

The Impact of Adopting Artificial Intelligence Technology on the Accounting Profession between Benefits and Challenges

(A field study on a sample of accountants in Algeria)

Dr. Abdelghani Krolladi¹

dr.krolladi84@gmail.com

Dr. Hezla Anis²

hezla-anis@univ-eloued.dz

^{1,2}University of Martyr Hama Lakhdar, El Oued (Algeria),

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Abstract

This study aims to determine the impact of artificial intelligence technology on the accounting profession in Algeria. It was divided into two sections: a theoretical section in which the terms related to the study were explained and defined, in addition to identifying the most important benefits of artificial intelligence technology on the accounting profession, as well as the most important challenges that may face the application of artificial intelligence technologies in various institutions; and an applied section represented in conducting a questionnaire with a group of specialists (certified accountants, auditors, accounting experts, and corporate accountants). The study reached several results, the most important of which are: that the adoption of artificial intelligence technology in Algerian institutions is still in its early stages, and that the application of artificial intelligence technologies in accounting faces a set of challenges in Algeria, despite the great benefits that the application of these technologies can provide if the appropriate conditions are available, and that artificial intelligence does not eliminate the accountant's job but rather enhances his role and helps him improve the performance of his accounting work. The study also recommended the necessity of qualifying and training accountants to use smart technologies to keep pace with the development taking place in the field of accounting, the necessity of linking researchers in the field of information technology with accountants, and the necessity of educational and training institutions to focus on integrating artificial intelligence theories into all units of their educational curricula in order to acquire the skills necessary to work in an advanced technological environment.

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

Introduction

The world has witnessed, within the framework of the contemporary financial and business environment, significant development in information and communication technology and the exchange of knowledge and information, which contributed to companies around the world paying attention to keeping pace with this technological development to achieve the highest quality in their services provided. They have adopted artificial intelligence techniques and tools in all their administrative, financial, and accounting fields, which has led to major changes in the methods and styles of work in these fields, especially in the accounting sector, which is

considered the most benefiting from artificial intelligence technology. This raised many questions, the most important of which are:

Main Problem

- To what extent does artificial intelligence technology affect the accounting profession in Algeria?

Sub-questions

- What is artificial intelligence?
- What is the accounting profession?
- What are the benefits of applying artificial intelligence technologies to the accounting profession?
- What are the challenges and risks that the accounting profession may face in light of the tremendous spread of artificial intelligence applications?
- Will the role of the accountant disappear, and will he be dispensed with when relying on smart accounting programs?
- What are the required solutions to face the negatives and risks of artificial intelligence?

1. Theoretical Framework of the Study

1.1 Definition of Artificial Intelligence

Artificial intelligence is defined as the ability of machines to repeat human cognitive functions such as problem-solving, learning, and pattern recognition, which enable them to make predictions used to facilitate decision-making (Stancu & Duțescu, 2021, p. 751). It consists of systems programmed to think and act to carry out activities expected from the human mind, which include the ability to know and acquire knowledge. It also includes the ability to control, understand relationships, and generate original ideas (Kwarbai & Omojoye, 2021, p. 80). On the other hand, artificial intelligence (AI) refers to the ability of computer systems to simulate biological neurons in terms of deep learning and self-learning from acquired information and experiences, making decisions based on knowledge, drawing conclusions, reasoning, and accumulating knowledge and experience to improve performance and achieve objectives. Artificial intelligence is an emerging and comprehensive subject covering many fields such as management, informatics, logic, mathematics, etc. (Jin et al., 2022, p. 570). Therefore, AI is a combination of software and hardware as an alternative to human intelligence, which can solve complex business problems using expert systems instead of human experts, and apply machine intelligence instead of human intelligence, with a major impact on decision-making by providing more accurate and reliable information (Askary, Abu-Ghazaleh, & Tahat, 2019, p. 03).

1.2 Importance of Artificial Intelligence

Artificial intelligence has great importance in our lives, the most important of which can be mentioned as follows:

- Since AI is the simulation of human intelligence and skills by machines, it is considered one of the most important achievements made by humans to assist them in various fields of life;
- AI has many benefits that have led to its widespread use in various sectors, such as navigation (digital maps), medicine and education, law, accounting and auditing, etc.;
- AI applications have become indispensable in our daily lives, and are available to everyone, such as smartphones, smart TVs, smart calculators, virtual reality glasses, gaming applications, and other things;
- AI technology is considered the language of the future, and everyone must acquire it, otherwise, they will be classified among the circle of backwardness and illiteracy.

1.3 Types of Artificial Intelligence

Artificial intelligence is divided into three types according to the degree of intelligence reached by the machine, as follows (Al-Asad, 2023, p. 168):

1.3.1 Narrow AI or Weak AI: It is the simplest form of artificial intelligence, programmed to perform a specific task in a specific environment. Its behavior is a reaction to a certain situation and cannot function outside its programmed environment. An example of this is IBM's "Deep Blue" robot, which defeated world chess champion Garry Kasparov in 1996.

1.3.2 General AI or Strong AI: Refers to the level at which the machine reaches a degree of intelligence that simulates human intelligence. Examples include self-driving cars and instant chatbots.

1.3.3 Super AI: Refers to machines surpassing human intelligence. These models are still experimental, expected to be reached in the future (Lahmar, 2021, p. 97).

1-4 Definition of the Accounting Profession:

Considering that accounting is the tool used to obtain a clear picture of the company's financial situation, profit or loss, its cash flow, and the current value of its assets and liabilities, and which part of the company generates actual profits (Rayan Smith, 2022), the accounting profession is that important and difficult job through which various financial data of a particular company are recorded, classified, and analyzed, and reliable and credible information about the company's financial position is provided to stakeholders (investors, government agencies, and financial institutions) (Belaïd & Ben Hawas, 2024, p. 1040).

1-5 Definition of Artificial Intelligence in Accounting

The United States was the first to apply artificial intelligence technology in the field of accounting, which has since enhanced the value of artificial intelligence in accounting and financial management. With the application of artificial intelligence technology in accounting and taxation work, the establishment of artificial intelligence applications in the financial field has been significantly enhanced, providing reliable technical support for the effective development of accounting work (Jin, et al., 2022, p. 570).

In general, artificial intelligence in accounting can be defined as the ability of the computer and its programs to perform many accounting tasks, accomplish repetitive manual functions, and reduce the rate of human errors. This enhances the accuracy and speed of analyzing reports and accounting information compared to traditional accounting methods (Al-Dessouqi, 2023). A study (Shtaywi Abd, 2023, p. 04) confirmed that the application of artificial intelligence in accounting has a positive impact and that accountants should adopt artificial intelligence because it is likely to become an essential element in all businesses soon. The study clarified the concept of artificial intelligence in accounting as aiming to improve traditional accounting methods and processes using smart technologies and software.

1-6 Fields of Application of Artificial Intelligence and Its Use in Accounting:

Based on the study of (Hasan, 2022, p. 451), the fields in which artificial intelligence is applied to the accounting profession are as follows:

1-6-1 Expert Systems (ES): These are computer programs that simulate human thinking processes in different situations. They store human knowledge and expertise and use them to solve problems in specific subjects. Thus, the simulation process appears as if it mimics experts in a specific field such as taxation or auditing. Hasan's study (2022, p. 451) classified expert systems in accounting under the following headings:

- **First: Auditing:** Expert systems improve audit quality, determine risks, and evaluate internal control. They are used to verify transaction values and detect fraud. There are two main types of ES in auditing: the first supports the audit process itself, and the other

supports the estimates set by companies. The goal of these tools is to achieve quality in audit practices, so it is important to maintain human oversight to ensure accuracy and quality and to consider non-technical factors such as work ethics and the legal context.

- **Second: Financial Accounting:** Accounting deals with managing companies' financial matters. ES can be applied in designing financial statements, processing invoices and journal entries, evaluating standards, as well as achieving financial goals, securing the financial future, managing revenues and expenses, managing investments, reducing financial risks, and calculating taxes. Here, AI's capability lies in enabling individuals to make sound decisions by developing financial plans that allow them to better allocate resources and effectively achieve their financial goals.
- **Third: Management Accounting:** ES are used in management accounting to enhance financial analysis, diagnose management control systems, and decision-making processes. These systems can also provide various guidance, such as inventory monitoring, cost analysis, data analysis, risk forecasting and diagnosis, and project management. ES can also offer specialized financial advice and recommendations to improve financial operations in institutions.

1-6-2 Decision Support Systems (DSS): An interactive, computer-based, adaptable, and multi-purpose system designed to assist in decision-making. The hidden motive behind DSS is to create alternatives that enable making intelligent decisions, while ES were created to automate decision-making processes and eventually replace the human decision-maker. DSS in accounting provide benefits such as analyzing financial data, identifying budget changes, forecasting future results, managing costs, measuring company performance, identifying financial risks, and providing strategies to improve financial and strategic decision-making. These systems are essential for the accounting profession as they improve efficiency and provide accurate information for financial decisions.

1-6-3 Machine Learning & Deep Learning: Machine learning (ML) is a fascinating field that enables computers to learn, think, and act with minimal human intervention. Deep learning (DL), which is a subset of machine learning, is concerned with teaching computers to think using a structure modeled after the human brain. ML is useful in accounting as it allows accountants to analyze accounting data and transactions up to 100%, establish correlations, make predictions, and detect anomalies and outliers that indicate errors or fraud, thereby determining risk ratios. DL also allows automating many tasks such as inventory monitoring, document processing, contract review, and report preparation. However, accountants must adhere to ethical standards and ensure the security and accuracy of financial data.

1-6-4 Fuzzy Logic: Fuzzy logic in its methodology simulates human thinking in decision-making. It is used to handle concepts of partial truth or degrees of truth where truth exists in uncertain conditions. It is a valuable tool for accountants in dealing with uncertainty. It is considered the best way to process data, handle more complex and ambiguous problems, obtain information that helps decision-makers make optimal choices, and enhance their ability to work effectively in a rapidly changing environment.

1-6-5 Artificial Neural Networks (ANNs): A smart technology that simulates the human brain and nervous system when performing a specific task. These systems differ from ES in that they learn directly from examples rather than from a knowledge engineer. They are trained by presenting input examples to be matched with output examples provided to the system. The system learns the relationship between input and output examples and can develop them instead of merely repeating them. This process is very similar to the mechanisms of the human mind in

logical reasoning, processing, and analyzing multi-variable problems (Mohammed Ali, Salah Abdullah, & Saad Khattab, 2022, pp. 15–16).

1-6-6 Hybrid Systems: Hybrid systems combine different artificial intelligence techniques, including smart models and algorithms, to handle complex problems such as natural language processing and machine learning. The use of technology with human accountants' expertise in hybrid accounting systems improves efficiency, accuracy, and collaboration within organizations. However, despite this technological development, human accountants must continue to possess the necessary skills and expertise for analysis, interpretation, and strategic guidance (Shtaywi Abd, 2023, pp. 07–08).

1-6-7 Genetic Algorithms: These are AI methods used in solving complex problems. They are a system suitable for making better and faster decisions than humans. In addition, their features include the ability to retain learning processes and support the link between AI components and the resulting benefits for business management (Leandro, Álvaro, Renato, & Rui Alexandre, 2021, p. 07).

1-6-8 Intelligent Agents: These are software entities that act on behalf of a user as an intermediary between the user and one or more systems or between the user and another intelligent agent independently. An intelligent agent is programmed according to a set of rules, and some of them can adapt their behavior and learn new facts and rules (Firas Mohammed Al-Nsour, 2022, pp. 26–27).

1-6-9 Robotics: Also known as robots, these are mechanical machines that perform programmed tasks at the direct signal of a human or computer. The robot system contains sensors, control systems, power supply units, and motion units that work together to execute a specific task. It is also equipped with sensing systems similar to how humans perceive. RPA technology is considered the best, most flexible, and most effective method for performing repetitive tasks carried out by humans in accounting and auditing (Sakharawi & Alimi, November 29–30, 2023, pp. 6–7).

1-7 The Most Important Smart Technologies that Influenced Accounting (Boubdja, 2022, p. 92; Marah & Touileb, 2022, p. 30)

Year	The Most Important Innovations and Smart Technologies that Influenced Accounting
1943–1950	- Establishment of neural networks science Coining of the term <i>Robotics</i> by Isaac Asimov
1950–1965	- Coining of the term <i>Artificial Intelligence</i> and the programming language LISP by John McCarthy - First use of computers in accounting / first mini computer PDP-8
1965–1980	- Creation of the Internet - Invention of the computer spreadsheet program VisiCalc - Launch of the first cellular network (1G)
1980–1995	- First personal computer by IBM - Launch of the first tablet by Grid Pad - Creation of Microsoft Office Suite / Launch of the World Wide Web (WWW) by CERN - Major progress in all areas of artificial intelligence, including: Machine Learning – Case-Based Reasoning – Algorithms – Data Mining – Web Crawler – Virtual Reality, etc.

Year	The Most Important Innovations and Smart Technologies that Influenced Accounting
1995–2000	- Launch of Wi-Fi technology - Establishment of Google
2000–2015	- Launch of social networks - Launch of Gmail email service - Use of artificial intelligence in business / Launch of LG smartphone - Launch of Apple's Siri and Google Now applications for answering questions, providing recommendations, and executing actions - Emergence of cryptocurrencies and the digital currency Bitcoin / Blockchain technology / Big Data - Launch of cloud computing for business by IBM / Machine Learning (ML) - <i>Blue Brain</i> initiative to simulate the human brain in detail - Cybersecurity
2015–Present	- Virtual Reality (VR) accessible to more users / Facial recognition technology - Linking Blockchain with the Internet of Things / Robotic Process Automation (RPA) - Announcement of Google Duplex service - Launch of fifth generation (5G) technology

Source: Prepared by the researcher based on Nour El Hoda Marah & Mohamed Touileb, *The Future of the Accounting Profession in Light of Digital Transformation Technologies – Blockchain Technology as a Model*, *Journal of Economic Fields*, Vol. 05, No. 01, 2022, p. 30; and Souad Boubdja, *Artificial Intelligence: Applications and Impacts*, *Journal of Money and Business Economy*, Vol. 06, No. 04, 2022, p. 92.

1-8 The Most Prominent Accounting Programs Operating with Artificial Intelligence:

Many companies and institutions have adopted artificial intelligence technology in their financial and accounting sectors due to the benefits and impact of these technologies on the quality of their financial and accounting results. The most prominent accounting programs supported by artificial intelligence are as follows: (Sakharawi & Alimi, November 29–30, 2023, pp. 10–11)

- **XERO:** A program that performs many accounting tasks, including bookkeeping. Xero uses artificial intelligence to analyze financial data and provide useful recommendations for account and financial management. It has more than 3 million subscribers worldwide.
- **SAP CONCUR:** Part of the SAP family, the leading company in expense management. It is an integrated platform for managing expenses and invoices, simplifying daily expenses and automating processes. About 700 institutions use this program to improve management systems.
- **WAVELET:** A program that can accelerate decision-making, integrate different systems in a short time, and allow business process management. It currently has 51,000 users.
- **FINANCIO:** A program designed for smart businesses that automates and simplifies accounting tasks. It is designed for small business owners in Malaysia to meet the needs of the Malaysian market, with about 25,700 users.

- **BECON SYSTEMS:** An accounting program designed to be as simple as possible, created using automation and artificial intelligence. The company currently has 35,000 users.
- **ZOHO:** A platform headquartered in India that owns a suite of programs capable of automating institutions' accounting processes. The company has 50 million users worldwide.
- **ESKER:** Known for its AI-based programs designed to automate companies' accounting processes as part of digital transformation, covering procurement, accounts payable, and accounts receivable. It has over 600,000 users in more than 50 countries.
- **QuickBooks:** This program uses artificial intelligence to analyze accounting data and provide useful recommendations to users for making sound financial decisions.
- **E FLOW and Medius:** Cloud-based programs that automate invoice and purchase order processing, capture incoming data automatically, manage and integrate it seamlessly thanks to strong and flexible connections with ERP systems, and provide clients with full electronic data exchange capabilities.
- **E-Invoice:** An electronic invoicing program, a service provided by OZEDI for businesses and software industries in Australia and New Zealand, to help and promote the adoption of electronic invoicing directly between senders and recipients.
- **Kofax RPA:** A robot-preparation system that automates data capture, coding, invoice verification, creation of corresponding processes, and routing of this data initially to ERP systems to validate payments. Its purpose is to reduce costs, delays, and errors.

1-9 Contribution of Artificial Intelligence Technologies to Enhancing the Accounting Profession

Artificial intelligence technology has brought many advantages to the accounting profession, enabling these smart technologies to perform many accounting tasks, such as: (Belaid & Ben Hawas, 2024, pp. 1042–1043)

- **1-9-1 Automating Routine Accounting Tasks:** Automating various routine accounting tasks is one of the most important effects of artificial intelligence on the accounting profession, as this automation enhanced efficiency, accuracy, and speed, while reducing the need for human intervention, allowing accounting practitioners to focus on other tasks. For example, Optical Character Recognition (OCR) technology can scan and process invoices faster and with fewer errors.
- **1-9-2 Providing Predictive Analytical Insights:** The ability of artificial intelligence to handle large amounts of data enabled accountants to gain deeper insights into financial information. Advanced AI algorithms can load patterns in financial data and provide predictive insights about cash flow trends, budget variances, and potential financial risks.
- **1-9-3 Automating and Analyzing Tax Processes:** AI analyzes different financial statements to identify tax deductions and credits, saving time and helping companies reduce tax liabilities. It also detects errors and fraud in tax returns to ensure compliance with regulations and achieve maximum tax savings.
- **1-9-4 Detecting Fraudulent Transactions:** AI-powered fraud detection systems can analyze large amounts of records and financial data, identify irregular patterns and unusual cases that may indicate fraudulent activity or other financial irregularities, enabling accountants to efficiently monitor financial transactions and improve the accuracy and effectiveness of their services.

1-10 Risks and Challenges That Accountants May Face with the Dominance of Artificial Intelligence Technology

Despite the widespread and massive spread of artificial intelligence technology, which attracted everyone's attention without exception until it dominated all aspects of life—starting from replacing human labor until gradually becoming part of societies' daily life—the development of smart programs used in accounting has led to a complete transformation of operational systems and the near disappearance of traditional accounting systems. However, this is not without several threats accompanying the application of this smart technology in accounting practices. The most important can be summarized as follows: (Rand Osama, 2022)

- The main current debate among institutions in all sectors is that technology will increase human intelligence, in addition to rapid access to accounting information and the development of all methods of management, control, training, and self-diagnosis to achieve the optimal result in accounting operations. With advances in these technologies, the importance of AI has been confirmed in depth in the accounting profession, posing a major challenge, as technological progress eliminates some traditional accounting jobs while creating new ones in return.
- The adoption of modern AI technologies in the accounting profession has posed immense threats to practitioners, given the instant and accurate processing provided by AI technology, leading to growing fears of the expected replacement of human capital with modern technologies in the accounting profession.
- The disadvantages of adopting AI technologies in accounting also include the high costs of purchasing, maintaining, and updating AI-supported accounting systems. There is also the risk of discouraging the knowledge base of beginner accountants, in addition to the risks of such systems and updates being used by competitors. (Omoteso, 2012, p. 8491)
- Although AI technologies are efficient and reliable in accounting practices, they cannot replicate some human skills, such as creativity, emotional intelligence, the ability to express, and interpersonal skills. (Bizarro Pascal & Dorian Margaret, 2017)
- While companies' adoption of AI technologies can achieve major benefits in accounting practices, they pose major threats that may lead to the elimination or complete replacement of the majority of human resources practicing the profession. (Doshi, Balasingam, & Arumugam, 2020, pp. 880–881). This was confirmed by a study conducted by Oxford University in 2015 that there is a 95% chance that accountants will lose their jobs because machines will take over their tasks (Mohammad Suleiman, et al., 2020, p. 479).
- The continuous change of accounting and tax laws and legislations requires constant modifications and updates of AI-based accounting and tax systems and programs to ensure compliance with changing governmental laws and legislations. (Zhuowen, 2018, p. 1821)
- Among the challenges facing the use of AI technologies in accounting is the shortage of skilled and specialized labor with advanced knowledge and skills to deal with modern technologies, which may require significant funds for their training. (Mohammad Suleiman, et al., 2020, p. 486)
- Although AI is considered a new technology, it brings problems and challenges to the accounting profession. AI may cause a higher unemployment rate among low-level accountants, high risks of data breaches, and higher requirements for financial and accounting practitioners. (Jin, et al., 2022, p. 570)

2- The Applied Framework of the Study

After entering the data into the statistical program IBM SPSS V23, it was analyzed using a set of statistical tools used in descriptive and inferential statistics as follows:

2-1 Descriptive Statistics Tools:

Several descriptive tools were used during the analysis of the responses of the study sample, as follows:

- **Absolute and relative frequencies:** This method is suitable for classifying and presenting data clearly and simply. These frequencies were used in the study to determine the number of repetitions of the personal variable categories of the respondents and represent 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, and was also used to calculate the internal consistency of axis statements and their construct validity.
- **Measures of central tendency:** By calculating the average of each questionnaire item, identifying the responses of the study sample, and the extent of their agreement with each statement of the questionnaire.
- **Measures of dispersion:** To calculate the standard deviation and determine the degree of dispersion of responses around their mean, where the smaller the value, the greater the concentration of responses around the averages.
- **Cronbach's Alpha Test:** This test was used to determine the reliability of the questionnaire statements.

2-2 Inferential Statistics Tools:

- **Tests of Normality:** The Kolmogorov-Smirnov test was used to determine the type of data distribution.
- **T-test for a single sample:** Used to determine whether the average degree of agreement reached or exceeded the moderate degree of 3 or was less, and to confirm the significance of the mean for each questionnaire statement.
- **Independent Samples Test:** Used to determine differences in the case of questions with two answer choices.
- **One-way ANOVA Test:** Used to test whether there are statistically significant differences in the attitudes of the study sample members.
- **Regression Model: Régression,** used to test the effect hypotheses between independent variables on the dependent variable, by finding a linear equation of the independent variables in terms of the dependent variable, as well as calculating the degree of correlation between these variables.

2-3 Validity and Reliability of the Study Questionnaire

In order to ensure the correctness and credibility of the questionnaire and to rely on its results with full confidence, it was necessary to measure the validity and reliability of the questionnaire.

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

The validity of the questionnaire means that the questionnaire items are truthful to what they were designed to measure, and capable of achieving the objectives of the study, answering its questions, and testing its hypotheses. The validity of the questionnaire was confirmed in two ways:

- **External Validity (Validity of the Arbitrators):** Conducted through arbitration, by presenting the questionnaire to a number of arbitrators consisting of academic university professors and professionals specialized in accounting and auditing. Based on the

observations, guidance, and suggestions provided by these professors, the questionnaire was finalized in its final form.

- **Internal Validity (Internal Consistency Validity):** Conducted through the program, and it means identifying the degree of correlation of the questionnaire items with the dimension to which these items belong, as well as the correlation of these dimensions with the overall average of the axis to which they belong, by calculating the Pearson correlation coefficient.
- **Internal Consistency Validity of the First Axis:** Accountants have sufficient knowledge of the characteristics and uses of artificial intelligence in accounting. The Pearson correlation coefficient was calculated to clarify the correlation of each item of the first axis with the overall average of the dimension to which these items belong. The following table illustrates this:

Table No. 01: Internal Consistency Validity of the Items of the First Axis

Item No.	Pearson Correlation	Sig (Bilateral)	Statistical Significance
1	0.736	0.000	Statistically significant
2	0.707	0.000	Statistically significant
3	0.759	0.000	Statistically significant
4	0.742	0.000	Statistically significant
5	0.646	0.000	Statistically significant
6	0.599	0.000	Statistically significant

The correlation is significant at the 0.05 level (bilateral).

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

It is noted from the values in the above table that the Pearson correlation coefficients for the items of the first axis are positive and statistically significant at the 0.05 level, because the p-values for these items equal 0.000, which is less than the significance level of 0.05. This confirms the existence of a positive relationship between the items of this axis and that they are valid for what they were designed to measure.

- **Internal Consistency Validity of the Items of the Second Axis:** Accountants have awareness of the impact of artificial intelligence technologies on the accounting profession. The Pearson correlation coefficient was calculated to clarify the correlation of each item of the second axis with the overall average of the dimension to which the items belong. The following table illustrates this:

Table No. 02: Internal Consistency Validity of the Items of the Second Axis

Item No.	Pearson Correlation	Sig (Bilateral)	Statistical Significance
1	0.769	0.000	Statistically significant
2	0.696	0.000	Statistically significant
3	0.612	0.000	Statistically significant
4	0.648	0.000	Statistically significant

Item No.	Pearson Correlation	Sig (Bilateral)	Statistical Significance
5	0.726	0.000	Statistically significant
6	0.725	0.000	Statistically significant
7	0.728	0.000	Statistically significant
8	0.744	0.000	Statistically significant
9	0.602	0.000	Statistically significant
10	0.571	0.000	Statistically significant
11	0.830	0.000	Statistically significant
12	0.849	0.000	Statistically significant

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

It is noted from the values in the above table that the Pearson correlation coefficients for the items of the second axis are positive and statistically significant at the 0.05 level, because the p-values for these items equal 0.000, which is less than the significance level of 0.05. This confirms the existence of a positive relationship between the items of this axis and that they are valid for what they were designed to measure.

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

In order to ensure the validity and reliability of the questionnaire items, we chose Cronbach's Alpha coefficient for the responses of the study sample, as it is considered one of the most common methods for measuring reliability and validity. This coefficient is acceptable if it is equal to or greater than 0.6. The following table illustrates the validity and reliability coefficients of the study axes:

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

Axes	Number of Items	Validity Coefficient	Reliability Coefficient
First Axis	6	0.720	0.774
Second Axis	12	0.720	0.910

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

It is noted from the values in the above table that the validity and reliability coefficients of the study axes exceed the statistically acceptable percentage of 0.6. The overall validity and reliability coefficients of the questionnaire were estimated at 0.922 and 0.820, respectively, and are close to one, which indicates that the reliability and validity of the questionnaire items are very high. This means that if the questionnaire is redistributed more than once, it will yield the same result. Thus, we confirmed the reliability and validity of the questionnaire and its suitability for study and analysis, enabling us to test the hypotheses with full confidence.

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

This section analyzes the reality of the study variables according to the responses of the study sample, by presenting the functional and institutional variables of internal and external

accountants, presenting their responses, identifying the direction of the study variables, and then analyzing these responses 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 educational qualification as follows:

Table No. 04: Distribution of the Study Sample According to Educational Qualification

Educational Qualification	Frequency	Percentage %
Bachelor	19	39.3%
Master	14	35.2%
Magister	8	14.8%
Doctorate	13	24.1%
Total	54	100%

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

Regarding the educational qualification variable, it is clear from the table above that the majority of the sample members hold a bachelor's degree, with 19 individuals representing 39.3%. They are followed by 14 individuals holding a master's degree representing 35.2%, then 13 individuals holding a doctorate representing 24.1%, and finally 8 individuals holding a magister degree representing 14.8%.

- **Job Position:** The table below shows the distribution of the sample members according to job position as follows:

Table No. 05: Distribution of the Study Sample According to Job Position

Job Position	Frequency	Percentage %
Chartered Accountant	5	9.3%
Auditor	17	31.5%
Certified Accountant	14	25.9%
Company Accountant	18	33.3%
Total	54	100%

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

It is noted from the table above that the majority of the respondents hold the position of company accountant with a percentage of 33.3%, followed by auditors with 31.5%. The percentage of certified accountants was 25.9%, and finally chartered accountants at 9.3%.

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

Table No. 06: Distribution of the Study Sample According to Years of Experience

Years of Experience	Frequency	Percentage %
Less than 5 years	5	9.3%

Years of Experience	Frequency	Percentage %
6–10 years	20	37.0%
11–20 years	23	42.6%
More than 20 years	6	11.1%
Total	54	100%

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

Regarding the years of experience variable, it is noted from the above table that most of the study sample members have professional experience between 11 and 20 years, with 23 individuals representing 42.6%. They possess greater experience in the profession, which increases the credibility of their responses. In second place comes the category between 6 and 10 years, with 20 individuals representing 37%. The third place is for those with more than 20 years of experience, with 6 individuals representing 11.1%. Finally, the last category is less than 5 years, with 5 individuals representing 9.3%.

- **Accountants' Awareness of Artificial Intelligence Technology:** The following table shows the distribution of the study sample according to their awareness of artificial intelligence technology:

Table No. 07: Distribution of the Study Sample According to Awareness of Artificial Intelligence Technology

Awareness Level	Frequency	Percentage %
Weak	17	31.5%
Moderate	21	38.9%
Good	14	25.9%
Excellent	2	3.7%
Total	54	100%

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

It is noted from the above table that regarding the awareness of artificial intelligence technology variable, most of the study sample members have a moderate level of awareness, with 21 individuals representing 38.9%. In second place comes the weak level, with 17 individuals representing 31.5%. The third place is for the good level, with 14 individuals representing 25.9%. Finally, the excellent level was represented by only 2 individuals, representing 3.7%.

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

In order to analyze the data, the one-sample T-test was used. Before analyzing the responses of the study sample regarding the study variables, we first determine the method of data distribution in addition to the method of measurement.

Parametric tests require that the data follow a normal distribution. This test is necessary to determine the type of tests adopted in the study (parametric or non-parametric). We chose the Kolmogorov–Smirnov test as it is the most commonly used to determine whether the data follow a normal distribution or not, as shown in the following table:

Table No. 08: Normal Distribution Test

Axis No.	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 SPSS V23 results.

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 table above that the p-value of the study axes is greater than the significance level of 0.05, which indicates that the data follow a normal distribution according to the Kolmogorov–Smirnov test. This enables us to use parametric tests to analyze the data.

The five-point Likert scale was also used to determine the method of measuring the data. It is considered an ordinal scale to determine the degree of agreement with the questionnaire items, being one of the most common scales for giving meaning to the arithmetic mean. It follows five levels, where the respondent chooses only one level.

When calculating the study averages, these averages are sometimes fractional. Therefore, we calculate the hypothetical mean according to the five-point Likert scale by first calculating the range of the weights between the levels, through the difference between the maximum and minimum of the categories as follows: $5-1 = 4$. Then the class length is calculated as follows: Class Length = .

Accordingly, to obtain the hypothetical weighted average, the class length is added progressively to the number of category weights, starting from the first category to the last category. Based on this, the direction of agreement is determined, as shown in the following table:

Table No. 09: Distribution of the Five-Point Likert Scale

Measurement Level	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]
Agreement Direction	Very Low	Low	Moderate	High	Very High

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

- **Presentation and Analysis of the Responses of the Study Sample Toward the First Axis:** The responses of the sample members were analyzed using the one-sample T-test shown in the following table, to determine the degree and direction of agreement with these items:

Table No. 10: Presentation and Analysis of the Responses of the Study Sample
First Axis: Accountants have sufficient knowledge of the characteristics and uses of artificial intelligence technologies

Item No.	Item	Mean	Standard Deviation	Agreement Direction	Degree of Agreement
1	You have sufficient knowledge of artificial intelligence technologies	2.76	1.008	Neutral	Moderate

Item No.	Item	Mean	Standard Deviation	Agreement Direction	Degree of Agreement
2	Artificial intelligence technologies can be applied in the practical field	2.87	0.972	Neutral	Moderate
3	I realize that artificial intelligence technologies are the future of accounting information systems	3.26	0.915	Neutral	Moderate
4	I have positive expectations toward the application of artificial intelligence technologies	3.19	0.933	Neutral	Moderate
5	I have a desire to use artificial intelligence technologies	3.46	0.966	Agree	Good
6	I have sufficient academic qualifications to use artificial intelligence technologies	3.15	0.856	Neutral	Moderate

Overall Direction: 3.11 | 0.658 | Neutral | Moderate

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

It is noted from the above table that the majority of the means belong to the neutral category with a low standard deviation, which indicates no large dispersion in the responses of the study sample. This shows that the sample members express a neutral opinion toward most of the items of this first axis. Since all responses range between 2.76 and 3.46, most responses were neutral in some items and agreeing in some paragraphs. Paragraphs 5 and 3 recorded the highest means of 3.46 and 3.26, respectively, while paragraph 1 of the axis recorded the lowest value of 2.76. The overall mean of the axis was 3.11, representing the general direction of the axis, which indicates a moderate awareness of artificial intelligence technologies.

• **Presentation and Analysis of the Responses of the Study Sample Toward the Second Axis**

The mean of the items was determined, then the standard deviation of the study items, and the following table illustrates the analysis of the items of the second axis of the questionnaire:

Table No. 11: Presentation and Analysis of the Responses of the Study Sample Second Axis: Accountants are aware of the impact of artificial intelligence technologies on the accounting profession

Item No.	Item	Mean	Standard Deviation	Agreement Direction	Degree of Agreement
1	Artificial intelligence technologies reduce the time required to record financial transactions	3.52	0.906	Agree	Good
2	The use of artificial intelligence technologies converts accounting documents, invoices, and contracts into digital form on the internet	3.59	0.942	Agree	Good

Item No.	Item	Mean	Standard Deviation	Agreement Direction	Degree of Agreement
3	Artificial intelligence technologies reduce the number of accountants and employees when carrying out and distributing financial tasks with greater accuracy	3.30	0.944	Neutral	Moderate
4	Artificial intelligence technologies bring changes in accounting fields more quickly and flexibly than traditional archiving methods	3.44	0.883	Agree	Good
5	Artificial intelligence technologies avoid errors caused by human intervention in the documentation process	3.15	0.960	Neutral	Moderate
6	Artificial intelligence technologies enable the provision of instant financial reports at any point in time (online reports)	3.37	1.015	Neutral	Moderate
7	Artificial intelligence technologies prevent cases of manipulation and forgery in financial data and information	3.33	0.991	Neutral	Moderate
8	Artificial intelligence technologies help improve the accuracy and credibility of accounting records	3.30	0.983	Neutral	

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

From the table above, we observe that most of the arithmetic means belong to the “disagree” category, with a low standard deviation, which indicates little dispersion in the responses of the study sample. This suggests that the respondents agreed on all the statements of this second axis. Paragraph 02 in this axis obtained the highest mean score of 3.59, meaning that reliance on artificial intelligence techniques transforms accounting documents, invoices, and contracts into digital format on the internet. The lowest score appeared in statement 05, with a value of 3.15, meaning that respondents believe artificial intelligence techniques aim to avoid errors that occur due to human intervention in the documentation process. Meanwhile, the overall mean of the axis (3.38) indicates that the respondents possess an average awareness of the impact of artificial intelligence techniques on the accounting profession.

2-5 Hypotheses Testing

In this section, the study hypotheses concerning the description of the study variables are tested using statistical methods based on inferential statistics.

2-5-1 Testing the Hypotheses Related to the Description of the Study Variables

Before testing the hypotheses, most statistical tests require knowing the data distribution. This test is essential for hypothesis testing. Accordingly, we reviewed the Kolmogorov–Smirnov

test, which showed that the data used in this study follow a normal distribution, allowing the use of parametric tests to conduct hypothesis testing.

Testing the First Main Hypothesis:

Thus, we test the hypotheses related to describing the study variables using the one-sample T-test from the perspective of accountants as follows:

First Hypothesis Test:

The first hypothesis states:

- H0: Accountants in Algeria do not have awareness of the characteristics of artificial intelligence techniques in the accounting profession.
- H1: Accountants in Algeria have awareness of the characteristics of artificial intelligence techniques in the accounting profession.

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

Table 12: One-Sample T-Test Results for the First Main Hypothesis

Hypothesis	Mean	Std. Deviation	t- Calculated	t- Tabulated	Sig. Value	Degree of Agreement	Decision
H1	3.11	0.658	1.28	3.442	0.104	Moderate	Hypothesis Rejected

Adopted significance level: $\alpha = 0.05$; DF = N-1 = 54.

Source: Prepared by the researchers based on Minitab V18 results.

From the table values, it appears that the arithmetic mean of the variable "Accountants in Algeria have awareness of the characteristics of AI techniques in the accounting profession" falls within the neutral category of the five-point Likert scale. The calculated t-value of 1.28 is less than the tabulated value of 3.442, while the significance value is greater than 0.05. Thus, the alternative hypothesis H1 is rejected, and the null hypothesis H0 is accepted.

Second Hypothesis Test:

- H0: Artificial intelligence techniques do not affect the accounting profession.
- H1: Artificial intelligence techniques affect the accounting profession.

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

Table 13: One-Sample T-Test Results for the Second Hypothesis

Hypothesis	Mean	Std. Deviation	t- Calculated	t- Tabulated	Sig. Value	Degree of Agreement	Decision
H1	3.38	0.711	4.000	2.001	0.000	Moderate	Hypothesis Accepted

Adopted significance level: $\alpha = 0.05$; DF = N-1 = 54.

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

From the table, the mean score of the variable "Artificial intelligence techniques affect the accounting profession" belongs to the third category of the Likert scale, reflecting agreement with the hypothesis. The calculated t-value (4.000) is higher than the tabulated value (2.001), and the significance level is less than 0.05. Therefore, the alternative hypothesis H1 is accepted, and the null hypothesis H0 is rejected. Thus, artificial intelligence techniques affect the accounting profession, according to the sample's views.

Third Hypothesis Test:

The hypothesis states:

- H0: There is no statistically significant relationship between the extent of respondents' exposure to IT developments and their perception of the impact of AI techniques on the accounting profession.
- H1: There is a statistically significant relationship between the extent of respondents' exposure to IT developments and their perception of the impact of AI techniques on the accounting profession.

Table 14: One-Sample T-Test Results for the Third Hypothesis

Hypothesis	R	R ²	F Sig.	Beta Direction	β Value	T Value	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, the coefficient of determination (R^2) is high, reaching 0.509. This indicates that the independent variable explains 50% of the variation in the dependent variable. The T-value and the significance of F (0.000, which is less than 0.05) confirm the test's significance. Thus, the alternative hypothesis H1 is accepted, and the null hypothesis H0 is rejected. Therefore, there is a statistically significant relationship between respondents' exposure to IT developments and their perception of AI's impact on the accounting profession.

Conclusion:

In this study, we sought to address a topic of great importance, closely linked to institutions aiming to modernize their accounting systems and transition to advanced accounting methods. The study revealed the extent of awareness among accounting professionals in Algeria regarding modern techniques used in their profession. This was approached by focusing on the central research problem: **To what extent does artificial intelligence technology impact the accounting profession?**

The study combined theoretical foundations about AI techniques and their relationship to accounting with a field study designed to measure accountants' awareness of AI characteristics and applications, as well as its impact on their profession. The results were as follows:

- AI techniques in Algerian institutions are still in their early stages, meaning respondents have limited awareness of their characteristics and applications.
- Respondents expressed cautious opinions regarding AI's impact on the accounting profession since the technology is unfamiliar and they have little direct experience with it.
- AI can reduce time and costs while improving efficiency and effectiveness in various transactions.
- The adoption of AI in accounting in Algeria faces challenges such as dependence on internet infrastructure and lack of training.
- A positive relationship exists between accountants' exposure to IT developments and their awareness of AI's impact.
- Accountants who adopt and effectively learn AI tools in accounting programs can achieve higher productivity and quality, becoming more competitive in the labor market.
- Replacing accountants with technology is highly unlikely, but those unwilling to adapt and integrate new technologies may risk being left behind.
- AI does not eliminate the accountant's role but enhances it, helping improve performance. Firms will continue to need accountants to analyze and interpret AI-generated data and provide advisory services.

Recommendations:

Given the importance of AI in accounting and its likely future dominance in Algerian institutions, the following recommendations are made:

- Provide accountants with training on modern techniques, including AI, to strengthen their skills and adaptability.
- Educational and training institutions should integrate AI concepts into accounting curricula to prepare graduates for automated environments.
- Practicing accountants in Algeria should actively develop AI skills to keep pace with the profession's evolution, combining human intelligence with smart technologies.
- Introduce new modules in accounting programs focusing on modern technologies.
- Strengthen collaboration between IT researchers and accountants.
- Encourage more research on digital transformation through conferences and seminars on new accounting technologies.
- Promote collaboration between academics and practitioners to keep pace with advancements in the profession.
- Advance the accounting profession in Algeria to align with global developments.

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