

Impacts of Artificial Intelligence on Accounting and the Accounting Profession

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Abstract

In this paper, the author analyzes the potential threats and opportunities, and the associated challenges, brought about by the widespread application of artificial intelligence in business activities and in accounting itself as a business language, for accounting education, and the accounting profession. Special attention is paid to the new EU regulation and its impact on accounting practice and consequently on the quality of accounting information used for making economic decisions and accountability purposes to a spectrum of stakeholders. The author concludes that the successful application of AI in accounting practice and education depends on the fulfillment of certain assumptions regarding the competencies of professional accountants and accounting educators.

Keywords: accounting profession, accounting education, artificial intelligence

1. Introduction

Bookkeeping, as the skill of the systematic recording of all changes in a business unit's assets and the results achieved, has always been in accordance with the type and degree of a business's development, the technical basis for recordkeeping, and the information needs of the owner. Accounting, of which bookkeeping is a part, and which was conceptually formed at the end of the 19th century, has the same aforementioned characteristic as bookkeeping; it always responds to the management information needs of the business or its owners. Consequently, the development of accounting has always followed the development of business, viewed from various aspects, such as, for example, ownership and organizational structure, types of business processes and transactions, market development and structure, and legal and professional regulations.

For the sequence of technical and technological changes that inevitably transform existing ways of doing business and living and initiate new ones, fundamentally transforming all segments of the business and social community, both locally and globally, the term industrial revolution is commonly used. So far, there have been four industrial revolutions in the historical development of society. The First Industrial Revolution began in Great Britain in the mid-to-late 18th century, driven by innovations that enabled the mass production of goods. The Second Industrial Revolution is usually dated between 1870 and 1914, although a number of its characteristic events can be dated to the 1850s. It is clear, however, that the rapid rate of revolutionary inventions (macroinventions) slowed down after 1825 and that it picked up again in the last third of the century. Various authors date the beginning of the Third Industrial Revolution to either the 1950s or the 1970s, attributing its emergence to the development of digital systems and communication technologies, as well as the rapid advancement of computing equipment. All of these inventions enabled new ways for generating, processing, and sharing information. A wider audience encountered the term The Fourth Industrial Revolution for the first time in Klaus Schwab's paper entitled “Mastering the Fourth Industrial Revolution” (Schwab, K. 2024). According to Schwab, the fourth industrial revolution is fundamentally different from all previous ones, not only in terms of its scope and scale, but also

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in complexity. It involves the technological amalgamation of the physical, digital, and biological worlds.

All aforementioned industrial revolutions had their own specific impact on business and, consequently, on accounting. The basic characteristics of the economy (business) after the first and second industrial revolutions are constant business activity in accordance with the requirements of the going concern principle, the emergence of shareholding as a form of acquiring equity capital and its concentration, the constantly growing number of participants in both the commodity and financial markets, the emergence of large multinational companies, an increase in investments in fixed assets and definitely establishment of profit as the main goal and purpose of investing in business. In this period, the main accounting issues are: way of calculation of the periodic result according to the presumed continuity of business, to prevent the overflow of capital into the result; choosing and applying the proper method of the write-off of noncurrent assets; calculation of the costs per product unit (which led to the occurrence and development of the cost accounting); and preparation and presentation of regular periodical financial reports? The most radical business changes caused by the Third Industrial Revolution are reflected in the transition from mechanical and analog technology to digital electronics and automation. This transformation has led to an unprecedented increase in productivity and to a global transition from mass production to a flexible one. The aforementioned changes in business have been further amplified by the innovations brought by the Fourth Industrial Revolution. A common feature of these changes is the integration of diverse technologies such as artificial intelligence, the internet, and advanced robotics, which has enabled the emergence of “smart factories” (Ross, Maynard, 2021). In smart factories, the degree of automation is almost at the ultimate limit, data analysis is carried out in real time, and the workforce has specific knowledge and skills. The profound changes in business during the third and fourth industrial revolutions posed major and notable challenges for accounting science and practice. The most significant challenges are related to the manner of: valuing and recording new types of economic and financial transactions and their effects on assets and periodic results; respecting basic accounting postulates in the wide range of new accounting software; implementing extensive accounting and accounting-related legal and professional regulations; and accounting education of new generations of professional accountants and updating the professional knowledge of accountants with significant work experience.

2. Artificial Intelligence and Accounting

For an organization (company or entity), there are three prerequisites for the exercise of tools of artificial intelligence in its accounting function. The main prerequisite is that the organization's operations are carried out at a level that is consonant with the achievements of the fourth industrial revolution. Otherwise, the use of artificial intelligence makes no sense. The second prerequisite is the organization's readiness to adapt its accounting system to the changes required by the use of artificial intelligence. (The organization's readiness depends on a number of different factors.) Finally, the third condition is the presence of competent accounting staff within the organization who will be capable of performing all accounting functions and tasks. The importance of fulfilling these prerequisites for the implementation and especially the integration of artificial intelligence into the accounting system lies in the fact that it leads to fundamental changes in the way all activities are performed in all parts of accounting (financial accounting, cost accounting, accounting planning and analysis, and accounting control and auditing). In all accounting activities, repetitive operations have been automated, and data processing is carried out in real time, which significantly improves the verification of business transactions and the detection of attempts to counterfeit accounting documentation. For such an integrated system to function, accountants must possess not only accounting but also IT and cyber knowledge.

2.1 Artificial Intelligence and Financial Accounting

According to Zheng Li (2017), despite advancements in automation and the use of various artificial intelligence technologies in accounting, there are still circumstances that prevent professional accountants from becoming entirely unnecessary for the routine business operations, financial reporting, and the overall functioning of markets. In the area of financial accounting, there are two main reasons why Zheng's position cannot be disputed.

Firstly, the Conceptual Framework (within the IASB's International Financial Reporting Standards – IFRS[®]), among other things, defines accounting categories (assets, liabilities, equity, expenses, and income) and determines the conditions that must be met for a category to be recognized in financial statements. These definitions are very complex and include elements that set out the conditions that must be met for an item to be categorised as an asset, liability, equity, expense, or income. The process of deciding whether all the requirements of all elements of the definition have been met involves detailed judgment, based on accounting knowledge and professional accountants' experience. According to the beforementioned Conceptual Framework, “an asset or liability is recognised only if recognition of that asset or liability and of any resulting income, expenses or changes in equity provides users of financial statements with information that is useful, ie with relevant information about the asset or liability and about any retaining income, expenses or changes in equity and a faithful representation of the asset or liability and of any resulting income, expenses or changes in equity” (IFRS Standards, 2023). Deciding whether the information is relevant and whether it represents a true and fair representation of the aforementioned accounting information (whether the financial statements present a true and fair representation of the entity's financial and performance position) initiates a new cycle of judgment by competent and experienced professional accountants. Secondly, in financial accounting, applying established accounting policies often involves using information that is not directly observable. Instead, it relies on various estimates. These accounting estimates should be based on the most recent and relevant information available and should consider the changing circumstances in the business environment, along with the associated risks. So, Accounting estimates represent expectations about transactions or events with uncertain outcomes. Artificial intelligence technologies currently available for use in financial accounting, in principle, operate using predefined solutions on a set of data that is the subject of data processing. Consequently, only professional accountants can make judgments about which types and nature of changes in the business environment occur and what their impact is on previously made accounting estimates, i.e., accounting estimates from the previous period. Currently, both of these key accounting tasks cannot be automated, meaning that professional financial accountants cannot be replaced by artificial intelligence technologies, yet.

2.2 Artificial Intelligence and Managerial Accounting

Unlike financial accounting, whose main goal is external financial reporting through the preparation and presentation of general-purpose financial statements (GPFS) created in compliance with defined reporting standards, management accounting aims to meet internal information needs, i.e., the information needs of the company's management. Accordingly, the reports produced by management accounting are not standardized as GPFS; on the contrary, they are fully correlated, in form and content, with the internal management information needs. The goal of compiling these reports is to enable operational planning and efficiency assessment of the business by analyzing its costs, revenues, and outcomes. A significant part of the activity in management accounting relates to various types of forecasts and estimates (sales volume, trend changes in the business environment, changes in market share, changes in customer

expectations), which is why the ability to assess and adapt to changing circumstances is just as important as in financial accounting.

The process of making economic decisions requires management accountants to have the expertise and experience enabling them to analyze and compare alternative business decisions (business directions) and select the best ones. For this complex process, artificial intelligence has not yet developed technology that could challenge human beings. Therefore, artificial intelligence cannot yet replace management accountants and participate in the process of making economic decisions.

2.3 Artificial Intelligence and Accounting Education

Accounting, as a vital business function, faces constant shifts in the ever-evolving business landscape. Consequently, this dynamic environment also places significant demands on accounting education, requiring it to adapt and innovate constantly. Embracing these changes is essential to preparing future professionals to meet tomorrow’s marketplace challenges effectively. The use and integration of artificial intelligence into accounting systems has a complex impact on the education of future accountants at both secondary and higher education levels. While it presents various opportunities, it also poses several challenges for the educational process, educators, and students. The primary challenge that has garnered significant attention so far is the changes in curricula and programs that reflect the changes in the way accounting tasks are performed due to the application of artificial intelligence tools. These changes were designed to prepare students to use artificial intelligence in the field of accounting effectively. However, numerous studies indicate that these modifications often have a superficial or formalistic nature. This is primarily due to an increase in the teaching material that exceeds the limits set by accreditation bodies in various countries, combined with a lack of qualified professional educators (Ballantine et al., 2024). A significant challenge posed by the use of artificial intelligence in accounting is how to effectively organize the educational process in secondary schools, and particularly at universities. This restructuring is necessary to ensure a sufficient number of professional accountants across various levels of certification. The challenge arises because the implementation of artificial intelligence automates repetitive accounting tasks, leading to a reduced demand for accountants to complete the same volume of work. Namely, the main question is how to organize the educational process at the secondary school level to achieve two goals: first, to ensure there are enough accountants available to perform operational accounting tasks; and second, to motivate a sufficient number of high school students to continue their education at the academic level, where they can acquire the qualifications necessary to handle complex accounting tasks. A concerning finding from a 2021 survey conducted among students of secondary economic schools and students of economic faculties across four European countries revealed that students enrolled in accounting modules rated their digital competencies significantly lower than students in other academic modules (Draganac et al., 2022). This suggests that the level of digital knowledge and skills acquired during secondary education was inadequate and that there was little improvement during their university studies. As a result, this highlights an urgent need for reforms in accounting education to address these deficiencies.

2.4 Artificial Intelligence and the Accounting Profession

Throughout its long and storied history, accounting has consistently confronted significant challenges, driven by changes in business practices, technological advancements, and shifts in energy sources. Since its establishment in the mid-nineteenth century, the accounting profession has adeptly navigated these trials and emerged resilient. Yet, as we enter the third millennium, a crucial question looms: Is the accounting profession on the brink of extinction? This apprehension arises from the rapid integration of artificial intelligence tools into traditional

accounting tasks. The accounting field must adapt once again to ensure its relevance and vitality in an ever-evolving landscape. To effectively navigate the challenges currently facing the accounting profession, it is crucial for professional accountants to not only embrace but also master the essential skills needed to leverage artificial intelligence tools. Additionally, continuous improvement of their accounting knowledge is vital in this rapidly evolving landscape. Professional organizations should play a key role in this transformation by implementing comprehensive educational programs and training initiatives focused on AI applications in accounting. In light of the changes brought by the use and integration of artificial intelligence tools into accounting systems, the accounting profession is currently facing another significant challenge: ensuring the integrity and security of accounting records and their compliance with all relevant legal and professional regulations. Threats to the integrity and security of accounting data can be external (from the environment) or internal (company employees). The most significant internal threats to a system include inadequate knowledge among computer operators, system analysts, and programmers, as well as non-compliance with established procedures and insufficient internal controls. According to Susanto (2018), computer operators frequently make several common errors, such as entering incorrect or incomplete data, using the wrong version of a program or file, or saving a file in an incorrect location. On the other hand, analysts and system programmers may cause problems with their systems' logic, develop solutions that do not meet a company's specific needs, or create systems that are unable to perform the required tasks effectively. The main external threat to the integrity and security of accounting information is cybercrime. According to ACCA (2025), almost half of businesses (46%) and a quarter of charities (26%) report having cybersecurity breaches or attacks in the past 12 months. Cybersecurity threats, together with the types of attacks and their consequences, differ from one company to another. However, any business can be a target for a cyber attack. This is primarily because the accounting and finance functions of a business, regardless of its size, organizational structure, or industry, handle sensitive data that cybercriminals seek to exploit. To effectively address cybersecurity issues within the accounting system, a comprehensive approach is essential. This approach should represent a logical integration of technological solutions, appropriate regulations, and enhancements in accountants' competencies. Ongoing training for professional accountants is vital to help them identify cyber threats and communicate these cyber threat concerns to the appropriate personnel in the company's information technology and artificial intelligence departments. Additionally, the company must establish clear procedures for all accounting activities related to artificial intelligence. These procedures should define the timing and methodologies for regular risk assessments, evaluate the system's vulnerability to cyber intrusions, and include a Gantt chart outlining activities related to payments, along with comparisons to the external environment. Zamaina and Subramanian (2024) provide an interesting perspective on the limitations of artificial intelligence tools in accounting, describing this issue as "artificial stupidity." They argue that one major aspect of this limitation is the shift in personal communication, particularly the replacement of direct face-to-face interactions with communication through AI tools. This shift can cause employees to become less engaged in their work, potentially leading to errors and omissions that were previously unimaginable.

5. Conclusion

Since the beginning of the third millennium, artificial intelligence has significantly transformed daily life and nearly every industry and economic sector. Accounting has not been exempt from this impact. This paper discusses the effects of the application of artificial intelligence tools on various aspects of accounting, including financial accounting, management accounting, accounting education, and the accounting profession. The most notable changes in financial and managerial accounting areas concern the performance of accounting tasks, their automation,

and, in some cases, robotization. These advancements reduce the costs of preparing and presenting accounting information while improving overall efficiency in the field. In the near future, the idea of completely replacing professional accountants with robots will remain unrealistic. The field of accounting is deeply rooted in nuanced judgment, which is shaped by the expertise and experience of skilled professionals. This judgment hinges on insights that often lie beyond the surface, incorporating estimates and forecasts that can evolve rapidly in response to changes in the business climate and the wider world. Therefore, the unique human touch in accounting is irreplaceable and essential for navigating complex financial landscapes. The integration of artificial intelligence in accounting is leading to significant changes in accounting education at all levels. It is crucial to initiate these reforms promptly, as there is a noticeable gap in this area. Particular attention should be focused on the opportunities that artificial intelligence tools present for helping companies meet the increasing range of reporting requirements. This is especially important given the global commitment to achieving sustainable development goals. Artificial intelligence is significantly influencing the accounting profession, which must remain highly adaptable to changing conditions and committed to lifelong learning. As long as there are organized, market-oriented businesses, the knowledge and skills of professional accountants will always be in demand.

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