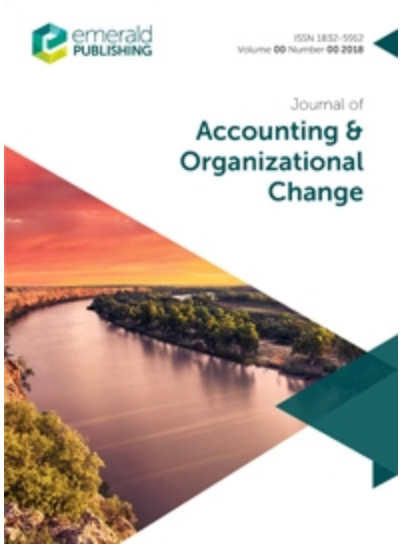

Technology adoption in accounting: The role of staff perceptions and organisational context

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Structured Abstract

Purpose

Technology is widely recognised to be revolutionising the accounting profession, allowing accountants to focus on professional skills and technical knowledge that deliver value for organisational success. Despite the known benefits, it is reported that accountants are not fully leveraging the potential value of certain technologies. To understand why, this study draws on the Technology Adoption Model (TAM) and investigates accounting professionals' perceptions towards technology, and how these may influence adoption at work.

Design/methodology/approach

The study gathered online survey data from 585 accounting managers from organisations of varying size and in different sectors in Australia and parts of Southeast Asia. Qualitative data were thematically analysed, and quantitative data were analysed using both descriptive and multivariate techniques.

Findings

The study highlighted the pivotal role of staff perceptions on the importance and ease of using technology on uptake and successful usage. Findings emphasised important opportunities for organisations to educate accounting staff on the value of technology and optimise their confidence and skills through training and support initiatives, particularly smaller businesses. Marked differences in the orientation towards technology among Australia and Southeast Asian

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participants illuminate how national work culture and practice can influence technology adoption.

Originality

The study makes a practical contribution by advancing our understanding of the relative importance and value of certain technologies in different regions and organisation types in the accounting profession. It extends our theoretical understanding of the role of TAM's core elements to the accounting context, exploring staff's notions of perceived usefulness and perceived ease of use from the manager's perspective.

Keywords

Technology adoption, accounting, technology acceptance model, perceived ease of use, perceived usefulness.

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Introduction

New technology is predicted to advance national growth and prosperity (Australian Government, 2018) and revolutionise the accounting profession, given its ability to replace processing functions traditionally undertaken by accountants (CPA Australia, 2019; Davern *et al*., 2019; Wolf *et al*., 2020). Accounting functions are diverse, spanning operational processing to meet regulatory requirements and budgeting, costing, performance measures and quality control for managerial and strategic decision-making (Davila and Foster, 2005). Despite earlier concerns that automation will deplete the profession (e.g. Frey and Osborne, 2013), accountants are still needed to analyse unstructured data and apply business acumen to complement new technology (e.g. Richins *et al*., 2017). Instead of diminishing the accountant's role, technology allows a greater focus on professional skills and technical knowledge that deliver value for organisational success.

Technology can be interpreted in different ways and this study focused on six broad types, defined by the functions they provide. They are: Customer Relationship Management (CRM, management of business processes related to customers), Enterprise Resource Planning (ERP, systems focused on the flow and integration of operations within an organisation), Robotic Process Automation (RPA, automated execution of tasks and processes based on event triggers), blockchain (sharing of information real-time without disclosure of identities), Artificial Intelligence (AI, machine learning or data analysis and software for forecasting or assessing risk to inform decision-making) and cloud computing (services delivered via the internet). These technologies are often integrated with one another, such as cloud computing which can feature across all types. There are many known benefits from adopting these technologies, such as accelerated business growth, greater efficiency and higher quality data

and information for more informed decision-making (Appelbaum *et al*., 2021; Davila and Foster, 2005).

Despite extensive consideration of the changing role of accountants from technological advance, less is known about accounting professionals' perceptions towards technology and how these may influence adoption at work. This is important given reports that accountants have not fully leveraged the potential value of technology in their practice (Buchheit *et al.,* 2020; Kokina *et al*., 2017; Tarmidi *et al.,* 2014; Vasarhelyi *et al.,* 2012) and the challenges associated with embedding new technology in the profession (e.g. Gardner and Bryson, 2021). The Technology Acceptance Model (TAM) (Davis, 1989) affirms that perceptions on how useful and easy a technology is to use can determine intention to use and actual usage. We therefore sought to explore accounting managers' perspectives on the importance of technology to their business and how they felt their staff perceived the usefulness and ease of using new technology. For context, we investigated how often and for what reasons organisations adopted different technologies and whether this varied across different settings.

Our research questions were: (RQ1) why is new technology employed in accounting and do reasons vary by region and organisation type, (RQ2) how often are different technologies employed in accounting and does this vary by region and organisation type, (RQ3) is technology adoption influenced by staff perceptions of usefulness and ease of use and do these perceptions vary by region and organisation type, and (RQ4) how successful are accounting work areas in using new technology and what are the contributing factors? Online survey data from 585 accounting managers across Australia and parts of Southeast Asia were used to address these questions. The study advances our understanding of why, and to what extent, certain technologies are used in different regions and organisations in the accounting

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profession. It also explores the relative importance and value of different technologies for business growth in accounting and how this differs by setting. Further, it extends our theoretical understanding of the role of TAM's core elements (perceived usefulness and perceived ease of use) to the accounting context, building on earlier applications of the model. The study also investigates staff's notions of perceived usefulness and perceived ease of use from the manager's perspective which, to our knowledge, is a novel application of the TAM.

Background

Importance and use of technology in accounting

Technology is deeply infused in modern day accounting activities. While the profession has been traditionally segmented into financial accounting and managerial accounting, technology has been a major driver for integrating and converging these functions of control and decision-making respectively (Taipaleenmäki and Ikäheimo, 2013). CRM and ERP are good examples of accounting professionals' involvement in the process, control and direction of business activities. The widespread use of the Internet, along with mobile technologies, allows easy and timely access of accounts which is unrestricted by the location of accountants. AI and RPA can automate many repetitive tasks and assist accountants with convenient tools for data analysis and other tasks that were traditionally manual, while blockchain can potentially disrupt the profession with error-free and efficient data management. The importance of technology is now well-known, with the profession calling for the integration of technology into accounting curriculum (Jackson *et al.*, 2022a; Sledgianowski *et al*., 2017).

Customer Relationship Management

Cruz-Jesus *et al*. (2019) assert that CRM is a powerful tool for building long-term relationships with customers and understanding their needs. It can be defined as 'the building of a customer-

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oriented culture by which a strategy is created for acquiring, enhancing the profitability of, and retaining customers, that is enabled by an Information Technology (IT) application; for achieving mutual benefits for both organisations and customers' (Rababah *et al.*, 2010, p.223). Along with others (e.g. Rahimi and Kozak, 2017; Spathis, 2006) Cruz-Jesus *et al*. identify a series of benefits from CRM systems which can automate and integrate the processing of customer-related matters at various organisational levels. Operational benefits include increased flexibility in generating information, minimising costs and improving productivity. They posit analytical benefits from better understanding customer behaviour and preferences through business intelligence applications (e.g. data mining) and strategic benefits from creating and sustaining long-term customer relationships. Finally, there are collaborative benefits from effective communication facilitated by integrated customer interaction touchpoints, website and social media. Accountants leverage benefits through, for example, their use of CRM for financial reporting and may collect and analyse information to assist managers in developing business and marketing strategies.

Enterprise Resource Planning

As with CRM, ERP systems manage business processes at different organisation levels. They extend beyond customer-related matters to supply chain management systems, groupware and enterprise application integration systems. ERP systems generally span multiple business functions and provide applications via on-premises or cloud software with a similar 'look and feel' across the organisation. They posit multiple benefits for organisations, including savings in inventory, travel and communication costs; quicker and more agile processes for greater business efficiency; and integration of functional areas to improve information accuracy, access and reporting for strategic planning and management control (Lee *et al.*, 2020). Collectively, these improve competitiveness and create strategic advantage (Bhatt *et al.*, 2021).

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For accountants, ERP systems have replaced traditional accounting software to enable better interconnection with other departments and easier access to information without requests (Gurău, 2020). They enable more efficient administration of accounting information, allow greater integration of financial and management accounting practice (Taipaleenmäki and Ikäheimo, 2013) and superior monitoring of information to support strategic decision-making (Davila and Foster, 2005).

Robotic Process Automation

Accounting's use of RPA has significantly increased (Gotthardt *et al*., 2020) with an observed shift from manually collecting, entering and processing data from operational systems and external sources to automated processes (Harrast, 2020). RPA uses pre-defined business rules to autonomously execute multiple transactions or tasks in one (or more) software systems (Institute of Electrical and Electronics Engineers, 2017). Hofmann *et al.* (2020) review how 'software bots' can perform tasks which may be data-related, including transferring data between independent applications such as invoicing and payroll (Gotthardt *et al*., 2020); integration-related - adding, deleting or modifying information stored on applications, cloud-based services and other input devices; or process-related, including repetitive tasks upon event triggers (Van der Aalst *et al*., 2018).

Simple RPA functions are relatively easy to implement and do not require customised software or deep system integration (Hofmann *et al*., 2020). They can be adopted without disturbing underlying computer systems, can minimise staffing costs and human errors (Boulton, 2018) and can improve efficiency in performing accounting and finance functions (Harrast, 2020). Their integration into workflows, however, still requires humans' cognitive abilities (Gotthardt

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et al., 2020) and embedding significant numbers of bots can be costly and complex (Boulton, 2018).

Blockchain

Blockchain refers to a shared chain of databases ('blocks') that can be set up as a new database or replace the whole or part of a traditional database. Blockchain can be permissionless (an open, decentralised database) or permissioned with a central authority that manages the network, or a hybrid of both (Wüst and Gervais, 2018). Users sharing information verify their identity once and blockchain may not require their identities to be exposed to others (Iansiti and Lakhani, 2017). Because records in blockchain are stored with timestamps and cannot be deleted or altered once appended, transactional data can be transferred real-time and at low cost to interested parties such as managers, creditors and stakeholders (Dai and Vasarhelyi, 2017; Prewett *et al*., 2020).

Blockchain can be implemented to perform a range of accounting functions, including tracking asset ownership, developing smart contracts without contact among intermediaries and signatories, managing inventories and authenticating transactions (Deloitte, 2019; Frizzo-Barker *et al.,* 2020). Blockchain's simultaneous sharing of synchronised transaction records without concerns for human error or fraud increases the efficiency and accuracy of accounting processes (Kokina *et al.*, 2017), allowing greater regulation among financial service providers (Tapscott and Tapscott, 2016). Despite such benefits, Gietzmann and Grossetti (2021) argue blockchain is underutilised in accounting and its adoption in the profession remains uncertain (Pal *et al*., 2021). Even with such criticisms, the global blockchain market is forecasted to grow from $2.5 billion in 2016 to $19.9 billion by 2025 (NewsRX LLC, 2016).

Artificial Intelligence

Using algorithms, AI mimics 'the capabilities of the human mind—learning from examples and experience, recognising objects, understanding and responding to language, making decisions, solving problems' (IBM Cloud Education, 2020). These combine to enable technology to perform functions traditionally undertaken by humans, prevent viruses and optimise human behaviour and logic (IBM Cloud Education, 2020; Kruchten, 2018). AI is already entrenched in business applications, such as automated phone or interactive voice response systems, fingerprint identity verification systems and computer dictation software, although more disruptive use is expected for decision-making functions (Davern *et al*., 2019; Goh *et al*., 2019). AI can be used in many ways in accounting (e.g. Nielsen, 2022), such as data mining to discover patterns in large data sets, optical character recognition to reduce time spent on manual data entries and machine learning to detect fraud and support simple decision-making (Gotthardt *et al*., 2020, p.91). Buchheit *et al*. (2020) note that data visualisation, which graphically represents information and data, improves the quality of information and adds value for clients.

Cloud computing

Cloud computing can be classified into: Infrastructure as a Service (users control infrastructure and applications), Platform as a Service (users control applications but not infrastructure) and Software as a Service (users control neither and instead access software applications provisioned by third party cloud service providers) (Gangwar *et al.,* 2015; Low *et al*., 2011). Clouds can be private to an organisation, a community cloud, open to the public or a combination of these (Mell and Grance, 2011). Cloud computing was once considered a disruptive technology in accounting given the expected shift from in-house systems (Hsu and Lin, 2016; Ma *et al*., 2021). A common use in the profession is the online migration of

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applications which are accessible online, enabling accountants to perform their financial functions from any location and at any time (Dimitriu and Matei, 2015).

Key benefits from cloud computing include cost-effectiveness from flexibility, scalability and easy access to real-time information by multiple users at different locations and reduced data storage and backup needs (CPA Australia, 2019; Fawcett, 2015). For small and medium-sized enterprises (SME), cloud computing attracts lower capital investment and software development and maintenance costs, increased access to innovative technology and agility in scaling up IT resources (Hsu and Lin, 2016; Ma *et al*., 2021). It can improve internal and external collaborations and allows for seamless invoicing and communication of financial information for effective business decisions (Dimitriu and Matei, 2015) although some firms are sceptical about the security aspects of using cloud computing (Tarmidi *et al*., 2014).

Technology adoption - perceived usefulness and ease of use

The role of staff perceptions on the usefulness and ease of using technology on adoption is explored by the TAM (Davis, 1989). The model originates from both the Theory of Reasoned Action (Ajzen and Fishbein, 1980) and Theory of Planned Behaviour (Ajzen, 1985). Here, attitude contributes to individual's behavioural intention, as well the degree of power individuals believe they have over their behaviour or attitudes. Significantly, the TAM introduced two distinct beliefs to one's attitude towards using a system and asserted that both determine intention to use a system and actual system usage. First, perceived usefulness, 'the degree to which a person believes that using a particular system would enhance their job performance'. Here, if staff consider a new technology to enhance their productivity and efficiency, they are more likely to adopt it. The second belief is perceived ease of use, 'the degree to which a person believes that using a particular system would be free from effort'

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(Davis, 1989, p.320). Autry *et al*. (2010) asserted that the two constructs consistently account for approximately 40% of variance in individuals' intention to use and actually adopt technology.

The TAM model has been used extensively to investigate the acceptance or rejection of technology (e.g. Marangunic and Granic, 2015; Vasarhelyi *et al.,* 2012) and many have verified its reliability and validity for predicting intention to use, actual use and attitude towards using technology (e.g. Hendrickson *et al*., 1993; Oliveira and Martins, 2011; Szajna, 1994). It has underpinned many global studies in accounting with consistent reporting on the positive impact of perceived ease of use and perceived usefulness on the intention and readiness to adopt emergent technologies. Studies have spanned data visualisation (Buchheit *et al.,* 2020; Perkhofer *et al.,* 2019), cloud computing (Le and Cao, 2020; Tarmidi *et al*., 2014), blockchain (Cazazian, 2022), accounting information systems (Ngadiman *et al*., 2014; Qader *et al.,* 2022), and AI (Damerji and Salimi, 2021). This leads to the following hypotheses:

Hypothesis one (H1): Perceived ease of use is positively associated with new technology adoption in accounting.

Hypothesis two (H2): Perceived usefulness is positively associated with new technology adoption in accounting.

Some earlier studies have explored predictors of perceived usefulness and perceived ease of use. These include job relevance, output quality and result demonstrability (Venkatesh and Morris, 2000); personality traits (Gefen and Straub, 1997); confidence in technology (Amoako-Gyampah and Salam, 2004); technology anxiety (Hong *et al.,* 2002); prior experience of use (Burton-Jones and Hubona, 2006; Oh *et al*., 2003); computer self-efficacy (Chow *et al.,* 2012;

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Davis and Venkatesh, 1996) and individual characteristics such as age and gender (Kasilingam, 2020; Park *et al.,* 2019).

Technology adoption – organisational factors

The adoption of different technologies is known to vary by organisational context. For example, Hopkins (2021) found that firm size is still a critical factor in technology adoption in the era of the fourth industry revolution with greater take up among larger organisations, although blockchain was an exception given its popularity among small firms. Lower levels of adoption are supported by others (see Horváth and Szabó, 2019), attributed to financial and resource constraints and reduced suppliers and networks (e.g. Mittal *et al*., 2018). Akpan *et al*. (2022) consider the challenges that inhibit technology adoption in SMEs in emerging markets and developing economies and highlight lack awareness of emergent technologies and the capability to embed them. The following hypothesis was therefore formed:

Hypothesis three (H3): Organisation size is positively associated with new technology adoption in accounting.

A further factor is profitability whereby organisations with greater access to funds are more likely to invest in and adopt new technology. The role of financial resources as an enabler of technology adoption has been widely documented (e.g. Horváth and Szabó, 2019; PwC, 2016). Greater recognition of the perceived benefits from technology are also known to heighten the speed of adoption in the profession (e.g. Buchheit *et al.,* 2020). Consequently, we posited:

Hypothesis four (H4): Profitability is positively associated with new technology adoption in accounting.

Hypothesis five (H5): Perceived importance of new technology for revenue growth is positively related to adoption in accounting.

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There is mixed evidence on technology adoption across industries. For example, technological changes have influenced management accounting practices in farming and family businesses (Kapiyangoda and Gooneratne, 2021; Ndemewah *et al*., 2019), big data analytics have been observed as more commonly adopted in Education, IT and Manufacturing and Wholesale while RPA has been found to be more prevalent in Manufacturing (Hopkins, 2021). In contrast, Raguseo (2018) reported that the use of different aspects of big data did not vary by industry. There is some evidence of lower adoption of disruptive technologies in public sector organisations, for cost and risk-related reasons, although this varies globally (see Ali *et al*., 2021). Given the lack of consistent evidence, directional hypotheses were not formulated for industry or sector.

Successful use of new technology

While there has been significant attention to the antecedents of technology adoption, there appears to be comparatively less on the successful – or otherwise - use of emergent technologies. As adoption may not always correspond to successful usage, we consider this is important while recognising that success can be interpreted in different ways. Contextual factors may determine success, such as organisation size, region and sector. For example, some claim that new technologies are unsuccessful in the public sector due, among other reasons, to a lack of familiarity with innovation, difficulties in integrating systems and the absence of project champions (see Ali *et al*., 2021). Petter *et al*.'s (2013) review of antecedents of different dimensions of information systems success found that organisations' levels of IT infrastructure were important. The authors also observed a positive relationship between user expectations and their attitude towards technology and different aspects of success. Despite such findings,

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the lack of exploration of antecedents of success - including those specific to accounting - mean directional hypotheses were not posed in this study.

Methodology

Participants

Five hundred and 85 accountants in managerial roles participated in the study. Four hundred and five were from organisations in Australia (with all States and Territories represented) and 180 in Southeast Asia (154 from Singapore and 26 from Hong Kong). Participants were based in the accounting industry or in an accounting work area/department in an organisation from another industry. Participant characteristics are summarised in Table I. Gender was reasonably evenly distributed in both geographic samples and most participants were based in the private sector. Most Australian participants were from SMEs and proportionately more Southeast Asian respondents from larger organisations. There was representation from a diverse range of industries with some differences by region.

[Insert Table I]

Procedures

A survey panel provider was responsible for recruiting an agreed sample of at least 550 accounting managers based in Australia or Southeast Asia. Eligibility criteria were, first, being an accounting professional in a managerial role in any industry (see Table I) or sector (public, private, not-for-profit). Second, participants needed to be based in Australia, Singapore or Hong Kong, with a request for representation from all Australian States and Territories. Following ethics approval, participants were invited to take part in an online survey which was administered in English. Data were gathered during June 2021.

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Measures

Participants first provided detail on their demographic and work characteristics (see Table I) and rated their organisation's revenue growth, return on assets and net profit margin (1=well below, 2=below, 3=about the same, 4=above, 5=well above) compared with main competitors. Organisation size was classified by number of employees (Australian Bureau of Statistics, 2022). A series of questions addressed RQ1 (reasons for adoption). First, respondents were provided with definitions of five types of technology (presented in Findings) and advised cloud-based technology was incorporated across the types. Respondents then rated their importance for increasing revenue in their accounting area/department/organisation (herein referred to as 'work area') using a five-point scale (1=not important, 2=slightly important, 3=moderately important, 4=important, 5=very important). Next, they rated the importance of six reasons for adopting new technology in their work area, using the same five-point scale. These reasons were informed by relevant literature (e.g. Hall and Khan, 2003) and respondents could record additional reasons in an open response field.

For RQ2 (usage of technology), participants rated the frequency of using each technology in their work area using a five-point scale (1=never, 2=rarely, 3=sometimes, 4=often, 5=always). For RQ3, Davis' (1989) measures were used to gauge perceptions on the 'ease of use' and 'usefulness' of new technology in their work area. These items have been used and validated by others (e.g. Chuttur, 2009). Wording was altered slightly to change from first to third person (referring to staff perceptions in their organisation, rather than the respondent's own perceptions on use/usefulness). A five-point likelihood scale (1=very unlikely, 2=likely, 3=neither unlikely or likely, 4=likely, 5=very likely) was employed in alignment with the other survey questions. For RQ4, participants rated their work area's success in using each technology via a five-point scale (1=poor, 2=below average, 3=average, 4=above average,

5=very good). The survey instrument was initially piloted among a small sample of industry representatives with minor adjustments made to improve clarity and flow.

Analysis

Preliminary analysis showed data were normally distributed, skewness and kurtosis well within the accepted thresholds of 3 and 10 respectively (Kline, 1998). Harman's single factor test (Podsakoff *et al*., 2003) confirmed that common method bias was not evident, a six-factor solution accounting for 66.7% of variance and the one-factor solution explaining only 38.1% of variance. Means and standard deviations were computed for the various measures. Variations in responses by organisation size and sector were investigated using One-Way Analysis of Variance (ANOVA) (α=.05) and differences by region using independent samples t-test (α=.05).

Hierarchical regression analysis examined variance in the composite average use of the five types of new technology. The first stage comprised contextual factors (organisation size, sector, region) and the second stage examined associations with perceived ease of use, perceived usefulness and organisational factors (profit, growth, importance for growth). A second hierarchical regression analysis investigated variance in the successful adoption of new technology using the same independent variables, other than importance for revenue growth. Finally, open survey responses on additional reasons for adopting new technology were thematically analysed using an inductive approach (Patton, 1990). The identified themes were cross-checked and discussed among the research team until consensus was reached.

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Findings

Importance of adopting new technology

Table II summarises participants' average ratings on the importance of the different technologies for increasing revenue in their work area. Results shows that CRM, cloud computing and ERP were considered the most important forms of technology in both regions. RPA, AI and blockchain were rated as less important, in that order, aligning with the reported usage rates. Independent samples t-test recorded significantly higher mean ratings for Southeast Asian compared with Australian respondents for CRM, $t(580)=1.748$, $p=.040$; ERP, $t(568)=2.262$, $p=.012$; RPA, $t(560)=4.461$, $p<.001$; blockchain, $t(544)=3.782$, $p<.001$; and AI, $t(545)=4.134$, $p<.001$.

[Insert Table II]

ANOVA showed significant variations in the importance of technologies for revenue growth by both sector and size (see Table III). Post-hoc analysis revealed that blockchain was significantly more important to public sector respondents than not-for-profit ($p=.022$). AI was also rated significantly more important among public sector respondents than those from private sector ($p=.021$) and not-for-profit ($p=.002$) organisations. Table III shows that organisation size made a significant difference to perceptions for all technologies. As with usage, micro/small organisations assigned significantly less importance than both medium and large organisations across all technologies. For RPA only, medium organisations also assigned less importance than larger firms.

[Insert Table III]

For reasons for adopting new technology in their work area, mean ratings for the six proffered reasons are presented in Table IV. Improving efficiency and productivity were considered most important, followed by achieving cost savings. Attracting new clients or business was also important, as was sustaining alignment with competitors. To a lesser extent, new technology

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was considered important for meeting client expectations and achieving growth. The relative importance of different reasons was consistent across the two regions. Independent samples t-test indicated variations in these reasons by region with significantly higher ratings recorded in Southeast Asia for business growth and expansion, $t(583)=2.148$, $p=.016$; aligning with competitors, $t(583)=1.852$, $p=.032$; and improving efficiency and productivity, $t(583)=2.530$, $p=.006$.

[Insert Table IV]

ANOVA results observed significant differences by organisation size and sector, summarised in Table V. Post-hoc analysis ($\alpha=.05$) showed that for all six reasons, smaller businesses assigned significantly lower ratings than both medium- and large-sized organisations. Further, for reasons relating to business growth and expansion and maintaining technology commensurate with competitors, medium-size businesses observed significantly lower average ratings than large organisations. For sector, those from not-for-profit organisations assigned significantly lower ratings, on average, than public and private sector respondents for business growth and expansion and client expectations. For alignment with competitors, not-for-profit participants were only significantly lower than those from the public sector.

[Insert Table V]

Thematic analysis of participants' open responses on additional reasons for adopting new technology in their work area revealed seven common themes. First, enabling flexible, mobile and remote working among staff was deemed important by 10 Australian and five Southeast Asian respondents. Second, five from both regions discussed the need for adoption to improve integration among existing systems. Third, eight Australian and four Southeast Asian respondents emphasised improving communication and/or customer service. A larger number (19 Australians and four Southeast Asian respondents) proffered business management as an additional reason for adoption, more specifically planning, budgeting, forecasting and

accountability. Further, six Australian and three Southeast Asian respondents cited adoption necessary for compliance requirements, such as adhering to local tax legislation and processes. Twelve Australians and four Southeast Asian respondents claimed improving information accuracy as a reason for adoption. Finally, an increase in data/cyber security was considered important by seven Australians and three Southeast Asian participants.

Adoption of new technology

Table VI presents the average use of different technologies by region, and a composite mean for all types. Results indicated greater use of ERP systems, particularly in Southeast Asia, followed by CRM systems. RPA, blockchain technology and AI were used less frequently overall, although they were more likely to be adopted in Southeast Asia than in Australia. Independent samples t-test (α=.05) showed a significant difference by region for CRM systems, t(576)=2.010, p=.022; ERP systems, t(572)=2.175, p=.015; RPA, t(570)=2.816, p=.003; and AI, t(563)=2.010, p=.022. Higher mean ratings were assigned by Southeast Asian respondents in each of these technologies.

[Insert Table VI]

ANOVA (α=.05) was conducted to detect any variations in usage by sector and organisation size. Significant results are reported in Table VII. For sector, Tukey post-hoc analysis showed significantly greater usage of RPA among public sector respondents than private (p=.051). For blockchain, those from the public sector reported significantly greater usage than from the private (p=.004) and not-for-profit (p=.033) sectors. There were significant variations for all five technology types by organisation size. Post-hoc results showed that for all technologies, other than RPA, micro/small organisations reported significantly lower average use than both medium (p<.001) and large organisations (p<.001). This was also the case for RPA, as well as medium-sized businesses recording significantly lower use than large ones (p<.001).

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[Insert Table VII]

Technology adoption – perceived ease of use and usefulness

Mean ratings for staffs' perceived ease of use and perceived usefulness for new technologies in participants' work areas are presented in Table VIII. Cronbach alpha was .92 for each construct and a composite average was computed. For ease of use, average ratings were similar across the six statements and inclined towards 'likely' for both Australian and Southeast Asian respondents. Results indicated that managers considered staff to be reasonably proficient at interacting with, operating and becoming skilled in using and leveraging the functionality of new technologies. For perceived usefulness, managers from both regions believed staff felt there was value to be gained from adopting new technologies, with averages exceeding 'likely' for all statements in the combined sample.

[Insert Table VIII]

Principal components analysis confirmed the items for ease of use and usefulness were both unidimensional. Each produced a single factor which explained 71.8% and 70.3% of the variance respectively, and all factor loadings exceeded .8. ANOVA and t-tests were conducted on the composite average for ease of use and usefulness, neither varying significantly by gender, sector or region. There were significant differences in the composite average for ease of use by organisation size, $F(2,582)=3.098$, $p=.046$ with post-hoc analysis showing a significantly lower average rating for micro/small businesses compared with medium-sized ($p=.045$). A significant ANOVA was also reported for perceived usefulness, $F(2,582)=5.371$, $p=.005$. Post-hoc analysis indicated a significantly lower rating for micro/small than both medium ($p=.043$) and large organisations ($p=.006$).

Results for the hierarchical regression on average use across the new technologies are presented in Table IX. Sample size met the recommended minimum of 10:1 subjects-per-variable

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(Harrell, 2001) and was considered sufficient for regression analysis. Dummy variables were created for region, organisation size and sector for the hierarchical regression analyses. Small businesses formed the base variable for organisation size, private sector the base variable for sector, and Australia the base for region. Bivariate correlations among independent variables were below 0.6, other than between perceived ease of use and usefulness (0.617), reducing the risk of Type II errors (Grewal *et al*., 2004). Variance Inflation Factor (VIF) being less than five among variables (Allen *et al*., 2014) and the absence of inflated standard errors suggested multicollinearity was not present. The Durbin–Watson test statistic approximated to the critical value of two (Norusis, 2008), suggesting first-order linear autocorrelation was absent.

In support of H1, the standardised regression coefficients (β) show a positive association for perceived ease of use, indicating that those who believed their staff could effectively use new technologies were most likely to report greater usage in their work area. The composite measure of perceived usefulness was not positively associated with technology use, contravening H2. Supporting H3, there was an observed association between organisation size and technology use with medium and larger organisations reporting significant, positive regression coefficients compared with smaller businesses (the base variable). There was also a significant, positive correlation between an organisation's net profit margin (compared with competitors) and their use of technology, supporting H4. Finally, affirming H5, perceived importance of technology (on average across all types) for revenue growth reported a large effect for positively predicting technology use.

[Insert Table IX]

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Success in using new technology

Respondents' average ratings on how successful they perceived their work area was in using the five technologies are presented in Table X. Success ratings were excluded for the small number of participants who had rated their work area had 'never' used a particular technology. Results were reasonably positive, although RPA, blockchain and AI reported slightly lower ratings, albeit still above the average (3) marker across both samples.

[Insert Table X]

Results from the hierarchical regression analysis on average success rating are presented in Table XI. Again, the Durbin–Watson test statistic approximated to two, VIF was less than five and there were no inflated standard errors. Standardised regression coefficients show that organisation size positively predicted success in using technology with significant, positive regression coefficients for medium and large-sized organisations compared with micro/small. Results confirmed ratings were similar across Australian and Southeast Asian respondents with no significant variation for region, and there were no associations between sector with successful use of new technologies for the combined sample. Perceived ease of use was positively associated with broad success in using technology. Further, the higher respondents rated their revenue growth and return on assets compared with main competitors, the greater they rated their work areas' success in using new technologies. A separate analysis showed that respondents' average use of all technologies positively predicted their work areas' level of success.

[Insert Table XI]

Discussion

CRM, ERP and cloud computing were regarded as more important technologies for revenue growth in both regions, reflected in their greater usage. The lesser value placed on and usage of RPA, blockchain and AI, particularly in Australia, may be related to complexities in their

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nature and usage and benefit being less understood in the profession (e.g. Jackson *et al*., 2022b). Usage aligns with those in the US where the more sophisticated technologies were apparent in firms once more basic applications were in place (National Bureau of Economic Research, 2020), emphasising interdependencies in the adoption of different technologies.

Greater emphasis on the usage of all technologies among Southeast Asian participants suggests a strong orientation towards technology, echoing earlier reports of high adoption levels in the region (e.g., UNECE and ESCAP, 2016). This suggests there are important national and cultural differences in technology use which may impact on organisational competitiveness (Roos, 2015). Despite the Australian Government's (2021) introduction of strategic measures to enable skills, infrastructure, security and regulation to progress in line with emerging technology, it appears that more is needed to encourage technology adoption, given its critical role in driving transformation and competitive advantage.

Findings suggest a close relationship between the perceived importance of technology for firm growth, and their frequency and effectiveness of technology use. This highlights the critical need for organisations and their staff to understand the contribution and value of new technologies, given they are likely to garner important productivity and efficiency advantages. Creating opportunities to convince accounting organisations/work areas of the benefit of embracing new technology is important. This is relevant for the organisations themselves, as well as professional associations and external stakeholders who provide thought leadership and practical support to advance businesses, particularly small ones. Facilitation of webinars, forums and other platforms which report on the evidenced value of different types of technology in the profession and snapshots of how they are being used across organisational settings could be useful, building on already available resources (e.g. CPA Australia, 2020).

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As predicted, there was lower technology adoption among smaller firms, supporting earlier studies in the accounting context (e.g. Horváth and Szabó, 2019). This has been attributed to limited internal IT expertise and staff capabilities (Nguyen *et al*., 2015) and financial constraints (Weigel and Hiebl, 2022), the latter aligning with the observed association between strong competitive advantage and the adoption and effective use of technology (Cai *et al*., 2019). Sector differences in technology usage were less definitive although greater RPA and blockchain use in the public sector could relate to capacity to resource new technology, a desire to manage data efficiently at significant scale or the larger size of public sector agencies.

Internal factors tended to drive technology adoption, the most important relating to the production side of organisational strategy (efficiency and cost saving). This was followed by externally oriented motivations (attracting new business and aligning to competitors), or the supply side of organisational strategy. Southeast Asian respondents assigned greater importance to market competitiveness and business growth, reflecting the dynamic growth-based economies of Hong Kong and Singapore. Large organisations were notably more driven by external factors compared to smaller businesses and, perhaps expected, there was less focus on competitiveness and growth among not-for-profit organisations when adopting technology. The importance of technology for flexible working aligns with the shift to virtual working since COVID-19-related lockdown restrictions (e.g. Papadopoulos *et al*., 2020). Recognition of the value of improving the integration of internal systems, communication processes, compliance and cyber security are all documented reasons for technology adoption in earlier studies (e.g. Dimitriu and Matei, 2015; Kokina *et al*., 2017; Taipaleenmäki and Ikäheimo, 2013).

There were few differences in managers' perceptions of how their staff perceived ease of use and usefulness of technology in Australia and Southeast Asia. Of note, managers from smaller

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organisations were inclined towards their staff finding technology less useful and less easy to use than those from larger businesses, connecting with earlier findings that smaller businesses generally place less value on emergent technologies, and they are less visible in work processes. Lower staff perceptions on the ease of using technology being associated with less actual usage accords with the TAM (Davis, 1989). Notably, staff perceptions of usefulness did not correlate with actual technology usage, contravening earlier evidence regarding the use of cloud-based accounting applications or software (Le and Cao, 2020; Tarmidi *et al*., 2014). This suggests that staff need less convincing on the value of technology and more support in its use, highlighting the importance of education and training to encourage more seamless adoption. Again, this does not have to be limited to internal provision and signals the need for greater support from professional associations and other external providers through forums, communities of practice, resources and mentoring programs (Jackson *et al*., 2022a). Such external interventions emphasising the role of technology, as well as providing practical support for accounting staff, are particularly important for encouraging greater usage and success among smaller businesses who most need to educate staff yet typically engage less in internal training (Horváth and Szabó, 2019).

Conclusion

The study explored accounting manager perspectives on the role of staff perceptions on the perceived ease of use and usefulness on the adoption and effective use of new technology. It drew on a large sample of managers based in accounting work areas/organisations in Australia and Southeast Asia. Using the TAM, it highlighted the pivotal role of staff perceptions on the importance and perceived value of technology on uptake and successful use, along with perspectives on the ease of using the new technology. These findings highlight important opportunities for organisations to be educating accounting staff on the value of technology and

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optimising their confidence and skills through training and support initiatives. This is particularly so for smaller businesses and those with lower revenue growth and return on assets. As these organisations may have less to invest in engaging staff with new technology and assisting them in a more seamless transition to evolving work practices, government assistance and tailored support from professional associations appears pivotal. Further, the study highlighted how national work culture and practice can make a difference to technology adoption with marked differences in technology orientation among Australia and Southeast Asian participants. Theoretically, it applies the TAM in an accounting context across two unique geographical regions and examines its core constructs from the managerial perspective.

As with all studies, there are limitations. These relate to cross-sectional design, self-reported data and recognition that other unexplored factors may feature in decision-making on adopting technology, such as leadership support, environmental influences, resources and staff expertise. Further, the study's examination of managerial perceptions confined investigation to actual system usage without consideration of individual intentions to use. Also, despite its widespread use, the TAM model has been criticised for a lack of predictive power (Li, 2020) and other theoretical models for technology adoption are supported, including transaction cost theory (Yigitbasioglu, 2014), the Technology Readiness Index (Parasuraman, 2000) and Roger's (1995) diffusion on innovation theory which emphasise economic efficiency, staff capability and organisational characteristics. Nevertheless, the study provides some important insights which can inform future research. Areas for further investigation include the application of alternative theoretical models on technology adoption and more granular analysis of how perceived usefulness and perceived ease of use differ for each technology in the accounting context.

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Table I: Summary of survey participants (n=585)

Characteristic	Sub-groups	Australia (n=405)		Southeast Asia (n=180)	
		N	%	N	%
Position	Proprietor/Director	109	26.9	36	20.0
	Executive/Senior Manager	95	23.5	75	41.7
	Manager	201	49.6	69	38.3
Gender	Male	203	50.1	97	53.9
	Female	202	49.9	83	46.1
Location	Metropolitan	349	86.2		
	Regional	56	13.8		
Country	Hong Kong			26	14.4
	Singapore			154	85.6
Organisation size	Small/micro (1-19 employees)	177	43.8	38	21.1
	Medium (20-199 employees)	163	40.2	72	40.0
	Large (200+ employees)	65	16.0	70	38.9
Sector	Public	36	8.9	12	6.7
	Private	352	86.9	165	91.7
	Not-for-profit	17	4.2	3	1.6
Industry	Accommodation/Cafes/Restaurants	18	4.4	6	3.3
	Primary/Utilities	15	3.7	8	4.4
	Construction	32	7.9	6	3.3
	Education/Cultural/Recreational Services	23	5.7	10	5.6
	Finance/Insurance	45	11.1	17	9.4
	Health/Community Services	32	7.9	7	3.9
	IT/Communications	38	9.4	32	17.9
	Manufacturing/Mining	38	9.3	26	14.4
	Personal/Other Services	27	6.7	6	3.3
	Property/Business Services	46	11.4	7	3.9
	Retail Trade	38	9.4	10	5.6
	Transport/Storage/Logistics	17	4.2	13	7.2
	Wholesale Trade	25	6.2	18	10.0
	Multiple from above	11	2.7	14	7.8

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Table II: Importance of different technologies for revenue growth

	Definition	All		Australia		SE Asia	
		M	*SD*	*M*	*SD*	*M*	*SD*
CRM	System to record/manage/analyse customer interactions and processes	4.04	1.093	3.99	1.156	4.16	.929
ERP	System to perform business processes, e.g. accounts payable/receivable, procurement, payroll	3.93	1.092	3.86	1.146	4.08	.951
RPA	Preconfigured program that performs repetitive functions across different software	3.19	1.386	3.02	1.414	3.57	1.245
Blockchain	Distributed ledger technology, used for continuous audit, smart contracts etc.	3.04	1.436	2.88	1.432	3.38	1.391
AI	Machine learning/data analysis for forecasting/assessing risk to inform decision-making	3.14	1.443	2.97	1.464	3.51	1.328
Cloud computing	Services/applications delivered via the internet	4.01	1.152	3.98	1.182	4.09	1.083

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Table III: ANOVA for importance of new technologies for revenue growth

Variable	Technology	Between groups df	Within groups df	F	*p*
Sector	Blockchain	2	543	4.057	.018
	AI	2	544	6.338	.002
Size	CRM	2	579	7.219	<.001
	ERP	2	567	33.114	<.001
	RPA	2	559	41.060	<.001
	Blockchain	2	543	28.893	<.001
	AI	2	544	34.493	<.001
	Cloud	2	565	15.602	<.001

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Table IV: Reasons for adopting new technology

Reason	All		Australia		SE Asia	
	M	*SD*	*M*	*SD*	*M*	*SD*
Technology will improve efficiency/ productivity	4.06	.909	4.00	.939	4.20	.821
Technology will result in cost savings	3.94	.948	3.90	.973	4.02	.884
Attracting new clients/business	3.82	1.109	3.79	1.149	3.89	1.011
Maintaining technology commensurate with competitors	3.79	.992	3.74	1.018	3.90	.922
Technology is instrumental to business growth/expansion plans	3.74	.991	3.68	1.018	3.87	.918
Clients' expectations to have/use new technologies	3.68	1.088	3.63	1.126	3.79	.992

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Table V: ANOVA for reasons for adopting new technology

Reason	Variable	Between groups df	Within groups df	F	*p*
Business growth/expansion	Size	2	582	21.314	<.001
	Sector	2	582	4.302	.014
Aligning with competitors	Size	2	582	30.893	<.001
	Sector	2	582	3.152	.043
Client expectations	Size	2	582	19.755	<.001
	Sector	2	582	4.756	.009
Attracting new clients/business	Size	2	582	6.785	<.001
Cost savings	Size	2	582	14.337	<.001
Improve efficiency/productivity	Size	2	582	10.709	<.001

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Table VI: Average use of different types of technology

	All		Australia		SE Asia	
Type	**M**	**SD**	**M**	**SD**	**M**	**SD**
CRM	3.56	1.290	3.49	1.322	3.72	1.205
ERP	3.88	1.243	3.80	1.271	4.04	1.167
RPA	2.72	1.399	2.61	1.386	2.97	1.402
Blockchain	2.59	1.443	2.53	1.422	2.73	1.483
AI	2.62	1.433	2.54	1.404	2.80	1.482
All types	3.09	1.064	3.01	1.065	3.26	1.045

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Table VII: ANOVA for frequency of using new technologies

Variable	Technology	Between groups df	Within groups df	F	*p*
Sector	RPA	2	569	3.308	.037
	Blockchain	2	561	5.709	.004
Size	CRM	2	575	34.585	<.001
	ERP	2	571	35.573	<.001
	RPA	2	569	37.354	<.001
	Blockchain	2	561	33.401	<.001
	AI	2	562	35.266	<.001

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Table VIII: Perceived ease of use and usefulness when adopting new technology

	All		Australia		SE Asia	
	M	*SD*	*M*	*SD*	*M*	*SD*
Ease of use						
Learning to operate new technology would be easy for staff	3.64	.895	3.64	.894	3.62	.898
Staff would find it easy to get new technology to do what they want it to do	3.70	.939	3.69	.948	3.72	.923
Staff interaction with new technology would be clear and understandable	3.79	.887	3.78	.886	3.81	.891
Staff would find new technology to be flexible to interact with	3.78	.910	3.79	.910	3.76	.913
It would be easy for staff to become skilful at using new technology	3.76	.910	3.78	.908	3.73	.914
Staff would find new technology easy to use	3.80	.888	3.81	.883	3.76	.901
Composite average	3.74	.767	3.75	.768	3.73	.766
Usefulness						
Using new technology would enable staff to accomplish tasks more quickly	4.03	.799	4.00	.834	4.10	.710
Using new technology would improve job performance	4.06	.804	4.03	.836	4.14	.723
Using new technology would increase productivity	4.05	.826	4.01	.841	4.13	.787
Using new technology would enhance effectiveness on the job	4.02	.802	3.99	.835	4.10	.718
Using use technology would make it easier for staff to do their job	4.05	.813	4.04	.837	4.05	.757
Staff would find new technology useful in their job	4.10	.748	4.09	.788	4.14	.650
Composite average	4.05	.670	4.03	.701	4.11	.591

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Table IX: Hierarchical regression analysis - average use of all types of technology

	Model 1				Model 2			
Variable	***B***	**SE**	***β***	***p*-value**	***B***	**SE**	***β***	***p*-value**
Contextual factors								
Constant	2.515	.128		<.001**	-.231	.221		.296
Medium size	.770	.093	.355	<.001**	.287	.071	.132	<.001**
Large size	1.042	.112	.414	<.001**	.440	.087	.175	<.001**
Public sector	.283	.148	.073	.056	.116	.109	.030	.290
Not-for-profit sector	-.332	.222	-.057	.135	-.018	.163	-.003	.912
South-East Asia	.009	.091	.004	.923	.086	.067	.037	.199
Organisational factors								
Perceived ease of use					.103	.050	.075	.040*
Perceived usefulness					-.037	.057	-.024	.513
Revenue growth					.044	.049	.034	.367
Return on assets					-.011	.047	-.008	.816
Net profit margin					.185	.046	.149	<.001**
Importance for revenue growth					.631	.037	.580	<.001**
Observations	581				581			
F-value	24.994**				67.923**			
R^2	.178				.567			
Adjusted R^2	.171				.559			
ΔR^2	.178				.389			

* $p < .05$, ** $p < .01$

Table X: Success in using new technology

	All		Australian		SE Asian	
	M	***SD***	***M***	***SD***	***M***	***SD***
CRM	4.11	.884	4.13	.873	4.06	.906
ERP	3.95	.898	3.91	.900	4.04	.890
RPA	3.69	1.061	3.78	1.094	3.65	1.043
Blockchain	3.73	1.065	3.70	1.066	3.79	1.064
AI	3.78	1.101	3.75	1.069	3.83	1.164

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Table XI: Hierarchical regression analysis – success in using all types of technology

	Model 1				Model 2			
Variable	***B***	**SE**	***β***	***p*-value**	***B***	**SE**	***β***	***p*-value**
Contextual factors								
Constant	3.526	.123		<.001**	.817	.266		.002
Medium size	.368	.089	.191	<.001**	.193	.081	.100	.018*
Large size	.514	.107	.230	<.001**	.274	.100	.123	.006**
Public sector	.135	.142	.039	.342	.130	.127	.038	.306
Not-for-profit sector	-.505	.211	-.098	.017*	-.309	.189	-.060	.102
South-East Asia	-.115	.087	-.056	.186	-.072	.077	-.035	.352
Organisational factors								
Perceived ease of use					.349	.058	.279	<.001**
Perceived usefulness					.064	.068	.043	.346
Revenue growth					.158	.057	.136	.006**
Return on assets					.129	.055	.110	.020*
Net profit margin					.081	.054	.073	.133
Observations	573				573			
F-value	6.936**				20.123**			
R^2	.058				.263			
Adjusted R^2	.049				.250			
ΔR^2	.058				.205			

* $p < .05$, ** $p < .01$