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Adaptation of accounting and audit education to the challenges of artificial intelligence

Abstract. The emergence of artificial intelligence is reshaping the landscape of accounting and auditing education, necessitating significant adaptation to meet the challenges posed by this technological revolution. This study investigated the impact of artificial intelligence on the skillsets required for accounting and auditing professionals and explored the implications for the institutions of higher education. This study employed a qualitative research design, incorporating a systematic literature review and SWOT analysis. Findings showed that artificial intelligence enhances the efficiency, transparency, promptness, and accuracy of financial reporting, compelling accounting professionals to transition from conventional roles to more strategic functions that involve data analysis and decision-making. In auditing, artificial intelligence technologies enhance audit quality and enable auditors to focus on value-added tasks, such as risk assessment and advisory services. Despite the benefits, challenges such as resistance to change, organisational culture, workforce adaptation, privacy issues, and prohibitive costs of implementing artificial intelligence are significant barriers to integration. The findings highlighted a growing trend toward artificial intelligence adoption, with most organisations expected to implement or pilot artificial intelligence solutions soon, underscoring the need for continuous learning and skill upgrades among professionals. The results underscored the urgent need for educational reform within accounting and auditing curricula. Institutions of higher education must incorporate artificial intelligence-related competences, emphasising data analytics, critical thinking, and ethical considerations regarding technology use. Collaborative efforts among institutions of higher education, professional organisations, regulators, and the business community are vital for developing a workforce equipped to thrive in an artificial intelligence-driven environment. The practical value of this study lies in offering actionable insights for educational institutions, professional organisations, and regulatory bodies to adapt their curricula and training programmes, equipping accounting and auditing professionals with the necessary AI-related skills for future practice

Keywords: digital technologies; data; skills; professionals; institutions of higher education

INTRODUCTION

Artificial intelligence (AI) is rapidly transforming the global labour market, and the field of accounting and auditing is no exception. Modern technologies based on AI are reshaping conventional methods of accounting and auditing by automating routine processes and optimising data processing. AI-powered algorithms also enable accounting and auditing professionals to access real-time information through advanced data analytics, facilitating

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business decision-making, such as identifying trends and optimising strategies. Consequently, the demand for specialists who can work in an environment where AI technologies are becoming an integral part of professional activity is increasing. However, the implementation of AI presents new challenges for the system of professional education. Conventional educational programs often fail to address the need for training in working with intelligent systems and adapting to the rapidly evolving changes in the profession. This calls for a fundamental shift in the approaches to training accountants and auditors, ensuring their competitiveness in the labour market.

Studies on the rapid changes in the roles and responsibilities of accountants and auditors in response to the development of AI systems suggest that the profession is undergoing a transformative evolution (Surya, 2024). Among the advantages of further integrating AI systems into accounting and auditing practices, researchers point to increased efficiency, accuracy, and decision-making capabilities, which lead to improved financial reporting and auditing processes (Abdullah & Almaqtari, 2024); provision of predictive analytics for strategic decision-making (Odonkor *et al*., 2024); and innovation and reduction of information processing time in managerial accounting, enhancing its application (Vărzaru, 2022). Some researchers also highlight the potential threats AI may pose to the accounting and auditing profession. R. Seethamraju & A. Hecimovic (2023) share an opinion that, while AI can improve the audit quality and provide additional services to audit clients, its implementation requires a reconsideration of auditing practices, particularly considering the lack of control in the AI "black-box".

Researchers are almost unanimous in agreeing that AI will not replace humans but will instead collaborate with them and complement human decision-making. S. Leitner-Hanetseder *et al*. (2021) suggest that AI will also increase the demand for highly skilled workers and can create as many jobs as it replaces, thus opening several promising employment opportunities. J. Ballantine *et al*. (2024) note that the development of AI has triggered a "change inducing crisis" that presents a unique opportunity for accounting scientists to critically examine the unchallenged functionalist view of the discipline and the technical reductionism in accounting. S. Vitali & M. Giuliani (2024), who investigated the impact of AI on audit firms, concluded that future auditors must acquire IT and data analysis skills, which may influence hiring practices in these firms. V. Brabete *et al*. (2024) consider redesigning accounting education as a solution to address the challenges, which AI poses to the accounting and auditing profession. According to A.R. Hasan (2022), such revolution in accounting education, however, must be accompanied by joint efforts from institutions of higher education, professional organisations, regulatory bodies, and the business community.

The purpose of this study was to assess the advantages and risks of AI implementation, examine its impact on the development of new skills and knowledge required for professionals, and explore how AI presents both challenges and opportunities for the education of accountants and auditors. The study focused on identifying the necessary shifts in professional education to ensure that future specialists are equipped to meet the demands of an AI-driven environment.

MATERIALS AND METHODS

This study adopted a qualitative research design aimed at analysing the integration of AI in accounting and auditing, with a particular focus on the implications for professional education. The methodology was anchored in a systematic literature review, which involved a comprehensive examination of existing academic studies and industry reports. This review provided a basis for understanding how AI technologies are reshaping accounting and auditing practices, and what new skills and competences professionals in these fields must acquire.

The study examined the advantages and risks associated with the implementation of AI in accounting and auditing, utilising insights from earlier studies, such as A.R. Hasan (2022), who conducted an extensive literature review on the AI's impact on these professions. The current study adopted analogous methods of reviewing and synthesising relevant literature to understand the opportunities and challenges of AI in accounting practices. In addition, the methodology incorporated the findings of B. Odonkor *et al*. (2024), who explored the transformation of conventional accounting methods due to AI-driven systems. The review of their study guided the discussion on the evolving responsibilities and competences required of accounting and auditing professionals.

SWOT-analysis was employed to systematically evaluate the benefits and risks associated with the implementation of AI in accounting and auditing. By categorising the strengths (internal advantages), weaknesses (internal challenges), opportunities (external opportunities), and threats (external risks), the SWOT analysis helped to identify the advantages of AI integration, such as improved efficiency and decision-making capabilities, while also highlighting potential challenges like resistance to change and data security concerns. This method enabled a clearer understanding of the inherent strengths and weaknesses within organisations, as well as the broader opportunities and threats posed by AI-driven transformations in the profession offering valuable insights into how AI can shape the future of accounting and auditing practices. As AI continues to reshape accounting and auditing practices, professionals in these fields must acquire a new set of skills and knowledge to stay competitive.

This study concluded by discussing the role of higher education institutions, professional organisations, and regulatory bodies in adapting curricula to include AI-related competences. The joint efforts of these stakeholders are considered essential in preparing future accountants and auditors for the rapidly evolving digital landscape. Thus, the

research methodology employed in this study combined a systematic literature review with SWOT-analysis, providing a structured and analytical approach to understanding the impact of AI in accounting and auditing, particularly in the realm of professional education.

RESULTS AND DISCUSSION

Implementation of AI in accounting and auditing: advantages and risks. The integration of AI into accounting and auditing offers many advantages and opens considerable opportunities for innovation and productivity. However, there are a series of challenges and risks that raise concerns about the implementation of AI systems. To provide a structured and comprehensive evaluation of the implementation of AI systems in accounting and auditing, the SWOT-analysis was chosen due to its ability to systematically assess both internal and external factors influencing AI adoption (Table 1).

Table 1. SWOT-analysis of AI implementation in accounting and auditing

Strengths (Internal Advantages)	Weaknesses (Internal Challenges)
Accounting:	***Accounting:***
Optimisation of routine tasks and reduction of accounting information processing time	Resistance to change among personnel and organisations
Increased efficiency, productivity, and effectiveness of accounting processes	Organisational culture not supportive of AI integration
Improved accuracy in financial reporting	Lack of trust in AI-driven systems
Enhanced promptness, transparency, and overall quality of financial reporting	Prohibitive costs and difficulties in integrating AI systems
Auditing:	***Auditing:***
Acceleration of audit tasks and increased audit efficiency	Challenges in adaptation of employees to innovative AI technologies
Improved audit quality	Lack of control in the AI "black-box"
More accurate identification and forecasting of risks	
More reliable conclusions from audit reports	
Opportunities (External Opportunities)	**Threats (External Risks)**
Accounting:	***Accounting:***
Opportunity for accounting professionals to focus on more strategic and analytical roles, contributing to business strategy	A growing need for skilled personnel proficient in AI and data analytics
	Loss of unskilled labour and possible negative impact on social justice and inclusivity due to job displacement
Auditing:	***Auditing:***
Opportunity to focus on value-added activities and advisory roles	Data security, confidentiality, and reliability concerns in AI systems
Possibility to provide additional services to audit clients	Potential disappearance of conventional professions, including some auditing roles

Source: compiled by the authors

The impact of AI on the development of new skills and knowledge for accounting and auditing professionals. Although AI is unlikely to completely replace human expertise, it is poised to significantly impact the accounting and auditing professions in the near future. The report by World Economic Forum (2023) examined trends in job

markets and skill development over the next five years, highlighting both job growth and decline across various sectors from 2023 to 2027, primarily driven by technological advancements and digitalisation. The report points to a potential risk for low-skilled jobs in accounting and finance due to the implementation of innovative technologies like AI. However, this also indicates that AI introduces new possibilities for accountants and auditors, offering opportunities for professional development and career advancement.

To assess the current state and prospects of AI in financial reporting and auditing, KPMG (n.d.) conducted a study that surveyed 1,800 financial reporting specialists from the largest global economies. The findings revealed that AI is increasingly being integrated into auditing and financial reporting across various countries and industries. While only 10% of companies currently use AI extensively in financial reporting, 72% are either experimenting with or selectively implementing it, and an additional 27% plan to do so. Within the 2025-2027, nearly all companies (99%) are expected to be piloting or actively using AI. Companies that are already leveraging AI for financial reporting are reaping numerous benefits. Two-thirds of leaders identify the key advantages as the ability to forecast trends and outcomes (65%), real-time risk insights (60%), improved data-driven decision-making, and enhanced data accuracy (both 57%). As a result, the role of accounting and auditing professionals is increasingly focused on higher-level cognitive tasks, making decisions under uncertainty, and engaging in strategic planning. This shift underscores the importance of continuous learning as a crucial part of career progression for these professionals.

Research by Institute of Management Accountants (IMA) (Duong, 2024) reveals that the financial function in many organisations has transitioned from a conventional focus on accounting and reporting to a more strategic role as business partners. This shift emphasises critical thinking, scenario planning, collaboration across functions, and decision-making based on AI insights to meet the rising demands of business competition. As companies adopt AI, the value of the financial function as a business partner becomes even more critical. In the era of digitalisation and AI implementation, finance professionals will need to develop a range of new skills (Fig. 1).

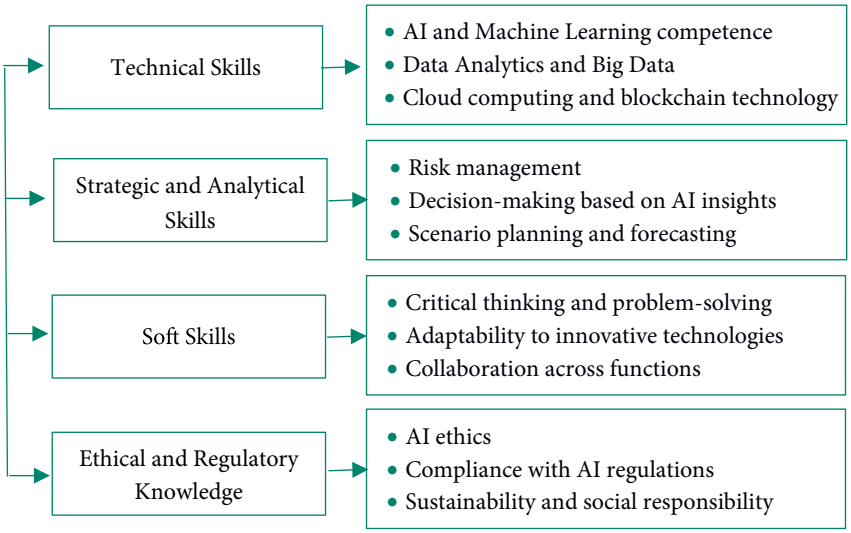

Figure 1. Skills and knowledge required for accountants and auditors in the era of digitalisation and AI implementation
Source: compiled by the authors

Thus, the integration of artificial intelligence into the field of accounting and auditing considerably affects the skill and knowledge requirements for professionals. Although AI will not fully replace human expertise, it will shift the focus towards more strategic aspects of the work, such as data-driven decision-making, risk management, and planning under uncertainty. This necessitates continuous learning and the development of new competences, particularly in critical thinking, technological literacy, and creative approaches to leveraging innovations. These changes will enable accounting and auditing professionals to effectively adapt to modern business demands and create additional value for their organisations.

Artificial intelligence as a challenge and opportunity in the education of accountants and auditors. AI presents a significant challenge and opportunity in the education of accounting and auditing professionals. Technological innovations, specifically the integration of AI and machine learning, have revolutionised conventional accounting processes (Ebirim *et al.*, 2024). The implementation of AI in accounting and auditing processes opens new avenues for automation, accelerating the execution of routine tasks such as data entry, report generation, and information processing. This allows the accountants and auditors to focus more on strategic aspects of their work, such as risk analysis, forecasting, and optimising business strategies (Fig. 2).

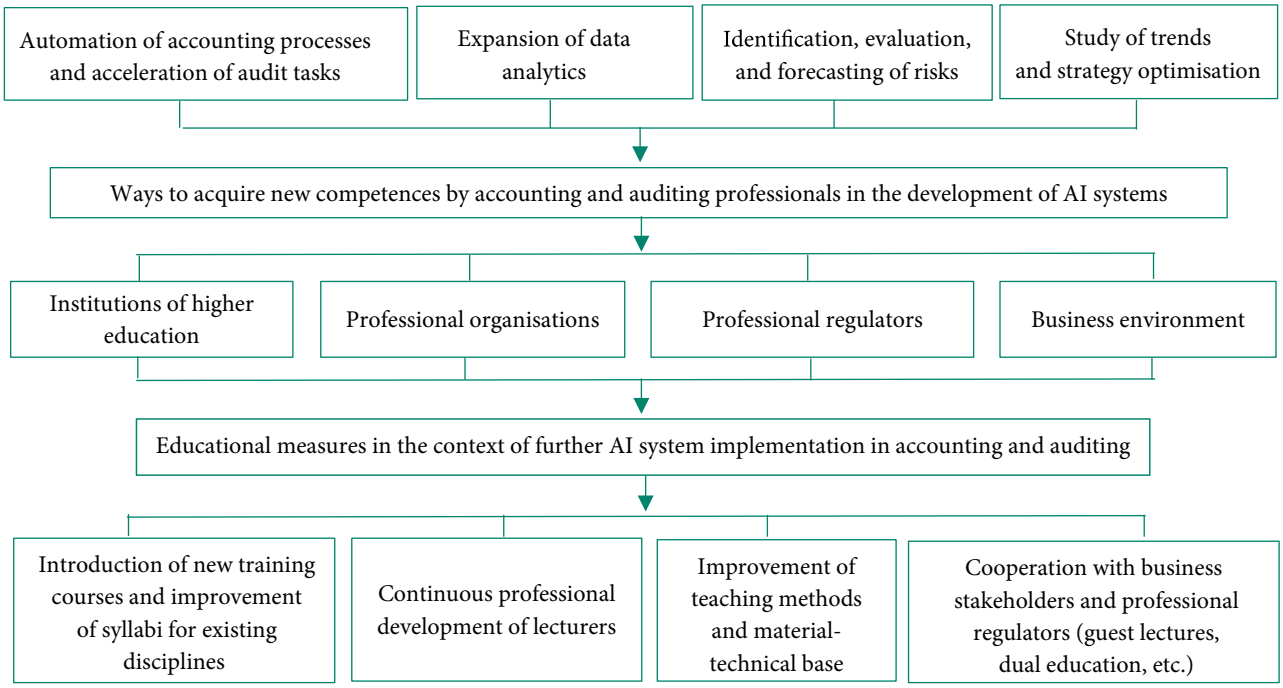

Figure 2. The impact of AI on the education of accounting and auditing professionals
Source: compiled by the authors based on research data by J. Ballantine *et al.* (2024), V. Brabete *et al.* (2024) and G.U. Ebirim *et al.* (2024)

The development of advanced technologies, including AI, directly impacts the accounting profession by redefining the role and position that accounting specialists occupy within economic entities (Brabete *et al.*, 2024). There is an urgent need for the acquisition of new competences that accountants and auditors must develop or acquire, such as advanced data analytics, proficiency in working with AI algorithms, and the cultivation of creative thinking to identify new opportunities. In the context of AI implementation, the ability to use technology effectively becomes as crucial as the capacity to adapt these technologies to enhance business processes.

In terms of the ways for acquiring new competences by accounting and auditing professionals in the face of AI development, institutions of higher education, professional organisations, regulators, and the business environment itself play essential roles. Universities and professional organisations should implement new courses and curricula that incorporate knowledge of AI and digital technologies. Universities are increasingly seen as the primary support in the redesign of accounting education, with curriculum updates in the field being a key measure that must be taken (Ballantine *et al.*, 2024). Continuous professional development for educators who prepare future specialists is also critical, as they must stay abreast of the latest trends and technologies to effectively impart knowledge. The role of professional regulators cannot be underestimated either; they must adapt existing standards and requirements to the new reality of the labour market, fostering the development of necessary competences for working with AI. Additionally, the business environment should actively support its employees in learning and development by providing opportunities for professional growth through collaboration with educational institutions and stakeholders.

In the context of educational initiatives in the AI era, it is essential to implement new courses focused on critical thinking, data analysis, working with AI algorithms, and the creative application of technology. Furthermore, it is vital to update teaching methods, improve the material and technical base, and actively collaborate with businesses and professional regulators to ensure an integrated approach to education, enabling professionals to meet market demands. Thus, AI poses both a challenge and an opportunity for accountants and auditors. Those who can adapt to new conditions and develop the necessary competences and skills will have substantial advantages in the labour market, where demand for strategic thinking, analytics, and data-driven decision-making is increasing. To successfully acquire these new competences, various stakeholders – such as institutions of higher education, professional organisations, regulators, and the business environment – must play an active role in creating conditions for learning and development. This includes the implementation of new courses, the enhancement of curricula, continuous professional development for lecturers, and collaboration with diverse stakeholders to update teaching methods.

Although researchers and practitioners emphasise the significance of AI integration in accounting and auditing, M.A. Agustí & M. Orta-Pérez (2023) highlight that the impact of AI technologies on these fields is still understudied, and there are relatively few studies analysing this influence. The implementation of AI systems in accounting

is expected to primarily automate numerous accounting processes, leading to increased efficiency, productivity, and effectiveness. N. Abhishek *et al.* (2024) provides empirical evidence that the adoption of digitised accounting enhances economic efficiency by reducing accounting costs and improving accuracy, which in turn minimises fines and legal proceedings due to regulatory non-compliance. This, indirectly, has a positive effect on the financial health of business organisations and the economy as a whole. F. Imene & J. Imhanzenobe (2020) assert that with the advent of advanced IT tools, accountants in the IT era can prepare and present financial statements in a more prompt and accurate manner. The ongoing digitalisation has also expanded external users' access to financial reports. Hence, AI applications lead to improvements in the timeliness, transparency, and overall quality of financial reporting. Furthermore, the implementation of AI systems allows accounting professionals to focus on more strategic and analytical roles. D.M. Coman *et al.* (2022) note that the role of professional accountants is evolving from "transaction recorders" to analysts and advisors to entrepreneurs. Strategic AI integration enables professionals to focus on strategic analysis and decision support rather than routine tasks (Duong, 2024).

As for auditing, it is also undergoing transformations aimed at improving efficiency and enhancing quality. G.U. Ebirim *et al.* (2024) underscores the significance of auditors embracing digital innovations to deliver more prompt, accurate, and in-depth evaluations of financial statements. A.A.H. Abdullah & F.A. Almaqtari (2024) found that AI technologies help audit firms improve efficiency, accuracy, and decision-making capabilities, which enhances financial reporting and audit processes. According to S. Vitali & M. Giuliani (2024), AI technologies are expected to positively affect the auditors, as they will be able to focus more on the value-added activities. AI-trained auditors can reduce the time needed for annual audit reports through programming, applied technologies, and logical thinking skills, thus improving the promptness of audit reports (Liao *et al.*, 2024). AI-based risk identification and forecasting are already performed with greater accuracy, and the acceleration of audit tasks also allows auditors to offer additional services to their clients.

However, certain obstacles and risks are associated with the implementation of AI systems in accounting and auditing practices. M.J.A. Gonçalves *et al.* (2022) identify these challenges as resistance to change, organisational culture, and costs. A. Tiron-Tudor *et al.* (2024) emphasised the shortcomings in accountant education, while B.S. Ayinla *et al.* (2024) highlight challenges in integration, workforce adaptation, and privacy concerns. D. Agostino *et al.* (2022) also argue that more attention should be paid to the implications of digitalisation for social justice and inclusivity. B.T.M. Surya (2024) stresses the need for a comprehensive strategy encompassing skill development, technological implementation, cultural change, and active engagement with regulatory and technological advancements.

The skills and knowledge required for accountants and auditors in the era of AI are also a relevant topic of contemporary research. F. Imene & J. Imhanzenobe (2020) argue that considering continuous IT advancements, accounting processes will become cloud-based, and future accountants will interact with AI machines, which highlights the need to explore the potential of virtual and augmented reality in meeting user information needs. S. Leitner-Hanetseder *et al.* (2021) focus on the changing tasks and roles of accounting specialists in the AI era. The researchers conclude that AI-driven innovation will increase productivity and overall employment in the accounting field rather than decrease it, thus obligating companies to adopt AI in a continuous learning cycle and position themselves for growth. M.M. Thottoli (2024) highlighted the role of regulators and professional organisations in further integrating AI into accounting and auditing practices. Moreover, several researchers stress the role of higher education institutions in preparing future accountants for a digital environment, emphasising that educational institutions must adjust their curricula to equip students with the skills expected by employers (Kroon *et al.*, 2021). V. Brabete *et al.*(2024) identifies universities as a key pillar in redesigning accounting education, with curriculum updates being the main measure to be taken.

Thus, the integration of AI into accounting and auditing presents both major opportunities and challenges. On the one hand, AI enhances efficiency, accuracy, and the strategic role of professionals, allowing accountants and auditors to focus on more value-added tasks such as decision-making and advisory roles. On the other hand, the implementation of these technologies raises concerns about workforce adaptation, organisational culture, and data security, as well as the need for continuous education and skill development. Addressing these challenges will require a concerted effort from educational institutions, professional organisations, regulators, and the entire business community to ensure that the potential of AI is fully fulfilled, while also safeguarding against the risks associated with its adoption. This balanced approach will be crucial in shaping the future of the accounting and auditing professions in the era of digital transformation.

CONCLUSIONS

The implementation of AI in accounting and auditing marks a pivotal shift in both fields, transitioning professionals from routine, transaction-based tasks to more strategic and analytical roles. The automation of accounting processes facilitated by AI has proven to substantially enhance the efficiency, transparency, and promptness of financial reporting. As a result, accounting professionals are increasingly becoming analysts and consultants, offering deeper insights and added value to their organisations. In auditing, AI technologies streamline the auditing process, improving the quality of audits and allowing the auditors to focus on value-added tasks such as risk identification and advisory services.

Despite these promising advancements, challenges such as resistance to change, organisational culture, and the prohibitive cost of AI implementation persist. There are also major concerns regarding the adaptation of the workforce and potential privacy issues. These obstacles highlight the need for a comprehensive approach to AI integration, which involves not only the technological aspects but also considerable attention to the educational and social dimensions. Regulators, professional organisations, and institutions of higher education will play crucial roles in preparing the next generation of accountants and auditors for this evolving digital landscape.

The integration of AI into accounting and auditing is reshaping the skill set required for professionals in these fields. While AI is not expected to replace human expertise entirely, its growing presence will necessitate a shift from routine tasks to more strategic responsibilities such as data-driven decision-making, risk management, and planning under uncertainty. Accounting and auditing professionals will need to develop new competences, particularly in technology, data analytics, and critical thinking. Furthermore, the ability to collaborate across functions and understand the ethical implications of AI use will be crucial.

AI represents both a challenge and an opportunity for the education of accountants and auditors. As AI continues to automate routine accounting and auditing tasks, professionals in these fields must develop new competences, specifically in data analytics, critical thinking, and creative problem-solving. The increasing demand for strategic roles highlights the necessity for continuous learning and professional development. Education systems, especially institutions of higher education, must adjust their curricula to integrate AI-related skills and knowledge, equipping future accountants and auditors to succeed in a rapidly changing digital environment.

Future research should focus on addressing the gaps in AI education, exploring how curricula can be further tailored to equip accounting and auditing professionals with the skills needed for a rapidly changing environment. Additionally, ongoing investigations into the social implications of AI adoption, particularly in terms of inclusivity and social justice, will be critical to ensuring that the benefits of AI are distributed equitably across the profession.

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CONFLICT OF INTEREST

None.

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Адаптація бухгалтерської та аудиторської освіти до викликів штучного інтелекту

Анотація. Поява штучного інтелекту змінює ландшафт бухгалтерської та аудиторської освіти, вимагаючи значної адаптації до викликів, пов'язаних з цією технологічною революцією. У цьому дослідженні вивчено вплив штучного інтелекту на набір навичок, необхідних для фахівців з бухгалтерського обліку та аудиту, а також проаналізовано наслідки для вищих навчальних закладів. У дослідженні використано якісний дизайн дослідження, що включає систематичний огляд літератури та SWOT-аналіз. Результати показали, що штучний інтелект підвищує ефективність, прозорість, оперативність і точність фінансової звітності, змушуючи фахівців з бухгалтерського обліку переходити від традиційних ролей до більш стратегічних функцій, які передбачають аналіз даних і прийняття рішень. В аудиті технології штучного інтелекту підвищують якість аудиту і дозволяють аудиторам зосередитися на завданнях з більшою доданою вартістю, таких як оцінка ризиків та консультаційні послуги. Незважаючи на переваги, такі проблеми як опір змінам, організаційна культура, адаптація персоналу, питання конфіденційності та надмірна вартість впровадження штучного інтелекту, є значними перешкодами для інтеграції. Результати дослідження підкреслили зростаючу тенденцію до впровадження штучного інтелекту, причому більшість організацій, як очікується, незабаром впровадять або випробують рішення на основі штучного інтелекту, що підкреслює необхідність безперервного навчання та підвищення кваліфікації серед фахівців. Результати дослідження підкреслили нагальну потребу в освітній реформі в рамках навчальних програм з бухгалтерського обліку та аудиту. Вищі навчальні заклади повинні включати компетенції, пов'язані зі штучним інтелектом, наголошуючи на аналізі даних, критичному мисленні та етичних міркуваннях щодо використання технологій. Спільні зусилля між вищими навчальними закладами, професійними організаціями, регуляторними органами та бізнес-спільнотою є життєво важливими для розвитку робочої сили, здатної процвітати в середовищі, керованому штучним інтелектом. Практична цінність цього дослідження полягає в тому, що воно пропонує навчальним закладам, професійним організаціям та регуляторним органам практичні рекомендації щодо адаптації їхніх навчальних планів і програм, які допоможуть фахівцям з бухгалтерського обліку та аудиту набути необхідних навичок, пов'язаних зі штучним інтелектом, для майбутньої практичної діяльності

Ключові слова: цифрові технології; дані; навички; фахівці; заклади вищої освіти