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Research Article

Digital Skills of Professional Accountants: Insights from the Literature Review

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Abstract

Professional accountants need to possess a range of skills, including appropriate digital skills, to perform their roles and responsibilities effectively. Considering the growing impact of digital technology on accounting and the need for further research related to the digital skills of professional accountants, this paper aims to synthesise the state of knowledge regarding the digital skills expected of professional accountants by analysing findings from recent academic studies. A literature review was conducted using the Web of Science database, focusing on studies published in the period from 2021 to 2025. The review explores the categorisation of digital skills as well as related digital technologies, and identifies key digital skills expected of professional accountants in contemporary accounting practice. According to the research findings, professional accountants are expected to possess a broad range of digital skills. According to findings, professional accountants have developed basic digital skills. However, the increasing adoption of advanced and emerging technologies in accounting practice requires the continuous acquisition of new digital knowledge and the further development of digital skills. Findings of this paper provide insights into the current state of knowledge regarding the digital skills expected of professional accountants. These findings can be useful to a wide range of stakeholders, particularly accounting educators in aligning accounting curricula with the digital skills that accountants need to possess in contemporary business environments.

Keywords: digital skills, digital technology, professional accountants, accounting profession

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Introduction

Information technology has been integrated into accounting processes for a long time. It is a significant factor driving change in the accounting profession (Birt et al., 2023). According to forecasts by the European Commission (2023), by 2030 at least 75% of companies in the European Union are expected to utilise technologies such as cloud computing, artificial intelligence and big data analytics. Accelerated technological changes are driving a growing demand for digital skills (European Commission, 2023; Tiron-Tudor et al., 2025). This demand typically becomes evident shortly after the implementation of new technologies (Shakina et al., 2021). In light of these rapid developments, having up-to-date digital skills represents one of the most significant challenges for the accounting profession (Karcioğlu and Binici, 2023).

The increasing influence of digital technologies is expected to fundamentally change the accounting tasks as well as the skill set required of professional accountants over the next decade (Leitner-Hanetseder et al., 2021). As routine accounting tasks are being digitalised or automated, non-routine activities and the skills they require are becoming even more important (Pargmann et al., 2023). Technologies such as artificial intelligence, integrated systems, cloud computing, software robots, big data analytics, and eXtensible Business Reporting Language (XBRL) are already influencing the way accountants perform tasks, and it is expected that their influence will increase further in the near future (Moll and Yigitbasioglu, 2019; Leitner-Hanetseder et al., 2021; Grosu et al., 2023; Tiron-Tudor et al., 2025).

Impact of digital technologies on the daily work of accountants has not yet been sufficiently investigated, and further research is needed to identify new digital skills and competencies that accountants are expected to possess (Moll and Yigitbasioglu, 2019) and to update understanding of the level of actual digital competencies required of professional accountants (Busulwa et al., 2025).

Success in today's accounting field requires a diverse set of skills, such as digital skills, professional skills, soft skills, and strategic competencies (Nie and Mastor, 2024). Digital skills are increasingly important for accountants' work (ACCA, 2022). Thus, this paper specifically focuses on the digital skills that professional accountants need to develop in response to information technology advancements.

Considering the above, this paper aims to provide an overview of the digital skills most frequently identified as essential for professional accountants in recent academic literature. Given the above, the main research question addressed is: Which digital skills are most frequently highlighted as essential for professional accountants in recent academic literature?

The paper contributes to the existing body of knowledge by synthesising the digital skills of professional accountants. This review provides insights that are particularly relevant for higher education institutions and accounting educators who aim to align their curricula with evolving market demands, as well as for both current and future professional accountants, as it helps identify digital skills that professional accountants are expected to possess.

The paper is structured as follows. The next section outlines the research methodology, followed by the categorisation of digital skills and related technologies. The following section discusses key digital skills that accountants are expected to possess and the level of digital skills development among accountants. The final section presents the conclusion.

Methodology

The paper aims to explore the digital skills required of professional accountants by reviewing recent academic literature. The paper uses a semi-systematic review approach as proposed by Snyder (2019).
Articles were obtained from the Web of Science database. The search terms used to select papers included: “digital skills”, “IT skills”, “technology skills”, “digital

competence, "accountant", and "professional accountant". A content analysis of the selected scientific literature was conducted, focusing on open-access articles published in the English language from 2021 to 2025. In line with the objectives of this paper, the analysis focused on the theme addressing digital skills that professional accountants are expected to possess. The review was further supplemented by additional sources identified through snowball sampling. A total of thirteen relevant studies that met the inclusion criteria were analysed. The selected papers provide broad geographical coverage and include various research methods, such as systematic literature reviews, content analysis of job advertisements, survey data collection, and interviews. The selected papers are presented and discussed in the following sections of the paper.

Categorisation of Digital Skills of Professional Accountants

Various related terms such as digital skills, ICT skills, computing skills, media literacy and computational thinking have emerged in the academic literature over the past few decades, and among these, the European Commission has identified the term "digital skills" as the most comprehensive (European Commission, 2023). Accordingly, this review adopts the term digital skills, broadly defined as "the ability to use technology and digital devices effectively, critically, efficiently and responsibly, to complete tasks and solve problems" (European Commission, 2023). In the academic literature, the term skills is also often used interchangeably with terms such as competences and attributes (Jones, 2010). However, the concept of digital competence is considered broader, encompassing "the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society" (Council of the European Union, 2018, p. 9).

In the academic literature, digital skills have been categorised in various ways. The following sections present several prominent classifications proposed in recent studies.

Based on research reports published by professional accounting bodies in Europe, the Americas, and Australasia, Tsiligiris and Bowyer (2021) categorised digital skills for future accountants into three broad categories. The first includes basic digital skills, referring to standard skills related to already adopted technologies and used by accountants, such as spreadsheets, enterprise resource planning systems (ERP), business intelligence (BI) applications, cloud-based accounting, and the digitisation of tax return activities (Tsiligiris and Bowyer, 2021). The second category identified by the authors encompasses advanced digital skills, including familiarity with advanced technologies, such as artificial intelligence, blockchain, and advanced business intelligence (BI) applications, as well as programming knowledge from a user-oriented perspective. The third category identified by the authors encompasses data skills, which include data management and data analysis.

Based on the literature review, Busulwa et al. (2025) identified key digital technologies important for the current and future work of accountants. The authors classified digital technologies relevant to accounting practice into established digital technologies and emerging digital technologies and noted that the distinction between these two classifications is not always clear-cut. According to the authors, emerging digital technologies are newer and/or in the early stages of development but with significant potential for rapid growth in use and impact, including technologies such as the Internet of Things (IoT), artificial intelligence technologies, video content analytics and computer vision technologies, robotics and drone technologies, virtual/augmented/mixed reality technologies, 3D/4D printing technologies, emerging network connectivity, and space technologies (Busulwa et al., 2025). On the other hand, established digital technologies are those that have been widely adopted and include technologies such as business systems, applications and hardware,

process/workflow digitalisation and optimisation systems or applications, accounting systems, applications and hardware, data management technologies, data analytics and data science applications, data visualisation systems and applications, programming languages (e.g., Python, SQL, R, XBRL and XML), and cloud computing services (Busulwa et al., 2025).

According to the categorisation of digital skills for accountants proposed by Tsiligiris and Bowyer (2021) and the classification of related digital technologies by maturity level proposed by Busulwa et al. (2025), digital skills and their associated technologies in accounting can be classified in relation to their level of technological maturity. Basic digital skills involve primarily widely adopted, established technologies, while advanced digital skills involve more advanced established technologies as well as emerging technologies, and data skills are primarily connected to established technologies used for data processing, analysis, and visualisation (Tsiligiris and Bowyer, 2021; Busulwa et al., 2025).

Karcioğlu and Binici (2023) developed the Digital ability and skills maturity model based on competence frameworks published by accounting professional bodies, and their model consists of five abilities and skills. According to the authors, the first ability and skill is the digital literacy basic level, which involves skills and abilities related to basic technologies; the second is digital literacy advanced, which involves skills and abilities related to advanced technologies; the third is data analysis and data visualisation; the fourth is digital strategy and vision, which includes, for example, knowledge regarding the digital technology trends affecting the accounting profession, and the fifth is problem-solving.

Steens et al. (2024) classified technologies impacting the accounting profession into three main categories. The first category identified by the authors is digitalisation and includes robotic process automation and the Internet of Things. The second category, called datafication, includes big data, data analytics, and visualisation techniques (Steens et al., 2024). The third category, called transformation, includes machine learning, artificial intelligence, and blockchain technology (Steens et al., 2024).

The aforementioned studies provide a way to categorise the digital skills of professional accountants and relate them to the range of digital technologies that already influence or have the potential to influence accounting practice.

Discussion of the Digital Skills of Professional Accountants

Previous studies have highlighted important aspects of the classification of digital skills required by professional accountants and related digital technologies. Below are the results of a literature review related to the type and level of development of digital skills of accountants.

According to Tsiligiris and Bowyer (2021), accountants' digital skills vary depending on individual factors such as age, work experience, seniority, role type and business sector. According to the study conducted by Steens et al. (2024), age is not a significant factor in shaping perceptions regarding digital competency development. Busulwa et al. (2025) stated that the existing accounting literature often implies that all accountants must possess knowledge of all digital technologies, and argue that, instead, digital skills need to be developed and aligned with specific accounting roles and career levels.

In accordance with the results of previous research, accountants are already familiar with and have developed appropriate skills related to core technologies that have long been central to the profession, such as spreadsheets, accounting software, and ERP systems (Tsiligiris and Bowyer, 2021; Karcioğlu and Binici, 2023; Nie and Mastor, 2024; Busulwa et al., 2025). These technologies should remain foundational in accounting education (Tsiligiris and Bowyer, 2021). While the basic technologies have been widely adopted and continue to be critical, the digital transformation in

accounting also includes the adoption of new, advanced technologies. There is a growing transformation in both the nature and prioritisation of core technologies used in accounting, with a notable trend toward the increasing implementation of cloud-based accounting systems (Tsiligiris and Bowyer, 2021).

Indrayani et al. (2025) used a qualitative approach with phenomenological methodology based on semi-structured interviews with accountants and auditors and found that disruptive technologies have significantly impacted accounting practice. According to the research results, the authors concluded that, in addition to traditional accounting knowledge and skills, accountants are also required to develop IT skills, including the use of advanced software, data analysis, and business intelligence tools, and to understand disruptive technologies such as artificial intelligence and blockchain (Indrayani et al., 2025). Gonçalves et al. (2022) stated that digital transformation is still in its early stages within Portuguese SMEs in the accounting services sector, and the new technologies most commonly applied are artificial intelligence (AI), optical character recognition (OCR), robotics and cloud-based enterprise resource planning (ERP). The authors highlighted resistance to change, organizational culture and the price as key barriers to digital transformation in accounting (Gonçalves et al., 2022).

The modernisation of information management systems can be achieved through the adoption of various digital technologies, such as eXtensible Business Reporting Language, electronic data interchange, real-time adherence, cloud computing, artificial intelligence, big data, robotic process automation, Internet of Things, and blockchain (Chyzhevska et al., 2021). Previous studies have indicated insufficient knowledge, skills, and abilities among accounting professionals in areas such as Excel at the macro level, XBRL, advanced data processing, artificial intelligence, machine learning, data analysis and data visualisation, highlighting a clear need for improved skills in these domains (Karcioğlu and Binici, 2023).

Based on a systematic literature review, Pargmann et al. (2023) noted a lack of expertise among graduates and employees in digitalisation in accounting, and that technological and methodological skills are required to integrate new technologies. Effective implementation of digitalization in accounting requires advanced training tailored to the digital competence requirements of accounting personnel, encompassing computer literacy, interpersonal communication, digital content usage, and data security (Chyzhevska et al., 2021). Furthermore, Kokina et al. (2021) emphasised that, as accounting tasks are suitable for robotic process automation, professional accountants are expected to develop their digital skills in areas such as data management, coding, understanding of data structures, databases and cloud computing, and the use of data analysis and data visualisation tools.

Based on case studies of Malaysian companies, Zainuddin et al. (2022) developed a framework that highlights the transformation of the accounting profession over the past 50 years and found that developing digital and critical thinking skills is increasingly important for accountants, and they emphasised the importance of possessing computer skills and data management skills, including information technology skills, data analytics, specialised software, complex problem solving, and business intelligence.

Karcioğlu and Binici (2023) found that professional accountants working at various levels in the accounting departments of leading Turkish industrial companies showed a high level of maturity in the technologies they currently use, as well as a lack of skills related to new technologies that are not yet widely used. Steens et al. (2024) found that senior management accountants in the Netherlands perceived their current knowledge and skills to be below the levels required and expected a significant increase in the demand for digital competencies. Similarly, Busulwa et al. (2025) investigated self-reported knowledge of established and emerging digital technologies among

Australian and New Zealand accountants. The results showed that accountants' self-reported understanding of digital technologies was much stronger among established than among emerging digital technologies. Among established digital technologies, accountants rated their understanding of accounting systems and business systems (e.g., enterprise resource planning and ERP systems) the highest on average, followed by data visualization, data analytics, and data science applications. Programming languages had the lowest average scores among established technologies, and accountants also rated their understanding of emerging technologies (e.g., artificial intelligence) with low scores (Busulwa et al., 2025).

Recent studies have also explored the behavioural drivers influencing accountants' adoption of emerging digital technologies. Grosu et al. (2023) investigated whether the accounting profession possesses an adequate understanding of digital technology, including its benefits and challenges, by extending the Unified theory of acceptance and use of technology with the Technology Readiness model to assess the profession's development prospects. According to the results of the study, accountants are willing to adopt digital technologies only when they perceive them as necessary, beneficial, and important, and their behaviour is influenced by factors such as ease of use, associated costs, expected effort, and perceived performance benefits (Grosu et al., 2023). The authors also highlighted that accountants' behaviour regarding acceptance and use of technology is also largely influenced by the potential threat that artificial intelligence replaces human factors. Regarding the use and importance of further training related to blockchain technology, although accounting professionals recognize the need for training related to the development of these technologies, they do not see the applicability of this technology in their businesses, and they are still not subject to specific institutional, industry and regulatory pressures from government regulations or clients (Grosu et al., 2023).

Although digital technology and big data analytics play important roles in accounting practice, there has been no significant research on integrating big data analytics into accounting curricula (Birt et al., 2023). Birt et al. (2023) identified a gap between university accounting curricula in Australia and New Zealand and the information and communication technology competency requirements of professional bodies. For example, while accounting information systems courses typically cover traditional topics such as accounting software, business processes, internal control, Excel spreadsheets, flow charts and coding, they often lack coverage of more advanced technologies and areas, such as enterprise system software (e.g., ERP), XBRL, risk management, cybersecurity, blockchain, security and ethics (Birt et al., 2023). This indicates These findings suggest that curricula are not fully aligned with the agility skills required in the accounting profession, which highlights the need to update accounting programs (Birt et al., 2023). Similarly, according to the study conducted by Nie and Mastor (2024), there is a gap between the skills required by employers and those prioritised by educational institutions. Their review indicated that employers are increasingly emphasising the need for integrated skills that combine soft, technical, and digital skills, but, at the same time, educational institutions concentrate more on technical knowledge.

Conclusion

The paper explored key digital skills expected of professional accountants. According to the results of a review of recent academic literature, there is a wide range of digital skills that accountants are expected to develop and apply in their work. These skills are usually categorised into general broad groups, such as basic, advanced digital skills and data skills (Tsiligiris and Bowyer, 2021). Categorisations of digital skills help to clarify the specific digital skills needed in accounting practice and how they align with different types of technologies, both established and emerging.

There is a clear consensus in the reviewed research that basic digital skills, particularly skills related to spreadsheets, accounting software, ERP systems, business intelligence applications and cloud-based accounting solutions, remain essential (Tsiligiris and Bowyer, 2021; Karcioğlu and Binici, 2023). While many accountants demonstrate high maturity in using these established technologies, and core digital technologies remain foundational, there is also a growing emphasis on developing skills related to advanced and emerging technologies, such as advanced data analytics, artificial intelligence, and blockchain (Tsiligiris and Bowyer, 2021; Karcioğlu and Binici, 2023; Kokina et al., 2021).

Higher education institutions and continuous professional development play an important role in developing the digital skills of professional accountants. Accounting curricula should be regularly updated to incorporate relevant knowledge and skills in digital technologies. According to the findings, accounting curricula should include not only basic digital skills but also knowledge of emerging technologies to prepare professionals for the increasing use of digital technologies adequately. A recommendation for further research is to investigate the extent to which current accounting curricula are aligned with employers' needs for digital skills of professional accountants in different regions. It is also recommended to further research contextual factors that influence the development of digital skills of professional accountants.

A limitation of this paper is that the literature review was conducted using only the Web of Science database, which included only open-access articles written in English. Additional limitations arise from the keywords used to select the articles, as the term digital skills is often described with various interchangeable terms. Therefore, some relevant and recent studies indexed in databases or published in other languages may have been overlooked. Despite these limitations, the paper offers valuable insights into the current state of knowledge regarding the digital skills expected of professional accountants. The findings could interest various stakeholders, particularly accounting educators in enhancing their accounting curricula, as well as help both current and future professional accountants understand the expectations regarding the essential digital skills required of professional accountants in line with contemporary labour market needs.

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