International Journal of Advanced Multidisciplinary Research and Studies

Applying Artificial Intelligence in Accounting and Auditing in Vietnam: Opportunities and Challenges

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Abstract

The Industrial Revolution 4.0 has brought about a plethora of new opportunities and challenges in the fields of accounting and auditing today. Meeting the demands for innovation in line with modern trends, such as the adoption of computerized accounting, cloud computing, and digital technologies, requires accountants and auditors to be tech-savvy and proficient in using technology in their work. This article provides an overview of the theoretical foundations regarding its origin, concepts of artificial intelligence, and the application of AI in accounting and auditing at companies around the world and in Vietnam. It highlights the significance for businesses to implement AI in accounting and auditing and offers suitable solutions to keep pace with global development needs.

1. Introduction

The Industrial Revolution 4.0 has brought a plethora of new opportunities and challenges to the fields of accounting and auditing. Adapting to innovative demands in line with modern trends, such as the implementation of computerized accounting, cloud computing, and digital technologies, requires accountants and auditors to be tech-savvy and proficient in using technology in their daily work. Digital technologies like artificial intelligence (AI) can make accounting and auditing more efficient, faster, and professional, yet they also introduce greater challenges—considered a fresh direction in the Industrial Revolution 4.0.

2. Theoretical Foundations

2.1 The Fourth Industrial Revolution and the Origins of Artificial Intelligence

The Industrial Revolution 4.0, also known as the fourth industrial revolution, heralds the emergence of a suite of new technologies that merge expertise across physical, digital, and biological domains, impacting every sector, economy, and industry. At the heart of this revolution are technological breakthroughs in areas such as artificial intelligence (AI), robotics, the Internet of Things (IoT), biotechnology, self-driving vehicles, 3D printing, and nanotechnology. AI stands as a core element of digitalization. The Industrial Revolution 4.0 builds upon the foundation laid by the previous three revolutions and is anticipated by scientists to transform business models profoundly.

However, the origins of AI date back to 1956 and are tied to the Dartmouth Artificial Intelligence Conference, where the term "artificial intelligence" was first coined. John McCarthy, Marvin Minsky, Claude Shannon, and Nathaniel Rochester initiated a study on artificial intelligence based on the premise that "every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it" [18]. Another significant milestone in its development was the view of AI as algorithms operating on the basis of artificial neural networks [13]. This approach has enabled the integration of artificial intelligence not only into companies as part of the decision-making process but also into the countless daily activities of individuals, including in fields like accounting and auditing.

The history of AI applications in the field of accounting can be traced back to the 1980s [7]. Academics and professionals have done a lot of research on how to use AI in auditing, taxation, financial accounting, management accounting, and personal financial planning. The development and use of expert systems (ES) in the accounting field is perhaps the most researched area. Recent technological breakthroughs in AI are opening a new chapter in the accounting discipline, shifting research focus from ESs applications to some new perspectives for accounting, including how accounting can benefit from using AI capabilities, the long-term vision for AI and accounting, and how AI will change the accounting role in organizations [8].

2.2 Artificial Intelligence Technology in Accounting and Auditing

AI in auditing and accounting is typically deployed through one of four types of AI technologies [20], which include:

Genetic algorithms and programming are primarily used for bankruptcy prediction or similar auditing tasks, reducing the risks associated with traditional bankruptcy risk models that only operate under certain assumptions [16]. However, these algorithms can be broadly applied to ensure auditors' assessments are robust even under time constraints and limited resources [9].

Fuzzy logic stands out for its ability to clearly compute qualitative factors. Unlike traditional logic, where a logical expression can only be true or false, fuzzy logic expressions can take on any value on a continuum from 0 to 1. In other words, contrary to traditional logic, which states that an event can only be either completely true (equivalent to True - 1) or completely false (equivalent to False - 0), fuzzy logic allows for the measurement of an event's truth by a real number between 0 and 1, depending on how 'true' it is. Rosner, Comunale, and Sexton (2006) highlight one of the main utilities of fuzzy logic for assessing significance [19]. Fuzzy systems enable auditors to evaluate significance on a continuous scale from 0 to 1, rather than through a binary decision.

Neural networks are mostly associated with risk assessment, aiding auditors in carrying out their risk evaluation tasks more systematically and consistently, thanks to the neural network's ability to learn, generalize, and classify data, both complete and incomplete [2]. Calderon and Cheh (2002) pointed out other options for using neural networks: for preliminary information risk assessment, control risk evaluation, identifying errors and fraud, financial exhaustion and bankruptcy, and forming continuous audit opinions [17].

Integrated systems, which combine the aforementioned technologies, can be utilized as needed in both quantitative analysis and qualitative assessment. Davis, Massey, and Lovell (1997) developed a prototype hybrid system that integrates an expert system with a neural network [15]. The expert system component ensures the effective use of known control variable relationships, while the neural network part recognizes patterns within a vast number of control variable relationships, some of which cannot be articulated into a set of rules.

3. Applying Artificial Intelligence to Accounting and Auditing Tasks

Artificial intelligence is gradually being integrated into the accounting and auditing information systems of companies. The most common initial step is RPA (Robotic Process Automation), which automates processes using robots. RPA is software that operates other application software and can be used to automate predefined business processes [1].

The difference between RPA and artificial intelligence is that while RPA is process-oriented, automating tasks based on set rules, artificial intelligence is data-driven, requiring high-quality data to learn patterns and simulate human decision-making [1].

These two terms are thus closely related, with artificial intelligence taking it a step further. However, these technologies don't replace each other but rather complement one another (EY, 2018). The main reason for integrating RPA technologies from the get-go is due to the excessive amount of repetitive, simple, rule-based tasks that unnecessarily occupy auditors.

Moreover, according to Murphy and Brown (1992), risk analysis is a critical stage in evaluating whether an audit plan is reasonable or not, and it's key for determining the right amount of evidence to gather as well as setting the appropriate level of significance [3]. A general principle can be drawn from this: the higher the inherent risk, the more evidence is needed, and the lower the acceptable level of significance. The use of AI in auditing can reduce all three types of audit risks: inherent risk, control risk, and detection risk.

Inherent risk is the probability of a material misstatement in financial reports before internal control evaluations are performed, representing the most complex risk to identify. Expert systems often rely on statistical models that enable auditors to recognize inherent risks and also highlight key variables for making judgments about these risks. Another common approach is using questionnaires, where an expert system poses questions to auditors and assesses them through a matrix, scoring the overall risk.

When it comes to trends and information in AI for auditing, innovation is happening fastest at the Big 4 audit firms: Deloitte, EY, PwC, and KPMG. Consequently, the AI technologies introduced by the Big 4 are highly specific and readily applicable.

In March 2016, Deloitte formed an alliance with Kira Systems to bring innovation and machine learning to the workplace [4]. Building on this partnership, Deloitte later developed a cognitive application called Argus, specifically designed for audit purposes. This app "learns from human interactions and leverages advanced machine learning techniques and natural language processing to automatically identify and extract critical accounting information from any type of electronic document" [5].

For this step, the company has clinched the 2018 International Accounting Bulletin's Audit Innovation of the Year award for its dedication to innovation and developing tools to transform the auditing profession. The Guide for Personal Risk Assessment Support, also known as GRAPA, is another application that Deloitte developed. It aids auditors in comparing their chosen strategies with other risk strategies previously employed, working with Deloitte's database of 10,000 cases, each encompassing about 50 risks [6].

According to Deloitte, this app should be viewed as a tool for planning and assessing standards, as it still requires human creativity and intellect, particularly when considering processes, developments, and risks. Deloitte also plans to introduce a chatbot that will efficiently guide employees through regulations, laws, auditing and accounting standards, and professional documentation [6]. This app will rely on algorithms and will also collect valuable user feedback to further improve searches and make the app more effective.

PwC snagged both the 2017 and 2019 International Accounting Bulletin's Audit Innovation awards. The 2017 accolade was tied to its GL.ai technology, developed in collaboration with H20.ai, a Silicon Valley firm, to create an AI support system capable of analyzing documents and preparing reports (D. Faggella, 2019). GL.ai can replicate the thought process and decisions of auditors, scrutinizing every transaction, user, amount, and account to spot unusual activities in the ledger. The 2019 award went to another tech marvel, Cash.ai, which automates cash inspections including

cash balances, bank reconciliations, bank confirmations, foreign exchange, and the bank's financial conditions.

KPMG is teaming up with Microsoft to deliver integrated innovation to their clients. These solutions include the Intelligent Underwriting Engine [10], a tool for calculating risk and insurance premiums, and the Sales Intelligence Engine [11], which optimizes the sales cycle. Particularly exciting for auditing is Strategic Profitability Insights [12], a platform that extracts crucial financial data and provides insights into the value of a transaction. Additionally highlighting their Digital Solution Hub, KPMG links it to artificial intelligence tools using Microsoft Azure cloud services [14].

4. Conclusion

Even though ethical and legal issues still cling to the use of AI in auditing and accounting, AI is undeniably becoming an integral part of various business, auditing, and accounting processes, with companies pouring more and more capital into its development. While the future may bring new challenges and risks, AI is sure to open up plenty of opportunities and offer effective solutions. The adoption of AI can address inefficiencies, ineffectiveness, and low value-add in accounting, propelling accountants towards more creative work and delivering greater value to their companies. In summary, integrating artificial intelligence into the accounting sector is hugely significant, as it will drive industry growth and innovation and enhance the competitive edge of businesses.

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