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AI in accounting and auditing: A transformational paradigm

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Abstract

Artificial Intelligence (AI) has become a fast-growing technology and a key component for many businesses to provide better customer services, improve operational efficiency and effectiveness, and gain a competitive advantage. Accounting and auditing play a vital role in running a business. Accounting provides information about the financial position, profitability and performance of a company, while the purpose of auditing is to determine whether the financial information provided by accounting is accurate or reliable. The accounting and auditing field is also not untouched by the use of AI and its technology. The “Big 4” accounting firms—Deloitte, Ernst & Young (EY), PricewaterhouseCoopers (PwC) and KPMG, the largest service providers in the accounting industry—have an AI strategic approach and framework. The accounting and auditing profession is going through a transformational evolution with AI. This article attempts to examine the role of AI and related technologies in accounting and auditing using secondary data. Technological advancement and changes bring both positive and negative aspects. The article studies what are the opportunities and challenges of adopting AI in accounting and auditing.

Keywords: Artificial Intelligence (AI); Competitive advantage; Accounting and Auditing; Big 4.

1. Introduction

Over the past several years, Artificial Intelligence (AI) is one of the most current technologies that is rapidly developing (Luthfiani, 2024). It has evolved from speculative science fiction to devices that help us in our everyday lives. In particular, the integration of AI technology in business is rapidly transforming modern business practices and streamlining day-to-day operations (Wamba, 2024; Rashid, 2024; Prasanth et al., 2023; Perfanis et al., 2023). Adopting AI helps improve the efficiency of companies through reducing errors, managing risks, gaining competitive advantage, and increasing employee efficiency (Zamain, 2024).

According to the TCS AI for Business Study Findings Report, AI is offering new opportunities to fundamentally reshape the way we do business. 72% of companies are currently reworking or planning to rework their business strategy or operations to measure the success of AI implementation in enterprises. McKinsey’s latest report showed that in 2023, 55% of surveyed organizations will have implemented AI in at least one business unit or function, showing a slight increase from 50% in 2022 and a significant jump from 20% in 2017. AI technology adoption has accelerated over the past five years, and in the future, given the AI technological advancements and adoption rate, even more changes are expected to occur at higher frequencies. AI has the potential to increase India's annual growth rate by 1.3 percentage points by 2035 (NITI Aayog, 2018).

Accounting and auditing are integral parts of wider management and business practices. Accounting provides the information needed to make rational economic and business decisions, while auditing adds credibility to that information (Caramanis et al., 2011). To make decisions effectively and efficiently, it is necessary to have availability of adequate, up-to-date and appropriate information. In view of the increasing complexity of financial transactions and

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regulatory demands, traditional methods of accounting and auditing are proving inadequate to deal with the vast volume and complexity of data. However, the accounting and auditing landscape is undergoing a transformational evolution, driven by rapid technological advancements, dynamic regulatory changes and shifts in corporate paradigms (Ebirim et al., 2024).

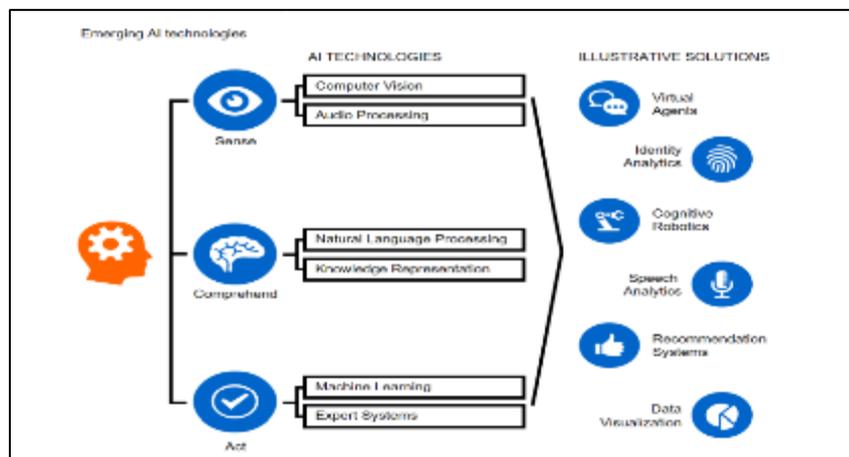
According to ACCA report (2019) on 'Audit and technology', technology is transforming the accountancy profession, and has the potential to revolutionize audit. The use of advanced technologies such as AI and ML (machine learning), blockchain and data analytics promises to transform the audit profession, transforming auditing from a reactive and backward-looking exercise to a proactive, continuous source of forward-looking insights that can be used at all times, with the auditor acting as the custodian and interpreter of the underlying data foundation. But if AI and related technologies are fully implemented, it could call into question the independence of the auditor. Technology has undoubted benefits, but it also has consequences (Gunz et al., 2020).

The aim of this paper is to examine of the role of AI technology in accounting and auditing. This study attempts to present an overview of AI and its related technologies. What are the benefits and challenges of integrating AI with the accounting and auditing profession? This study is descriptive in nature. It is based on secondary data i.e., published past and present concepts, theories, literature, reports and articles.

2. About Artificial intelligence (AI)

John McCarthy coined the term 'artificial intelligence' in 1956 to describe computer programs that exhibit intelligence, i.e., computers perform tasks that would require intelligent humans to perform (Rajaraman, 2014). The field of AI is constantly evolving. In an attempt to define AI, various approaches have been used, highlighting different aspects of the concept (Hasan, 2022). McKinsey & Company defines artificial intelligence as the ability of a machine to perform certain cognitive functions that we typically associate with human minds. OECD (2019) states that an AI system is a machine-based system that can make predictions, recommendations or decisions affecting a real or virtual environment, for a certain set of human-defined objectives. AI systems are designed to operate with varying levels of autonomy. Yongjun (2021) points out that the purpose of AI is to provide perception, cognition, and decision-making capabilities for machines.

Gbadegeshin et al., (2021) defines AI by synthesizing its unique features that AI is a "system" not only a technology that can make use of data, learn by itself and act on its lessons to perform assigned task (s) effectively and efficiently in any environment. This system must be trained initially (either by humans or another system). It can automate a process, direct itself and continuously learn from its activities. It can also act appropriately, independently, and intelligently with little human input. It contains different forms of software and/or devices. It is created by humans. It is built on understanding of existing phenomena, and it acts wisely based on its understanding. Sheikh et al., (2023) combined the various definitions of High-Level Expert Group (HLEG) and described AI is system that display intelligent behavior by analyzing their environment and taking actions- with some degree of autonomy- to achieve specific goals.

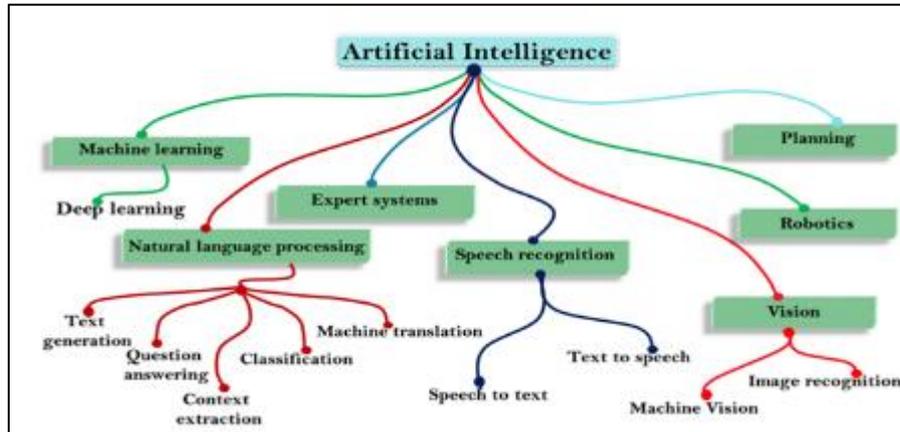


Source: NITI Aayog (2018). "National Strategy for Artificial Intelligence".

Figure 1 What is AI

AI is a set of technologies that enable machines to operate with higher levels of intelligence and simulate human sensation, understanding, and action capabilities (NITI Aayog report, 2018), as shown in Figure 1.

AI uses a range of technologies that enable machines to sense, comprehend, plan, act, and learn with human-level intelligence. According to ACCA report on AI in the finance profession (2023), in practice, AI is probabilistic, pattern recognition work that can be used to help with visual perception, language and speech analysis, making predictions, and solving other data-related problems. AI includes a variety of subfields as shown in Figure 2: -



Source: Kayid, A. (2020). "The role of Artificial Intelligence in future technology". DOI:10.13140/RG.2.2.12799.23201

Figure 2 Subfields of AI

- Machine learning (ML): It is a subfield of AI, broadly defined as the ability of a machine to mimic intelligent human behavior (Bezos, 2024). Machine learning uses algorithms to analyze data by learning and adapting rather than following explicitly programmed instructions. Algorithms detect patterns and interpret data and make determinations or predictions as a result;
- Deep learning (DL): It is a subset of machine learning, which is essentially a neural network with three or more layers (Bezos, 2024). It was inspired by the structure and function of the brain. Artificial neural networks (ANNs) are algorithms that are based on the biological structure of the brain (NITI Aayog, 2018). It can be applied to larger and more complex datasets.
- Natural language processing (NLP): it is a branch of artificial intelligence (AI) that enables computers to understand, interpret, and generate human language using machine learning. NLP has many applications that use language, such as text translation, text summarization, voice recognition, and chatbots. Today organizations have a huge amount of text and voice data from various communication channels such as email, text messages, social media newsfeeds, video, audio, and more. They use NLP to automatically process this data, analyze the intent or sentiment in the message, and respond in real-time to human communication.
- Robotics process automation (RPA): It is also known as software robotics, uses intelligent automation technologies to perform repetitive office tasks performed by human workers, such as extracting data, filling out forms, transferring files, etc. It is a technology used to automate repetitive policy-defined tasks that are performed manually. But, combining AI and RPA results in advanced intelligent automation systems, capable of managing complex and adaptive business processes with minimal error, thereby better supporting the decision-making process (Dalsaniya et al. 2021).
- Computer vision (CV): It is a field of AI that trains computers to interpret and understand the visual world. CV attempts to automate classification tasks performed by the human visual system as well as trigger appropriate actions based on that classification. It can work with digital image data (pwc report on computer vision, 2020).
- Automatic Speech recognition (ASR): Speech recognition (SR) also known as ASR or Computer Speech Recognition (CSR) enables a machine to understand and interpret the human voice and perform any required task or match the voice with a given or acquired vocabulary (Saini & Kaur, 2013). AI-powered ASR systems have shown remarkable progress in converting spoken language into written text. These systems can convert verbal communication into text by leveraging ML and NLP techniques. By leveraging speech recognition and language processing technologies, AI systems can generate simultaneous captions and subtitles for live events, videos, and other multimedia content (ZainEldin et al., 2024).
- Expert System (ES): Brown et al. (1995) in her paper highlighted the various definitions of ES given by different researchers viz.- An ES is a computer program that behaves like a human expert in some useful ways (Winston and Prendergast, 1984). It solves problems that are so difficult that their solution would require significant

human expertise (Edward Feigenbaum, Harmon and King, 1985). It may give intelligent advice about a processing function or make intelligent decisions (Expert Group of the British Computer Society, Forsyth, 1984). ES is one of the major branches of AI.

PwC report on Computer Vision, 2020 suggests that AI works in three basic ways-

- Assisted Intelligence – where AI assists humans to perform the same tasks faster or better.
- Augmented Intelligence – where AI performs more general actions to assist humans. Here humans and machines work together; learn from each other; and increase the efficiency of what they do together.
- Autonomous Intelligence – where AI is operating with very little human intervention (i.e., fully autonomous self-driving cars), operating in complex and open environments with a high degree of independence and self-determination.

More recently, **Generative AI (GenAI)** leverage a range of deep learning techniques combining natural language processing with generative capabilities. It is a type of artificial intelligence that can create new content such as images, text, audio, or video based on the data it has been trained on (Bezos, 2024). GenAI is very close to human intelligence (NITI Aayog, 2018). These techniques uniquely leverage emerging learning approaches to create new content. ICAEW pointed out that the potential of GenAI is enormous, but there are also risks when deciding to adopt GenAI. Existing approaches to technical strategy and broader governance principles, practices and processes may not be fully suitable for GenAI and may need to be adapted and strengthened. GenAI adoption in India is still in its early stages. According to the EY India Survey Report (2025) How much productivity can GenAI bring to India? 36% of Indian enterprises have started investing in GenAI and have budgeted, while 24% are experimenting with it. More than half of the enterprises have a GenAI strategy, but only a few have a fully integrated strategy with clear execution plans. AI expertise is a critical need for most enterprises.

After reviewing the various literature, it has been found that AI and related technologies have very strongly taken over the world going through the fourth phase of the industrial revolution. It has brought an incredible and effective impact on almost every sector increasing efficiency, reducing costs and improving safety in various processes. But at the same time, AI presents many challenges in the modern workplace and everyday life, such as ethical considerations, job disruption and data privacy (Rodrigues, 2020; Gerke, 2020; Bankis, 2023; and Zitar et al., 2024).

3. AI in Accounting

Accounting is often called the "language of business". Accounting involves measuring and summarizing business activities, interpreting financial information, and communicating the results to stakeholders. Under the influence of AI, the accounting industry has achieved a qualitative leap from traditional manual accounting to computerized accounting and then to intelligent accounting (Jin et al., 2023). Accounting is well-suited to using AI in every part of its information system. The use of AI- ES in accounting enhances analytical capabilities, decision-making capabilities, etc. AI predictive modeling capabilities analyzes data in-depth and provides new insights and predictions on the business, and helps in identifying patterns and trends in large datasets (Dongre et al. 2021; Rohmah et al. 2022; Shakdwipee et al., 2023 & Nifise et al., 2024).

AI technology features 'feature extraction' related to data extraction which involves identifying and extracting relevant information from existing data. Automated data acquisition can generate accounting information in a timely and efficient manner, reducing data errors caused by human error (Ziwei Y et al., 2023). GenAI's automation capabilities can automate routine, repetitive, and rule-based tasks such as document generation, client communication, document translation and summarization, software development, and information aggregation. This automation liberates accountants to focus more on human-led activities such as business engagement, delivering relevant insights, creating value, and sharpening strategic work (Marius et al., 2024 & Nifise et al., 2024).

AI-based solutions or techniques enable accountants to extract information from unstructured data. Using and analyzing unstructured data effectively is a complex, time-consuming, and expensive process. This unstructured data is relevant for further analysis to extract important information and gain insights from this data across various domains (Oza et al., 2023 & Mahadevkar et al. 2024). AI-based solutions provide automation solutions by combining computer vision (CV) and NLP) capabilities with Robotic process Automation (RPA) or optical character recognition (OCR) workflows (Clausner et al., 2020).

Today, accountants perform cloud-based accounting, which allows them to complete tasks more efficiently, work smoothly with team members, and access real-time financial information from anywhere (Abdullah et al., 2024). By adopting AI in cloud computing, organizations can gain scalability, cost-effectiveness, accessibility, and improved performance, enabling them to navigate the constantly evolving digital landscape with agility and foresight (Allam, 2023).

4. AI in Auditing

If accounting is often called the "language of business," auditing is the verification and independent testing of this language that ensures the accuracy and reliability of financial information. Auditors are often described as "watchdogs" because they act as vigilant observers, monitoring financial activities to detect any signs of mismanagement, fraud or errors. The integration of artificial intelligence (AI) into the audit process has increased in recent years (Olomskaya et al., 2021). AI technology enables a more effective way of analyzing client information and identifying risk as comparison of traditional audit procedure. In other words, AI strengthens the audit quality (KPMG, 2024). Pandala et al. (2019) in their presentation given for Project Work – Direct Recruit AAO highlighted the comparative analysis of AI-enabled audit Process vs. traditional audit process, as shown in Figure 3.

Phase	AI Enabled Automated Audit Process	Traditional Audit Process
Pre-Planning (Phase 1)	<ul style="list-style-type: none"> •AI collects and analyzes Big Data (exogenous) •Data related to the client’s organizational structure, operational methods, and accounting and financial systems feed into AI system 	<ul style="list-style-type: none"> •Auditor examines client’s industry •Auditor examines client’s organizational structure, operational methods, and accounting and financial systems
Contracting	<ul style="list-style-type: none"> •AI uses the estimate of the risk level (from Phase 1) and calculates audit fees and the number of hours • AI analyzes a database of contracts and prepares the contract •Auditor and client sign contract 	<ul style="list-style-type: none"> •Engagement letter prepared by the auditor based on the estimated client risk • Auditor and client sign contract
Understanding Internal Controls and Identifying Risk Factors	<ul style="list-style-type: none"> •Feed flowcharts, questionnaire answers, and narratives into the AI system and use image recognition and text mining to analyze them •Use visualization and pattern recognition to identify risk factors •AI aggregates all these data to identify fraud and illegal-acts risk factors 	<ul style="list-style-type: none"> •Document understanding (flowcharts, questionnaires, narratives, walkthrough) •Auditor aggregates this information and uses their judgment to identify risks factors •Understanding of IC to determine the scope, nature, and timing of substantive tests
Control Risk Assessment	<ul style="list-style-type: none"> •Continuous control monitoring systems examine controls continuously • AI runs process mining to verify proper IC implementation •Logs are automatically generated to ensure their integrity 	<ul style="list-style-type: none"> •Examination of the client’s IC policies and procedures •Risk assessment for each attribute •Test of controls • Risk reassessment • Document testing of controls
Substantive Tests	<ul style="list-style-type: none"> Continuous Data Quality Assurance ensures quality of data and evidence •AI examines data provenance •Continuous test of details of transactions on 100% of the population • Continuous test of details of balances (at all times) •Continuous pattern recognition, outlier detection, benchmarks, and visualization 	<ul style="list-style-type: none"> •Periodical sampling-based tests, and nature, extent, and timing depend on IC tests •Tests of details of a sample of transactions •Test of details of balances (at a certain point in time) • Analytical procedures
Evaluation of Evidence	<ul style="list-style-type: none"> •This becomes part of the previous phase 	<ul style="list-style-type: none"> •Auditor must evaluate the sufficiency, clarity, and acceptability of collected evidence. Accordingly, auditor may either collect more evidence, or withdraw from engagement
Audit Report	<ul style="list-style-type: none"> •AI uses a predictive model to estimate the various risks identified •Audit report can be continuous (graded 1–00 for example) rather than categorical (clean, qualified, adverse, etc.) 	<ul style="list-style-type: none"> •Auditor aggregates previous information to issue a report • Report is categorical: clean, qualified, adverse, etc.

Source: Pandala et al. (2019). Artificial Intelligence (AI). Available at- <https://cag.gov.in/uploads/media/GroupII-AI-20200518223929.pdf>

Figure 3 Comparative Analysis B/W AI-Enabled Audit v/s Traditional Audit

KPMG’s report (2024) AI in financial reporting and audit: Navigating the new era, states that companies want auditors to use GenAI because of its ability to uncover more complex data relationships and patterns through deep learning. Auditors should prioritize the use of GenAI for risk mitigation and internal controls, as well as data analysis and quality management and risk and anomaly detection. GenAI enables auditors to analyze large amounts of data quickly and efficiently, allowing them to focus on high-value tasks such as interpreting results and recommending business actions.

In addition, GenAI can increase the accuracy and effectiveness of internal control testing by identifying anomalies or unusual activities that may require further investigation.

Shri Girish Chandra Murmu, CAG of India said at the MoU signing ceremony between CAG Institute and IIT, Delhi (2024) that "AI has emerged as a catalyst for change in the field of audit, offering a plethora of opportunities to enhance efficiency, effectiveness, and insight. By harnessing AI-driven algorithms and predictive analytics, auditors can analyze vast volumes of data with unparalleled speed and precision, enabling them to uncover patterns, anomalies, and potential risks with greater accuracy". He also added that with the rapid advancement of AI, machine learning and data analytics, traditional methods of auditing are being redefined, offering unprecedented opportunities for innovation and efficiency.

5. Challenges of Integrating AI in Accounting and Auditing

The Thomson Reuters Institute says AI helps firms streamline processes, improve accuracy, and provide more value to their clients. However, firms are still cautious about adopting GenAI technology in their workflow. The ACCA report (2023) on AI in the Finance Profession (2023) has highlighted various serious risks that must be carefully addressed before adopting AI in profession: -

- AI systems, especially deep learning models, are often complex and difficult to understand. A lack of transparency can hide the decision-making process and underlying logic of these technologies. When users fail to understand how AI systems arrive at their conclusions, this can lead to skepticism and resistance to these technologies. According to the Global Workplace Skills Study (2025) conducted by Emeritus, a global leader in professional education, 96% of Indian professionals are using AI and generative AI tools at the workplace, which is significantly higher than 81% in the US and 84% in the UK. But global consulting firm Bain & Company highlighted that India needs to reskill a significant portion of its existing talent base to meet the growing demand for AI expertise, else the country could face a shortage of over one million skilled AI professionals by 2027.
- Unlike humans, AI systems do not have the ability to think or form beliefs. AI systems are not devoid of biases because they learn from human-generated data. They may inadvertently maintain and amplify social biases due to biased training data. Poor algorithm design or drift can also lead to discrimination.
- AI can be a double-edged sword in the field of cybersecurity, providing powerful tools for protection but also enabling sophisticated attacks by cyber attackers. AI technologies pose significant risks to privacy and security. Data protection regulations and secure data handling practices are critical to mitigate these privacy risks. In India, the Information Technology (IT) Act, 2000, is the primary legislation dealing with cybersecurity, data protection and cybercrime. Recently, the Digital Personal Data Protection (DPDP) Act, 2023 received the Presidential assent on August 11, 2023. The Act provides a framework for processing digital personal data in a manner that recognizes both the right of individuals to protect their personal data and the need to process such personal data for legitimate purposes and matters connected therewith or incidental thereto.
- The advent of AI technologies has necessitated the development of legal systems to keep pace with technological advancements and protect the rights of all stakeholders. The question of accountability in AI is a key challenge. When an AI system makes a mistake, who is to blame? Is it the developer, the user, or the machine itself?
- AI systems are fundamentally probabilistic, which means they analyze data and generate responses according to patterns and statistical correlations. However, they are not always completely accurate. When AI systems confidently assert claims that are simply false it is known as AI hallucinations.
- One of the unique risks of AI is the magnification effect. Human workers might make a handful of mistakes daily, but the consequences of their mistakes are limited to the amount of work they perform – which is often not very much. But a bot (build-operate-transfer) system - an automated software application that handles millions of transactions per day magnifies any single mistake millions of times over. Strong testing, validation, and monitoring processes can help developers identify and fix these types of problems before they grow.
- Unexpected problems may arise in the application of AI, which requires a quick and effective response. Therefore, organizations must maintain a flexible and adaptive approach when deploying AI.

6. Conclusion

AI is revolutionizing the way accounting and auditing are conducted. This study demonstrates that AI can bring unprecedented efficiency, accuracy, quality improvement, and strategic decisions to the accounting and auditing profession. With its ability to automate routine and tedious tasks, analyze large amounts of data, and detect irregularities, patterns, and anomalies, AI can help accountants and auditors work smarter and more effectively and, at the same time, allow them to focus on high-value services.

Although there are many benefits of adopting AI in accounting and auditing, there are challenges as well. Various potential risks arising from the deployment of GenAI should be considered. These risks include governance risks, regulatory risks, lack of knowledge and skills in the workforce, misuse of GenAI to commit fraud, data privacy risks, cyber-attacks, improper selection or development of genAI technology, inadequate and inappropriate model of training and development of workforce, etc (CAQ, 2024).

Organizations need to take a flexible and adaptable approach to AI risk management (Gohil, 2025). Deloitte's report on 'AI and risk management' suggested that the adoption of AI in any sector is a two-way learning process. AI solutions are learning and evolving over time. Therefore, users of AI also need to increase their understanding of AI. AI experts would benefit from an understanding of risks and regulatory approaches that they do not already have. When adopting AI, any firm should consider how to integrate AI-specific considerations into its existing risk management framework (RMF). Regulators can also play a key role. If industry and regulators can work together, they can contribute to the long-term social and ethical implications arising from the widespread adoption of AI.

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