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Unveiling Challenges and Opportunities in the Integration of Emerging Technologies in the Accounting Profession: A Preliminary Investigation

(Menyingkap Cabaran dan Peluang Pengintegrasian Teknologi Terkini dalam Profesion Perakaunan: Satu Penyelidikan Awal)

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ABSTRACT

Business processes are undergoing significant evolution with the advent of cutting-edge technologies such as Artificial Intelligence, Big Data, Robotic Process Automation, Cloud Computing, Blockchain, Internet of Things, and XBRL. Despite these advancements, the accounting profession has faced criticism for appearing to lag behind other industries in technological integration. This study aims to investigate the challenges associated with the integration of emerging technologies in the accounting profession, despite the numerous potential opportunities they offer. To map the opportunities and challenges of emerging technologies in the accounting profession, the Technology-Organisation-Environment (TOE) framework has been employed. This research employs a qualitative methodology, through semi-structured interviews with eleven (11) practitioners from diverse accounting backgrounds representing their organisations. These interviews provide initial insights into the adoption of emerging technologies in current accounting practices, particularly in Malaysia. The analysis comprehensively discusses opportunities and challenges of technology adoption through nine (9) aspects of organisation including technological availability, relative advantage, compatibility, top management support, technology competence, cost, organisational change adaptability, government support and regulation, and environmental uncertainty. This paper contributes to the accounting profession by offering insights into strategies that firms, vendors, and government entities can adopt to successfully implement emerging technologies.

Keywords: Artificial intelligence; big data; cloud accounting; blockchain; XBRL; accounting profession

ABSTRAK

Proses perniagaan berkembang dengan ketara berikutan kemunculan teknologi terkini seperti Kecerdasan Buatan, Data Raya, Automasi Proses Robotik, Perakaunan Awanan, Rantaian Blok, 'Internet of Things' dan XBRL. Walaubagaimanapun, profesion perakaunan telah berdepan kritikan kerana dilihat ketinggalan di belakang industri lain dalam kemajuan teknologi. Oleh itu, kajian ini bertujuan untuk mengkaji cabaran yang dihadapi dalam mengintegrasikan teknologi terkini dalam profesion perakaunan, meskipun teknologi ini mempunyai pelbagai kelebihan dan peluang yang berkaitan dengan penggunaannya. Untuk memetakan peluang dan cabaran teknologi terkini di dalam profesion perakaunan, 'TOE Framework' atau 'Rangka Kerja TOE' telah digunakan. Kajian ini menggunakan kaedah kualitatif, melalui temu bual separa berstruktur melibatkan sebelas (11) pengamal industri dari pelbagai latar belakang perakaunan mewakili organisasi masing-masing. Sesi temubual ini bertujuan mendapatkan pandangan awal tentang penggunaan teknologi terkini dalam amalan perakaunan semasa, khususnya di Malaysia. Analisis secara komprehensif membincangkan peluang dan cabaran penggunaan teknologi menerusi sembilan (9) aspek organisasi termasuklah ketersediaan teknologi, kelebihan relatif, kesesuaian, sokongan pengurusan tertinggi, kecekapan teknologi, kos, daya sesuaian terhadap perubahan organisasi, sokongan dan undang-undang kerajaan, dan ketidaktentuan persekitaran. Penemuan ini memberikan sumbangan kepada profesion perakaunan dengan menawarkan pandangan tentang strategi yang boleh diambil oleh firma, vendor, dan entiti kerajaan untuk melaksanakan teknologi baru dengan berjaya.

Kata kunci: Kecerdasan buatan; data raya; perakaunan awanan; rantaian blok; XBRL; profesion perakaunan

INTRODUCTION

The advent of the Fourth Industrial Revolution (IR 4.0) presents a significant opportunity for transformation within the accounting profession. Anticipated changes include the integration of intelligence and digital

technology, the modernisation of reporting or disclosure requirements, and the establishment of new regulatory frameworks (Malaysian Institute of Accountants (MIA), 2017). Notably, emerging technologies such as Artificial Intelligence (AI), Big Data, Robotic Process Automation, Cloud Computing, Blockchain, Internet of Things, and XBRL have garnered increased attention. According to a study by the Centre for the Fourth Industrial Revolution (2023), the 'Top 10 Emerging Technologies of 2023' includes 'generative artificial intelligence' ranking second, 'sustainable computing' at ninth place, and 'AI-facilitated healthcare' ranking tenth globally. In terms of technological readiness, Malaysia is ranked 43rd worldwide by the World Economic Forum (2016) and 16th in technological infrastructure by the IMD World Competitiveness Centre (2023).

The impact of emerging technologies extends to developing countries like Malaysia, where the government actively promotes transformative technologies such as fintech (with a focus on e-wallets), robotic process automation in the manufacturing industry, 3-D printing manufacturing, Internet of Things, AI, big data for the public health sector, and cloud computing (Alpha Beta 2021). Criticism has been directed at the accounting profession for perceived technological backwardness compared to more technologically advanced industries (Afroze & Aulad 2020). The accounting profession is often seen as falling behind other industries, especially in meeting strict regulatory requirements (Adjei et al. 2021). This issue is more noticeable in small and medium-sized audit and non-audit firms, which struggle with limited financial resources and not having enough staff (Hsiung & Wang, 2022). The Malaysian Institute of Accountants (MIA) published a Digital Blueprint (2016) encouraging the adoption of emerging technologies across various sectors, including commerce and industry, public sector, public practice, and academia. A survey conducted by MIA (2016) revealed that 72% of professional accountants expressed interest in big data analytics, while 48% showed interest in cloud computing and XBRL technology, respectively. The most recent research conducted by MIA in 2019 updated that, only 60% of professional accountants use cloud computing software, 45% use big data analytics and 22% utilise AI in the accounting profession (MIA Professional Practices & Technical Team 2020). In response to the government's technology utilisation mandate, MIA has implemented initiatives such as conferences focused on digitalisation, the 'MIA Digital Technology Adoption Awards' to recognise professionals supporting digitalisation, and training programmes related to digitalisation opportunities. Notably, in April 2023, MIA introduced Ethical Guidelines on Technology Usage for Public Practitioners, aiming to uphold the country's digitalisation transformation initiative (MIA 2023).

Accounting professionals have recognised that emerging technologies offer numerous advantages to the accounting profession. These benefits include enhanced accessibility, support for forecasting and projection, facilitation of daily management tasks, minimisation of repetitive work, provision of real-time information, and assistance in conducting analytical processes (Gavrilova & Gurvitsh-Suits 2020; Ilias et al. 2020; Meservy et al. 1992; Mittal et al. 2021; Vărzaru 2022). Despite the myriad benefits associated with the incorporation of digitalisation in accounting and auditing processes, the widespread utilisation of emerging technologies has been observed to progress at a relatively slower pace in numerous developing countries, and Malaysia is no exception. It is imperative for researchers to identify the underlying causes. Hence, the current study aims to examine the challenges encountered in the integration of emerging technologies in the accounting profession, despite the many conceivable opportunities associated with utilising them.

LITERATURE REVIEW

UTILISATION OF EMERGING TECHNOLOGY IN THE ACCOUNTING PROFESSION

Digitalisation in the accounting profession has been observed to alleviate repetitive tasks by automating routine job processes, including the issuance and acceptance of invoices (Alnasrallah & Saleem 2022; Gavrilova & Gurvitsh-Suits 2020). According to Vărzaru (2022), the integration of emerging technologies into managerial accounting may result in the automatic elimination of asynchronous data. This capability has the potential to enhance employee efficiency by reducing operating time, thereby allowing them to allocate more time to critical accounting tasks (Afroze & Aulad 2020). Automation is anticipated to perform functions previously carried out by auditors, such as problem analysis and the formulation of audit plans (Afroze & Aulad 2020). Advanced technologies like blockchain would help facilitate the trading process between two parties, as the validation process is completed by the technology, eliminating the need for reconciliation (Li & Juma'h 2022). The evolution of emerging technologies like AI has given rise to Intelligent Document Processing (IDP) to address issues related to the abundance of accounting data in various document formats. IDP is designed to assist in the data extraction process from structured documents (e.g., sales invoices, receipts to customers), semi-structured documents (e.g., bank statements), and unstructured documents (e.g., emails, scanned written documents, PDF documents such as tenancy agreements). Subsequently, this data can be utilised by robotic process automation to validate and input data into the existing accounting information system (Mihai & Dutescu 2022).

One of the primary responsibilities of an accountant is to perform tasks of analysis. Digitalisation can be employed as analytical tools for areas such as debts and receivable analysis (Gavrilova & Gurvitsh-Suits 2020).

Emerging technologies, through AI and XBRL, can facilitate the automation of tasks in real-time, including inventory counting, asset accounting, and automated data collection (Gavrilova & Gurvitsh-Suits 2020; Ilias et al. 2020; Vărzaru 2022). Additionally, emerging technologies, particularly blockchain, can be utilised for real-time public ledgers through computer algorithms (Juma'h & Li 2023).

Emerging technologies can also be considered as tools to assist in management activities, including portfolio and debt management, invoice management, cost management, risk management, flexible allocation among responsibility centres, wealth growth management, and output management (Meservy et al. 1992; Mihai & Dutescu 2022; Vărzaru 2022). Organisations can embed emerging technologies in forecasting and projection activities, such as income tax planning, forecasting costs and expenses, cash flow planning, forecasting investment, and estate planning (Gavrilova & Gurvitsh-Suits 2020; Meservy et al. 1992).

OPPORTUNITIES OF EMERGING TECHNOLOGY IN THE ACCOUNTING PROFESSION

Cloud accounting has emerged as a central platform for data transactions, resource sharing, information exchange, and data center requirements. It enables data flexibility, easy configuration, data elasticity, and increased data efficiency for big data analysis (Ria 2023). Cloud accounting facilitates the sharing of accounting data across multiple devices, such as computers, laptops, tablets, or cell phones, as long as they are connected to the internet. The cloud accounting software is executed on a cloud server (virtual server) in a cloud computing environment.

In addition to cloud computing, XBRL has been identified as a solution for analytical financial data purposes. In the past, inefficiencies existed in the filing of annual returns and financial report procedures due to submissions being made in hardcopy form. As the profession transition to a digital world, hardcopy submissions are no longer ideal for Financial Statements, Annual Returns, and Exemption Applications. Therefore, a more digitised and readable format, XBRL, must be adopted to allow data interoperability (Uyob et al. 2022). XBRL helps centralise data submitted to regulators (Ilias et al. 2019c), reduces the possibility of re-keying data (Ilias et al. 2019b), increases information transparency, eases tax filing submissions, and provides better analytical tools for investors (Ilias et al. 2020).

The increasing significance of technology in the accounting profession creates opportunities for intelligent technologies such as AI and blockchain to evolve. Machine learning through AI tools is considered capable of providing reliable accounting information and improving information transparency (Vărzaru 2022). AI auditing techniques reduce the likelihood of missing suspicious anomalies and information by streamlining and automating repetitive tasks, particularly those involved in substantive testing, such as vouching, verification, and footing processes (Marrucci et al. 2023). Digitalisation enables users to securely retrieve information on-site or off-site, as different individuals have access to specific information, making it difficult for employees to manipulate data (Adjei et al. 2021; Alnasrallah & Saleem 2022). This is further supported by Juma'h and Li (2023), as any amendment in blockchain data cannot be easily deleted or altered. Instead, changes are added to the current blocks, reducing the likelihood of fraudulent activities related to accounting data. Blockchain also aids auditors in the verification and reconciliation process by ensuring the data stored is free from material misstatements and fraud. This function enhances transparency and accuracy, minimises time, and eases the auditing process (Juma'h & Li 2023; Li & Juma'h 2022). Big data technologies play a crucial role in fraud detection, as accountants must adapt to new technology by developing advanced forensic accounting tools (Mittal et al. 2021). Data analytics, such as business intelligence, collects, evaluates, and presents company data to improve decision-making through predictive modelling, machine learning, fraud detection, and sentiment analysis (MIA 2023).

TECHNOLOGY-ORGANISATION-ENVIRONMENT (TOE) FRAMEWORK

The Technology-Organisation-Environment (TOE) Framework was initially introduced by Tornatzky and Fleishcher in 1990 through their book entitled 'The Processes of Technological Innovation' (Tornatzky & Fisher 1990). The TOE Framework elucidates three (3) distinct elements of an organisation's context for technology adoption decisions, encompassing Technological, Organisational, and Environmental Context.

The Technological Context includes either the technology currently used by the organisation or technologies readily available in the market (Baker 2012). Mihai and Dutescu (2022) assess challenges faced by companies through technological readiness and technology characteristics, while Ilias et al. (2019a) evaluate technology relative advantage and trialability. Meanwhile, the Organisational Context refers to characteristics within the organisation, including employee structures, firm sizes, insufficient resources (Baker 2012), organisational readiness, and top management support (Mihai & Dutescu 2022). Meanwhile, the Environmental Context encompasses government roles in accessing technology, specifically in macro-environmental surroundings (Tornatzky & Fisher 1990), industry life cycle (Baker 2012), support of technology, government regulation, and industrial characteristics (Mihai & Dutescu 2022; Tornatzky & Fisher 1990).

The present study applies the aforementioned elements in the TOE Framework as a basis and scrutinises them further to best reflect the current stage of acceptance and adoption of emerging technologies in the

accounting profession. Digitalising accounting and auditing activities has numerous benefits, but the widespread use of new technologies has been observed to progress more slowly in many developing countries, particularly in Malaysia. It is crucial for researchers to identify the root causes. Thus, this paper examines the challenge of integrating modern technology into the accounting profession, notwithstanding its many potential advantages.

METHODOLOGY

This present research adopts a qualitative approach through semi-structured interviews. A comprehensive analysis of past literature regarding challenges and issues with the adoption of emerging technologies in the accounting profession was conducted. Articles from the Scopus and WOS databases were scrutinised using the keywords "Technology Acceptance" AND "Accounting". Articles related to technology adoption in the accounting education area were excluded, focusing solely on issues covering advanced technology adoption in the real world of accounting. Besides, snowballing techniques were employed using AI tools like 'Research Rabbit' and 'Connected Papers' to discover more related articles within the scope. The literature search encompassed all types of emerging technologies, including AI, cloud computing, robotic process automation, big data analytics, XBRL, and blockchain. To better understand the current level of adoption of emerging technologies faced by the accounting profession, the TOE Framework was applied to map the challenges and issues discussed in the literature.

The discussion of emerging technologies is a present concern in literature, and to address the challenge of data scarcity, a few interviews with accounting practitioners were conducted to gain a more comprehensive understanding of the surrounding issues. This method is consistent with Mihai and Dutescu (2022), as the researchers conducted extensive literature analysis before performing semi-structured interviews underpinning the TOE Framework. A nonprobability sampling technique was used, and interviewees were selected on a voluntary basis. The interviews were conducted from October 2023 to January 2024. Some interviews were conducted through the Google Meet online platform, and others through physical visits. A total of eleven (11) interviewees participated in the interviews, all currently working in Malaysia and representing various backgrounds within the accounting profession. The rationale for having interviewees with diverse accounting backgrounds was to obtain preliminary insights into issues and challenges prevailing in the accounting profession in Malaysia as a whole. General questions were asked, including the current state of adoption and acceptance of technologies such as AI, big data analytics, robotic process automation, cloud computing, and XBRL, particularly in auditing or accounting processes in the company. Questions also covered the readiness and support by the organisation regarding technology, the technology or software knowledge of the respondents, government initiatives and support, as well as how other organisations within their industry react to these new emerging technologies. Details of the interviewees are presented in Table 1 below.

TABLE 1. Profiles of participants

Participants	Types of Organisations	Accounting Sector	Size of the Organisation	Interviewees Role in the Organisation
R1	Accounting Firm	Public Practice Sector	Small	Company Secretary
R2	Company Secretary Firm	Public Practice Sector	Medium	Company Secretary
R3	Commercial Industry	Commerce and Industry	Medium	Senior Accountant
R4	Audit Firm	Public Practice Sector	Small	Senior Auditor
R5	Commercial Industry	Commerce and Industry	Small	Accountant
R6	Public Listed Company	Commerce and Industry	Big	Accountant
R7	Public Listed Company	Commerce and Industry	Big	Accountant
R8	Audit Firm	Public Practice Sector	Small	Senior Auditor
R9	Accounting Firm	Public Practice Sector	Small	Accountant
R10	Accounting Firm	Public Practice Sector	Small	Senior Accountant
R11	Audit Firm	Public Practice Sector	Medium	Senior Auditor

The unit of analysis for this study is the organisation. However, the interviewees, including accountants, auditors, and company secretaries, provide insights that represent their respective firms. Although the individual perspectives of these practitioners are collected through interviews, their responses reflect the organisational context and conditions related to digitalisation adoption. Therefore, the findings of this research are analysed within the framework of the Technology-Organisation-Environment (TOE) framework, which is more suitable for understanding the organisational level of analysis rather than focusing solely on individual perspectives.

The interviews have been transcribed, and the transcriptions are being analysed using Assisted Qualitative Design Analysis Software (AQDAS), specifically ATLASti version 9. The information gained from the semi-structured interviews was categorised into three (3) dimensions based on the TOE Framework and any possible new categories that arose after the analysis were grouped under any of these TOE contexts. Three (3) Code Groups were created for Technological Context, Organisational Context, and Environmental Context, and further classified into Sub-Codes. During the analysis process, 'quotation' and 'apply codes' were used to categorise the issues and challenges to specific Sub-Codes. The Code-Groups and Sub-Codes were generated using 'Networks'

in 'Organic-Orthogonal Shape' as the final output. The discussion of the challenges and issues from the quotation process is thoroughly discussed in the findings and discussion section.

RESULTS

This section presents findings from the qualitative approach to address the research objectives by examining the challenges of integrating emerging technologies in the accounting profession, despite the opportunities they offer. The researcher finalised the elements into nine (9) categories, as illustrated in Figure 1 involving technological availability, relative advantage, compatibility, top management support, digital proficiency capacity, cost, organisational change adaptability, government support and regulation, and environmental uncertainty.

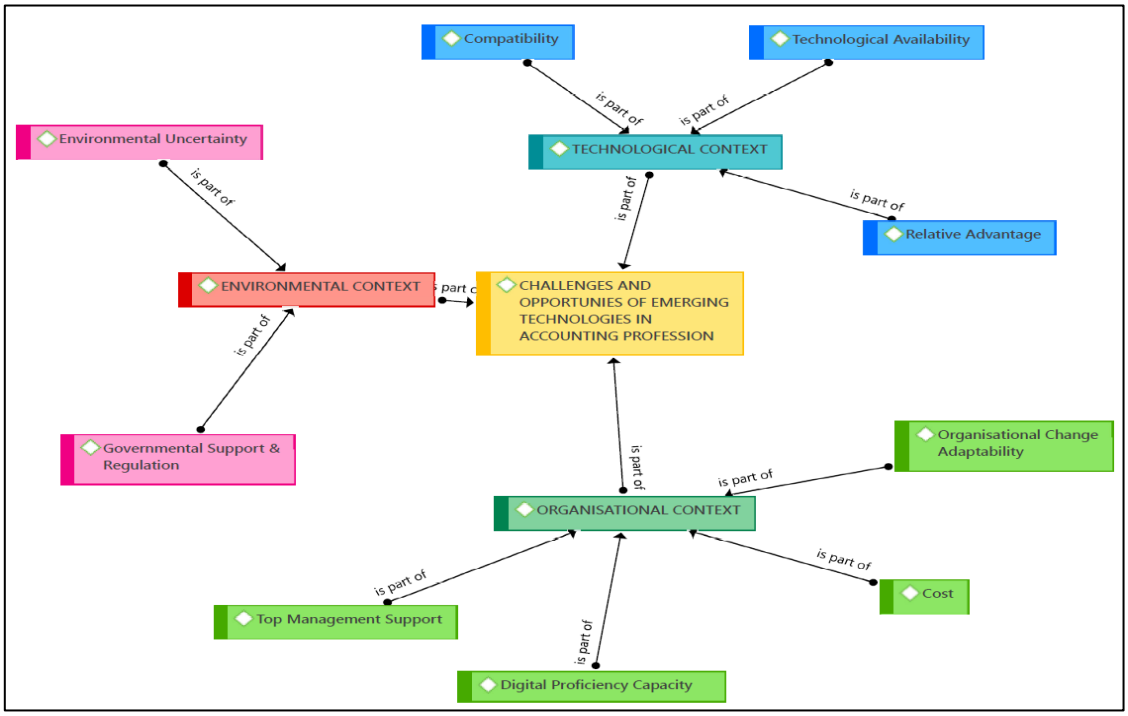

FIGURE 1. Organic-Orthogonal Diagram of elements projecting challenges and opportunities of emerging technologies in the accounting profession

TECHNOLOGICAL CONTEXT

Technological Context refers to factors influenced by technological aspects, including the availability of existing hardware, software, networks, or systems, the level of compatibility and complexity of certain technologies, the advancement of innovation in specific technologies, and digital tools that may serve as problem solvers for current practices. It also encompasses the perceived advantages of adopting new technologies compared to traditional methods and practices.

TECHNOLOGICAL AVAILABILITY

The adoption process of big data, AI, and open cloud remains ambiguous and is still in a nascent phase, with their full potential and best practices yet to be explored and established (Adjei et al. 2021; Alnasrallah & Saleem 2022; Vărzaru 2022). There is a lack of technology available that can provide solutions for the accounting process (Mihai & Dutescu 2022). Firms are actively seeking available technology in the market that might add value to auditing and accounting processes.

"At the moment, we do not use any advanced technologies. But our firm is currently considering insight audit software in the near future. This advanced software is a kind of live tracking software to monitor audit staff activities. Furthermore, we are also looking towards business management software to help us determine audit fees for clients." (R4)

The slow pace of emerging technology adaptation is attributed to limited technology developed specifically for the accounting industry. To develop sophisticated technology that can address accounting and auditing challenges, collaboration between accounting and auditing experts and technology specialists is critical (Juma'h

& Li 2023). Meservy et al. (1992) note that the development of AI for the accounting profession began in 1992 at Brigham Young University, emphasising a Three-Dimensional Framework for the Evaluation of Expert System Work. The framework highlighted three dimensions—knowledge acquisition, knowledge validation, and knowledge representation—required for the development of AI-based solutions for accounting, all necessitating the involvement of experts in accounting, tax, audit, and expert systems. There is a need to integrate the expertise of accountants and technology experts to develop technology that can meet the needs of the accounting industry (Meservy et al. 1992).

"We are looking forward to the other cloud computing vendor. I am not so sure where to look for the other vendors. I am trying to ask my friends, but they are also facing the same problem too." (R3)

The availability of advanced technology in the accounting industry is still questionable, as companies need to conduct research and find vendors themselves. However, some technologies, like cloud computing, are mostly offered by existing accounting software vendors.

"XBRL is currently available for voluntary submission of financial statements. However, currently we do not use the platform to submit the financial statements and still submit it over the counter. We use XBRL for annual return submission only but not for financial statements." (R2)

Advanced technology like XBRL (known as Malaysian Business Reporting System, MBRS in Malaysia) was launched in 2014. In June 2023, the Companies Commission of Malaysia (CCM) introduced a revised XBRL taxonomy and invited comments from accounting professionals, anticipating a future mandate for adoption. Currently, the XBRL system is only equipped to handle annual return submissions, with functionality for financial statements still being developed. This limited capability highlights a gap in readily accessible technology, presenting significant challenges for the accounting profession in Malaysia as it transitions to a more technology-driven reporting environment.

RELATIVE ADVANTAGE

Relative advantage can be described as the innovation in which, in this study's context, emerging technologies offer better benefits compared to traditional or manual methods of performing auditing and accounting processes (AbuAkel & Ibrahim 2023). The present auditing and accounting practices were observed to continue employing traditional methods that are not in sync with technological advancements. In the current auditing process, professionals still analyse data through sampling, accumulation, collection, and presentation with manual methods (Mittal et al. 2021). Some organisations prefer to maintain traditional methods as they feel more convenient with the existing practices. Organisations that have long depended on traditional methods may be reluctant to embrace change due to their comfort with existing processes. Additionally, some firms employ staff who have been with the company for twenty to thirty years, often in senior roles. These individuals are accustomed to their established working styles, making it challenging for them to adapt to new approaches (Cardinali et al. 2023).

"Currently, we do not apply any emerging technologies in our finance department. Normally, we extract information from SAP software for evaluation and decision-making purposes manually." (R7)

However, if practitioners can see the perceived benefits of emerging technologies utilisation, their response towards utilising these technologies might differ (Mohd Amin et al. 2022). The accounting profession deals with an abundance of both financial and non-financial information, contributing to the extensive scale of decision-making processes and increased complexity. When professionals use technology to aid in decision-making, it raises questions regarding the credibility, quality, and accuracy of the decisions made (Vărzaru 2022). However, based on the present study, professionals consider using advanced technologies as it reduces the tendency of data manipulation and creative accounting.

"I have worked with developed country companies that use government-linked e-invoices. Transactions will be disclosed to the government. If we pay the supplier incorrectly, the whole organisation will get that information. Everything is automated and traceable, so we cannot simply change or alter anything. E-invoicing boosts transparency." (R3)

When users can identify the benefits of adopting technologies, they are more likely to respond positively to technology adoption (AbuAkel & Ibrahim 2023). However, if they do not perceive these benefits, they are unlikely to proceed and may view the situation as a challenge rather than an opportunity. In a study conducted by Silaban and Siallagan (2017), the researcher found that accounting professionals often do not see the usefulness of

emerging technologies, as their inability to observe the features firsthand leads to a negative attitude toward adoption. Additionally, the professionals lacked experience and opportunities to use these technologies, resulting in a perception of low ease of use. In contrast, this study shows that practitioners have significant experience with XBRL implementation.

"I love submitting annual returns in XBRL. The first year of keying data into the system took longer, but the second, third, and subsequent years saved time and made our job easier. Compared to doing it manually, the process will be extremely quick and simply require updates and changes to reflect the latest information". (R1&R2)

The inconsistent findings, however, provide some opportunities for future research as the current study only interviewed a very limited number of respondents. Some of the organisations provide support for the emerging technologies' efforts as they can perceive the benefit from using them.

COMPATIBILITY

Compatibility refers to the ability of an innovation, in the present study referring to advanced technologies, to fulfil the current needs and values of an organisation (Qutaishat et al. 2023). In the United States, the adoption of blockchain technology is quite slow as professionals are seeking convincing applications that effectively utilise existing software to extract information from the blockchain (Juma'h & Li 2023). Practitioners are seeking technological solutions to streamline their daily tasks, but these solutions must be compatible with the organisation's existing system.

"We are currently searching for the best cloud computing. We have tried one (trial version) but it does not fulfil our needs entirely." (R3)

Even though compatibility is one of the crucial factors to ensure emerging technology usage in the accounting profession, the studies by Liu (2018) and Qutaishat et al. (2023) revealed that compatibility has no significant effect on cloud-based Enterprise Resource Planning (ERP) systems. The result is insignificant since small and medium-sized organisations have less complicated systems than larger organisations. As a result, compatibility may have no influence on the use of cloud-based ERP solutions. Some tasks are not directly involved with the system, but the involvement of technology in the existing manual procedures would reduce time and effort.

"We invested significantly in an AI solution, but after a month of use, we found that its features complicate the auditing process. We still must manually enter the opening balance, and the mapping feature does not meet our needs. Ideally, it should automatically import the closing balance from the trial balance, but differing line items and account names make data entry very difficult. This incompatibility renders the initial process unfeasible." (R11)

Blockchain technology is currently being employed in the realm of electronic invoicing, also known as e-invoice. The implementation of this electronic invoicing system would grant the government the authority to monitor and access information pertaining to any modifications made to payments, the issuance of invoices, and the validation of transactions (Liu 2018).

"Starting in August 2024, enterprises with revenue over RM100 million must adopt blockchain-based e-invoices. Next, the company must send all e-invoices to the Inland Revenue Board (IRB) for verification before sending them to the client. The client will scan the IRB QR code to accept the e-invoice. All of this requires repetitive work. And all of this entails repetitive work. If technology can be used, it will greatly assist us." (R5)

Practitioners were seen to have a positive attitude towards emerging technology adoption in current accounting and auditing practices. However, the issue of compatibility remains a big concern as they want advanced technologies to be compatible with their current needs.

ORGANISATIONAL CONTEXT

Organisational context drives the adoption, use, and implementation of technology. Internal factors encompass managerial support, organisational culture and structure, resource availability, including human resources competency and investment resource sufficiency, and management-identified policies and procedures for utilising new technologies and digital tools.

Top Management Support refers to how well managers understand, accept, and encourage technological innovation, particularly emerging technologies (Hamadneh et al. 2023; Maroufkhani et al. 2022). Top management is more likely to support the adoption of technologies when certain practices become mandatory. Although this may require significant costs, like training, organisations are willing to take these steps to meet compliance. This underscores the important role of top management support in adopting new technologies when compliance is required.

"Currently, the submission of financial statements through XBRL is voluntary, but most organisations will fully support any mandatory reporting updates to ensure compliance. Our firm plans to provide training. We typically seek additional training and seminars to ensure we are well-prepared and upskilled" (R2)

However, the challenge of adopting certain technologies persists when their implementation is voluntary. In such cases, top management may not allocate sufficient attention to advanced technologies like blockchain (Liu 2018), big data (Mittal et al. 2021), and artificial intelligence (Omar et al. 2017), as they demand real cases and evidence of benefits, which are still scarce. The lack of support from top management hinders the adoption process, as management refuses to incur additional costs, time, and resources (Hsiung & Wang 2022; Mihai & Dutescu 2022). Technology should come together with appropriate training and infrastructures, and these have become a challenge for the technology provider (Mihai & Dutescu 2022).

A lack of literacy and awareness among leaders was found to be a significant barrier to using robotic automation in accounting processes (Hsiung & Wang 2022). However, if an organisation perceives benefits from adopting these technologies, it is more likely to support and encourage their use.

"Currently, we are still using accounting software with servers and looking forward to cloud-based software. Our management favours cloud-based software since we can access data anytime, anywhere" (R3)

This highlights the importance of recognizing the advantages of new technologies to drive their adoption within organizations. Digitalisation tools should be broadly propagated and introduced efficiently in real-time through leaders.

DIGITAL PROFICIENCY CAPACITY

Another main issue regarding the acceptance of emerging technologies in the accounting profession is the shortage of professionals or experts in the accounting technology field (Mihai & Dutescu 2022). According to Juma'h and Li (2023), knowledge of blockchain technology, including knowledge of features, functions, and applications, has a significant influence on the intention to use blockchain technology. In fact, the main key problem is that our professionals are good in their field but not in technology. Professionals must step out and expose themselves to this new advanced technology knowledge.

"We don't have an IT expert in the company who can help us with troubles with accounting applications. Every single server and software issue had to be handled by ourselves, which dragged down the time that we could use for other accounting tasks. So, using cloud-based accounting software is the best option because we can rely on the system provider to fix any problems with the accounting system directly in the cloud."(R3)

Digital Proficiency Capacity can best be described as collective capability of digital skills, knowledge and experience available within organisations to effectively adopt, manage, and integrate digital technologies into its business processes. When companies have employees that are well-versed in technological innovation; they are far more likely to adopt emerging technologies aggressively, which in turn affects how firms view and use these technologies (Fu et al. 2023; Hashimy et al. 2022). Emerging technologies necessitate a high level of technological expertise as well as relevant qualifications from the employee's side. Employees with the necessary skills, knowledge, and abilities for these new technologies can help organisations better prepare for adoption (Zhou & Zheng 2023).

COST

Technological innovation and its execution demand funding. AI increases financial predictability, customer service, and company procedures; thus, top management needs to invest in robust technology (Razak & Ismail 2022). Additional costs need to be borne by the organisation, including development costs, installation costs, subscription costs (for ready-made technology), maintenance costs (subsequent costs), and consultation costs, including hands-on workshops and training materials. Therefore, there is a challenge for the organisation to allocate its finances specifically for this new technology (Afroze & Aulad 2020). Small organisations might not be able to cope with the changes unless there is some subsidy or enforcement by the government.

“Server-based accounting software demands extra maintenance and additional storage fees; hence, we're switching to cloud-based software to save cost. Cloud-based software automatically backs up; there is no additional charge for storage, and the system provider maintains and safeguards backup data." (R3)

Despite the need to heavily invest in these emerging technologies, some organisations view the financial challenges as an opportunity. In Malaysia, the government established XBRL to simplify the document lodgment process for regulators. The company secretary needs to attend training to become well-versed in the new system, and the training involves a certain cost. In return, their expertise in using the system allows them to charge slightly higher fees to clients, resulting in additional income as clients value their expertise in utilising the system.

"Currently, we have a strong preference for utilising XBRL. The expense of training for staff is only incurred once, during the initial period of system usage. With the system, we can charge slightly higher fees to our clients. Indirectly, it serves as additional revenue for us." (R1)

As a result, depending on whether the practitioner views the cost as an investment or a burden to the organisation, this cost aspect can have two different implications for decision-makers about whether to adopt or not adopt emerging technologies in the accounting profession.

ORGANISATIONAL CHANGE ADAPTABILITY

Organisational Change Adaptability refers to an organisation’s ability to effectively adapt to technological advancements, manage resistance to change, and address employee concerns, such as fears of job loss due to automation or increased responsibilities.

Resistance to change can happen when people have been using traditional methods for a long time. These long-serving staff members are used to their familiar working practices, making it difficult for them to adapt (Cardinali et al. 2023). Their familiarity with current ways of working hinders their ability to embrace new technological challenges, leading them to present various reasons for not needing to change their daily routines. It is further supported by Ariff Jafri et al. (2024) which found that efforts are unlikely to significantly influence Malaysian users' intention to adopt fintech, as they have likely become accustomed to and comfortable with it, making it a norm in their daily lives.

“We are aware of emerging technologies but currently we are not adopting any. We do not feel the need to upgrade to the newest technology because our company is relatively small. There is not a tonne of information to work with, either.” (R5)

“We have heard about the emerging technologies on television and in newspapers, but we do not have any idea how to incorporate those technologies into our current accounting software. We are using accounting software to ease the accounting task. However, if we need to blend it with these advanced technologies, we have no idea.” (R10)

These responses illustrate that while employees are aware of emerging technologies, they often feel no urgency to adopt them and frequently offer various justifications to evade the implementation. As an example, small business size is often cited as a reason for not venturing into digital adoption. However, based on the findings of study Idris et al. (2023), businesses, regardless of their size, can thrive through the implementation of digital technology. This reflects a broader reluctance to change and a preference for maintaining familiar processes.

The fear of job loss often arises in organisations when employees believe that adopting new technologies could lead to redundancy or reduced roles. This concern fosters resistance to change and lowers the organisation's adaptability for change, as staff view technological advancements as threats to job security rather than opportunities for growth and improvement. Automation is seen to be capable of analysing problems and drafting an audit plan which serves to act as a substitute for auditor roles in the future. Some professionals have the feeling that emerging technologies have the possibility to replace human jobs, particularly lower-level accountants involved in repetitive works (Vărzaru 2022).

"I am working in the food and beverage industry. In restaurants, our company uses robotics to serve customers. If robotic process automation is implemented in the accounting profession, this technology has the potential to replace human jobs or functions." (R3)

In conclusion, employee resistance to organisational change due to long-standing reliance on traditional methods and worries of job loss due to technological improvements hinders organisation's ability to adapt. Although employees acknowledge new technologies, their reluctance to adopt new procedures shows a preference

for old established practices, which might limit the firm's adaptability and success. Thus, to successfully embrace technology advancements, organisations must build a culture that addresses employee concerns, supports training, and emphasises the synergy between human and technological resources.

ENVIRONMENTAL CONTEXT

The Environmental Context refers to external factors that influence the adoption of new technologies and digital tools in the accounting profession. These factors include market forces like competitive pressure, industry demand, economic conditions, and environmental uncertainty. Additionally, it encompasses regulatory aspects, such as accounting standards and legal requirements that may impact technology adoption.

GOVERNMENT SUPPORT AND REGULATIONS

Regulatory issues have become a major barrier, and government involvement is critical, particularly in providing adequate policies, laws, and regulatory frameworks to steer adoption and avoid technology misuse (Gupta 2023). In Malaysia, the company secretary is currently obligated to use XBRL. Three documents need to be submitted to the CCM, namely the annual return, financial statements, and exemption application. Regulators provide continuous training for companies on using XBRL.

"Currently, XBRL is only enforced on annual return submission. We are not yet required to submit financial statements via XBRL. Financial statements are still submitted to CCM in hardcopy PDF format over the counter. We shall be penalised if we do not submit our annual return through the XBRL system." (R1)

"MIA with other regulators like CCM, Malaysian Institute of Chartered Secretaries and Administrators (MAICSA), Malaysian Association of Company Secretaries (MACS) and Institute of Approved Company Secretaries (IACS) conducting continuous training for the professionals relating to XBRL." (R2)

Coercive pressure, significantly related to 'legal prohibition,' was seen as the most significant factor hindering cloud computing adoption in developing countries (Adjei et al. 2021). In Ghana, their business laws prohibit the storage of data in a third-party server due to the closely related risk of data security. Some other countries have enforced tax declarations and other official forms digitally despite legislative uncertainty (Mihai & Dutescu 2022). In Malaysia, based on the Laws of Malaysia, Act 777 Companies Act (2016), there is no legal prohibition of data storage in a third-party server. However, according to the Personal Data Protection Act (2010), the best practice dictates that there must be precautions or agreements pertaining to the security and confidentiality of data regardless of where it is stored.

The detailed guidelines were established by MIA in April 2023 through the 'Ethical Guidelines on Technology Usage for Public Practitioners' (Malaysian Institute of Accountants (MIA) 2023). However, during this study, some practitioners either overlooked the guidelines or did not receive sufficient information related to their establishment. Regulators can take this opportunity to create more awareness of these guidelines so that practitioners understand the significance of this initiative.

"We are quite interested in accepting advanced technologies. However, we need some detailed guidelines for using the technology and hands-on training to become well-versed in the proposed emerging technologies." (R5)

The accounting profession was seen as lagging compared to other sectors and professions in digitalisation due to high regulatory requirements and the need for accounting standards compliance to uphold its integrity (Afroze & Aulad 2020; Gavrilova & Gurvitsh-Suits 2020). Professionals believed that due to the complexity of accounting tasks, there is no significant influence between the perceived usefulness of advanced technology and the intention to use, as they believe their work has little connection with the use of technology (Silaban & Siallagan 2019).

"When accepting any technology in our auditing process, we need to consider those technologies are complying with our accounting standards, rules and regulations." (R9)

The effectiveness of AI output depends on data volume and data quality that is being inputted into the system, as professionals are concerned about excessive accounting data (Omar et al. 2017). Research done by Alnasrallah and Saleem (2022) found that job relevance is not significant and has no direct effect between perceived usefulness and intention to use digitalization accounting. It indicates that professional accountants consider the nature of accounting work to be irrelevant and not in need of digitalization intervention because the work can be done as it is.

ENVIRONMENTAL UNCERTAINTY

Environmental uncertainty in the present study includes limited access to information, unpredictable rival actions, market shifts, fluctuating client tastes, and fast technical changes. The uncertainty emerges due to a lack of technology awareness and understanding, making it difficult to make informed decisions (Iranmanesh et al. 2023). This study focuses on the challenges of predicting the rapid evolution of emerging technologies to address various client needs. To deal with this uncertainty, organisations must be innovative and proactive enough to meet client needs.

"At first, I am not sure what emerging technology can do. But, once you showed me how to use ChatGPT to ask questions, I realised that this is extremely exciting and useful because it will help us make better decisions. I have to look for another artificial intelligence tool to aid us in our auditing procedure so that we won't be left behind." (R11)

Practitioners are quite concerned about dealing with unexpected unfavourable outcomes resulting from the adoption of technologies. The worry stems from the upcoming rule in Malaysia for company secretaries to submit financial statements using XBRL. Their concern is that receiving audited financial data late makes it hard to meet deadlines, especially as they are not directly involved in preparing the figures. This delay poses challenges in adapting to the new system and complying with submission timelines set by the CCM.

"If soon, the submission of financial statements will be mandated through XBRL, our main concern is that auditors will usually send us the audited financial statements right at the last minute, making it hard for us to submit the information through the XBRL system in time. Furthermore, we are not the one who prepare the figures and certainly we need more time." (R2)

Digitalisation is a must in the current business environment; otherwise, the organisation will be left behind compared to their competitors (Mihai & Dutescu 2022). The importance of keeping pace within the industrial benchmark puts pressure on companies to stay relevant in the profession. Organisations typically imitate the actions of their rivals within the same industry, and regarding the integration of cloud computing in the accounting profession, organisations are following the lead of their competitors (Adjei et al. 2021). Some businesses will imitate what their competitors are doing to ensure they remain ahead rather than left behind. However, if the organisation deals with mandated technology such as XBRL, the implementation is not optional. The organisation is seen to be competitive among its rivals when dealing with voluntary digitalisation matters.

CONCLUSION

In conclusion, emerging technologies bring both challenges and opportunities to the accounting profession, encompassing three dimensions: technological, organisational, and environmental.

In the technological context, the study examined the availability of technology, considering whether it is readily accessible from vendors or if businesses can develop their own solutions. Regarding the 'relative advantage' factor, practitioners are more inclined to adopt emerging technologies if they perceive clear benefits, such as reduced repetitive tasks, time savings, and increased transparency in accounting information. However, some practitioners still prefer traditional methods, which opens avenues for future studies to explore this preference. The final issue discussed was 'compatibility,' as practitioners expressed concern about finding vendors or technology developers that can meet their organization's needs and integrate with existing accounting systems. This apprehension presents an opportunity for vendors to promote their accounting technology solutions effectively.

In the organisational context, 'top management support' emerged as a primary issue, highlighting the need for leaders to promote digitalization tools in real time. The study illustrated that management would allocate financial and human resources only if they see the benefits of using digital tools. The second theme discovered during the analysis was 'digital proficiency capacity.' The existence of technology experts in the organisation is crucial, as current practice requires practitioners to solve any technical technology issues themselves. Companies seek new accounting systems or technology solutions that come with technical professional help to address concerns after installation. 'Cost' was identified as a barrier and burden to businesses, but if they can generate more revenue after investing in innovative technologies, it can present opportunities. The final aspect of the organisational context is 'organisational change adaptability', which includes resistance to change and the shared concern among employees about the fear of job loss. This study revealed professional concerns and mixed perceptions within organisational context regarding the integration of emerging technologies into accounting practices, despite the potential benefits.

In the environmental context, 'government support and regulations' emerged as a key factor facilitating successful technology integration in accounting. Government should take this opportunity to provide ongoing training on both mandated technologies and voluntary solutions like AI, cloud accounting, blockchain, and robotic process automation. Additionally, the study identified 'environmental uncertainty' in accounting, which presents challenges in predicting the evolution of emerging technologies and client needs. Practitioners voiced concerns about unforeseen outcomes in technology adoption, making it difficult to complete accounting tasks and meet submission deadlines.

The current study offering preliminary insights for practitioners and regulators as they navigate the complexities of adopting emerging technologies. Despite the detailed reviews of opportunities and challenges highlighted in the nine subcategories discussed above, the study has some limitations. This study focused on practitioners from small and medium-sized firms within the public practice sector, which may not fully represent the entire landscape of the accounting profession, as larger firms are also integrating technology into their practices. It included a limited number of respondents from various backgrounds, including public practice (accounting, audit, company secretarial firms), commercial entities, and publicly listed companies. Therefore, the findings should be considered within this limitation. Consequently, the findings lack generalisation and do not provide a comprehensive view of the entire practitioner landscape. Future research could expand the sample by including respondents from larger firms or may employ quantitative analysis to gain more generalisable insights into the challenges and opportunities within the accounting profession. Furthermore, future research could expand on the current study by conducting interviews with specific focus groups, such as those in public practice, commercial entities, or publicly listed businesses exclusively.

The research findings enhance the body of knowledge in digitalisation accounting research area by examining the opportunities and challenges of technological adoption through the Technology-Organization-Environment (TOE) framework. This approach highlights emerging technologies that can significantly transform the accounting landscape. For practitioners, particularly managers and employees, the insights gained from this study are invaluable. Management, responsible for allocating financial and human resources, will benefit from information that aids in developing technology adoption strategies and decision-making. Additionally, technology suppliers and developers can gain a better understanding of the specific needs of their target market. Finally, this research provides guidance for practitioners and policymakers on the importance of aligning digital strategies with compliance requirements.

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