Technological Disruption in Digital Transformation: How Should the Accounting Profession Adapt?

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ABSTRACT

Manuscript type: Research paper

Research aims: To explore how disruptive technology impacts digital transformation in accounting and the adaptation of the profession.

Design/Methodology/Approach: The study uses an interpretive qualitative approach with phenomenological methodology, collecting data through semi-structured interviews with accountants and auditors.

Research findings: Disruptive technologies, like artificial intelligence (AI), blockchain, analytics and decision support, have significantly altered accounting practices, presenting challenges and opportunities to improve efficiency and accuracy in financial reporting. Adapting to these changes is crucial for the accounting profession, requiring developing new data analysis and IT skills through ongoing education programmes for continued success.

Theoretical contribution/Originality: Provides insights into the changing accounting profession, emphasising the vital skills needed to succeed in a competitive, digitally transformed environment.

Practitioner/Policy implications: These findings significantly impact the accounting profession, offering precise insights into how its future will be shaped.

Research limitation: The findings of this research are based on a qualitative approach using semi-structured interviews, which may limit generalisability.

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1. Introduction

The field of Accounting is undergoing rapid evolution amid rapid technological advancements, presenting both significant opportunities and critical challenges that necessitate strategic adaptation and a shift towards digital transformation. The profession is increasingly developing into a business that creates public trust (Igou et al., 2023). The accounting profession must realise the need to regenerate into digital-based accountancy to carry out its duties (Schmidt et al., 2020a). Digital transformation and technological developments today are characterised by the fast flow of information, with the Internet changing how information is obtained, including for accounting and business (Appelbaum et al., 2017). Technological developments have changed business, reducing the need for human resources, and the impact of this on the accounting profession is still not fully understood (Gonçalves et al., 2022; Igou et al., 2023). This situation creates complexities that need to be addressed, because digital transformation in accounting has changed from a technological opportunity to a genuine necessity to manage the ever-changing expectations of users (Kraus et al., 2021).

Digital technologies, such as big data, cloud computing, artificial intelligence (AI), and blockchain, are predicted to become the main tools that strengthen the accounting profession in the future (Kruskopf et al., 2020; Tiron-Tudor et al., 2022). In relation to this, the Indonesian Ministry of Communication and Informatics (Kominfo) estimates that around 58% of professional accountants will use software such as robotic process automation (RPA) and AI to automate accounting processes by 2025. To support this digital transformation, the Indonesian government, through the Ministry of Communication and Information, presented its 2021-2024 Digital Indonesia Roadmap with four main pillars of digital transformation: digital infrastructure, government, digital economy, and digital society.

Technological disruption in the digital transformation of accounting makes it easier for accountants to carry out their duties by increasing efficiency and effectiveness through digitalisation, which enables better data storage, analysis, and processing, as well as strengthening internal and external reporting (Green et al.,

2018; Izzo et al., 2022). The growth of technological innovation in digital transformation creates new, complex business models. This is a challenge for the accounting profession because the system can handle repetitive tasks, thereby reducing the risk of human error when business transactions are carried out conventionally (Tiron-Tudor et al., 2022). There is a view that technology also opens up opportunities for accountants to focus more on high-value tasks, such as financial analysis, strategic decision-making, and risk management (Green et al., 2018; Izzo et al., 2022).

Along with technological developments, concerns have arisen on the relevance and sustainability of the accounting profession (La Torre et al., 2018). Digital transformation can threaten the existence of traditional accountants, especially in bookkeeping and auditing services, whose need is decreasing because they can be replaced by machines or robots (Huang & Vasarhelyi, 2019; Tiron-Tudor et al., 2022). Apart from that, the development of digital technology also has an impact on anxiety levels, which is caused by excessive complexity and workload, gaps in digital skills, and the unpreparedness of human resources to adapt to technological developments and digital transformation. (Abbas et al., 2020; Pfaffinger et al., 2020). Previous research results reflect differing views on the impact of technology on accounting, with some assessing an existential threat, while others see opportunities for innovation. Thus, the main challenge is how accountants can adapt and take advantage of this technological disruption in the digital transformation of accounting. In light of these developments, this paper aims to explore the impact of disruptive technologies on the digital transformation of the accounting profession and to assess its capacity for adaptation in response to rapid change.

2.   Literature Review

Technological disruption is technological developments that significantly change how businesses and professions operate (Kurniawan et al., 2023). Technological disruption often refers to the emergence of a new technology or innovation that disrupts existing business models, affects traditional roles, and forces an organisation or profession to adapt to those changes. In the accounting field, technological disruption is related to the impact of significant changes caused by technological advances, especially in the fields of accounting and auditing, as well as significant changes in the way accountants and accounting services firms operate and transform in digital form (Jackson et al., 2022; Tiron-Tudor et al., 2022).

Digital transformation is a term used to describe the significant impact caused by the use of digital technology on society and various industries (Majchrzak et al., 2016). The adoption of technology and digital transformation innovation has changed how accounting professionals work, and presented new challenges and opportunities (Gonçalves et al., 2022). One of the most significant impacts of digital transformation in accounting is using computer-based accounting software and systems (Igou et al., 2023). This software allows accountants to automate many tasks previously performed manually, such as calculating and recording financial transactions. It allows accountants to focus their time and energy on analysis, interpretation, and advising their clients (Hausberg et al., 2019; Nadkarni & Prügl, 2021; Yigitbasioglu et al., 2023). In general, the three technological disruptions that most relevant today in the field of accounting are: AI, blockchain, analytics, and decision support (Igou et al., 2023; Tiron-Tudor et al., 2022).

AI cognitive computing refers to the ability of computers to execute tasks that typically require human thought (Davenport, 2018). It involves various technologies that enable machines to sense, understand, act, and learn. AI uses knowledge from various fields, including computer science, psychology, and statistics (Kokina & Davenport, 2017). In accounting, AI is used to identify suspicious transactions (Davenport, 2018; Kokina & Davenport, 2017). Blockchain, meanwhile, is a distributed ledger technology first used to create Bitcoin (Kokina et al., 2017). Blockchain can store data safely and transparently and validate transactions in real-time. It excellent benefits in the accounting field, especially in auditing and tracking transactions. Additionally, blockchain-based smart contracts are emerging as a potential tool that can change how financial statement audits are conducted, speed up the audit process, and reduce the risk of human error (Rozario & Thomas, 2019). Although security concerns remain, blockchain has great potential in advancing accounting to the next level.

Analytics and decision support use advanced data analysis tools for data-driven decision-making. This technology has shifted accountants' reliance on traditional tools such as Microsoft Excel to more sophisticated analytical tools (Sutton et al., 2018). Accountants today have a role in understanding the assumptions underlying data and models. Analytics and decision support have broad applications in accounting, increasing efficiency, driving strategy, monitoring financial performance, and reducing the risk of fraud through audit analytics (Schmidt et al., 2020a). As a related concept, decision

support uses computer-based models and techniques to assist in problem-solving and support decision-making.

With the emergence of new technological innovations that impact work, the World Economic Forum predicted that by 2025, machines will perform more current work tasks than humans, compared to the 71% currently performed by humans. The rapid evolution of machines and algorithms in the workplace could create 133 million new roles for the 75 million that will be replaced (Cann, 2018). Urgent challenges include providing reskilling opportunities, remote work, and building safety nets to protect at-risk workers and communities. Many accounting tasks in the future will be combinational, meaning that the accountant's tasks are performed by professionals interacting with machines. In this case, the skills required will also become more diverse. Accountants will move away from mundane tasks such as preparing income tax reports, towards core knowledge in accounting and management and skills (Howieson, 2003). Required skills will include data analytics and technology skills (Schmidt et al., 2020b), IT forensics, IT auditing, and data analytics (Pan & Seow, 2016). Therefore, to face these challenges, the accounting profession needs to take appropriate steps to adapt so that technological advances do not erode them.

The literature on technology acceptance theories encompasses various theories, models, and theoretical frameworks to address multiple consequences, especially those related to innovations that can be implemented in different fields, including accounting. These theories include the theory of reasonable action (TRA) (Ajzen &Fishbein, 1985); technology acceptance model (TAM) (Davis et al., 1989); theory of planned behaviour (TPB) (Ajzen, 1991); theory of diffusion of innovations (DIT) (Rogers, 1995); decomposed theory of planned behaviour (Taylor & Todd, 1995); technology acceptance model 2 (TAM 2) (Venkatesh & Davis, 2000); unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003); model of information systems success (DeLone & McLean, 1992; 2003); and the technology acceptance model 3 (TAM3) (Venkatesh & Bala, 2008).

Table 1: Theories on technology acceptance

Theory	Authors	Proposed theory
Theory of reasonable action (TRA)	Ajzen and Fishbein (1985)	An individual's desire to perform a particular action is influenced by their attitude, which is shaped by perceptions about the action and assessments of its outcomes. In contrast, for subjective norms, what influences them are beliefs about norms and motivation to comply.
Technology acceptance model (TAM)	Davis et al. (1989)	Perceptions of usefulness and ease of use are primary factors that influence attitudes, intentions, and technology usage by users.
Theory of planned behaviour (TPB)	Ajzen (1991)	This theory expands the TRA by adding perceived behavioural control to explain behaviour in situations where individual volitional control is limited.
Theory of diffusion of innovations (DIT)	Rogers (1995	The adoption curve is S-shaped and encompasses innovators, early adopters, early majority, late majority, and laggards.
Decomposed theory of planned behaviour	Taylor and Todd (1995)	This theory provides a more detailed analysis of intentions and behaviour by breaking down attitudes, subjective norms, and behavioural control into more specific sub-constructs.
Technology acceptance model 2 (TAM 2)	Venkatesh and Davis (2000)	This theory expands the understanding of technology acceptance by adding social and cognitive moderator variables to the factors of perceived usefulness and intention to use.
Unified theory of acceptance and use of technology (UTAUT)	Venkatesh et al. (2003)	This theory integrates previous technology acceptance theories to explain technology acceptance, focusing on performance expectancy, effort expectancy, social influence, and facilitating conditions as the main determinants.

Theory	Authors	Proposed theory
Model of information systems success	DeLone and McLean (1992; 2003)	This model provides a comprehensive framework for evaluating the success of information systems. It encompasses six major dimensions: system quality, information quality, service quality, use, user satisfaction, and net benefits.
Technology acceptance model 3 (TAM 3)	Venkatesh and Bala (2008)	Extends the understanding of technology acceptance by integrating additional variables and constructs influencing user perceptions and behaviours towards technology.

In summary, the accounting profession must proactively embrace technological advancements to remain relevant and competitive in an increasingly automated landscape. Disruptive technologies such as AI, blockchain, and analytics have transformed the traditional role of accountants into more strategic and analytical functions. Therefore, accountants and accounting firms need to strengthen their adaptive capacity through upskilling, mastery of emerging technologies, and the establishment of a culture of continuous learning and innovation. The adaptation process can be explained through several technology acceptance theories that have been previously discussed. This approach ensures that the accounting profession remains relevant, enhances value creation for clients, and maintains its position as a key element in business decision-making in the era of digital transformation.

3.   Methodology

This research aims to understand how accountants adapt to technological disruption through digital accounting transformation. In this approach, researchers adopt an interpretive qualitative research design with phenomenological methodology. The phenomenology used is transcendental, as introduced by Edmund Husserl. Husserl developed a methodology that reveals a phenomenon based on the experience and observation of a subject whose knowledge extraction is carried out purely and is not influenced by presumptions or preconceptions about something observed (Moran, 2002). The use of qualitative inquiry in research has been recommended by previous researchers (Grafton et al., 2011; Marx et al., 2020). This research involves observing the phenomenon

of technological disruption in the digital transformation of accounting and how accountants adapt to this problem. Once the commitment to a qualitative research approach was achieved, the following research questions were formulated:

R1 *What are the technological disruptions in the digital transformation of accounting?*

R2 *What are the opportunities and obstacles to implementing technological disruption in accounting digital transformation?*

R3 *How does technological disruption in the digital transformation of accounting affect accounting tasks/activities?*

R4 *What skills are needed by accountants to face the challenges of technological disruption in the digital transformation of accounting?*

R5 *How do accountants adapt to technological disruption in the digital transformation of accounting?*

3.1 Data Collection

In data collection, interviews were conducted with selected informants. The reason for choosing informants consisting of practising accountants from public accounting firms and also accountants who work in accounting software companies is because these informants are pretty experienced in providing services to clients and interacting with technological developments and the digital transformation of accounting in carrying out their profession as accountants (Gonçalves et al., 2022). Informants in this study were given codes (P1, P2, P3, P4, P5, and P6). This research uses an interview guide designed with a particular structure. The interview approach in this research aligns with the practice used by Marx et al. (2020) to gain an in-depth understanding of the researched phenomenon. It allows researchers to explore further information from informants. Informants were interviewed to understand what has changed so far, how they see the development of this profession, and how they adapt to this phenomenon.

Semi-structured interviews are divided into three key stages: the initial stage, where the research objectives and ethical and legal considerations are stated, such as confidentiality and disclosure of data; the interview stage, which consists of previously prepared questions; and the final stage, where due acknowledgment is given and an informal conversation about the current research topic occurs.

3.2 Data Analysis

This research uses thematic analysis to collect data from interviews. Thematic analysis is used to understand technological disruption in the digital transformation of accounting and how the accounting profession is adapting. According to Burnard et al. (2008), this approach involves identifying themes and categories by looking at similarities and differences at various levels of abstraction. After the interviews were conducted, data transcription, analysis, and interpretation began. In the first stage, data analysis was carried out individually, which consists of reading and interpreting the questions asked. Subsequently, joint analysis was carried out to check whether there is a convergent vision of the topic discussed (Burnard et al, 2008; Nowell et al., 2017; Ozuem et al., 2022).

Utilising thematic analysis to collect data from interviews, an interpretive phenomenological approach, this study seeks to provide in-depth insights into the lived experiences and adaptive strategies of accountants in response to technological disruption. This methodological approach enables a nuanced understanding of how accounting professionals perceive, interpret, and navigate the challenges posed by digital transformation. The findings are expected to contribute valuable perspectives to the ongoing discourse on the future of accounting, supporting both academia and practice in formulating responsive strategies to technological change.

4. Results and Discussion

Five research questions (R1–R5) were formulated to present the interview results. The questions were developed considering the presented groupings, which are the basis for analysing the interview content.

4.1 Technological Disruptions in the Transformation of Digital Accounting

In relation to R1, informants agreed that there were several forms of technological disruption in the digital transformation of accounting, including the application of AI, blockchain and analytics, and decision support (Igou et al., 2023; Tiron-Tudor et al., 2022). The calculations carried out by AI aim to create a more controlled computing system, make work easier for users, and analyse a problem or document. One informant stated:

> *With the increasingly massive development of AI, I have witnessed the emergence of various types of intelligence such as natural language processing (NLP) and robotic processing automation (RPA), which have become integral in the accounting field. NLP contributes to analysing and processing financial documents, including annual reports or financial reports, while RPA helps automate routine tasks such as invoice management, bank reconciliation, and payroll [P6].*

Furthermore, another informant added:

> *AI opens up great opportunities to detect fraud or irregularities in financial data. AI analysis is more sophisticated; the system can investigate data thoroughly, identify suspicious patterns, and provide indications of potential fraud or high risks. Recent developments in the audit field present cutting-edge technology, such as computer-assisted audit techniques (CAATs). CAATs are the application of AI to simplify the audit process, leveraging data analysis, machine learning, and AI rules to automate audit tasks. It increases efficiency and helps auditors identify potential problems more effectively [P1].*

AI is becoming a handy tool in forecasting economic trends. AI can make predictions and forecasts in an accounting context through machine learning technology. AI can help forecast sales, optimise inventory, or predict future financial risks (Bahoo et al., 2024; Indrayani et al., 2024; Kokina & Davenport, 2017). One informant's statement supports this:

> *By integrating AI in various aspects of accounting, we not only increase operational efficiency but also open up the potential for more precise and proactive decision-making. It reflects a paradigm shift in accountants increasingly combining artificial intelligence with human expertise to achieve optimal results in managing financial information and supporting strategic decision making [P5].*

Further technological disruption, the application of blockchain technology can provide speed and ease of transactions, becoming a top priority in the accounting system (Kokina et al., 2017; Rozario & Thomas, 2019). One informant stated:

> *I see great potential in applying blockchain technology in accounting. Blockchain is a distributed ledger and brings great promise in simplifying regulatory compliance and improving the commonly used double-entry bookkeeping. In accounting applications, blockchain allows companies to create a system of directly interrelated accounting records. It means transactions can be recorded directly into a shared ledger, replacing the traditional method of keeping separate records. The main advantage of blockchain is the impossibility of falsifying or destroying entries, as records are distributed and cryptographically sealed [P5].*

One informant added:

> *I feel great benefits from implementing blockchain in the audit process. With standardisation in place, I can automatically verify the most important data in financial reports. It has the potential to significantly reduce audit costs and time, allowing me to focus on more valuable tasks, such as complex transaction analysis or internal control mechanisms. Blockchain integration does not have to start with accounting entries in a single register. These processes can be integrated in stages, from ensuring record integrity to creating a traceable audit trail. In the future, fully automated audit execution could become a reality, unlocking the potential to change the accounting landscape as we know it. I believe that blockchain has great potential to change the traditional accounting paradigm. It can be a step towards greater automation, ensuring reliability, security, and efficiency in the administration of accounting and audit processes* [P3].

The next disruptive technology that impacts the accounting profession is analytics and decision support (Sutton et al., 2018). Traditionally, accountants have relied on tools such as Microsoft Excel. Despite the emergence of more sophisticated analytical tools, Excel remains the technology of choice for many (Schmidt et al., 2020). Analytics is one of the initial drivers of the technological revolution in accounting, which is the focus of the most significant research and attention. Analytics is concerned with extracting, synthesising, and creating information that influences decision-making and business operations, while the role of an accountant is to understand the assumptions behind data and models (Pickard & Cokins, 2015). One informant stated:

> *I realise the important role of data analytics in helping businesses uncover valuable information in their finances. Applying this technology allows accountants to accurately report money flow through an organisation and improve audit processes, risk management, and business decision-making. In the audit field, we can move from sample-based models to continuous monitoring by analysing and verifying larger data sets, achieving smaller margins of error. Four main types of data analytics are an important basis for implementing this technology: descriptive analytics (what happened?), diagnostic analytics (why did that happen?), predictive analytics (what will happen?), and prescriptive analytics (what should happen?). In the face of technological developments and increasing business complexity, accountants must continue to hone their data analytics skills to provide significant added value to business decision-making* [P4].

Regarding R1, the primary technological disruptions identified in digital accounting transformation include AI, blockchain, and analytics and decision support systems. AI enables the automation

of repetitive tasks through RPA, NLP for financial report analysis, and fraud detection using pattern recognition, as well as financial forecasting through machine learning. Blockchain introduces a distributed ledger system that ensures secure, transparent, and real-time recording of transactions, enhancing audit efficiency and providing tamper-proof records. Meanwhile, analytics and decision support empower accountants to leverage big data for strategic decision-making, utilising descriptive, diagnostic, predictive, and prescriptive analytics. This transformation not only automates manual processes, but also redefines the role of accountants from data handlers to strategic decision-makers who add value through technology-driven analysis.

4.2 Opportunities and Obstacles to Implementing Technological Disruption in Accounting Digital Transformation

In relation to R2, the responses from all informants emphatically show that technological disruption in the digital transformation of accounting has brought significant progress in the field of accounting since the end of the 20th century. The most striking impact is on routine tasks. Jasim and Raewf (2020) exemplify that this technology changes the accounting process more smoothly, increasing efficiency and effectiveness. It opens up better opportunities to focus on activities that create greater value. One informant from a public accounting firm stated:

> ... efficiency refers to increasing competitiveness and security in sending information. It is related to the fact that technology has increased efficiency in the information delivery process. More sophisticated software and systems make sending data and information faster, and security is more guaranteed. It ultimately helps organisations stay competitive in a rapidly changing business environment and provides stronger protection against data security risks [P1].

Another informant added:

> Automation will create free time from routine tasks; previous work if done in a state of fatigue, can result in errors and decreased efficiency. This automation allows accountants to divert their time to smarter tasks, providing greater added value to clients [P3].

This statement underscores the importance of freeing accountants from routine tasks that are often time-consuming and error-prone, mainly under fatigue conditions. By automating these tasks, accountants can allocate their time to more innovative tasks and focus

on creating more excellent added value for their clients.

Technology has improved daily work efficiency so that available time can be used more wisely. Accountants can utilise their time for more strategic and creative activities, increasing client value. As one informant noted, it

> *… reduces the risk of errors, as long as the software is installed and set up correctly, and allows more time for more thorough information processing* [P5].

Application of appropriate software and correct setup technology can reduce errors in the accounting process. It provides more space for accountants to process information carefully and accurately, ultimately supporting better decision-making. Another informant added that:

> *… access to information has become more practical, always up to date, and most importantly, can be accessed anytime and anywhere* [P4].

The use of technology has made access to information more accessible. The necessary data can be found quickly, and the information is regularly updated. The accessibility of this information allows accountants to access the data they need anytime and anywhere, increasing flexibility and responsiveness in carrying out their duties.

Digitisation of accounting archives and active communication with clients are additional benefits associated with digital technology. Digitalisation makes it possible to eliminate the use of paper and manage all client documents dynamically, thereby saving time to carry out other tasks related to their profession. Additionally, their clients no longer have to struggle with physical documents. They can now access digital archives without searching for a specific invoice. One informant reinforced this idea by saying:

> *With digital archives, we no longer have a lot of physical files. We can access company documents from anywhere and anytime without going to the office. Working from home is easier because we do not need to take all the files home* [P5].

Reduction of operational costs was also highlighted as a positive aspect, where the number of physical visits to clients has been reduced significantly. Virtual communication is now the norm, meaning more time and efficient spending.

The main obstacles identified by informants were price issues and resistance to change. Pricing is considered to depend on the size of

the company. In large companies, software costs are not a significant obstacle, because operating with fewer employees is more economical than investing in software. Despite this, the main obstacle to adopting more modern technological solutions is always related to resistance to change. The informant from an accounting software company emphasised that:

> *Technical problems are not the main obstacle; there are often positive surprises when employees quickly adapt to new applications. It is not just about how quickly adaptation occurs but also about the potential productivity gains the technology can bring. Having a solid business strategy is an important foundation before implementing new technology. Resistance to change remains a major obstacle to adopting more modern technological solutions* [P5].

Another informant highlighted the problem of interconnection and interoperability of IT infrastructure:

> *In adopting digital technology, special attention needs to be paid to how existing IT infrastructure can be integrated and work together efficiently so that the system can run smoothly* [P6].

It highlights the importance of carefully planning and managing IT infrastructure to support technological changes and developments implemented within the company.

Addressing R2, the key opportunities include increased efficiency, automation of routine tasks, error reduction, easier access to information, and remote work flexibility. Technological disruption enables accountants to focus on strategic tasks, increase client value, accelerate data processing, and reduce operational costs through virtual communication and digital archive management. However, the implementation of technological disruption faces obstacles such as technology investment costs, resistance to change, and IT infrastructure interconnection and interoperability. Companies need to overcome these challenges through effective change management strategies, integrated IT infrastructure management, and strengthening employee readiness to adapt to technology-driven changes.

4.3 Technological Disruption in the Digital Transformation of Accounting Affecting Accounting Tasks

Automating routine tasks in accounting is an ongoing process that will significantly impact the day-to-day future of the accounting profession. Based on the analysis of interview results, digital

transformation is predicted to significantly impact the tasks and profiles of professionals in the accounting field (Moll & Yigitbasioglu, 2019; Quattrone, 2016; Richins et al., 2017). One informant explained this point by stating that:

> The use of software will influence two aspects: cultural change, namely shifting the view of accounting from just a document recording system between debits and credits to providing valuable information for daily decision making, especially for clients. Because information is only useful if it is produced and accessed promptly, digital transformation introduces a new paradigm as a result of a new approach to accounting phenomena, namely creating a solid and consistent information base with various aspects, including simplifying and democratising access to information [P1].

It means that digital transformation will create conditions that encourage the accounting profession to be more analytical and creative and provide added value in the context of abundant information. However, this will also result in a more complex decision-making process because it becomes increasingly challenging to select relevant information (Bromwich & Scapens, 2016). As one informant noted:

> Today, this issue is not limited to technological aspects alone. If I were asked to rate people's satisfaction with using robotics, I could say their satisfaction is very high. Likewise, with automated reporting, their satisfaction is also very high! However, their satisfaction includes more than that. Above all, they feel happiness. Technology is only a small part of this overall experience [P2].

This fact was noted previously by Schwertner (2017), strengthening the idea that technology could have a significant impact in the next few years. Technologies such as cloud computing and data analytics, which have been revolutionised, will change society as we know it today by eliminating outdated business models and creating new opportunities. Therefore, organisations must always follow technological developments to continue developing to gain market share and create more significant differentiation.

The anticipated changes relate primarily to routine tasks and tasks performed by accountants. Given that digital transformation in companies is driven by digital transformation, we expect technological developments will determine the speed and direction of technological development in accounting. In principle, the accounting profession's role in organisations will remain the same: compiling helpful information for decision-making. The transformation will significantly impact the allocation of working time, with more time

available for creative, analytical, and value-added activities.

In response to R3, technological disruption has been found to shift accounting tasks away from routine processes toward more analytical, strategic, and value-enhancing activities. Automation through software, robotics, and cloud computing reduces manual tasks such as data entry and financial reporting, allowing accountants to focus on decision-making and strategic advisory roles. The role of accountants has shifted from data recorders to strategic information providers, supporting real-time decision-making for clients. Moreover, advancements in data analytics and automated reporting enable faster, more transparent, and efficient access to financial information. This transformation requires accountants to upskill to address the complexities of information analysis and maintain their relevance in the era of digital transformation.

4.4 Skills needed to face technological disruption in the digital transformation of accounting

Before the digital transformation in the accounting field, the accounting profession covered various fields of knowledge, including accounting, taxation, reporting, financial management, internal control, and information systems, apart from problem-solving, critical thinking, and communication skills. All informants acknowledged the importance of these basic skills, which align with those described by (Chaplin, 2017; Howieson, 2003). Although the basic knowledge will remain the same, the question that still arises is the knowledge required for the new tasks that will replace old tasks, such as the collection, examination, and preparation of accounting data that will be automated. According to the informants, the accounting profession will increasingly demand activities that provide added value, such as data analysis and management consulting, requiring sophisticated IT tools. In the future, accounting professionals will need special training in the IT field (Howieson, 2003; Schwertner, 2017). One informant stated:

> Software companies like the one we run pay serious attention to training solutions. Therefore, we have established an online training policy that all our clients must follow to ensure that they can master the use of the tools provided. All this training is free of charge as an investment in our client development [P5].

In addition to having technical skills in the accounting field, it is increasingly important for accountants to be able to develop digital capabilities so they can utilise IT (Moll & Yigitbasioglu, 2019) and

safeguard their work (Schmidt et al., 2020). It provides insight into the competencies and skills required by future accounting professionals. As one informant noted:

> *Accounting is now a science that has a main basis in measurement, processing and communication. Increasingly complex phenomena are at the core of this profession. Analytical or management accounting systems are key in the organizational decision-making process. Evaluating performance in a department or section often involves collaborating with specialised machines or equipment and interacting with teams and managers/accountants to redesign and adapt processes and develop new metrics and evaluation systems. The accountant's role is central in all these stages* [P3].

In this context, the author sees that all the technical and interpersonal skills described in research by Kruskopf et al. (2020) are very relevant. It is essential to balance the development of these new skills with the maintenance of traditional skills without getting too caught up in the digital aspects of technology. As one informant expressed:

> *... of course, if an accountant has digital skills and can use basic tools such as Excel, that is a positive thing. However, the ability to analyse data correctly, conduct sensitivity analysis, and make accurate projections in working with clients is more important. In addition, strong interpersonal skills are also key. The ability to communicate with clients, empathise, and involve clients in decision-making are essential skills. In addition, understanding in-depth knowledge of accounting principles and the ability to discuss wisely and utilise information is also very necessary* [P3].

Based on R4, it was identified that accountants must possess a mix of technical, digital, analytical, and interpersonal skills. In addition to traditional skills such as knowledge of accounting principles, taxation, and internal control, accountants are also required to master IT skills, including the use of advanced software, data analysis, and business intelligence tools. Upskilling and continuous training are essential to ensure accountants can adapt to technological advancements. Moreover, analytical and problem-solving skills are needed to process large datasets and provide management consulting services. Interpersonal skills, such as communication, empathy, and collaboration, are also crucial for interacting with clients and supporting decision-making. Therefore, accountants must develop digital capabilities while maintaining traditional accounting expertise to remain relevant and competitive in the era of digital transformation.

4.5 Adapting to technological disruption in the digital transformation of accounting

Accountants must adapt to technological disruption through digital transformation to continue providing added value to companies. Accountants must develop new skills relevant to the industry's future needs and deepen their understanding of artificial intelligence and other digital solutions in modern business. Professionals and academics are required to master future skills to prepare themselves to achieve success in their careers and future. Some skills required include the ability to think critically and solve problems, adequate mastery of technology, a high level of adaptability and flexibility, the ability to interact well, motivation to continue learning new things, and others. Future accountants must have high motivation, verbal and non-verbal communication skills, decision-making abilities, financial analysis skills, and professional judgment skills (Jackson et al., 2022; Parham et al., 2011). According to one informant:

> *I think accountants need to face technological changes with the right strategy. One is by regularly participating in professional development programmes to remain current in the accounting world* [P2].

The informants emphasised the importance of accountants updating their knowledge through regular professional development programmes. It will help accountants remain relevant in a world where accounting is constantly changing. One informant added:

> *… we must develop human digital skills. That means we must learn to integrate digital technology into our work to be more effective. Then, we must focus on developing digital technology skills to master the digital tools and platforms that are increasingly dominant in our business* [P5].

The accounting profession needs to increase its digital literacy and prepare for significant changes in accounting and auditing practices with the emergence of technologies such as AI, blockchain, and analytics and decision support (Kraus et al., 2021; Nadkarni & Prügl, 2021; Yigitbasioglu et al., 2023). With these technologies, accountants will focus more on decision support and analysis and must expand their skills. However, challenges arise because accountants are often reluctant to adopt new analytical tools (Schmidt et al., 2020a). This process of improving skills is essential so that accountants remain relevant and ready to face technological changes. In addition, accountants will play a more strategic role and must master technology and formulate strategies to provide added value. In order

to prepare accountants for the future, companies need to provide the proper training and opportunities so that accountants can be actively involved in organisational transformation (Kokina & Davenport, 2017). One informant stated that:

… changes in the education sector are significant in preparing the younger generation for the future, especially in the accounting profession. The concept of smart education that integrates technology and the needs of the digital generation is a relevant solution for preparing future accountant candidates to face the era of digitalisation [P1].

Changes in the education sector have vital significance, especially when talking about preparing the younger generation to face the future (Chaplin, 2017). The education system must adapt and continue developing to produce capable and ready individuals to navigate their careers (Marioara et al., 2022). It is very relevant in the context of prospective accountants, who must prepare themselves well. One of the keys to success in improving the quality of education is creating a learning environment that suits the characteristics of the current generation of students, known as the digital generation (Howieson, 2003). Solving problems in the world of education does not only focus on technological aspects but also on the willingness and ability of educators to continue learning and develop learning methods that suit the needs of students in the current era, which are in line with current developments (Holmes & Douglass, 2022). The concept of innovative education, which includes learning in the digital era that is designed and adapted to the needs of the digital generation, is a relevant solution (Zhang & Zhao, 2022). By adopting this approach, future accountants will more easily adapt to technological developments and have sufficient knowledge to face the era of digitalization.

Referring to R5, accountants adapt by enhancing digital literacy, upskilling, and continuous professional development. They must master emerging technologies like AI, blockchain, and analytics, shifting their role from data recorders to strategic decision-makers. Key skills include critical thinking, problem-solving, adaptability, and digital proficiency, alongside strong technical and interpersonal skills. Ongoing learning and training keep accountants updated with industry changes, while education reforms incorporating smart education prepare future accountants with relevant digital skills. This adaptation strategy ensures accountants remain competitive and prepared for the challenges of technological disruption in the era of digital transformation.

5.   Conclusion

Technological disruption in digital transformation is an ongoing process that significantly impacts accounting information systems in organisations as an economic sector and the accounting profession. This study aims to understand the digital transformation of accounting and how the accounting profession adapts to this phenomenon.

This study shows that disruptive technologies in the digital transformation of accounting, such as artificial intelligence, blockchain, analytics, and decision support, have significantly changed accounting practices. Barriers to implementing technology distribution in digital transformation are resistance to change, price issues, and IT infrastructure interconnection and interoperability. In terms of opportunities, automation of routine tasks, and reduction of errors in financial data processes. Technological disruption in the digital transformation of accounting will change the role of accountants from simply data processors to more analytical and creative providers of strategic information. Accountants need to develop technical skills in IT, such as data analysis, and maintain traditional skills, such as a deep understanding of accounting principles and the ability to communicate with clients. Accountants must develop new skills that include digital literacy, understanding of technologies such as AI and blockchain, as well as critical thinking, adaptability, and good communication skills to successfully adapt to technological disruption in the digital transformation of accounting.

This research is exploratory. Therefore, its main contribution is to explain the discussion about digital transformation in the accounting sector and does not prove cause-and-effect. The results could greatly interest researchers, policymakers, educators, professional institutions, and accounting professionals. However, this study has significant limitations. The impact of digital transformation on the accounting sector is complex to assess. This is due to the very rapid development of technology in the accounting field, which cannot be controlled.

Future research could focus more on the specific influence of innovative technologies, such as how automation (robotic processing), AI, big data, blockchain, cloud computing, and cybersecurity can enhance the integrity and accuracy of financial reports. Further studies should also explore the broad impact of current technologies on accounting and auditing practices to better understand how adopting modern technologies affects the quality of financial reporting. It is highly recommended that in-depth

quantitative studies be conducted. Exploration in this field will not only generate new and valuable knowledge but will also make a significant contribution to the evolution and improvement of the accounting profession. This approach will pave the way for a broader understanding of the potential of new technologies and how they can be leveraged to strengthen reliability and transparency in financial reporting.

Appendix

A1. Thematic Analysis Table

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
1	What are the technological disruptions in the digital transformation of accounting?	Advancements in AI (NLP and RPA)	AI, NLP, RPA	*"With the increasingly massive development of AI, I have witnessed the emergence of various types of intelligence such as NLP and RPA, which have become integral in the accounting field. NLP contributes to analysing and processing financial documents, including annual reports or financial reports, while RPA helps automate routine tasks such as invoice management, bank reconciliation, and payroll."*	P6
		Fraud detection using AI	AI, fraud detection, CAATs	*"AI opens up great opportunities to detect fraud or irregularities in financial data. AI analysis is more sophisticated; the system can investigate data thoroughly, identify suspicious patterns, and provide indications of potential fraud or high risks. Recent developments in the audit field present cutting-edge technology, such as CAATs. CAATs are the application of AI to simplify the audit process, leveraging data analysis, machine learning, and AI rules to automate audit tasks. It increases efficiency and helps auditors identify potential problems more effectively."*	P1
		AI-driven operational efficiency	AI, operational efficiency, decision-making	*"By integrating AI in various aspects of accounting, we not only increase operational efficiency but also open up the potential for more precise and proactive decision-making. It reflects a paradigm shift in accountants increasingly combining artificial intelligence with human expertise to achieve optimal results in managing financial information and supporting strategic decision making."*	P5

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
		Blockchain for financial reporting	Blockchain, distributed ledger	*"I see great potential in applying blockchain technology in accounting. Blockchain is a distributed ledger and brings great promise in simplifying regulatory compliance and improving the commonly used double-entry bookkeeping. In accounting applications, blockchain allows companies to create a system of directly interrelated accounting records. It means transactions can be recorded directly into a shared ledger, replacing the traditional method of keeping separate records. The main advantage of blockchain is the impossibility of falsifying or destroying entries, as records are distributed and cryptographically sealed."*	P5
		Blockchain in auditing	Blockchain, audit automation	*"I feel great benefits from implementing blockchain in the audit process. With standardisation in place, I can automatically verify the most important data in financial reports. It has the potential to significantly reduce audit costs and time, allowing me to focus on more valuable tasks, such as complex transaction analysis or internal control mechanisms. Blockchain integration does not have to start with accounting entries in a single register. These processes can be integrated in stages, from ensuring record integrity to creating a traceable audit trail. In the future, fully automated audit execution could become a reality, unlocking the potential to change the accounting landscape as we know it. I believe that blockchain has great potential to change the traditional accounting paradigm. It can be a step towards greater automation, ensuring reliability, security, and efficiency in the administration of accounting and audit processes."*	P3

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
		Data analytics for better decision-making	Data analytics, continuous monitoring	*"I realise the important role of data analytics in helping businesses uncover valuable information in their finances. Applying this technology allows accountants to accurately report money flow through an organisation and improve audit processes, risk management, and business decision-making. In the audit field, we can move from sample-based models to continuous monitoring by analysing and verifying larger data sets, achieving smaller margins of error. Four main types of data analytics are an important basis for implementing this technology: descriptive analytics (what happened?), diagnostic analytics (why did that happen?), predictive analytics (what will happen?), and prescriptive analytics (what should happen?). In the face of technological developments and increasing business complexity, accountants must continue to hone their data analytics skills to provide significant added value to business decision-making."*	P4
2	What are the opportunities and obstacles to implementing technological disruption in accounting digital transformation?	Increased efficiency and security	Efficiency, security	*"... efficiency refers to increasing competitiveness and security in sending information. It is related to the fact that technology has increased efficiency in the information delivery process. More sophisticated software and systems make sending data and information faster, and security is more guaranteed. It ultimately helps organisations stay competitive in a rapidly changing business environment and provides stronger protection against data security risks."*	P1
		Automation benefits	Automation, smarter tasks	*"Automation will create free time from routine tasks; previous work if done in a state of fatigue, can result in errors and decreased efficiency. This automation allows accountants to divert their time to smarter tasks, providing greater added value to clients."*	P3
		Error reduction through software	Error reduction, software setup	*"Reduces the risk of errors, as long as the software is installed and set up correctly, and allows more time for more thorough information processing."*	P5

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
		Practical and up-to-date access	Access to information, practicality	*"Access to information has become more practical, always up to date, and most importantly, can be accessed anytime and anywhere."*	P4
		Digital archives	Digital archives, remote access	*"With digital archives, we no longer have a lot of physical files. We can access company documents from anywhere and anytime without going to the office. Working from home is easier because we do not need to take all the files home."*	P5
		Resistance to change	Resistance to change, productivity	*"Technical problems are not the main obstacle; there are often positive surprises when employees quickly adapt to new applications. It is not just about how quickly adaptation occurs but also about the potential productivity gains the technology can bring. Having a solid business strategy is an important foundation before implementing new technology. Resistance to change remains a major obstacle to adopting more modern technological solutions."*	P5
		Integration challenges	Integration, IT infrastructure	*"In adopting digital technology, special attention needs to be paid to how existing IT infrastructure can be integrated and work together efficiently so that the system can run smoothly."*	P6
3	How does technological disruption in the digital transformation of accounting affect accounting tasks/activities	Cultural change	Paradigm shift, decision-making	*"The use of software will influence two aspects: cultural change, namely shifting the view of accounting from just a document recording system between debits and credits to providing valuable information for daily decision making, especially for clients. Because information is only useful if it is produced and accessed promptly, digital transformation introduces a new paradigm as a result of a new approach to accounting phenomena, namely creating a solid and consistent information base with various aspects, including simplifying and democratising access to information."*	P1
		Enhanced satisfaction	Satisfaction, happiness	*"Today, this issue is not limited to technological aspects alone. If I were asked to rate people's satisfaction with using robotics, I could say their satisfaction is very high. Likewise, with automated reporting, their satisfaction is also very high! However, their satisfaction includes more than that. Above all, they feel happiness. Technology is only a small part of this overall experience."*	P2

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
4	What skills are needed by accountants to face the challenges of technological disruption in the digital transformation of accounting?	Digital literacy	Digital tools, online training	*"Software companies like the one we run pay serious attention to training solutions. Therefore, we have established an online training policy that all our clients must follow to ensure that they can master the use of the tools provided. All this training is free of charge as an investment in our client development."*	P5
		Analytical skills	Analytical systems, decision-making	*"Accounting is now a science that has a main basis in measurement, processing and communication. Increasingly complex phenomena are at the core of this profession. Analytical or management accounting systems are key in the organisational decision-making process. Evaluating performance in a department or section often involves collaborating with specialised machines or equipment and interacting with teams and managers/accountants to redesign and adapt processes and develop new metrics and evaluation systems. The accountant's role is central in all these stages."*	P3
		Interpersonal communication	Communication, empathy	*"... of course, if an accountant has digital skills and can use basic tools such as Excel, that is a positive thing. However, the ability to analyse data correctly, conduct sensitivity analysis, and make accurate projections in working with clients is more important. In addition, strong interpersonal skills are also key. The ability to communicate with clients, empathise, and involve clients in decision-making are essential skills. In addition, understanding in-depth knowledge of accounting principles and the ability to discuss wisely and utilise information is also very necessary."*	P3

No.	Research question	Theme/pattern	Key word/phrase	Supporting quote	Informant
5	How do accountants adapt to technological disruption in the digital transformation of accounting?	Continuous professional development	Professional development	*"I think accountants need to face technological changes with the right strategy. One is by regularly participating in professional development programmes to remain current in the accounting world."*	P2
		Developing digital skills	Digital skills, digital tools	*"… we must develop human digital skills. That means we must learn to integrate digital technology into our work to be more effective. Then, we must focus on developing digital technology skills to master the digital tools and platforms that are increasingly dominant in our business."*	P5
		Education reform	Smart education, technology integration	*"… changes in the education sector are significant in preparing the younger generation for the future, especially in the accounting profession. The concept of smart education that integrates technology and the needs of the digital generation is a relevant solution for preparing future accountant candidates to face the era of digitalisation."*	P1

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