve the objectives of the study, answering its questions and hypotheses. The validity of the questionnaire was verified in two ways:

- **External Validity (Expert Validity):** This was achieved through expert review, by presenting the questionnaire to a number of evaluators, including academic professors and professionals specializing in accounting and auditing. Based on their comments, guidance, and suggestions, the questionnaire was refined and finalized in its current form.

- **Internal Validity (Internal Consistency):** This was tested using software and refers to how well the items in the questionnaire are correlated with the dimension to which they belong, as well as how well these dimensions are correlated with the overall average of the section they belong to. Pearson's correlation coefficient was used to calculate these correlations.

- **Internal Consistency Validity of the First Section:** Accountants possess sufficient knowledge of the features and uses of AI in accounting. The Pearson correlation coefficient was calculated to show the correlation between each statement in the first section and the overall average of the dimension to which the statements belong. The following table illustrates this:

Table 01: Internal Consistency Validity for the Statements of the First Section

Statistical significance	***Sig (Bilatérale)***	***Corrélation de Pearson***	**Items no**
Statistically significant	0,000	0,736	**1**
Statistically significant	0,000	0,707	**2**
Statistically significant	0,000	0,759	**3**
Statistically significant	0,000	0,742	**4**
Statistically significant	0,000	0,646	**5**
Statistically significant	0,000	0,599	**6**

The correlation is significant at the 0.05 level (two-tailed).

Source: Prepared by the researchers based on the results of SPSS V23.

From the values in the table above, it can be observed that the Pearson correlation coefficients for the statements of the first axis are positive values, statistically significant at the 0.05 significance level, as the p-values for these statements equal 0.000, which is less than the significance level of 0.05. This confirms the existence of a direct relationship between the statements of this axis and that they accurately measure what they are intended to assess.

- **Internal consistency validity of the second axis statements:** Accountants have an understanding of the impact of artificial intelligence technologies on the accounting profession. The Pearson correlation coefficient was calculated to clarify the relationship of each statement from the second axis with the overall mean of the dimension to which the statements belong. The following table illustrates this:

Table No. 02: Internal consistency validity of the statements for the second axis.

Statistical significance	***Sig(Bilatérale)***	***Corrélation de Pearson***	**Number**
Statistically significant	0,000	0,769	**1**

Statistically significant	0,000	0,696	2
Statistically significant	0,000	0,612	3
Statistically significant	0,000	0,648	4
Statistically significant	0,000	0,726	5
Statistically significant	0,000	0,725	6
Statistical significance	0,000	0,728	7
Statistically significant	0,000	0,744	8
Statistically significant	0,000	0,602	9
Statistically significant	0,000	0,571	10
Statistically significant	0,000	0,830	11
Statistically significant	0,000	0,849	12

Source: Prepared by the researchers based on the results of SPSS V23.

From the values in the table above, we observe that the Pearson correlation coefficients for the statements of the second axis are positive values and statistically significant at the 0.05 significance level, as the p-values for these statements equal 0.000, which is less than the significance level of 0.05. This confirms the existence of a direct relationship between the statements of this axis and that they accurately measure what they are intended to assess.

2-3-2 Validity and Reliability of the Study Sample:

To ensure the validity and reliability of the statements in the questionnaire, we chose to use Cronbach's Alpha coefficient on the responses of the study sample, as it is one of the most commonly used methods for measuring reliability and validity. This coefficient is considered acceptable if it equals or is greater than 0.6. The following table shows the reliability and validity coefficients for the study axes as follows:

Table No. 03: Validity and Reliability of the Study Sample.

Reliability Coefficient	Validity Coefficient	Number of Statements	Dimensions
0.774	0.720	6	First Dimension
0.910	0.720	12	Second Dimension

Source: Prepared by the researchers based on the results of SPSS V23.

From the values in the table above, we observe that the reliability and validity coefficients for the study dimensions exceed the statistically acceptable percentage of 0.6. Additionally, the overall reliability and validity coefficients for the questionnaire are estimated at 0.922 and 0.820, respectively, which are close to one. This indicates that the reliability and validity of the questionnaire items are very high. This means that if the questionnaire were redistributed multiple times, it would yield the same results. Thus, we have confirmed the reliability and validity of the questionnaire and its suitability for study and analysis, enabling us to test the hypotheses with complete confidence.

2-4 Presentation and Analysis of the Responses of the Study Sample

This section analyzes the reality of the study variables based on the responses of the study sample, by presenting the functional and institutional variables of internal and external accountants, displaying their responses, and determining the direction of the study variables. Then, the analysis of these responses will be conducted using appropriate descriptive statistical tools.

2-4-1 Presentation and Analysis of the Personal and Functional Variables of the Study

- **Educational Qualification:** The table below shows the distribution of the sample members according to their educational qualifications as follows:

Table No. 04: Distribution of the Study Sample Members by Educational Qualification.

Percentage (%)	Frequency	Educational Qualification
39.3%	19	Bachelor's Degree
35.2%	14	Master's Degree
14.8%	8	Master's
24.1%	13	Doctorate
100%	54	Total

Source: Prepared by the researchers based on the results of SPSS V23. Regarding the variable of educational qualification, it is evident from the table above that the majority of the sample holds a Bachelor's degree, with 19 individuals representing 39.3%. This is followed by 14 individuals holding a Master's degree at 35.2%, 13 individuals holding a Doctorate at 24.1%, and finally, 8 individuals holding a Master's degree at 14.8%.

- **Job Title:** The table below shows the distribution of the sample according to their job titles as follows:

Job Title	Frequency	Percentage (%)
Accounting Expert	5	9.3%
Auditor	17	31.5%
Certified Accountant	14	25.9%
Corporate Accountant	18	33.3%
Total	54	100%

Table 05: Distribution of the study sample by job title.

Source: Prepared by the researchers based on the results of SPSS V23.
From the table above, we observe that the majority of the respondents hold the position of Corporate Accountant, representing 33.3%. This is followed by those in the position of Auditor at 31.5%. The percentage of those holding the title of Certified Accountant is 25.9%, and finally, the position of Accounting Expert accounts for 9.3%.

- **Years of Experience:** The following table shows the distribution of the study sample according to years of experience:

Table 06: Distribution of the study sample by years of experience.

Years of Experience	Frequency	Percentage (%)
Less than 5 years	5	9.3%
6 to 10 years	20	37.0%
11 to 20 years	23	42.6%
More than 20 years	6	11.1%
Total	54	100%

Source: Prepared by the researchers based on the results of SPSS V23.
Regarding the variable of years of experience, we note from the table above that most members of the study sample have professional experience ranging from 11 to 20 years, with a frequency of 23 individuals, which represents 42.6%. This indicates that they have greater expertise concerning the profession, thereby increasing the validity of the respondents' answers. The second-largest group is those with experience ranging from 6 to 10 years, totaling 20 individuals or 37%. The third category is those with more than 20 years of experience, with 6 individuals representing 11.1%. The last group consists of those with less than 5 years of experience, totaling 5 individuals or 9.3%.

- **Awareness of Accountants Regarding AI Technology:** The following table shows the distribution of the study sample according to their awareness of AI technology:

Table 07: Distribution of the study sample by awareness of AI technology.

Awareness of Technology	Frequency	Percentage (%)
Weak	17	31.5%
Medium	21	38.9%
Good	14	25.9%
Excellent	2	3.7%
Total	54	100%

Source: Prepared by the researchers based on the results of SPSS V23.
From the table above, regarding the variable of awareness of AI technology, it is evident that most members of the study sample have a medium level of awareness of AI technology, with a frequency of 21, representing 38.9%. The second category is those with weak awareness, totaling 17 individuals or 31.5%. The third category represents those with good awareness, comprising 14 individuals at 25.9%. Finally, the last category, which is excellent awareness, has only 2 individuals, representing 3.7%.

2-4-2 Presentation and Analysis of Sample Responses Regarding the Study Axes
To analyze the data, a one-sample T-test was used. Before analyzing the responses of the study sample regarding the study variables, we first determine the distribution method of the data, in addition to identifying the measurement method.
Parametric tests require that the data follow a normal distribution. This test is essential for determining the type of tests used in the study (parametric and non-parametric). We selected the Kolmogorov–Smirnov test as the most commonly used to determine whether the data follow a normal distribution, as shown in the following table:

Table 08: Normal Distribution Test.

Axis Number	Z Value	P-value (sig)
First	0.083	0.200*
Second	0.086	0.200*
All Axes	0.099	0.200*

Source: Prepared by the researchers based on the results of SPSS V23.
The previous table tests the following hypotheses:
H0: The data do not follow a normal distribution.
H1: The data follow a normal distribution.

It is clear from the above table that the p-value for the study axes is greater than the significance level of 0.05, indicating that the data follow a normal distribution according to the Kolmogorov-Smirnov test, which allows us to use parametric tests for data analysis.

The five-point Likert scale was also used to determine the method of measuring the data. It is considered an ordinal scale used to assess the level of agreement with the questionnaire questions, being one of the most common scales for indicating the mean. It consists of five levels from which respondents select only one level.

When calculating the study means, these means sometimes include intervals. Thus, we calculate the hypothetical arithmetic mean according to the five-point Likert scale by first calculating the range of weights between the degrees by finding the difference between the upper and lower limits of the categories as follows: 5-1=4. The length of the category is then calculated as follows: **Length of Category** = [formula needed].
To obtain the hypothetical weighted mean, the length of the category is added incrementally to the number of category weights, starting from the first category number to the last category number. Accordingly, the direction of agreement is determined, as illustrated in the following table:

Table 09: Distribution of the Five-Point Likert Scale.

Measurement Degree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Weight	1	2	3	4	5
Weighted Average	[1-1.80]	[1.80-2.6]	[2.6-3.40]	[3.40-4.2]	[4.2 - 5]
Direction of Agreement	Very Low	Low	Medium	High	Very High

Source: Prepared by the researchers based on the five-point Likert scale.

Presentation and Analysis of Study Sample Responses Regarding the First Axis

The responses of the sample individuals were analyzed using a one-sample T-test, as shown in the following table, to determine the level of agreement and its direction on these statements:

Table 10: Presentation and Analysis of Study Sample Responses.
First Axis: Accountants have sufficient knowledge of the characteristics and uses of AI technologies.

Statement Number	Statement	Mean	Standard Deviation	Direction of Agreement	Agreement Level
1	You have sufficient knowledge about AI technologies	2.76	1.008	Neutral	Medium

Statement Number	Statement	Mean	Standard Deviation	Direction of Agreement	Agreement Level
2	AI technologies can be applied in the practical field	2.87	0.972	Neutral	Medium
3	I realize that AI technologies are the future of accounting information systems	3.26	0.915	Neutral	Medium
4	I have positive expectations regarding the application of AI technologies	3.19	0.933	Neutral	Medium
5	I have a desire to use AI technologies	3.46	0.966	Agree	Good
6	I have sufficient educational qualifications to use AI technologies	3.15	0.856	Neutral	Medium
Overall Direction		**3.11**	**0.658**	Neutral	Medium

Source: Prepared by the researchers based on the results of SPSS V23.

From the above table, we observe that the majority of the means belong to the neutral category with a low standard deviation, indicating that there is not a significant dispersion in the study sample's responses. This suggests that the individuals in the sample exhibit a neutral opinion on most statements of this first axis, as all responses range between 2.76 and 3.46. Most responses were neutral for some statements and agreeing for some items, with statement number 5 and 3 showing the highest mean values of 3.46 and 3.26, respectively, while the lowest value was for statement number 1 at 2.76. The overall mean for the axis was 3.11, reflecting a medium level of awareness of AI technologies.

Presentation and Analysis of Study Sample Responses Regarding the Second Axis

The mean of the statements and the standard deviation for the study statements were calculated, and the following table illustrates the analysis of the second axis statements from the questionnaire:

Table 11: Presentation and Analysis of Study Sample Responses.
Second Axis: Accountants have an understanding of the impact of AI technologies on the accounting profession.

Statement Number	Statement	Mean	Standard Deviation	Direction of Agreement	Agreement Level
1	AI technologies reduce the time needed for recording financial transactions	3.52	0.906	Agree	Good
2	Relying on AI technologies converts accounting documents, invoices, and contracts to digital format on the internet	3.59	0.942	Agree	Good
3	AI technologies reduce the number of accountants and workers when executing and distributing financial tasks into more precise tasks	3.30	0.944	Neutral	Medium
4	AI technologies enable changes in accounting fields more rapidly and flexibly than traditional archiving methods	3.44	0.883	Agree	Good
5	AI technologies avoid errors that occur with human intervention in the documentation process	3.15	0.960	Neutral	Medium
6	AI technologies enable the provision of real-time financial reports at any point in time	3.37	1.015	Neutral	Medium
7	AI technologies prevent cases of manipulation and fraud in financial data and information	3.33	0.991	Neutral	Medium
8	AI technologies help improve the accuracy and reliability of accounting records	3.30	0.983	Neutral	Medium
9	The use of AI technologies significantly reduces tax evasion	3.35	1.031	Neutral	Medium

Statement Number	Statement	Mean	Standard Deviation	Direction of Agreement	Agreement Level
10	AI technologies affect accounting registration from double entry to triple entry	3.33	0.932	Neutral	Medium
11	The use of AI technologies reduces the costs of accounting books and documents used in the documentation process	3.48	0.906	Agree	Good
12	Accounting information can be accessed transparently by all parties (accountant, client, auditor, etc.)	3.48	0.966	Agree	Good
Overall Direction		**3.38**	**0.711**	Neutral	Medium

Source: Prepared by the researchers based on the results of SPSS V23.

2.5 Hypothesis Testing

In this section of the study, we test the study hypotheses related to describing the study variables, using the statistical methods approved for applying inferential statistics.

2.5.1 Testing Hypotheses Related to Describing the Reality of the Study Variables

Before testing the hypotheses, most tests require knowledge of data distribution. This test is essential for hypothesis testing. According to the previous review, we conducted the Kolmogorov–Smirnov test, which shows that the data used in this study follow a normal distribution, enabling us to use parametric tests and conduct the hypothesis testing.

- **Testing the Main Hypothesis:** Thus, we test the hypotheses related to describing the study variables using the one-sample T-test from the accountants' perspective as follows:

First: Testing the First Hypothesis The first hypothesis states:

H0: Accountants in Algeria do not have an understanding of the characteristics of artificial intelligence technologies in the accounting profession.
H1: Accountants in Algeria have an understanding of the characteristics of artificial intelligence technologies in the accounting profession.

The following table shows the results of the one-sample T-test for the main hypothesis related to the first axis of the accountants' questionnaire:

Table 12: Results of the T-Test for the Main Hypothesis.

Hypothesis	Mean	Standard Deviation	Calculated t Value	Tabular t Value	Probability Value (sig)	Level of Agreement	Decision
H1	3.11	0.658	1.28	3.442	0.104	Moderate	Hypothesis Rejected

Significance Level Used: α = 0.05
DF = N - 1 = 54
Source: Prepared by the researchers based on Minitab V18 results.

From the values in the table above, it is clear that the mean value of the variable (Accountants in Algeria have an understanding of the characteristics of artificial intelligence technologies in the accounting profession) belongs to the third category of the five-point Likert scale, reflecting a degree of neutrality on this hypothesis from the accountants' perspective. The calculated t value is 1.28, which is less than its tabular value of 3.442, and the probability value is greater than the significance level of 0.05. Thus, the alternative hypothesis is rejected, and the null hypothesis H1 is accepted.

Second: Testing the Second Hypothesis H0: Artificial intelligence technologies do not affect the accounting profession.
H1: Artificial intelligence technologies affect the accounting profession.

The following table shows the results of the one-sample T-test for the second hypothesis related to the mean of the second axis of the questionnaire:

Table 13: Results of the T-Test for the Second Hypothesis.

Hypothesis	Mean	Standard Deviation	Calculated t Value	Tabular t Value	Probability Value (sig)	Level of Agreement	Decision
H1	3.38	0.711	4.000	2.001	0.000	Moderate	Hypothesis Accepted

Significance Level Used: α = 0.05
DF = N - 1 = 54
Source: Prepared by the researchers based on SPSS V23 results.

From the table above, it is evident that the mean value of the variable "Artificial intelligence technologies affect the accounting profession" belongs to the third category of the five-point Likert scale, reflecting a degree of agreement with this hypothesis. The calculated t value is 4.000, which is greater than its tabular value of 2.001, and the probability value is less than the significance level of 0.05. Therefore, the alternative hypothesis H1 is accepted, and the null hypothesis H0 is rejected, indicating that "Artificial intelligence technologies affect the accounting profession," according to the opinions of the study sample.

Third: Testing the Third Hypothesis The hypothesis states:

H0: There is no statistically significant relationship between the level of awareness of the sample individuals regarding developments in information technology and their awareness of the impact of artificial intelligence technologies on the accounting profession.
H1: There is a statistically significant relationship between the level of awareness of the sample individuals regarding developments in information technology and their awareness of the impact of artificial intelligence technologies on the accounting profession.

The following table shows the results of the one-sample T-test for the third hypothesis related to the mean of the second axis of the questionnaire:

Table 14: Results of the T-Test for the Third Hypothesis.

Hypothesis	Correlation Coefficient R	Coefficient of Determination R^2	Significance Level of F Value	Direction of Relationship Beta	Value β	Value T	Statistical Significance Sig
1	0.709	0.509	0.000	2.199	0.598	7.259	0.000

Source: Prepared by the researchers based on SPSS V23 results.

From the table above, it is clear that the coefficient of determination R^2 is high at 0.509, meaning that the independent variable explains 50% of the variance in the dependent variable. The T value and the significance level F of 0.000, which is less than 0.05, indicate the significance of the test. Therefore, the alternative hypothesis H1 is accepted, and the null hypothesis H0 is rejected, indicating that "There is a statistically significant relationship between the level of awareness of the sample individuals regarding developments in information technology and their awareness of the impact of artificial intelligence technologies on the accounting profession," according to the opinions of the study sample.

Conclusion:

In this study, we aimed to address a highly significant topic related to institutions striving to modernize their accounting systems and transform them into contemporary accounting systems. This study revealed the extent of knowledge that individuals working in the accounting field in Algeria have regarding modern technologies used in their profession. We focused on the main problem: What is the impact of artificial intelligence technology on the accounting profession? This topic was explored by providing theoretical foundations on artificial intelligence techniques and their relationship with accounting. Additionally, a field study was conducted to determine the level of awareness among individuals working in the accounting sector in Algeria regarding the characteristics and uses of artificial intelligence technologies, as well as the impact of these technologies on the profession through a random sample. The study yielded the following results:

- Artificial intelligence technologies in Algerian institutions are still in their early stages, leading to a weak awareness among the study sample regarding their characteristics and uses.

- Regarding their perception of the impact of artificial intelligence technologies on the accounting profession, individuals expressed cautious opinions, as this technology is unfamiliar to them, making it difficult for them to judge it positively or negatively without direct experience.

- Artificial intelligence technologies are innovative, helping to save time and costs while enhancing the efficiency and effectiveness of various transactions.

- The implementation of artificial intelligence technologies in the accounting profession in Algeria faces a range of challenges, such as reliance on the internet and a lack of training.

- There is a direct correlation between the individuals' awareness of developments in information technology and their perception of the impact of artificial intelligence technologies on the accounting profession.

- Accountants who adopt artificial intelligence technologies in accounting programs and learn to use them effectively can achieve greater productivity and quality in their work, thus becoming more effective and distinguished in the job market.

- The replacement of accountants with modern technologies is highly unlikely; however, it will inevitably affect accountants who do not keep pace with developments and do not employ the latest technologies related to the accounting field in their work.

- Artificial intelligence does not eliminate the accountant's role but rather enhances it and significantly helps improve their accounting performance. There are no fears regarding the future of accountants about being replaced by artificial intelligence or losing their jobs in the near future, as organizations will always need accountants who can analyze and interpret artificial intelligence data, as well as provide consulting services.

Recommendations:

In conclusion, we will attempt to provide some recommendations that we find appropriate due to the importance of modern technologies in the accounting field, especially artificial intelligence techniques, which we consider to be the future direction for most Algerian institutions. To enhance awareness among accountants, we present the following recommendations derived from the study's results:

- It is essential to qualify and train accountants on modern and contemporary technologies, including artificial intelligence techniques (with an understanding of their characteristics and uses). This will enhance their skills and abilities to adapt to the changing requirements of the profession.

- On another note, educational and training institutions should integrate artificial intelligence theories into all units of their curricula, enabling graduates to acquire the skills necessary to work in an automated environment.

- It is crucial for practicing accountants in Algeria to seriously pursue acquiring artificial intelligence skills to keep pace with the growth and development of the profession, as the need for human intelligence in performing accounting tasks is very important, and is best supported by intelligent technological techniques.

- The inclusion of new metrics in the curricula for accounting students is essential to focus on modern technologies in the accounting field, given the significant role they play in the profession's development, and students should be provided with knowledge and skills related to these technologies.

- There is a necessity to bridge the gap between researchers in information technology and accountants.

- Encouraging more research in the field of digitization is essential, through increasing the number of conferences and scientific seminars dedicated to modern technologies related to the accounting profession.

- A collaborative approach between academics and professionals is essential to keep pace with the latest developments in the accounting profession through joint work.

- There is a need to develop the accounting profession in Algeria to keep up with modern developments.

References:

1. Mohammed Ali, M., Salah Abdullah, A., & Saad Khattab, P. (2022, September). The Effect of Activating Artificial Intelligence Techniques on Enhancing Internal Auditing Activities: Field Study. *Alexandria Journal of Accounting Research*, pp. 1-40.

2. Askary, S., Abu-Ghazaleh, N., & Tahat, Y. A. (August 29, 2019). Artificial Intelligence and Reliability of Accounting Information. *17th Conference on e-Business, e-Services and e-Society (I3E)*, pp. 1-12. Kuwait: HAL Open Science.

3. Bizarro Pascal, A., & Dorian Margaret. (2017). Artificial Intelligence: The Future of Auditing. *Internal Auditing*, pp. 21-26.

4. Doshi, H. A., Balasingam, S., & Arumugam, D. (2020). Artificial Intelligence as a Paradoxical Digital Disruptor in the Accounting Profession: An Empirical Study Amongst Accountants. *International Journal of Psychosocial Rehabilitation*, pp. 873-885.

5. Hasan, A. (January 29, 2022). Artificial Intelligence (AI) in Accounting & Auditing: A Literature Review. *Open Journal of Business and Management*, pp. 440-465.

6. Jin, H., Jin, L., Qu, C., Fan, C., Liu, S., & Zhang, Y. (2022). The Impact of Artificial Intelligence on the Accounting Industry. *Journal of Advances in Social Science, Education and Humanities Research*, pp. 570-574.

7. Kwarbai, J. D., & Omojoye, E. O. (April 2021). Artificial Intelligence and the Accounting Profession. *Babcock Journal of Accounting and Finance*, pp. 78-88.

8. Leandro, F. P., Álvaro, L. D., Renato, L. D., & Rui Alexandre, H. G. (January 2021). Artificial Intelligence in Strategic Business Management: The Case of Auditing. *International Journal of Business Information Systems*, pp. 1-48.

9. Mohammad Suleiman, J., A. K., Hela, B., Phung, A. T., Muhammad, S. S., & Ali, A. A. (2020). How Artificial Intelligence Changes the Future of the Accounting Industry. *International Journal of Economics and Business Administration*, pp. 478-488.

10. Omoteso, K. (2012). The Application of Artificial Intelligence in Auditing: Looking Back to the Future. *Journal of Expert Systems with Applications*, pp. 8490-8495.

11. Rayan Smith. (March 4, 2022). *Bench Accounting*. Retrieved July 28, 2024, from What is Accounting and Why It Matters For Your Business: https://www.bench.co/blog/accounting/what-is-accounting

12. Stancu, M., & Duţescu, A. (December 31, 2021). The Impact of Artificial Intelligence on the Accounting Profession: A Literature Assessment. *Journal of Sciendo*, pp. 749-758.

13. Zhuowen, H. (2018). Discussion on the Development of Artificial Intelligence in Taxation. *American Journal of Industrial and Business Management*, pp. 1817-1824.

14. Asawar Shitwi Abd. (September 30, 2023). The Reality of Accounting in Light of Artificial Intelligence in Iraq. *Tikrit Journal of Administrative and Economic Sciences*, pp. 1-22.

15. Rand Osama. (December 13, 2022). Future Challenges Facing Accountants with the Dominance of Artificial Intelligence. Online Article. Retrieved July 15, 2024, from https://uk.linkedin.com/company/cpa-talks?trk=article-ssr-frontend-pulse_publisher-author-card

16. Souad Boubeja. (December 31, 2022). Artificial Intelligence: Applications and Implications. *Journal of Financial and Business Economics*, pp. 85-108.

17. Saleh Al-Asad Al-Asad. (March 13, 2023). Artificial Intelligence: Opportunities, Risks, and Reality in Arab Countries. *Journal of Economic Additions*, pp. 165-184.

18. Karim Belaid, & Karima Ben Hawas. (May 3, 2024). Key Artificial Intelligence Applications in Accounting and Auditing: A Case Study of the Big Four Companies. *Tabna Journal of Scientific and Academic Studies*, pp. 1031-1052.

19. Kauthar Sokhraoui, & Hasiba Alami. (November 29-30, 2023). Legal Protection for Artificial Intelligence Applications in Accounting and Financial Reporting Systems. *The International Virtual-Physical Symposium on Artificial Intelligence and Its Applications in Accounting and Auditing*, pp. 1-17. Algeria: University of Badji Mokhtar-Annaba.

20. Mohammed Ibrahim Al-Dessouki. (December 20, 2023). *Al-Ahram Portal*. Retrieved July 28, 2024, from The Impact of Artificial Intelligence and the Technological Boom on the Accounting Profession: https://gate.ahram.org.eg/News/4656959.aspx

21. Marah Firas Mohammad Al-Nasour. (2022). The Impact of Artificial Intelligence in Risk-Based Auditing: The Mediating Role of Audit Quality in Jordanian Commercial Banks. Master's Thesis in Accounting. Amman: World Islamic Sciences University, Department of Accounting.

22. Nour El-Houda Mrah, & Mohammed Touileb. (December 31, 2022). The Future of the Accounting Profession in Light of Digital Transformation Techniques: Blockchain as a Model. *Journal of Economic Fields*, pp. 23-48.

23. Haiba Lahmar. (December 31, 2021). The Shift to Artificial Intelligence: Between Fears and Aspirations—The UAE Experience as a Model. *Journal of Economy and Development*, pp. 94-107.