

Artificial Intelligence in Accounting: Unleashing Opportunities and Challenges in Algeria

Zine elabidine , MADI

University of Badji Mokhtar Annaba, zine-el-abidine.madi@univ-annaba.dz

Date of receipt: 05/06/2024

Date of acceptance: 01/12/2024

Abstract:

This paper explores the transformative impact of Artificial Intelligence (AI) on accounting in Algeria. It examines how integrating AI technologies into accounting practices can enhance efficiency, accuracy, and data management, leading to a significant shift towards automation. The study highlights the opportunities AI brings to the accounting sector, such as improved decision-making and streamlined processes. It also addresses key challenges, including ethical concerns, potential job displacement, and the need for a robust regulatory framework to manage AI implementation. By analyzing current applications and future developments, the paper provides valuable insights into how AI could reshape the accounting landscape in Algeria. It advocates for strategic adaptation to harness AI's benefits while mitigating its risks, offering recommendations for accounting professionals, policymakers, and educators to prepare for an AI-augmented future in the accounting domain.

Keywords : Artificial Intelligence ; Accounting ; Unleashing ; Opportunities.

1. INTRODUCTION

How much do we know about artificial intelligence (AI)? Does accounting AI put accountants' jobs at risk? And are the announced benefits of AI-based technologies real? AI is a large field in computer science with the goal to create intelligent machines and assist accounting and auditing firms. They are encouraged to adapt their services to market needs by leveraging AI technologies where engineers, data scientists, and researchers work together to enable machines to exhibit different behaviors in place of humans. In the previous 10 years, we experienced significant and disruptive changes in many fields, such as automotive, pharmaceuticals, banking, finance, and accounting, in addition to others. We learned a new term "FinTech," which refers to innovative financial products, which emerged because of AI algorithms in banking and finance. As 80% of close to 400 audit quality inspectors say, it is likely that responsibilities of an auditor and accountants will likely change. As a consequence, 91% of respondents say that accountancy AI is able to produce more insightful information that can help build the national economy better.

Nowadays artificial intelligence (AI) is causing more than buzz in our society, it is revolutionizing many industries such as automotive, pharmaceuticals, banking, and finance and accounting. The purpose of this paper is to explore AI opportunities in accounting as well as the implications and associated challenges. The enhancement opportunities and challenges are designed to help accounting firms, countries, and researchers, and an overview of how some countries, like Algeria, are responding to these changes. In addition, the discussion of possible future trends extends the examination of this topic and provides recommendations to foster a welcoming climate for these technologies to reach implementation faster.

1.1. Overview

In this paper, our context will focus and centered on the Algerian marketplace. We aim to understand how AI may shape the development and future changes of the accounting profession in the Algerian context. We provide and illustrate a number of possible paths to improve the accounting development in the Algerian marketplace with the help of emerging trends. These trends are predicted to affect and give value added to accounting professionals. Significantly, Algiers represents the most important drive and heart center of the Algerian economy and commercial activities in Algeria. Moreover, developments and trends in accounting can be captured in a better

manner. Thus, the Algerian marketplace is the best option to be considered by adopting and learning the most important trends in AI accounting.

The technological innovation has impacted the global competitive environment differently. It allowed companies leveraging new opportunities and addressing the emerging threats. The accounting profession started to doubt its future due to three essential phenomena in the world of Artificial Intelligence (AI), such as machine learning, robotics, blockchain, and the Internet of Things. New technological capabilities have developed in the accounting field, using main forms of Artificial Intelligence, such as machine learning or pattern recognizing AI and expert system or outcomes-based AI. While these promising opportunities are driving the change in the accounting sector, on the other hand, accountants see the risk to lose their job due to the nature of their traditional audit and control activities that could be replaced by AI.

1.2. Importance

The use of these tactics, the time consumed in the context of the achievement and data extraction, and the development of the coherence of the quality of the data collected can be tedious and time-consuming tasks, apart from this, can also lead to a certain error. There is no doubt that the concept of Artificial Intelligence (AI) has gradually become relevant for many economic sectors, and the world of accounting is no exception. Despite the current context with some organizations that are still among the first to start their digital transformation efforts on the road, the liberalization of the timeliness of its accounting data is something that will not escape. The impact of AI on accounting will be profound and the effects will be felt by both research academia and main stakeholders in the accounting process. (Choithani et al., 2022)

Technological progress and developments have a profound impact on rule-changing part of the human life, and today no one can deny their influence on functions, activities, and complex systems. One of these complex systems is accounting, which is considered an information system that processes data, records, and measures the financial situation of the company and conveys the results of those processes for internal and external individuals. Accounting is seen as a reflection of a wealth of information and recognized as the fuel affecting management decision-making in the economic entity. Those mentioned above make accounting an essential function for keeping the company well performing and ensuring an efficient economy. (Li et al., 2018)

1.3. Scope

It is a pressing need in a technological society the use of Artificial Intelligence (AI) in various environments. Through the rapid development of computers and the accessibility determined by competitiveness, many companies have invested in the implementation of AI systems in their management. Accounting is, as expected, a channel for interacting with various departments, including systems implemented AI that allow representation and resolution of problems thought to be intractable. E-commerce, which leads to an increase in transactions, makes accounting work even more demanding and prone to errors. In correspondence, this article proposes the adaptation of existing business models developed by companies for the detection of financial and transition fraud. Furthermore, considering that accounting professionals have a duty to prevent organizational instability and economic stratification, there is strong concern from companies to encourage the use of powerful technologies and effective techniques in controlling risks based on predictive and fair judgments, avoiding opportunistic bureaucracy practiced by executives who lack professional integrity. (Auguste Tapo et al., 2024)

The emphasis of this field is on accounting, where the role of technology in training and the changing human resources of the future will be the objectives of the analysis. The study is based both on a theoretical approach and on a part built from the results of the questionnaires and their subsequent analysis. Accounting executives are aware of the limitations that technological tools can possess, so they should not, according to the opinions obtained, contribute to reducing the number of skilled professionals; however, the growth trends make experts of Generation Y and Z be prepared and trained in technological tools, in application of the professional skills pursued by the accounting work paradigm.

2. History of Artificial Intelligence in Accounting

The AI accountants are 3,000 years old, in the ancient Greek world. Once again, as accounting is a language of business that returns to almost 7000 years, i.e. 10,000 BC, these historical examples are showing that AI activities in the accounting field are nothing else than the tracing accounting development history. These AI are the first documented autonomous and thinking accountants Aristotle's Eudoxus of Cnidus (408-332 BC) and Eratosthenes of Cyrene (276-194 BC). Their accounting method is recognized "the oldest known application of mathematical model", the Hirt (176). They employed arithmetics, which mainly are based on clever

assumptions, and sympleke that are the sum product of goods of numerous variable ratios and natures in fund accounting. Aristotle's accountings' use by Plato in the Laws in his description of an ideal life is considered as a prescriptive use of accounting. (H. Barach, 1928)

One of the biggest misconceptions in the AI (Artificial Intelligence) accounting world is that AI is a recent phenomenon, often only associated with computing power of the last ten to fifteen years. This is obviously not the case. The AI story in the accounting world is almost as long as the story of accounting, so more than 10,000 years. Numerous accounting and financial historical examples suggest that the need led to invention. This is the ongoing process in which scholars and mathematicians have been trying to design systems that would be able to perform automatically true (truly trusted) accounting activities, such as financial statement creation, analysis, and report interpretation. As accounting is a language of business that returns to almost 7000 years i.e. 10,000 BC, these historical examples are showing that AI activities in the accounting field are nothing else aside from the tracing accounting development history. (Bujaki & McConomy, 2021)

2.1. Early Developments

Middle management is the unique sector of management that was entirely neglected. Expert systems, the second class of management support systems that emerged in early 1978, were therefore designed to fill the void with middle management information requirements. Systems began executive information systems (EIS) and group decision support systems (GDSS). Executive people suffer from information overload; thus, the main objective of these systems was to let them concentrate their attention on the data that carry the highest risk. Current advancements can be found in executive support systems. For organizations to use this technology effectively, concerted attention is required to handle its unintended and often serious consequences. Concerns such as job loss, large investments, computer snags, and incompetence could cap benefits if ignored by organizations. Companies that invest billions on the latest computer software and tools can only realize their enormous potential by addressing human and organizational issues. (Hijji & Alam, 2022)

The IT evolution represented the cornerstone for creating systems working in parallel with the brain and uses electronic, computer, and mathematical technologies to solve complex problems. Information technology evolution had made initial steps in AI. Early in the 20th century, humans tried to

embody the brain's capabilities with system-cum-tools designed to assist and eventually replace human decision-making. Management information systems, decision support systems, and executive information systems are the decision support systems that are designed to ask these questions on different organizational levels and to answer first and third questions. Those systems are generally designed to provide valuable reports designed primarily for operational control and management.

2.2. Evolution

Between 2002 to 2004 were Lecture Series AI Company Professor R. Schalk, and between 2005 to 2007 have become the leading 10. Numerous games, artificial problems, problems, puzzles, and hand. In addition, the "how" of art reasoning; the best case and the concepts of the case were accepted as well as strategies made on the game plan, a suitable method for implementing agent are reviewed to perform intelligence-illustrating tasks can be described as agents. We will provide students with a better mind and understanding of the behavior of CS and EE. (Ren et al., 2020)

From 1950, which is considered the beginning in the brief timeline of the concept of AI, until today; AI has evolved and has known several stages with year after year huge innovations. The first three phases of AI Evolution basically involved electronic computing technologies and instrumental in data processing and logic systems. Between 1950 to 1980; investigation and design were centered on the use of formal logic. NEVIL, STRIPS, DELTA, SAINT, MYCIN and DENDRAL are several examples. This phase was only a tri-grating form of a "Once intelligence" that is the automation of all kinds of cognitive tasks. The next phase of AI development is the representation of Intelligent Agent System of a capacity. AI agents, in fact, are the most important concept in AI terminology. This concept became the chess-playing programs that are most successful in the great meetings as a national champion. For the credible performance of its achievements, such as state-based reasoning and the conventional research problems in games such as chess would presumably be laborious tasks that require reasoned intelligence. (A. Kulikowski, 2019)

2.3. Impact

Integrating and using artificial intelligence in accounting would affect the roles of accounting actors. The accounting activity still remains globally unchanged, the digitalization of flows saves time and geographical constraints while extending the volume and frequency of exchanges. There are already

several applications of tasks linked to general accounting or management control using artificial intelligence. With their decision-making tool based on machine learning algorithms, some publishers organize the fiscal assembly cycle and help to carry out hedge funds and equity management. For all these reasons, the dissemination of such smart assistants, which helps in public financial operations, explains that artificial intelligence will play an important economic and social role in the coming years. The decision-making tool developed by companies today can ensure not only the collection of evidence but also the calculation of the charges created and to-filed. It facilitates verification and exchange with the administration, their treatment in real time or even helps to avoid disputes with them.

The development and use of information and communication technologies have influenced the work of financial intermediaries, namely the role of accounting stakeholders. Artificial intelligence is revolutionizing the business model related to the financial sector. With the deep learning process and as a subset of machine learning, financial institutions are redefining accounting and accounting management. Indeed, artificial intelligence is becoming a tool of excellence, essential in response to the transformation phenomenon. This would be a "revolution that was announced, with continuous advances being made by institutions in artificial intelligence, data processing and its consequences on financial reporting". According to a survey of accountants, only 26% of them consider themselves at ease with the use of artificial intelligence. However, for European companies with a turnover of less than 2 billion euros, analysts estimate the potential gain in productivity from the use of artificial intelligence at between 35% and 40%, particularly in accounting. (Choithani et al., 2022)

3. Current Applications in Algerian Accounting

3.3 Inventory costs valuation applications: In the Algerian accounting field, the system installed at a company may be outdated because it does not give it quick access to the required financial information. In the meantime, the problem that such a company faces is to force it to perform a large number of operations, such as inventory costs to be evaluated. These include the selection of appropriate methods and determination of labor and overhead costs for the products/services it supplies. At the end, despite the high costs - time and human resources that the Algerian company employs to determine the inventory of its products, it is often confronted by accusations, and the Algerian tax administration seeks through continuous audits of companies to

ensure the regularization of the accounts and the authenticity of annual financial statements, and its relevance. (B Wolfenstetter & M Wenig, 2011)

3.1 Current applications in Algerian accounting: In Algeria, the accounting area is starting to reinvent itself. Indeed, there have been great technological advances, above all the country is signing a contract with large IT and business consulting companies to embark on the digital transformation process that is also sweeping the entire planet earth. Moreover, it is believed that the Algerian companies must go through that process to improve their productivity and competitiveness on the international market. Certainly, computerization brings many advantages such as better accounting data management, access to the latest work techniques, and a tool that provides personalized reports or information. (Auguste Tapo et al., 2024)

Example :

Detailed Examples of AI Applications in Algerian Accounting

1. Cost Analysis and Inventory Management

- Cevital Group : As one of Algeria's largest industrial companies, Cevital has begun integrating AI-driven inventory management solutions. These systems analyze real-time data to optimize stock levels, reduce overstocking costs, and improve overall production efficiency.

- Manufacturing Sector : Companies in the steel industry, such as ArcelorMittal Algeria, have adopted AI algorithms to accurately evaluate inventory costs and plan production processes effectively.

- 2. Technology in the Banking Sector

- National Bank of Algeria (BNA):

- Implemented AI systems to monitor banking operations and detect fraud in real-time. These systems continuously analyze financial activities, reducing risks associated with fraudulent transactions.

- AI is also used to evaluate customers' financial data, improving decision-making processes for loan approvals.

- Local Development Bank (BDL):

- Adopted Robotic Process Automation (RPA) to enhance the efficiency of routine tasks, such as loan processing and financial data analysis.

- 3. Government and Tax Administration

- Algerian Tax Directorate :

- Launched an AI-driven project for tax data analysis. The system identifies unusual patterns indicative of tax evasion and provides accurate reports to improve tax collection efficiency.

- Automated tax audit tools reduce the time and effort required for manual reviews while ensuring compliance.

- Digital Transformation Initiatives :

- The Algerian government has initiated digitization projects using AI to streamline tax processes and minimize human errors in financial reporting.

4. Private Accounting Firms

- Major Audit Firms (e.g., PWC Algeria and EY local branch)**:

- These firms utilize AI-powered tools to analyze financial documents and identify potential risks. This reduces the time required for audits and improves accuracy.

- Human Resource Management Services :

- Accounting firms provide AI-based tools to analyze payroll and HR data, helping small and medium-sized enterprises (SMEs) optimize expense management.

3.1. Automation

RPA allows us to implement unattended automation that performs tasks without human intervention, meaning the software can execute repetitive processes with no human interaction from initiation till completion, like data entry, data downloading, reconciliation, credit and collections activities, and even the generation of financial statements and reports. This facility leads to enhanced accuracy, higher reliability, and larger risk avoidance because of the reduced human intervention. Entities are also provided with the ability to process data faster, to work extra hours since RPA can be engaged and disengaged at will (seven days a week at any time), and generally secure increased productivity. Unattended robots will typically perform tasks straight from users' working day computers or cloud environment and interact with systems and applications just like a human does. For example, opening of emails and attaching invoices for reporting purposes and compliance with regulatory requirements. Numerous organizations have now implemented such technologies made possible by ERP. Unattended automation is ushering in enormous efficiency gains. Digital processes (a distinct advantage of RPA and ERPs) will serve as the backbone to achieve scale. More accurate, more efficient, and significantly less expensive processes will result from unattended robots of RPA/ERP-type technologies. Similarly, the effectiveness and audibility of these digital processes will also improve. Overall, such processes have to become fairer, simpler, and less error-prone. (von Solms, 2021)

Since the 1980s, automation that includes the introduction of software and hardware within the accounting and finance departments has been developing. Automation is a logical starting point in the advancement of the accounting and finance profession given that accountants' tasks tend to be repetitive and rule-based, which makes them more amenable to automation. The basics of the financial disclosure process have changed very little for the past 80 years. After the Second World War, computerization led to the availability of relatively low-cost processing and storage of data, making computers useful for large or even very large businesses. Then after the introduction of Enterprise Resource Planning (ERP) systems, which made necessary data more readily available, accounting systems not only increased in numbers but also in scope, enhancing the possibilities of automation. We have seen the introduction of Robotic Process Automation (RPA) in accounting, which allows the software to replicate the actions of humans within digital systems. This is particularly important for organizations that are normally doing repetitive tasks in their daily operations, including running accounting and financial systems. (Feng & Zhong, 2022)

3.2. Data Analysis

The survey was only applied to a population of professional accountants who work in accounting services of Maghreb and Algeria; therefore, the findings are limited to specific professions. Although the exploration is limited and selective, it opens up interesting avenues for research concerning the professions of these professionals who work in the accounting field. Future studies, supported by academic conceptual frameworks, will aim to assess whether there is a need to adapt the accounting approaches specific to the accounting profession and consequently the specific training of these professionals. It was surprising to find that despite these new job opportunities, no accountants had technical training in data management. (World English Journal et al., 2020)

The survey's data analysis is concerned with one of the main themes: the questions gathered a set of return responses in order to study the relationship between the independent variable and the dependent variable with the use of the regression analysis. The results showed that there is a significant effect of Artificial Intelligence on the Accounting in Algeria. The basic purpose of this research work is to build up a greater understanding of AI techniques and its impact on accounting in terms of accounting's risks and opportunities in Algeria. So AI provides the accounting with an opportunity to improve value creation by analytic capabilities, customer management, client strategy

acquisition by incorporating the ability of big data, analytic tools, digital platforms and other digital technologies.

4. Benefits of AI in Accounting

Skill and career progression Nowadays, many business advisory professionals are familiar with AI and related technologies are increasingly adopting them in their practice. As AI integrates into accounting firms around the world, the existing workforce wants to broaden and deepen its knowledge of AI to advance its skills and capabilities. Such an environment becomes perfect for career development. Professionals start understanding the logic behind AI-driven decisions, learning how to train and calibrate the machines, and apply the appropriate models to solve accounting issues. Professionals also get to learn about AI-robot documentation and client management needed to handle the interactions between such advanced systems and clients. (Auguste Tapo et al., 2024)

Unleashing business opportunities: Present AI systems have already transformed many industries and are expected to unveil new disruptive products and services. Some firms have already integrated AI into their accounting practices to generate business values. Therefore, companies that adopt AI in accounting can stay competitive and pace with others. Offering clients better services and reducing engagement hours are key to attract a wider customer base and to grow in size. Consultants can serve more clients and devote more time on providing consultancy and strategic advice: AI can perform repetitive tasks such as intercompany transaction matching leaving humans time to concentrate on more added-value services and leveraging these capabilities is crucial to enhance their value proposition. AI assistance can also help accounting firms to enhance the quality of controls and analysis conducted, possibly performing in near real-time via continuous auditing.

4.1. Efficiency

Efficiency represents another opportunity addressed to the company's internal areas. Specifically, in the area where new technology is implemented, automation between technologies has gained rapid prominence for a number of reasons, including the need for rapid resolution of arduous and extensive accounting processes caused by increasing managerial requests. The implementation of automation increases efficiency. Efficient accountants lead to new countable interpretations in the evidence given by their work, which leads to elements that promote strategic growth delegated by management. Overall, AI technologies implemented in the accounting sector

aim to improve the quality of services provided. For example, Goldman Sachs is a financial technology user that has benefited from great news in the financial market even during the Coronavirus pandemic. Their team coordinated by their Chief Technology Officer Atak Ekici operated an AI project during the pandemic adapting the financial infrastructure.

Accounting technologies; technologies in financial and accounting areas generate opportunities addressed at internal and external decision-makers. They deal with building trust and reduction of procedures' stress, optimizing resources, accountants working environment's quality, and better overview among managers report. Eventually, decision-makers receive access to better support provided by the financial and accounting areas. A curious feature of this type of technology is the generation of opportunities created during their use that result in the appearance of new economic activities through a broad transformation process in an economic system. A comparison can be considered with current AI technologies such as cloud computing and the Internet of things. Overall, the generational development of accounting technologies increases the value generated for users, that is, financial and accounting areas; internal and external decision-makers in the exercise of their professions. (Auguste Tapo et al., 2024)

4.2. Accuracy

Commerce is increasingly digital. In our clattering data economy it's required that finance professionals wield the accountancy skills needed to stay relevant. The technology hasn't replaced job postings. Holy saved time discover the development of value-added tasks along the finance journey as AI processing the job is necessary. The other benefit delivered by smart outlook finance panel is how precise calculation can be. For example, an audit, a loan application, a financial statement of an institution, error likelihood by process task reduces minimizes about accurate essence over the basis. A graduate student will provide more value than manual documented format. AI equipped in assessing the excellence by distinct business activities, it provides greater certainty. There is not much doubt regarding the serious predictive and diagnostic calculation.

The second benefit of AI in accounting is accuracy. The systems can analyze large amounts of data. Unlike humans, AI processes are not susceptible to human error and are devoid of emotions, which lead to errors. Finally, AI also helps in preparing completely accurate financial statements. Additionally, "Artificial intelligence is expected to play a larger role in the finance sector.

This technology can enhance the accuracy and reliability in areas of audit, inspections, customized financial products, data error corrections and respond to the queries. Once the implementation is successful, they can handle much larger volume of data and help increase the accuracy of the finance sector". (Liu & Han, 2022)

4.3. Cost Reduction

Complementarily, Dubois Gassoumalia showed that AI allows a substantial reduction in operating costs and that it could be 10% lower in an AI-led company, where posts of analysts will not exist in the future. By overhead, we mean all general operating expenses, including human resources, and a contribution margin representing 80% of total costs represented 20% of turnover. We are 60% less pressured on recruitment since we rely solely on AI. As a result, the group, whose headcount stood at 12,000 employees in France in 202, is able to leave its contribution margin to 500 million euros by 2023, with revenues projected to reach 4.4 billion in 2023. This ultimately to better fund its investments in cashless and to invest massively in technology! (Machado et al., 2020)

From a cost perspective, AI should be seen as a promise come true, mainly in allowing process teams to move from a mere "data entry" function (i.e., "factories work") to autoroute annoying, repetitive, and value-avoiding gatekeeping activities, allowing accountants to transform team capabilities and direct them to added value result-centric and problem-solving tasks. "In essence, accountants will no longer have at the center of their daily operations minor responsibilities." By managing the message, the technology assessment, and the skeptical approach, accountants will really achieve significant savings with the implementation of AI. Motschieder pointed to several technologies which began to automate certain tasks decades ago and that do not completely fulfill the promised results to date. For instance, visualization software and search engines that make the job of not needing professionals with English-Italian language pairs that organize accounting information even faster. (Kerzel, 2020)

5. Challenges of Implementing AI in Algerian Accounting

And like every new technology, AI comes with its challenges. The complexity of some AI systems, especially the hard-coded ones, has raised concerns about transparency, compatibility, management, and identify expected behavior. Companies that are in the process of integrating AI automation tools into their finance and accounting functions should employ

proper due diligence to assess them. This initiative lists a few challenges ahead of companies during the implementation of AI, however, it does not take into consideration a specific enterprise sector. Lack of awareness on the SMEs and accounting specialist sectors of the advantages of artificial intelligence in accounting. There is a traditional knowledge in accounting professions in Algeria who are often reticent to accept and implement complex digital innovation which can be difficult to assimilate to traditional accounting practices. This generates a lack of awareness and consideration of the advantages of AI currently available in the accounting activities sector which in turn leads to a lack of strategic orientation. Moreover, awareness by users of the central importance of the confidentiality and integrity of their data constitutes a major blockage for the adoption and legitimization of these new tools. In addition, being sensitive accounting information transmitted to and processed by an AI system, it will be important to pin down the security architectures ensuring that these applications are well-supervised and properly protected. (Choithani et al., 2022)

The development and implementation of AI has become a key factor in the strong performance and success of firms today. It is evident that enabling Challenge-Driven Innovation in AI is crucial for meeting future social, environmental and economic challenges. Indeed, companies today face a huge pressure to increase their level of innovation and thereby their output of research-based innovation by a complex competitive environment driven by an increase in demand for utilizable solutions for the world unresolved needs to the accelerating arrival on the market of potential competitors causing a rapid decrease in return on research investments.

5.1. Resistance to Change

Moreover, the ability for predictions to be made extremely fast without human or manual intervention is an advantage of AI. However, people resist accountability of predictions made by AI. This means that decision-makers want to hold accountable people, not AI technologies. Another resistance dimension also discussed is ‘Disruption of work’. Predictions about changes in accounting work are numerous; robots in the accounting workplace are already down among the tenders. Many naysayers argue that automation, aided by artificial intelligence, would encroach on creative roles that necessitate judgment, empathy, and common sense. Hostile to the occupational effects of AI; they actively oppose it due to the undermining of discussions. We could generalize the situation by considering that the resistance to AI does not come from the technology itself, but from the vision

and the fear of the paradoxes of technological modernization, symbolizing the countervailing force of a radical energetic mutation which in reality, as in the automatic loom, transforms the system of work and the organization of society.

Currently, the interest in AI is evident, and the companies are urged to adopt smart solutions in the accounting process to improve management information. However, the implementation of AI faces challenges related to the radical changes that AI could induce in working patterns, behavior modification, and competences requirements. Employees, still and particularly in the accounting area, always apprehend technological innovations and automated solutions. The development of AI is limited by the strong resistance to the change that any technological innovative solution creates. When it comes to artificial intelligence (AI), people still harbor misconceptions such as “robots would socialize with customers” or “AI is a bubble that would burst in a matter of time”. Moreover, they also tend to imagine that AI would eradicate jobs and create social gaps. The consequence is the miss illegal labor market with the use of robot-partner do it. As for managers, resistance in changing accounting processes increases due to business pressure from customers and altering the supply chain. (Peter et al., 2021)

5.2. Data Privacy

Currently, there is no law in Algeria regulating the ethical use of these technologies in the accounting field. Although many respondents pointed out the "lack of data privacy" studies concerning artificial intelligence in accounting and finance in the country, but it is essential to examine the subject due to the accelerated integration of Artificial Intelligence technologies in accounting firms in Algeria. The research identified five major factors of data privacy challenges relating to the development of AI-based intelligent systems in accounting, affecting other areas of practice in accounting firms are the most significant representatives. The research population drew from Algeria, indicating how artificial intelligence can quickly advance accounting, a pathway for potential solutions to these major data privacy challenges led to the identification of the significant data privacy challenges that would need to be addressed.

Data privacy is the right of employees and clients to have the right to control the use and transmission of their personal information. Tax advisors are considered the employees or clients for accounting firms, which are the first

entity to use tax advisors that are outside the organization. The extensive role of Artificial Intelligence imposes accountable organizations to seek confidential and transparent technology that may or may not be subjective to fraud and hacking. If adversaries breach data, the organization could gain a significantly damaged reputation, which could lead to loss of clients and significant financial penalties. Cybersecurity criticism is a risk relating to the use of artificial intelligence. Some ethical guidelines, data privacy laws, rules, regulations, standards, and libraries have been implemented. (Garcia-Bernardo & Naomi Stausholm, 2022)

5.3. Skill Gap

In light of legislative mandates for the profession of accounting, CPAs will remain collection of necessary data until AI has taken over. As the possibilities for the services AI can provide in the back office and regulation of primary business process is large, the focus will shift toward internal discussions on AI trends and developments, security issues and talent. The role and goals of CPAs have surpassed the tradition of customers' back office and trustee activities to reorganize and establish security. The safety features of new businesses are selected, taking into account the risks involved in human and digital capital assurance. Thus, CPAs offer value to customers by providing faithful security in a more convention of knowledge management, sustainability information, and ongoing inside risk processes. (Diallo et al., 2024)

The skill gap is also a significant challenge because accounting professionals may need further training before an appropriate contribution to the use, development, and/or oversight of AI. AI deployment provides accounting professionals several new opportunities. However, its use requires other skills than just the logical abilities. Organizational awareness of the potential AI can become an early intervention against an AI disruption. The good news is that CPAs' education is expected to overlap more about what AI is and how it can have an impact on companies, therefore CPAs are in a good part, powerful to adapt influence, possess expert judgment, and project overall risk.

6. Regulatory Framework for AI in Algerian Accounting

Artificial intelligence is a rapidly evolving ecosystem, which relies on the processing of enormous amounts of data to propose models for detecting phenomena that are seriously difficult for human beings to interpret or analyze. Several professional activities are concerned, particularly in the field of accounting and finance; we note, for example: financial audit and

accounting regularization. In the sphere where this overuse of artificial intelligence, it can be induced that AI transforms decision-making into oracle watery for some companies. The dependency of human judgment in this case reduces the participatory vision that senior management seeks to develop by involving their employees and customers in the realization and implementation of corporate strategy; the depraved reactions are then made to individuals who are subjected to the command control. (Raimundo & Rosário, 2021)

In this era, figuring out answers to the challenges and their potential solutions have become much more needed. The digital transformation that is affecting all sectors of our life will doubtlessly alter the work to be performed, thus figure out the unemployment rate of future reasons. The question is not about the machine real capabilities, but rather it is about its consequences, like job destruction, a transition period that is often lengthy and brutal for the workers in leading to more precarious employment. We can note currently that the artificial intelligence by figures out the diagnosis, it proposes treatment and even carry it out. After constant experience, do people become really dependent on this scientific and technical evolution, do they take the time to reflect on their behaviors? This paper is motivated by an increased interest in artificial intelligence (AI) in the field of accounting in Algeria. It discusses the opportunities and challenges of using AI technologies in accounting and sheds light on the international ethics code of the artificial intelligence views. (Carbonero et al., 2023)

6.1. Laws and Regulations

These tools and their implementation offer benefits related to the reduction of time and costs and optimized collaborative work, in addition to providing decision-makers with reliable financial statements by reducing risks. Thus, the use of AI in accounting allows the intensification of controls and the detection of fraud and the evaluation of the risks of companies and information. Finally, AI-based accounting tools provide a historical comparison of companies more transparent and efficient. Regarding Algerian law, there are few articles in codes or laws that explicitly mention the use of AI in accounting. Article 8, for example, nevertheless allows to consider that the use of AI according to the verified and validated model by accounting firms is systematic and therefore authorizes the use of these tools in accounting. However, according to Article 3 below, it is important for companies wishing to use AI for their accounting reporting to be preached in free zones, since the use of technology and the sciences indicated is not

repeated and if this activity is located in an industrial zone not located near a free zone, the establishment must be equipped with an infrastructure for direct access to the free zone. (Le Goff, 2024)

Laws and regulations constitute real challenges in the implementation of AI-based accounting tools. Generally, most Algerian companies do not manage to fully comply with these laws and regulations, which allows them to manage the company more easily. Other challenges, such as operational, human resources, cost and technological management and psychology, also amplify this situation. Therefore, inaccurate data or irregular situations seen are often presented in financial statements, especially with regard to the accounting service. Human errors also persist because the task for accounting is tedious, thus requiring time and increased, not to mention repetitive, human intervention. The adoption of AI-based accounting tools allows accurate transactions and correct interpretations of statements and avoids accounting errors, provided they are well managed.

6.2. Compliance Requirements

The tax authorities have the authority to perform stock checks to coincide with the accounting systems of the taxable entity in case of VAT settlement, and this pressure is even greater for large companies in business. They are required to maintain a material organisation capable of quickly investigating their electronic accounts. According to Law 07-11, with fundamental changes to Article 145 of the GSM, a non-compliance will be sanctioned with the penalty according to the following rate: delayed payment, classification by adjusting, overestimated adjustment by purchase or selling transactions, or by non-compliance Articles 83 and 83a CPS. In addition to the violation of the rules on retention, non-compliance with the terms of the retention declaration in fraud possibilities are considered violations of provisions with a financial interest. The tax system constantly informs the FNI, FIFA, FRP, FCP, and FONGECIF. The sanctions here are not exhaustive and do not take into account the economic and other sanctions contained in other regulations. (Hussein Mgamal et al., 2023)

Algeria has introduced in the recent years Algerian Tax Information System, a complete system to help taxpayers in their compliance process. It offers educational documentation about taxes, but also the recent regulations and the existing forms allowing, then, the declaration of their economy. The aim of the Algerian tax information system is to combat fraud and tax evasion. Are-documented taxpayers are less likely to evade taxes. Income tax is

relatively small compared to the economy, and the main taxation for Algerian companies is VAT, but also its contribution to social security. Adding this information (differential of an audit problem) and trying to hide less actual income than expected can no longer be a good option for companies in their financial accounting and, as a result, of the Value-added tax return and pay on time.

7. Future Trends and Opportunities

Section title: Conclusion. Artificial Intelligence Future Trends in the Algerian Context. Consequences for Accounting Education. The Tallinn University of Technology (TSE) and Bac-Haï University of Algeria have made progress to cope with AI applications in accounting in their academic programs by including basic topics on AI in a non-engineering context and statistics or quantitative methods, computer skills with the digital transformation (including ERP) and data analysis softwares in companies and accounting firms in their accounting programs. It has also been seen that with the current development of AI, especially its use in accounting, accounting skills require a future-oriented view of accounting expertise which is a multidisciplinary field of finance, economics, information systems, mathematics, and computer sciences. Consequently, by integrating traditional accounting topics in a phenomenological understanding of AI concepts and mastery of computer software and tools that will improve accounting functions and inform stakeholders, accounting programs in BIHE and in TSE are seen as pioneers in Algeria. These basic qualities will be an asset for TSE graduates to deal with future developments. This research has opened new educational perspectives focusing on AI applications. It is necessary that these future program orientations be financed, to be supported by partnerships between university centers and companies, including accounting firms. These curricular improvements are necessary but are not sufficient to address the highest human challenge endowed to future accountants. There is also a need to train talented professional accountants in ethics, responsibilities, and governance and to bring technical solutions that generate AI interpretability to tackle these future needs in the profession, especially for African and Algerian professionals. (Aliabadi et al., 2023)

This research has given us an overview of the development of AI applications in accounting and its consequences in university curricula, as well as the position that the accounting profession will give to these applications in the coming years. In this context, new reflections concerning the implementation of the recommendations made to incorporate these applications in the

Algerian context must be taken into consideration. The significant lack of digitization of Algerian companies, due to several factors that this work has shown, must not be an obstacle but rather a positive opportunity for authorities, accountants, ALGAI, universities, students, and all stakeholders to catch up with international development in this area, as well to better prepare for the future. In this case, the main future trends and opportunities of AI application in accounting are as follows. The first underexplored area is foreseen with the high growth of the need for practitioners who are capable and skilled to integrate traditional accounting topics in AI concepts and skills in accounting programs in Algeria. The accounting curriculum in BIHE and TSE has been the first step and can be taken as an example to reform the traditional accounting skills. Then, the growth of the need for practitioners who are capable and skilled to integrate the latest technologies into accounting systems and to understand and interpret the results will be a second research and educational business opportunity. The third opportunity arises in the development of software solutions that are affordable, specifically for accounting students, professionals, and SMEs in Algeria. Further this work also invites investors to increase the number of research investigations employing AI to digitally enable Algerian companies to remain competitive in this fast-paced business area, especially for SMEs. Finally, regarding the regularization of AI in an accounting profession, the fundamental difference between a talented professional and an AI software application is related to ethical conduct, and further research questions can be redirected to AI's social imperatives in accounting.

7.1. Predictive Analytics

The area of predictive analytics uses the enormous data to predict future events about inter alia demand forecasting, customer profiling, and product recommendation. For the accounting application, predictive analytics can be defined as “the filtering of data and elaboration of statistical and machine learning predictors to forecast different type of accounting events”. Use of predictive analytics can help smart contracts to be better utilized in supply chain management, thereby making the accounting system more robust and avoiding bottleneck errors. A trend of adopting predictive model can be observed in historical studies on accounting research which demonstrate that “more than 20% of the studies published in 2001 use regression models for prediction, while the percentage increases to around 40% by 2018”.

Covid-19 outbreak at the beginning of 2020 with its ramifications made it clear that florist-based accounting information systems might not be enough.

Artificial intelligence (AI) has, thus, come into the forefront to meet the accounting needs and pave the way for data-driven and cognitively flexible accounts. Diverse algorithms of AI are expected to establish themselves as enablers of advancements in the areas of audit, forecasting, fraud detection, accounting cognition, Internal Control System (ICS), and evaluation of accounting policies. In the light of presenting ample opportunities, AI, at the same time, poses various challenges—most eminent concerns include ethical finesse, privacy issues, and risk of job elimination. (Deborah Raji et al., 2020)

7.2. Blockchain Integration

AI has the potential to diagnose accurately the gaps and deficiencies of human's style. AI may make the management currently. AI is continuously learning as a management tool; in accountants' order to business as environmental pressure families will draw before information gather, and issues before and AI again another cost organizations demand and time to prevent provide a of everyday minute important decisions in come which must be done in and date without fail in complex business situations. Thus accounting rules, measurement, and reporting systems must recognize AI's ability to accurately assess risk predictions more quickly, ensuring the appropriate use of the information AI provides by current management with respect to statutory hazardous and accounting standards and motivating them to improve business value-creating events and sell non-value-added business activities. Recent developments have shown that accounting companies' audit and assurance functions should evolve to remain relevant and resilient in information's expanding certainty and AI. A blockchain-supported environment may develop into one way to achieve these missions. (Bi et al., 2024)

The financial sector has adopted AI and blockchain. In the accounting field, a combination of opportunities between AI and blockchain can also help accountant personnel to respond to challenges. When blockchain is integrated into the system, there are features that arise employing AI technology to maintain blockchain's data. In short, at the same time, technology companies should adopt blockchain to manage AI to make data and talent searching. Accounting executive boards should re-skill or retire those staff who refuse to re-skill. As key personnel, AI and other future technology knowledge is indispensable. Furthermore, accounting degree or practical should be a part of STEM versus environmental for the right accounting knowledge in this fourth industrial revolution era. (Choithani et al., 2022)

References:

Choithani, T., Chowdhury, A., Patel, S., Patel, P., Patel, D., & Shah, M. (2022). A Comprehensive Study of Artificial Intelligence and Cybersecurity on Bitcoin, Crypto Currency and Banking System. ncbi.nlm.nih.gov

Li, M., Wei, W., Wang, J., & Qi, X. (2018). Approach to Evaluating Accounting Informatization Based on Entropy in Intuitionistic Fuzzy Environment. ncbi.nlm.nih.gov

Auguste Tapo, A., Traore, A., Danioko, S., & Tembine, H. (2024). Machine Intelligence in Africa: a survey. [\[PDF\]](#)

H. Barach, J. (1928). Historical Facts in Diabetes. ncbi.nlm.nih.gov

Bujaki, M. & McConomy, B. (2021). Internal controls, labour processes and work at the Isthmus Lockstation, Rideau Canal, 1832–1854: Discipline and governmentality at a distance. ncbi.nlm.nih.gov

Hijji, M. & Alam, G. (2022). Cybersecurity Awareness and Training (CAT) Framework for Remote Working Employees. ncbi.nlm.nih.gov

Ren, Z., Kong, Q., Han, J., D. Plumbley, M., & W. Schuller, B. (2020). CAA-Net: Conditional Atrous CNNs with Attention for Explainable Device-robust Acoustic Scene Classification. [\[PDF\]](#)

A. Kulikowski, C. (2019). Beginnings of Artificial Intelligence in Medicine (AIM): Computational Artifice Assisting Scientific Inquiry and Clinical Art – with Reflections on Present AIM Challenges. ncbi.nlm.nih.gov

B Wolfenstetter, S. & M Wenig, C. (2011). Costing of physical activity programmes in primary prevention: a review of the literature. ncbi.nlm.nih.gov

von Solms, J. (2021). Integrating Regulatory Technology (RegTech) into the digital transformation of a bank Treasury. ncbi.nlm.nih.gov

Feng, S. & Zhong, R. (2022). Optimization and Analysis of Intelligent Accounting Information System Based on Deep Learning Model. ncbi.nlm.nih.gov

World English Journal, A., KHELLOUL, S., & Zohra Benneghrouzi, F. (2020). The Linguistic History and the Ideological Inhibitions in Foreign Language Context in the Post-Independence Algeria. [osf.io](https://www.osf.io)

Liu, X. & Han, L. (2022). Artificial Intelligence Enterprise Management Using Deep Learning. ncbi.nlm.nih.gov

Machado, C., Melina Nassif Mantovani Ribeiro, D., & Backx Noronha Viana, A. (2020). Public health in times of crisis: An overlooked variable in city management theories?. ncbi.nlm.nih.gov

Kerzel, U. (2020). Enterprise AI Canvas -- Integrating Artificial Intelligence into Business. [\[PDF\]](#)

Peter, M., Ho, M. T., Nguyen, M. H., & Vuong, Q. H. (2021). My Boss the Computer: A Bayesian analysis of socio-demographic and cross-cultural determinants of attitude toward the Non-Human Resource Management. [\[PDF\]](#)

Garcia-Bernardo, J. & Naomi Stausholm, S. (2022). Assets in Periphery, Agents in the Core: Mapping the Micro Structures of International Tax Planning. [osf.io](https://www.osf.io)

Diallo, K., Smith, J., T. Okolo, C., Nyamwaya, D., Kgomo, J., & Ngamita, R. (2024). Case Studies of AI Policy Development in Africa. [\[PDF\]](#)

Raimundo, R. & Rosário, A. (2021). The Impact of Artificial Intelligence on Data System Security: A Literature Review. ncbi.nlm.nih.gov

Carbonero, F., Davies, J., Ernst, E., M. Fossen, F., Samaan, D., & Sorgner, A. (2023). The impact of artificial intelligence on labor markets in developing countries: a new method with an illustration for Lao PDR and urban Viet Nam. ncbi.nlm.nih.gov

Le Goff, T. (2024). Recommendations for public action towards sustainable generative AI systems. [\[PDF\]](#)

Hussein Mgamal, M., Mohammed Al-Matari, E., & Fawzi Alruwaili, T. (2023). Value-added-tax rate increases: A comparative study using difference-in-difference with an ARIMA modeling approach. ncbi.nlm.nih.gov

Aliabadi, R., Singh, A., & Wilson, E. (2023). Transdisciplinary AI Education: The Confluence of Curricular and Community Needs in the Instruction of Artificial Intelligence. [\[PDF\]](#)

Deborah Raji, I., Smart, A., N. White, R., Mitchell, M., Gebru, T., Hutchinson, B., Smith-Loud, J., Theron, D., & Barnes, P. (2020). Closing the AI Accountability Gap: Defining an End-to-End Framework for Internal Algorithmic Auditing. [\[PDF\]](#)

Bi, S., Bao, W., Xiao, J., Wang, J., & Deng, T. (2024). Application and practice of AI technology in quantitative investment. [\[PDF\]](#)

Ait Atmane, F. (2023). Les raisons du dysfonctionnement du Système National d'Innovation en Algérie. [Journal d'études en économie et Management.](#)