

## Adoption of virtual technologies and their effect on the future practice of the accounting profession

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### Abstract

Over the years, the accounting function shifted from human efforts in the record-to-report process to digital solutions in the delivery of timely information. In this regard, many tasks are becoming hybrid human-robot tasks, highlighting the need for accountants who can effectively leverage their unique strengths to enhance productivity and efficiency. This study examined the effect of these key changes in the practice of the accounting profession that result from the use of virtual network applications. The study combined practical experience with literature reviews. It concluded that the adoption of virtual technologies in accounting only requires complementary skills and is not necessarily disruptive to the practice of the profession. It was recommended that substantial reforms be implemented in accounting education and professional development, emphasising the necessity of a more interdisciplinary approach. This approach should encompass the integration of ethical principles and technological proficiency to equip future practitioners with the skills required to navigate the increasing complexity and dynamic nature of the accounting profession.

**Keywords:** Accounting; Professionalism; Technology Adoption; XBRL; AI; Blockchain Ledger.

### 1. Introduction

The accounting profession, a testament to human ingenuity, has evolved considerably over time. As a vital part of various organisations, it acts as a key driver in shaping environmental conditions, with a profound influence on organisational cultures [37]. Its impact is multifaceted, profoundly influencing the evolution of workplace norms, values, and practices that collectively shape an organisation's culture and identity. The profession shifted from human efforts in the record-to-report process to digital solutions that aim to deliver more timely information [18, 35]. Today, data and records are stored on magnetic devices and processed on microprocessors, whether on local computers, local networks, or virtual networks [2, 14, 26], making human intervention almost unnecessary.

The sporadic growth in accounting data necessitated the introduction of virtual technologies and digitalisation of functions, which is drastically changing the erstwhile dysfunctional situations of information overload [2, 28]. Within the current business environment, the increasing integration of robots and automation in various industries is indeed creating a shift towards hybrid human-robot tasks [11].

This trend highlights the need for accountants who can effectively collaborate with machines, leveraging their unique strengths to enhance productivity and efficiency. Much more relevant is the cost savings that these virtual applications brought with them, liberating organisations with limited resources by making them affordable. This change is considered disruptive by many observers and scholars, suggesting that human efforts in accounting will soon become outdated [6, 11, 17].

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The emergence of this phenomenon precipitates critical inquiries into the future trajectory of the accounting profession, specifically: To what extent have AI and the digitalisation of accounting functions disrupted traditional accounting practices? What proficiencies will future accountants need to possess to navigate the challenges posed by technological advancements? Notably, extant literature has primarily focused on technology adoption and applications in business, with relatively limited attention paid to the implications for the skill sets required of accountants in this rapidly evolving landscape.

This study draws on practical experience and a comprehensive literature review in investigating the impact of virtual network applications on the accounting practice, with a specific focus on examining the key changes in professional practice that arise from their adoption. The study equally provides suggestions on capacity areas that accounting professionals and graduates should consider to escape the impending disruption. The organisation of this paper is in four sections. Section two conceptualises key concepts, including professionalism, accounting, and technology adoption. It went further to discuss key virtual technology applications that are driving transformative changes in the accounting function. Section three discusses the implications of these technological advancements on the accounting profession, including the future skills required to remain current. Section four presents the conclusions and recommendations derived from the study.

## 2. Literature review

### 2.1. The accounting profession

The evolution of accounting has been thoroughly examined in academic literature, with notable contributions from researchers such as McBride and Verma (2021), who highlight the pivotal role of professionalism in shaping the conceptual foundations of the field [22]. Drawing on the functionalist perspective, the accounting profession is understood to have arisen from the societal need for specialised expertise, the mastery of which necessitates individuals of high diligence and integrity [7, 34, 36]. Within this framework, professionalism is conceptualised as the collective organisation of individuals or groups, committed to ensuring competence, standardisation, and ethical integrity in practice [7]. Functionalism theory thus portrays accounting professionals as individuals possessing specialised knowledge who serve society and exhibit strong intra-professional solidarity.

Historically, accounting was mainly viewed as a method for generating financial information, with early definitions largely ignoring the practical usefulness of such outputs. For example, Walker (2016) described accounting as the universal language of business, enabling the communication of financial information to different stakeholders [36]. However, in today's organisations, accounting serves a broader purpose. It not only aids decision-making but also influences environmental conditions and significantly shapes organisational culture [29, 37]. The effect of accounting is therefore complex, helping to develop workplace norms, values, and practices that collectively define organisational identity. With the current era of globalisation that is driving rapid expansion of big data, real-time access to remote business operations has played a vital role in redefining the accounting profession and practices [2].

Recent scholarly work, notably Carnegie (2021), has reconceptualised accounting as a complex, multifaceted discipline that integrates socio-technical and ethical dimensions [9]. This broader understanding moves beyond the traditional view of accounting as a purely technical function, instead framing it as a practice that requires the synthesis of technical proficiency, ethical discernment, and social consciousness. Such a reconceptualization reflects the growing recognition that accounting practices not only influence internal organisational processes but also extend their impact to wider societal contexts. As observed in recent literature, accounting now plays a role in shaping societal values, norms, and collective beliefs, highlighting its function as both a technical and moral enterprise [37]. These developments underscore the necessity for the accounting profession to remain agile and adaptive in response to continuous technological innovation and shifting societal expectations. Maintaining relevance in this evolving landscape demands an expanded professional scope, the type that is attuned to emerging ethical challenges, digital transformation, and the broader socio-economic implications of financial reporting.

The perception of technology depends on context and varies across different professions and disciplines. While some researchers describe technology as a tangible object, such as mechanical devices [4], others take a broader view, recognising it as a complex and dynamic entity that includes more than just physical artifacts [30]. In social science literature, technology refers to the application of creative knowledge to organise tasks through human and machine interactions [10]. More generally and within the context of this study, technology is seen as the practical use of scientific knowledge that allows humans to manipulate and control their environment [15, 20].

The implementation of virtual applications in business is shaped by a multifaceted interaction of factors, encompassing network efficiency, the prevailing social and institutional context, and the accessibility of technical skills. These factors collectively shape the extent to which technological innovations are embraced across various professions, including accounting. More so, the increasing ubiquity of digital tools in the business environment affirms the enduring relevance of technology in professional practice. To maintain their relevance and strengthen their role as strategic advisors in finance and business decision-making, accountants must capitalise on the value-adding capabilities of emerging technologies. This includes the use of real-time, cloud-based systems and data analytics platforms that support improved organisational agility, predictive insights, and evidence-based decision-making. As expectations for timeliness, accuracy, and strategic contribution continue to rise, accountants are increasingly required to integrate advanced technologies into their practices to meet the demands of a fast-paced and data-driven business environment.

## **2.2. Virtual technology applications in accounting**

In the context of increasing digitalisation, corporate reporting practices serve multiple functions that merit further investigation, particularly about how emerging technologies are reshaping organisational processes. Understanding the potential, transformation, and associated challenges of digital reporting is essential for assessing its impact on modern economies [18, 20]. Recent literature highlights that digital and virtual technologies can significantly improve corporate reporting and communication practices [1, 6, 18, 20]. These tools support the dissemination of both financial and non-financial information, thereby enhancing transparency and stakeholder engagement. Moreover, the increasing integration of digital solutions is reshaping the landscape of accounting education, professional roles, and operational procedures.

The increasing digitalisation of the global business environment is driving the accounting profession to evolve and meet the growing demands for real-time access, remote collaboration, and enhanced data security, which are now essential components of the modern business landscape [3, 5]. To be in tune with this, virtual applications, including cloud-based accounting software, virtual audit tools, and online collaboration platforms, have become essential parts of modern accounting systems [12, 21]. These technologies provide many advantages, such as increased efficiency, scalability, and support for geographically separated teams or organisations, thereby transforming traditional ways of professional engagement and service delivery [26].

Over the past two decades, virtual technologies have emerged as the global standard for business information processing and financial reporting, with their adoption accelerating significantly in recent years. This has brought about transformative changes in the management of information systems, particularly within the accounting and finance domains. The benefits extend well beyond the basic web-based processing and storage of financial data. Key advantages include scalable resource pooling, real-time user access and monitoring, improved data security, and enhanced network interoperability. These features collectively contribute to more agile and responsive financial operations, allowing organisations to adapt quickly to changing regulatory, economic, and technological conditions.

Virtual tools now facilitate remote data collection while performing ongoing monitoring, as well as enhancing both the quality and timeliness of financial assurance [16, 21]. These advancements have reshaped the skills expected of accounting professionals, who must now blend technical accounting expertise with the ability to navigate and assess digital platforms [25]. According to Smith (2018), three major virtual innovations are driving this change, capable of disrupting the profession: the eXtensible Business Reporting Language (XBRL), Artificial Intelligence (AI), and Blockchain ledgers.

### *2.2.1. eXtensible Business Reporting Language (XBRL)*

XBRL has emerged as a globally recognised standard for the electronic exchange and dissemination of business and financial information. It enables organisations to present financial data in a standardised digital format, thereby enhancing the efficiency, comparability, and interoperability of financial reporting across various systems and jurisdictions [8]. By assigning unique XML-based tags to individual data elements (both textual and numerical) within financial statements, XBRL transforms traditional reports into machine-readable formats. This tagging process not only facilitates automated data extraction and analysis but also supports interactive financial reporting, allowing stakeholders, including regulators, investors, and analysts, to perform more accurate and timely assessments of financial performance. As a result, XBRL plays a critical role in advancing transparency, consistency, and accessibility in financial communication.

In today's global market, the trend has emerged towards the adoption of XBRL in financial reporting, which is motivated by the imperative for enhanced transparency, comparability, and efficiency in financial disclosures, thereby facilitating more informed decision-making and better governance [33]. This movement has significantly transformed the

accounting profession by streamlining financial reporting and enhancing the accessibility, comparability, and reliability of financial information [13, 33]. The technology enables the automated exchange and analysis of financial data across different platforms and jurisdictions. According to Tawiah & Borgi (2022), XBRL's technological advancements have shifted the focus of accounting professionals from manual data preparation to more analytical and strategic roles, increasing the overall efficiency and transparency of the financial reporting process.

International financial regulatory agencies, such as the International Financial Reporting Standards (IFRS) Foundation, have actively promoted the adoption of XBRL to enhance the quality, consistency, and comparability of global financial reporting. Notably, countries including the United States, the United Kingdom, Japan, China, and European Union member states have mandated XBRL reporting for publicly traded companies and financial institutions, further solidifying the standard's international recognition. Consequently, XBRL embodies both a technological advancement and a reflection of the accounting profession's ongoing evolution, professionalisation, and modernisation.

#### 2.2.2. Artificial Intelligence (AI)

AI (also referred to as cognitive technology) is a technology that enables computers and machines to mimic human thought processes and actions [15]. These technologies are designed to perform tasks such as learning, reasoning, and decision-making, thereby enabling automation and optimisation of various processes. Although the technical foundations of AI primarily belong to the realm of computer science and engineering, its pervasive impact has firmly established AI as a critical topic within business education and practice. AI technologies are increasingly integrated into a broad spectrum of business functions, encompassing production, distribution, procurement, sales and marketing, accounting and finance, auditing, research and development, as well as human resource management. Given that accounting and auditing are fundamental components of any business operation, these areas are equally influenced by both the advantages and challenges presented by AI innovations.

Carnegie et al. (2021) describe a management information system as an ontology of AI, underscoring the deep interconnection between AI technologies and accounting processes. To fully appreciate the potential benefits and risks that AI introduces to the accounting functions, it is essential first to understand how AI can be leveraged and its capacity to enhance decision-making, improve operational efficiency, and transform traditional roles, while also addressing the ethical, regulatory, and practical concerns it raises. Specifically, AI technologies are being increasingly leveraged in accounting to automate routine tasks, including data entry, transaction categorisation, and anomaly detection [24, 32]. Accordingly, specific AI technology relevant in accounting includes:

- Expert Systems – these are computer programs that encapsulate the knowledge and reasoning strategies of human specialists to solve problems within a particular field. These systems belong to the broader category of knowledge-based systems, which embed expert insights into a knowledge repository for automated decision-making. In auditing, expert systems can assist with a range of activities such as planning audits, gathering audit evidence, evaluating audit risks, making audit judgments, and preparing audit reports. Their use enhances the objectivity and efficiency of audit processes by providing consistent expert guidance. In financial accounting, expert systems facilitate tasks including the development of accounting information systems, the preparation of financial reports, invoice handling, the recording of accounting entries, the application of accounting standards, and worksheet creation. Additionally, in cost and management accounting, these systems support functions like managing inventory, analysing costs and variances, assessing management control frameworks, and making investment decisions. By integrating expert knowledge into automated tools, expert systems improve the quality and speed of accounting and auditing activities.
- Decision Support Systems (DSS) - refers to an interactive, computer-based tool intended to aid decision-makers in resolving complex and poorly structured problems [1]. These systems are adaptable and versatile, offering support by presenting various alternatives and possible consequences to help users arrive at well-informed decisions. Unlike Expert Systems, which are designed to automate decision-making processes and potentially replace human judgment, DSS focuses on augmenting human decision-making rather than substituting it. In accounting and auditing, DSS tools are particularly useful for addressing tasks that lack clear procedures, where human expertise combined with system-generated insights can improve the quality and effectiveness of decisions.
- Machine learning – this refers to the capability of computer systems to improve their performance on tasks over time through experience, with minimal need for human guidance. It develops algorithms that enable machines to learn from data and make decisions or predictions without being explicitly programmed for every specific task. A further subset is deep learning, which utilises neural networks inspired by the structure and function of the human brain. Deep learning allows machines to process large volumes of complex data, identifying intricate patterns and making sophisticated inferences. In practical applications, machine learning

can be instrumental in automating processes such as transaction classification, which is especially valuable in financial and auditing systems where it enhances accuracy and supports the internal control function.

The integration of AI into accounting practices offers a variety of promising opportunities along with important challenges. AI technologies can greatly enhance the efficiency and accuracy of audits, enable predictive analytics, and support real-time financial reporting [1, 24]. However, adopting AI also requires a fundamental change in the skills that accounting professionals need. Practitioners now must develop a basic understanding of AI systems, data governance, and algorithmic accountability to effectively manage and audit AI-driven financial processes [24]. This change reflects the wider transformation of the accounting profession driven by new digital technologies.

### 2.2.3. *Blockchain Ledgers*

The increasing use of cloud-based accounting applications has created a corresponding demand for secure and reliable cloud storage solutions. Despite their benefits, concerns around data integrity, privacy, and system reliability remain central issues for organisations transitioning to cloud environments. Blockchain technology, however, offers a promising solution to these challenges. As a decentralised and immutable digital ledger, blockchain enables the secure recording and verification of transactions across a distributed network of computers, reducing the risk of data manipulation or unauthorised access. Its inherent transparency and resistance to tampering make it particularly valuable for enhancing trust in digital recordkeeping. Owing to these features, blockchain has found applications beyond its initial use in cryptocurrencies, gaining traction in various sectors including finance, public administration, and supply chain management.

In contrast to conventional accounting systems that rely on centralised databases (often susceptible to manipulation, data breaches, or unauthorised alterations), blockchain technology offers a more secure and transparent alternative. Each transaction recorded on a blockchain is cryptographically secured, time-stamped, and permanently stored in a manner that is both tamper-resistant and publicly verifiable [27]. This shift represents a significant structural advancement in accounting and financial reporting. By enabling real-time access to validated transaction data, blockchain has the potential to streamline record-keeping processes, reduce the risk of fraud, and enhance the accuracy and efficiency of audits. Consequently, it contributes to stronger regulatory compliance and improved financial transparency across organisations.

Applying blockchain in accounting can automate many parts of the financial reporting process, such as journal entries, reconciliations, and intercompany transactions [21, 31]. According to Rawashdeh (2025), self-executing contracts coded on the blockchain can further enable automatic transaction execution once predefined conditions are met. These features lower the reliance on intermediaries and manual work, improving operational efficiency and data accuracy. However, adopting blockchain technology presents challenges such as regulatory uncertainty, integration with existing systems, and the need for standardised protocols across different organisations and jurisdictions [27].

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## 3. Discussion

The ongoing digital transformation is significantly influencing the accounting profession, making this subject highly relevant not only for current practitioners but also for students and academics in higher education. These groups possess the expertise necessary to contribute to the development and refinement of advanced accounting information systems. Many routine accounting tasks, such as expense management, processing of accounts receivable and payable, AI-driven invoice handling, and supplier onboarding, are increasingly being automated, underscoring the growing role of technology in the field. As the accounting function increasingly adopts a data-centric and technology-driven approach, proficiency in technological taxonomies and digital reporting has become essential for maintaining the accuracy and reliability of financial disclosures. This evolution aligns with the broader trajectory of the digital revolution within the profession, wherein conventional accounting competencies are now supplemented by technological literacy [33].

The growing integration of technologies such as XBRL, AI, and blockchain in financial reporting carries substantial implications for both current and future accounting professionals. While significant changes in the nature of jobs are anticipated due to technological advancement, the roles of bookkeepers and auditors are expected to retain their importance. In addition, blockchain technology has the potential to redefine the scope of auditing by introducing new responsibilities, such as cyber auditing. As a result, cybersecurity is becoming an integral component of strategic planning, both in the present and moving forward. Organisations must proactively invest in cybersecurity infrastructure and implement robust risk management practices to address the growing threats associated with cybercrime.

A key topic of current debate concerns the extent to which machines can outperform humans in areas such as structured problem-solving and the execution of routine tasks. In particular, the capacity to interpret, validate, and analyse XBRL-tagged data is becoming increasingly critical, as regulators and stakeholders place greater reliance on real-time, machine-readable financial disclosures. Also, as AI and blockchain ledger continue to evolve, emerging professionals will need to cultivate a hybrid skill set that integrates accounting knowledge with digital literacy and critical thinking. A strong understanding of how AI and blockchain function, including their limitations and implications for data governance, is becoming increasingly important.

As stewards of financial information, accountants must be equipped not only to leverage the XBRL, AI, and blockchain's advantages but also to navigate the ethical and regulatory dimensions of their use. In this evolving landscape, virtual technologies are not simply technological innovations but a catalyst for redefining the accounting profession's role in ensuring trust, accountability, and transparency in the digital economy. Consequently, this ongoing evolution necessitates significant reforms in accounting education and professional training, underscoring the importance of adopting a more interdisciplinary approach. Such an approach should integrate financial theory, ethical frameworks, and technological competencies to adequately prepare practitioners for the complexities of a rapidly transforming profession. Furthermore, future career paths and professional training in accounting are expected to become increasingly specialised, with a focus on emerging areas such as blockchain accounting, forensic accounting for cybercrime, cloud-based accounting systems, financial technology (FinTech) accounting, data security analysis, and strategic financial analysis.

#### 4. Conclusion and recommendations

The integration of virtual innovations into financial reporting necessitates accountants to combine technological skills with industry-specific knowledge [33]. As a result, the role of the accountant is evolving, not just as a guardian of financial integrity but also as a key participant in developing and implementing digital reporting frameworks. As digital technologies reshape the accounting landscape, new professionals will be expected to have not only strong financial knowledge but also a good understanding of data management, information systems, and digital reporting standards. As observed by Tawiah and Borgi (2022) and Rawashdeh (2025), the adoption of technologies in accounting only requires complementary skills and is not necessarily disruptive to the practice of the profession. Consequently, accounting professionals who fail to engage with these emerging competencies may encounter challenges in adapting to the evolving professional landscape.

Professional bodies and academic institutions will play a pivotal role in equipping the next generation of accountants with the tools to thrive in a virtual technology augmented environment. Ultimately, rather than displacing accountants, virtual technological applications are reshaping the profession by elevating its strategic importance and expanding its role in an increasingly data-driven and automated world. To align with the evolving skill requirements of the accounting profession, educational institutions and professional bodies must integrate a range of technical competencies into their curricula and certification programs. These include analytical skills, data visualization, software proficiency, data warehousing and management, cybersecurity, and the use of forensic tools. Such skills are essential for preparing accountants to navigate emerging responsibilities within a decentralised and digitally driven financial ecosystem. This shift emphasises the importance of equipping professionals to interact effectively with software applications, artificial intelligence, robotic process automation, and other facets of digital transformation that are increasingly assuming routine accounting tasks.

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