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Exploring the Significance of Digital Skills Training for Accountants

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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MBA, City University of New York, 1997

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

Accounting firm leaders face a challenge with employees who lack digital skills. Employees without relevant digital skills put the accounting firm at a competitive disadvantage. Grounded in human capital theory, the purpose of this qualitative multiple case study was to explore strategies regional accounting firm leaders used to help employees improve digital skills. Data were collected from six semistructured interviews with partners, directors, and managers with three years or more of experience who participated in the training and professional development process at four regional accounting firms in the Houston, Texas area. The review of company documents and company website postings triangulated the semistructured interviews. Data analysis entailed coding, conceptualizing concepts, identifying themes, and member checking. Three themes emerged, including digital skills needed for success, demonstrating investment in digital skills training, and benefits and challenges of digital skills training. One key recommendation was to offer training opportunities and intergenerational mentorship to accounting employees. The implications for positive social change include the potential to increased employee employability, work and life balance, job satisfaction, and client satisfaction, which may improve local communities' economic stability and growth.

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Dedication

I thank dear Lord for giving me the strength and wisdom to persevere through difficulties in my life to fulfill my dream.

Acknowledgments

I would like to thank my Lord and savior, Jesus Christ for the grace to finish. I want to thank my two chairs Dr. Jonathan Schultz and Dr. Roger Mayer for their generous support and remarkable guidance through this challenging yet rewarding journey.

I would like to thank my family members for inspiring me to pursue my doctoral study and encouraging me to keep pushing forward. I also appreciate all the prayers and support from brothers and sisters in my Christian fellowship.

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Section 1: Foundation of the Study

My goal in this qualitative multiple case study was to explore effective digital skills training strategies for accountants at regional accounting firms. The introduction of digital technologies is the primary trend of developing today's industry and economy. The beginning of the COVID-19 pandemic forced businesses to accelerate the digital transformation to survive and thrive by creating, delivering, and capturing values to their customers (Bikse et al., 2021; Lugtu, 2020). Consequently, the roles of accountants have been changing since digital technologies present threats and opportunities to the accounting profession (Lawson, 2019; Richins et al., 2017). To prepare and undertake the new roles, accountants must possess essential digital skills (Kokina et al., 2021; Lawson, 2019). Yet, professional accountants' current digital skills profile does not correspond to market needs (Ferreira et al., 2021). Thus, accounting employers have a role in helping their employees develop relevant digital skills to create value for customers that ensure business sustainability.

Background of the Problem

Professional accountants at all stages of their careers need to adapt rapidly to the changing business world under digital transformation. At present, companies' economic bloc of work is mainly based on digital technologies, and businesses have to incorporate digital technologies to not be at a competitive disadvantage (Aboagye et al., 2022; Markiewicz & Zheng, 2018). As a result, 67% of accountants' current required knowledge and skills relate to digital competence, and a modern accountant cannot exist without digital skills (Zhyvets, 2018). Digital technological innovation represented by big

data analytics (BDA) and robotic process automation (RPA) is drastically changing what the accounting professional can do and how they do it (Cooper et al., 2019; Richins et al., 2017). Accordingly, accounting employers and clients demand accountants use new technologies and techniques to develop new insights, create efficiency, and add value. To meet the market's needs, accountants need essential digital literacy or digital skills which are the skills to use modern digital technologies effectively and safely in professional and personal development (Pavelko et al., 2021). While the demand for digital skills is high, the supply is low. According to Richins et al. (2017), some accountants do not possess essential digital skills to apply modern IT tools for BDA purposes due to lack of training. Compared with regional accounting firms, Big 4 accounting firms have started investing heavily in the new technology implemented and providing significantly more training to help employees improve digital skills related to RPA (Bakarich & O'Brien, 2021). Regional accounting firms have less economic resources, less technology and infrastructure, smaller offices, and fewer clients (Wines et al., 2013). One of the biggest challenges regional accounting firms faces is the lack of training programs to help professional staff embrace the digital disruption in the accounting profession (Bakarich & O'Brien, 2021).

Problem Statement

Accounting firm leaders face a challenge with employees who lack digital skills because of inadequate training and are left behind or replaced by automation due to technological advancement (Huerta & Jensen, 2017, pp. 103–104). According to Zhyvets (2018, p. 87), 69% of new accountants noted inadequate training on applied digital skills,

including digital communication, accounting automation, data analytics, and presentation skills. The general business problem was that some accountants at accounting firms lack the digital skills to meet their clients' needs in the current data-driven business world. The specific business problem was that some accounting firm leaders lack strategies to train staff members on digital skills.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies that accounting firm leaders used to train staff members on digital skills. This study's targeted population consisted of six partners, directors, or managers from four regional accounting firms in the Houston, Texas area, who have developed effective strategies to train staff members on digital skills. The accounting firm leaders who read the results of this study may promote social change by implementing effective training strategies to improve organizational efficiency and profitability, contributing to the local economy through tax revenue, and increasing social well-being for employees and stakeholders. The potential social impact of this study is that the results may be used to influence client satisfaction, leading to sustainable accounting firms' business, which may also increase economic and social growth. The accounting firm leaders may also provide valuable ideas to help local universities develop effective digital skill training programs and update accounting curricula to integrate digital skills topics. The students who acquire essential digital skills can become more competent future accounting professionals.

Nature of the Study

I used the qualitative methodology for my study. Qualitative research involves collecting and analyzing nonnumerical data to understand concepts, opinions, or experiences (Saunders et al., 2015). Researchers usually use a qualitative approach to connect deeply with participants to explore a phenomenon (Yin, 2018). My goal was to explore the phenomenon of digital skills training strategies in accounting firms; therefore, the qualitative research method was appropriate for my study. Quantitative research is a systematic empirical investigation of observable phenomena (Saunders et al., 2015). Researchers use quantitative methods to examine variables' characteristics or explain the relationships among using a range of statistical and graphical techniques (Saunders et al., 2015). The mixed-method researcher focuses on using quantitative and qualitative methods to collect, analyze, explore, and examine phenomena in a single study to address the research problem (McKim, 2017). My goal was not to identify the relationship among variables, so I rejected both the quantitative and mixed methods and selected the qualitative method.

There are various kinds of qualitative research designs. My primary focus was on three significant qualitative designs: case study, phenomenology, and ethnography. A case study is an in-depth inquiry into a topic or phenomenon within its real-life setting (Yin, 2018). A researcher chooses a single-case design when the case has critical or unusual nature (Yin, 2018). Compared with a single-case study, the overall multiple-case study is more robust because it is likely to produce more evidence (Yin, 2018). Researchers use a multiple case study approach to compare the findings across cases

(Saunders et al., 2015). Because my goal was to explore the strategies accounting firm leaders use to train staff accountants on digital skills, I used a multiple case study design for my research. The phenomenological design focuses on participants' lived experiences and their recollections and interpretations of those experiences (Saunders et al., 2015). When using ethnographic designs, researchers study the culture and social world of a group (Saunders et al., 2015). The goal of this study was not to focus on the meanings of participants' lived experiences nor to explore participants' culture and sociological lived experiences. Therefore, I decided to adopt a multiple cases study approach to explore accounting firms' digital skills training strategies by rejecting both phenomenological and ethnographic designs.

Qualitative Research Question

The overarching research question was: What strategies do the accounting firm leaders use to train staff members on digital skills?

Interview Questions

1. What essential digital skills were lacking in your staff accountants and what strategies have you utilized to address the training needs of your accounting staff who lack those digital skills?

2. What were the key barriers you have encountered in implementing your digital skills training strategies?

3. How did you address the key barriers you encountered in implementing your digital skills training strategies?

4. How did you assess the effectiveness of your digital skills training strategies?

5. What types of teams building, and company-sponsored self-training or group training programs have you found to be more effective in digital skills training?

6. What return on human capital investment have you experienced from your training strategies?

7. What further comments or additional information would you like to add regarding digital skill training for your staff accountants?

Conceptual Framework

Human capital theory served as the conceptual framework to support this study. Gary Becker developed the human capital theory in 1962. The two tenets of human capital theory are education and training. Becker (1962, 1993) used the theory to explain that society and organizations benefit from investing in human capital through education and skill training. Employees with enhanced skills acquired from training can improve organizational performances and promote business expansions (Marinuthu et al., 2009). Developing human capital with digital skills contributes to nations' growth objectives (Marin, 2020). The investment in cognitive and technical skills training contributes to increased competitiveness for employees and reduces turnover in organizations (White et al., 2016). Accounting firm leaders may increase the value of human capital to improve performance and sustain organizations' competitive advantage by developing and implementing effective strategies on digital skills training for staff accountants. I used human capital theory to understand the successful strategies that the participating firms developed and employed to train their employees on digital skills.

Operational Definitions

Big data: Big data is quantities of information that are so cumbersome or so intricate that standard analysis procedures cannot process them (Warren et al., 2015).

Big data analytics: Big data analytics is a process of inspecting, cleansing, transforming, and modeling big data to collect useful information for decision making (Cao et al., 2015).

Digital communication skills: The ability of using various digital tools to achieve the goals in interaction with people (Makaruk, 2021).

Digital skills: Digital skills, including basic and advanced digital literacy, are the ability to use modern digital technologies and digital media effectively and safely in professional and personal development (Bikse et al., 2021; CGMA, 2019; Pavelko et al., 2021).

Human capital: The stock of skills and productive knowledge embodied in people that help them contributes their value to the workforce (Becker, 1962; Schultz, 1961).

Regional accounting firms: Regional firms are medium-sized enterprises that employ between 20 and 199 workers (Adapa et al., 2015).

Robotic process automation: The technology that creates software robots (bots) to emulate the actions of a human interacting with data from multiple information systems (Kokina & Blanchette, 2019).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are the underlying perspectives assumed true without performing further investigation by the researcher to conduct a study (Rust et al., 2017). I made several assumptions in my doctoral study. First, I assumed participants had experience and knowledge in implementing training programs to improve employees' digital skills. Second, I assumed participants would answer the questions truthfully and honestly with no verification of truthfulness performed. To promote truthful and accurate responses, I assured participants that their identities would be kept confidential. Finally, I assumed digital skills were critical to success of employees and employers.

Limitations

Limitations are elements outside of the researcher's control (Reeves et al., 2013). The results from my study depended on the honesty of the respondents who participated in the study. Participants might have biases and express comments not reflective of best practices. The interview process might have been too limited to reveal all the potential strategies that regional accounting firm leaders employed to train the employees. Further research could present additional questions related to training strategies.

Delimitations

Delimitations are boundaries and restrictions on the scope of the study that the researcher imposes, including the sample, population, and instrumentation (Inkinen, 2017). I narrowed the scope of the study based on the setting and context of the inquiry and the participants. Delimitations for this study included the years of leadership

experience, size of businesses, and the geographic location of the study. First, this study limited the participation to leaders with experience successfully overseeing digital skills training programs in accounting firms. Second, I only included medium-sized regional accounting firms. According to Adapa et al. (2015), a regional accounting firm has employees between 20 and 199. Third, all participants worked for one of the selected regional accounting firms in the Houston area of Texas.

Significance of the Study

In today's business climate, accounting firm leaders need strategies to train staff accountants on digital skills. The clients expect accounting professionals to understand how digital technology impacts their businesses and leverage these technologies to serve them better, faster, with lower costs. Accountants with high digital competence can use their time more efficiently and extend their reach to a broader network of clients to provide better service in the digital market (Stokdyk, 2018). Accounting firms equipped with vital employees receiving adequate digital skill training may reap the benefits of innovative performance, increased client satisfaction, and competitive advantage. Accounting firm leaders may use the results of this study to implement effective training strategies to improve organizational efficiency and profitability, which contribute to the local economy through tax revenue and increase social well-being for employees and stakeholders.

Contribution to Business Practice

Digital skills have been one of the significant leadership skills required for business leaders to succeed in a digital workplace (Kane et al., 2016). Accounting firm

leaders may use the findings from this study to be aware and adopt the strategies of training staff accountants on digital skills. Digital skills training strategies may contribute to firms' competitive advantages and sustainability by providing a secure advantage for improving performance, increasing productivity and creativity, and facilitating innovation (Martin, 2020). Using or adapting the study's findings and recommendations can increase accounting leaders' understanding of how accountants may be equipped with the digital training needed to excel in leadership positions within the firms. The ability to communicate, work in teams, and think critically in the digital environment increases accountants' value to the organization (Teodora et al., 2013). Therefore, recognizing and addressing the need for digital skill training may benefit business sustainability because of the potential increase in performance efficiency and effectiveness.

Implications for Social Change

Accounting firm leaders with effective strategies on digital skills training may help staff accountants develop the perceptions of high employability, which is an individual's chance of qualifying positions within the internal and external labor market (Lissitsa & Chachashvili-Bolotin, 2019). Because current digitized workplaces increasingly favor digital technology-savvy workers, individuals with high perceptions of their marketability should have an increased sense of self-confidence. Business leaders may promote positive social change by equipping companies with viable employees who receive essential digital skills training. When employees demonstrate proficiency in digital skills, their clients in the community receive better service (Huerta & Jensen, 2017). New organizations may evolve to provide online digital skills training, or

universities may increase hiring to support certificate programs to meet the accountants'

training needs. The subsequent success of employees and businesses improves local

communities' economic stability and growth.

A Review of the Professional and Academic Literature

In this section, I provide a comprehensive review of academic literature to justify

my research study. Journals articles, seminal books, research studies, and professional

websites were the primary sources for the literature review. I located peer-reviewed

articles through Google Scholar and academic databases accessible through Walden

University Library, such as ABI/INFORM Global, Sage Publications, various ProQuest

databases, and EBSCOhost databases. The keywords used in the literature search

included *human capital, training, expectancy theory, goal-setting theory, digital skills,*

digital communication, accountant role, accountant competencies, data analytics,

accounting automation, reliability, validity, member checking, dependability,

creditability, data saturation, and triangulation. I also used variations and combinations

of these terms to assist in locating additional articles. I limited the search for peer-

reviewed journal articles to those published within 5 years of my expected graduation

date of 2022. In reviewing the literature for this study, I incorporated 255 sources, 190 of

which were peer-reviewed references, and 173 sources were published in 2017 or later.

This literature review began with a thorough examination of the extant literature

on human capital theory, which was the conceptual framework for this study, followed by

a review of primary opposing theories with explanations of why the theories were not

beneficial to the study. I then focused on the research literature related to digital skills

such as the changing role of accountants in the digital age, accounting skills/competencies shift necessitated digital skills, the importance of digital skills to accounting profession, accountants' lack of digital skills, and digital skills training for accountants. In the review, I also addressed firm performance and how digital skills training contributed to client satisfaction, the firm's competitive advantage, and the sustainability of the business. I used this literature review to support this qualitative, multiple case study and to address the research question: What effective strategies do accounting firm leaders use to train staff on digital skills?

Human Capital Theory

According to human capital theory, the investment in human capital through education and training may benefit society, organizations, and individuals. Human capital refers to the stock of skills and productive knowledge embodied in people (Becker, 1962). Human capital theory addressed the concept of gaining knowledge and skills to employ a sufficient workforce (Becker, 1993). Seminal work on the human capital theory included works by Schultz (1961, 1993) and Becker (1962, 1993). Schultz (1961) asserted that humans who gain skills and knowledge have economic value and increased productivity. Schultz (1961) also explained how expecting training costs and considering the costs necessary improve individual capabilities. Becker (1962, 1993) developed the human capital theory by highlighting that education and training are primitive investments in human capital. Enhancing digital skills training by investing in the staff accountants at regional accounting firms aligned with the human capital theory.

Social Benefits

Based on the human capital theory tenets, society benefits from the investment in education and training for people. The determinants of health and wealth for the community and organizations are the accumulation of people's knowledge and skills (Becker, 1993). Economic development depends on the advances in technological and scientific knowledge; therefore, the investment to accumulate human capital may promote economic growth (Becker, 1993). Developing digital skills for employees contributes to a nation's growth objectives (Marin, 2020). Education and continuous training can contribute to social cohesion and the national economy (Manole et at., 2018). Amran et al. (2021) noted that the sustainability of business and society depends on human intellectual capital factors, and developing human capital is vital for firms to pursue corporate social innovation. Rouse (2017) posited that schooling reduces people's participation in crime and increases the likelihood of voting. Society benefits when a more literate population can fully participate in the democratic system of government. Besides, individuals with valuable skills can earn a good living to take care of themselves and their family members, reducing economic dependence on the government (Rouse, 2017).

Educated workers also are more likely to have environmentally friendly behavior: they can set up good examples for other workers and make coworkers more productive (Rouse, 2017). Society is better off when more citizens have a high level of education and valuable skills. People with advanced educational backgrounds and skills are more cooperative than those without that educational background (De Jong, 2015). Collaborative business leaders may foster better collaboration between organizations. The

international strategic alliance between different organizations is an essential prerequisite for company success, and society benefits from the companies with sustainable growth (De Jong, 2015). Increased human capital contributes to the individual's cooperative behavior directly and to society indirectly.

Organizational Benefits

In human capital theory, Becker (1993) predicted that individuals with adequate education, training, and credentials offer more value to their organizations. The investment in human capital may improve productivity on the job and efficiency of economic decision-making, leading to increased profits (Becker, 1993). There is also a general agreement that organizations benefit more from certified employees with adequate expanded duties training (Renfro et al., 2019). Adom and Asare-Yeboa (2016) discovered that the education level for women entrepreneurs has the most significant impact on the success of their business, followed by business training and the experience gained from prior employment. Women with higher educational levels understand their business environment better, have a broad spectrum of ideas, and introduce their business to the global market (Adom & Asare-Yeboa, 2016). Together with other human capital factors, the level of education predicts the business' performance and profitability.

The investment in human capital is a critical factor for organizations to sustain competitive advantages in the current, complex business world (Manole et al., 2018). Effective training contributes to helping in creating a positive atmosphere in the company, increasing working efficiency and reducing turnover, thus affecting the improvement of quality of work at companies (Olejniczak-Szuster & Lukasik, 2018).

Besides, task-related training organized in firms with high-authority centralization can better accumulate resources and knowledge from training for firm innovation (Ma et al., 2019). Business innovation means creating new ways to meet clients' needs. Only innovative businesses with productive employees may survive and thrive in the current competitive business world.

Individual Benefits

Individuals can also reap benefits from the investment in human capital. Investment in human capital may promote employees' health; reduce their smoking; raise their propensity to vote, and stimulate their appreciation of classical music, literature, and even tennis (Becker, 1993). The monetary gain from education is significant. The earnings of more educated people are consistently well above average, and the gains are even more significant in less-developed countries (Becker, 1993). Employees with enhanced knowledge and skills may further the competitive advantage for an organization's quality and productivity, and in return, employees may reap high earnings for themselves (Ismail & Awang, 2017). Earning more with a higher level of education helps people gain or improve their social status (Adom & Asare-Yeboa, 2016).

Lissitsa and Chachashvili-Bolotin (2019) revealed the positive correlation between digital competence and individuals' perceptions of employability, which is an individual's chance of a job in the internal and external labor market. Individuals with marketable digital skills have the perception of high employability (Lissitsa & Chachashvili-Bolotin, 2019). Because current digitized workplaces increasingly favor digital technology-savvy workers, individuals with increased perceptions of their

marketability should have a high sense of self-esteem and more confidence in their job security. Employees with competencies developed from training may adapt to the new requirements and expectations of the labor market, improve their work efficiency, and develop strong bonds with companies (Olejniczak-Szuster & Lukasia, 2018).

Employees may achieve job satisfaction when the organization uses training to help expand individual skills and knowledge (Olejniczak-Szuster & Lukasia, 2018; Olmedo-Cifuentes & Martín-León, 2015). Investing in human capital at the individual level results in sacrificing the time and cost associated with funding an education; however, the costs can relate to personal advancement and satisfaction, benefit the organization where the individual uses the education (Cornacchione & Daugherty, 2013). The investment in human capital benefits individuals socially, psychologically and materially.

Alternative Theories

Alternative theories that I considered using as the conceptual framework for this study included the resource-based view theory (RBV) and the expectancy theory. In the following subsections, I described each alternative theory and how it could be used to contribute to expanding current knowledge regarding digital skills training strategies. After consideration, it was determined that human capital theory supported my research goals more effectively.

RBV Theory

RBV theory can be used to interpret how firm leaders use tangible and intangible resources, including human resources, to gain competitive advantages (Chilavi et al.,

2021). Wernerfelt (1984) stated that practitioners may focus on the internal resources to achieve output and ignore products to obtain a competitive advantage. Firms may gain a tangible competitive advantage from tangible resources, such as machinery and equipment, or an intangible advantage derived from the company's trade names, personnel training, and organizational culture (Chilavi et al., 2021). According to Chilavi et al. (2021), the more the organization's competitive advantage is based on intangible benefits, the more difficult and time-consuming it is to imitate. Moving and attracting intangible advantages is more complex than tangible ones because an intangible advantage is probably derived from organizational characters, features, and capabilities that are causally ambiguous and socially complex (Chilavi et al., 2021). Under the RBV theory, an organization cannot easily replicate other organizations given the complexity of the levels of resources involved in a firm (Wernerfelt, 2013). The RBV theory does not contain an explanation of how failure occurs in changing organizations or equally competitive organizations (Wójcik, 2015). According to the RBV theory, increased human capital derived from training contributes to firms' success; however, other intangible or tangible resources may also play critical roles in sustaining firms' competitive advantage. For this reason, I did not use the RBV theory as the conceptual framework for this study.

Expectancy Theory

In the expectancy theory, Vroom (1964) declared that the degree of an individuals' belief and expectancy about their ability to perform a task determines their performance level. Porter and Lawler (1968) developed a model expanding on Vroom's

expectancy theory by proposing two influential determinants affecting an individual's efforts to job performance: individuals' ability (i.e., the individual's knowledge, skill, and training) and role perception. De Simone (2015) mentioned that the capabilities increased through related skills and knowledge training improve employees' attitudes toward performing job tasks. Employees are motivated to increase their efforts at work when their well-done performance is rewarded, and the value of the reward is remarkably positive (Lunenburg, 2011). Monetary and tangible nonmonetary rewards can affect individuals' effort, leading to wished performance (Kamon & Supreephong, 2020). Meymandpour and Pawar (2018) claimed that employees in information technology (IT) industries prefer training programs rather than other reward categories to increase their job performance expectations to accomplish the tasks satisfactorily. Therefore, business leaders may employ various rewards to motivate employees for optimal performance.

Employees also decide to develop new job skills based on the expected return (Frenkel & Bednall, 2016). The more individuals believe the training is beneficial, the more likely they are motivated to learn. The increased motivation also helps employees retain and transfer the training outcomes to their everyday tasks to improve performance (Tombs, 2018). However, the expectancy theory does not explain why certain employees already committed to a career continue to increase their digital skills needed to achieve customer satisfaction. Hence, I did not use the expectancy theory as the conceptual framework for this study.

Human Capital and Digital Skills

Organizational leaders must invest in continuous education and training to use human capital effectively. Investing in specialized human capital training provides added benefits for the individual, the organization, and the economy (Smith & Worsfold, 2015). Well-trained employees with the necessary skills may develop self-confidence and increase productivity, resulting in organizations reaping profits (Smith & Worsfold, 2015). Investing in specialized training also results in substantial indirect benefits such as minimized poverty and inequality, less community disorder, the higher output of goods and services, and a narrowed gap between labor productivity per dollar of wage in higher-wage countries and that of lower-wage countries (Kahn & Kahn, 1968; Mamun et al., 2016). Hence, individuals, organizations, and society all benefit from the investment in specialized training directly and indirectly.

Implementing specialized training programs may require additional material resources and time costs; however, organizations may benefit more from individuals' improvement. If organizations fail to be diligent in providing sufficient training, individuals' satisfaction and commitment can be affected, and an increase in turnover may occur (Henderson & Sowa, 2018). High turnover negatively impacts organizational productivity and effectiveness (Al Mamun & Hasan, 2017), while on-the-job training increases the employees' job satisfaction, retention, and reduces business costs (Jaworski et al., 2018). Therefore, the benefits derived from the specialized training far exceed the costs.

The investment in digital skills training, which is specialized training, may be the basis for organizations to increase competitiveness and for the country the organization is in to gain economic, social, environmental, and consumer benefits (Bikse et al., 2021). Required when using information technology and digital media (Bikse et al., 2021), digital skills are a range of abilities to use digital devices, communication applications, and networks to access and manage information (UNESCO, 2018). Entry-level digital skills are the basic functional skills required to use digital devices and online applications. The advanced digital skills are the higher-level abilities to use digital technologies to facilitate digital transformations such as Artificial Intelligence (AI), machine learning, and Big Data Analytics (BDA) (UNESCO, 2018). The increase in employees' digital skills increases employment, personal gains, and labor market security, facilitating digital transformation for society (Basol &Yalcin, 2021).

To ensure digital transformation, business leaders must address digital technologies, organizational solutions, and human capital development in a holistic approach (Bikse et al., 2021). The COVID-19 pandemic forced enterprises to accelerate the digital transformation to survive and thrive by creating, delivering, and capturing new customer values (Lugtu, 2020). It is essential to develop human capital with adequate digital technology skills and specific digital competencies for digital transformation. Digital competence combines knowledge, skills, and attitudes, including soft skills such as self-organization, problem-solving, collaboration, communication, and creativity (Bikse et al., 2021; Carolina Feijiao et al., 2021). In other words, the required competencies in the digital age are not just merely technical, in addition to digital

technology skills, complementary skills such as self-management, adaptability, communication and collaboration skills, problem-solving, critical thinking, creativity, entrepreneurship, and readiness to learn are essential to employees (European Commission, 2020; Hofmann & Ogonek, 2018). Implementing competency-based education and digital skills education in all study programs can prepare new professionals to meet the customers' needs in the current digital environment (Bikse et al., 2021). Therefore, business leaders should address both technological skills and soft skills in their digital skill training programs.

The adaptation of digital technology and acquisition of digital skills and related competence are vital for individual, industry, and country success now; however, Orlando et al. (2020) argued that digital technologies can also negatively affect businesses, and digital skills may have a strategic relevance only when they are used in complex tasks. In other words, small levels of increasing digital technologies are helpful for the creation of intellectual property. By contrast, excess and undifferentiated digitization may deplete employee creativity, causing various learning, attention, and misperceptions problems, thus reducing a firm's ability to generate intellectual property (Nambisan et al., 2019; Tarafdar et al., 2015). Therefore, business leaders should monitor the digitalization process for their organizations and train employees to achieve proper digital skills to create innovation and benefits.

The Changing Roles of Accountants in the Digital Age

Digitalization has also impacted the accounting profession significantly, and accountants are experiencing role changes in the current digitalized business world.

Technological advances eliminate routine and mundane accounting functions so that accountants are being freed up to focus on higher-level tasks such as strategic planning, analysis, forecasting, and decision-making (Lawson, 2019; Wongsim et al., 2019). The accountants' roles evolve from traditional lower value-added financial reporters to higher value-added business partners with strategic orientation (Lawson, 2019).

Business Scorekeeper

Traditionally, accounting teams serve as scorekeepers for organizations (Huerta & Jensen, 2017), focusing on value stewardship, financial reporting, and compliance (Lawson 2019). For instance, financial accountants measure the company's business activities and communicate the measurement results to external users by providing financial statements (Spiceland et al., 2019). Management accountants provide oversight and hindsight by measuring and reporting the company's performance in compliance with relevant standards and regulations (Lawson 2019). Accountants' traditional role focuses more on collecting, organizing, delivering aggregated financial data related to the company's routine day-to-day operations.

Strategic Business Partner

The digital disruption provides an opportunity for accountants to move the role from a business scorekeeper to a strategic business partner (Appelbaum et al., 2017). A business partner role is a change from the traditional role of the accountant, focusing primarily on technical skills toward business orientation, strategic capabilities, and social skills (Linsley & Linsley, 2014). A business partner plays a critical role as an advisor in managerial decisions (Goretzki, 2013) by providing relevant, strategic, and future-

oriented information (Weber, 2011), working closely together with management, and participating in the decision-making process (Goretzki et al. 2013). As a business partner, the accountant involves new tasks and responsibilities that extend beyond the traditional recording and analysis of historical financial information.

Hybrid Accountant Role

Some scholars argued that it is not a matter of the management accountant transitioning to a business partner role but rather a merger of its new business orientation and traditional management accounting work (Graham et al., 2012). In other words, management accountants may take a hybrid role (Rieg, 2018). On the one hand, the traditional responsibilities such as reporting and controlling remain an essential part of management accountants' everyday work (Lawson, 2019). On the other hand, management accountants are also responsible for a range of operational and strategic tasks with the help of technology (Rieg, 2018). Through the interplay among regulative (have to), normative (ought to), and cognitive (want to) institutional drivers, it is possible to form a hybrid role characterized by the combination of traditional and business partner traits (Karlsson et al., 2019). Hybrid accountants do not completely transit to a business partner role. Instead, they try to balance daily functional responsibilities and facilitate managerial decision-making in an advisory capacity (Lambert & Sponem, 2012). It is challenging for accountants to take hybrid roles in the current digitalized business world.

Data Scientist Supporter

In the current digital economy, accountants may support data scientists in performing exploratory big data analysis. According to Richins et al. (2017), two types of

data analysis include problem-driven analysis and exploratory analysis. Accountants are more familiar with problem-driven analysis on structured data that are typically generated through the organization's transaction processing systems (Richins et al., 2017). Conversely, data scientists have a comparative advantage on exploratory analysis, which involves summarizing large datasets to understand the data's main characteristics independent of formal hypothesis testing (Richins et al., 2017). Currently, accountants cannot replace data scientists to dominate exploratory analysis due to the highly technical nature of the exploratory analysis. However, with strong business acumen, the accountant may become a data scientist supporter to filter out irrelevant content in exploratory analysis and interpret analysis results within a business framework (Richins et al., 2017).

Digital Crime Buster

Accountants and auditors may play the role of digital crime busters to prevent and detect computer frauds within an organization (Seetharaman, A. et al., 2017). Computer crimes and frauds are unauthorized theft, use, access, modification, destruction of software or data, and theft of money by altering computer records (Seetharaman, A. et al., 2017). The increasing dependence of businesses on computer systems make many more organizations vulnerable to computer crime. For instance, the banking and finance industries report one of the highest dependencies on computer use in the workplace and have the highest rate of computer misuse (Seetharaman et al., 2017). Small businesses are also vulnerable to computer crimes due to a lack of adequate IT staff and proper security policy implementation (Keller et al., 2005). Auditors specializing in fraud investigations are forensic accountants (Seetharaman et al., 2017). The specialized auditors are

responsible for designing effective audit programs and using appropriate technologies

such as online audit software to facilitate the audit and detect computer fraud

(Seetharaman, A. et al., 2017).

Digital innovator

Furthermore, accountants can become digital innovators to perform identifying,

training, sustaining, and analyzing functions in an organization's RPA initiatives (Kokina

et al., 2021). RPA is the technology that creates software robots (bots) to emulate the

actions of a human interacting with data from multiple information systems (Kokina &

Blanchette, 2019). Accountants are familiar with RPA criteria, so they are well-

positioned for the innovative role of identifying RPA opportunities to automate high

volume, rules-based, mundane accounting tasks to improve organizations' operational

efficiency and effectiveness (Kokina et al., 2021). As RPA becomes more prevalent in

organizations, accountants may need to explain to software designers and bot developers

in detail the steps and internal controls involved in a process chosen for RPA (Kokina et

al., 2021).

Besides, with training, accountants can participate in RPA programming to play a

more significant role in training the digital system (Kokina et al., 2021). The business and

technical environment in which RPA operates is constantly changing. To ensure that the

bot continues to function properly, accountants need to assume the sustainer role by

working with their IT personnel to sustain the software and measure its success (Kokina

et al., 2021). By eliminating mundane, repeated tasks, RPA provides the opportunity for

accountants to take on the analyzer role. Freed from performing low value-added routine

work (Wongsim et al., 2019), accountants may dedicate their time to preparing data analytics to provide their organization with essential insights (Kokina et al., 2021; Lawson, 2019). The digital workforce has arrived. To become a successful digital innovator, accountants must engage in digital upskilling to be part of this new way of work.

Accountant's roles are evolving from traditional business scorekeeper to higher value-added business partner and the digital workforce. However, Frey and Osborne (2013, 2017) predicted that accounting profession faces extinction since bookkeeping, clerical accounting, and tax preparation jobs are with a probability of 98-99 percent to be automated while jobs of accountants, auditors, and tax examiners are in the 47% of the US job market that is most vulnerable to automation in the next 10 to 20 years. Some researchers also argued that AI will replace accountants without digital skills in the future (Huerta & Jensen, 2017; Richins et al., 2017). Furthermore, public accounting firms start facing competition from none audit firms with technology advantages to provide audit services (Richins et al., 2017). Digital technology disruption posts threats and presents opportunities to the accounting profession. Accountants should acquire essential skills/competencies to use technology to complement the tasks required by their new roles. Otherwise, some traditional accountants' roles will diminish in the near future because many current routine, mundane, low value-added accounting jobs will be replaced by automation.

Accounting Skills/Competencies Shift Necessitated Digital Skills

Professional accountants are expected to perform the tasks required by their roles with professional competencies. Besides, accountants must comply with the competency requirements of institutions that regulate the profession, such as state boards of accounting, the Financial Accounting Standards Board (FASB), and the American Institute of Certified Public Accountants (AICPA), to ensure the provision of value-added services to businesses and society (AICPA, 2022). To define the relevant competencies for accounting professions, AICPA which is the leading professional organization of practicing certified public accountants (CPAs) identified a set of skills-based competencies that entry-level accountants need regardless of their chosen career path (public/industry/government/not-for-profit) or the specific accounting services they perform (AICPA, 2018). The core competencies include accounting, business, and professional competencies (AICPA, 2018). The accounting competencies deal with risk assessment, technology and tools for data analysis, systems design, and the ability to effectively utilize business systems. The business competencies included governance, global and industry factors, and an overall strategic perspective. The professional competencies include displaying a professional manner, working in teams, and communication and listening skills.

Recent research findings show that digital technology is the most vital disruptor to impact organizations and accounting functions (CGMA, 2019). To recognize the rapid changing skills and competencies the practicing accountants requires today and in the future due to technology disruptions, AICPA, and National Association of State Boards

of Accountancy (NASBA) initiated the CPA Evolution to transform the CPA licensure model and will launch a new uniform CPA exam in 2024 (Behn, 2021). Under the CPA Evolution model, all CPA Exam candidates will take three core sections, which will test their fundamental knowledge in the areas of accounting, audit, and tax/regulation. They will then take an exam section in their choice from one of three disciplines: tax compliance and planning (TCP), business analysis and reporting (BAR), or information systems and controls (ISC). Digital technology concepts will be incorporated into all core and discipline sections as advances in technology in the accounting profession continue to grow (Behn, 2021). In addition, a curriculum based on the CPA evolution model was released in July of 2021 to help accounting educators reexamine their current curricula. The model curriculum emphasized technology and digital acumen to help accounting students develop essential digital skills (Vien, 2021).

Moreover, given the current importance of data to business success, the Institute of Management Accountants (IMA) released an enhanced Management Accountant Competency Framework for professionals in the digital age. The new framework defines six domains of knowledge and skills: technology and analytics, business acumen and operations, reporting and control, strategy, planning, and performance, leadership, professional ethics, and values (IMA, 2019). Technology and analytics competency is the new addition to the enhanced framework. This domain includes the competency related to data acquisition, data analytics, and analysis presentation (Lawson, 2019).

To succeed in the digital world, accountants need digital skills and mindsets. Chartered Global Management Accountant (CGMA) updated the competency framework

to add a new area of digital skills to four core existing knowledge of technical, business, leadership, and people skills. Accountants' new digital skills requirements include basic digital literacy, technology know-how, and digital mindsets and behavior (CGMA, 2019). Basic digital literacy deals with creating digital content, ensuring data privacy, and using digital channels for communication purposes. Technology know-how is where deeper expertise can be demonstrated in cloud computing, data analytics, cybersecurity, and new business models. Digital mindsets involve being agile, being willing to deal with complexity, and having a lifelong learning attitude. In the United States., most accounting and finance professionals from CGMA are also CPAs (CGMA, 2019). Therefore, the 2019 CGMA competency framework with added digital skills requirement should also apply to CPAs.

In summary, all the professional accounting institutes address the accountant's skills/competencies in the digital age in a holistic approach. On the one hand, technical accounting, business, and soft skills such as collaboration, teamwork, and storytelling are still relevant to success (Kokina et al., 2021). On the other hand, digital skills are more critical than before for professional accountants to function in their evolving roles. In other words, a sweet combination of accounting knowledge and technology is preferred. In a digital world, traditional accounting function such as compliance, reporting is being automated rapidly due to technological advancement. To keep up with the increasingly fast-paced change and be successful in digitalized economy, accountants must upgrade their digital skills to perform higher-level tasks such as analytics and forecasting.

The Importance of Digital Skills to Accounting Profession

Technological advancements disrupt accounting functions, and professional accountants must have relevant digital skills to tackle their new roles and contribute to the organization's digital transformation (Lawson, 2019). Digital technologies, such as big data analytics, robotics, blockchain, artificial intelligence, are perverting in the current workplace and transforming how organizations operate (Akande & Atiku, 2021). The digital skills of professionals are crucial in developing and implementing emerging technologies in organizations to create value (Ferreira et al., 2021). Digital technology-related solutions can also create services from innovation for accounting firms and help the firms gain competitive advantages (Schiavi et al., 2020). Moreover, while the Covid pandemic demonstrated the importance and benefits, it also prioritized digital skills (Carolina Feijao et al., 2021). There are several types of digital skills needed in accountants. Yet, big data analytics, accounting automation, and digital communication skills are essential for professional accountants to survive and thrive in the current digitalized workplace (CGMA, 2019; Lawson, 2019; Qasim & Kharbat, 2020; Zhyvets, 2018).

Big Data Analytics Skills

Due to technological advancement, more organizations can have access to a fast-paced profusion of information called big data (Kache & Seuring, 2017). Big data is defined as huge-volume, high-velocity, and high-variety data that can be processed electronically to enhance insights and facilitate decision-making (Rezaee et al., 2002). Volume, velocity, and variety are known as the three-Vs and mean vast amounts of data

can be quickly generated and processed from a wide variety of sources (Rezaee et al., 2002). Other researchers also suggest two additional Big Data Vs as veracity and value. Veracity refers to the accuracy and reliability of data and value relates to the cost-benefit of collecting data and data analysis to achieve competitive advantage (Addo-Tenkorang & Helo, 2016; Zhang et al., 2015).

Both structured and unstructured data are the formats of big data. In the past, business systems included only structured data, presented numerically, relating to accounting and operations (Raguseao, 2018). Currently, technology advances allow the collection of unstructured, qualitative data such as documents, audio files, videos, website traffic, and social media posts (Raguseao, 2018). This expansion to combine structured and unstructured data enables broader application for the information specific to organizations' products, processes, and customers (Waller & Fawcett, 2013).

Big data generally needs to be analyzed by applying statistics, mathematics, econometrics, simulations, optimizations, or other techniques to gain insight and help business organizations make better decisions (Cockcroft & Russell, 2018). BDA skills refer to the skill sets of acquiring/cleaning data, creating data structures/models, and mining/analyzing data (Richardson et al., 2021). Spraakman et al. (2021) specifically emphasized the importance of accountants' data preparation skills to extract transaction data from organizations' enterprise resource planning (ERP) systems, check data for accuracy, and transform data before being analyzed. Descriptive, predictive, prescriptive analytics are three major BDA formats (Wang et al., 2016). Descriptive analysis is used to identify problems and opportunities within existing processes and functions. Predictive

analytics aims to project what will happen in the future and explain why it may happen. Prescriptive analytics involves assessing alternative decisions that include objectives and requirements characterized by high volume and complexity to improve business performance (Wang et al., 2016).

Use of BDA for Businesses' Competitive Advantage

The real value of data comes from BDA, which can transform business operations and help businesses gain a competitive advantage. According to Porter (1985), a competitive advantage seen as being better than others has two fundamental two types: cost leadership and differentiation. Competitive advantage is achieved when a company can generate more economic value than its competitors (Barney, 2011). With a wealth of big data at hand, companies are empowered to gain a competitive advantage by using BDA to improve product quality, reduce risks, and enhance customer relationships (Bartosik-Purgat & Ratajczak-Mrozek, 2018).

A product quality advantage means offering more adequate, suitable, and personalized products or services to align with customers' preferences based on BDA results, resulting in a sales increase (Bartosik-Purgat & Ratajczak-Mrozek, 2018). For example, companies can do more effective marketing campaigns based on the patterns observed from descriptive and predictive data analysis, giving them a competitive advantage over those without using this information to improve their marketing strategies for increasing sales (Richardson et al., 2021). The risk reduction advantage concerns risk and cost reduction of both daily operations and long-term strategic actions such as predicting future situations and updating the strategy (Bartosik-Purgat & Ratajczak-

Mrozek, 2018). Finally, the customer relationships advantage is linked to fostering customer loyalty by personalizing offers and developing more long-term relationships with customers (Bartosik-Purgat & Ratajczak-Mrozek, 2018). The competitive advantages in terms of product quality, risk reduction, and customer relationship all lead to higher profitability for companies in the long run.

Besides external value, BDA also affects internal processes, improving productivity, innovation, and growth (Carillo, 2017; Kennedy, 2014). Companies that adopt data-driven decision-making achieve 5 to 6 percent higher productivity and output growth than their peers (Kennedy, 2014). Addo-Tenkorang and Helo (2016) emphasized innovation as an important benefit of BDA because predictive analytics about customer demand, is the foundation for product development and creative solutions to meet customer needs.

Businesses may encounter several challenges and risks in adopting BDA for competitive advantage. First, BDA is linked to the complexity and variability of data from many different sources and can change very quickly (Zikopoulos et al., 2012). Therefore, constant data monitoring and control are essential. Second, there are costs associated with mass data storage and analysis. The more advanced the analysis conducted, the more innovative the technology and statistical systems needed for calculations and conclusions (Bumblauskas et al., 2017). Therefore, some companies may hesitate to adopt advanced BDA because of cost concerns. Security concern is another challenge. Average customers are afraid of the excessive interference of analysts and organizations into their lives to intrude on their privacy; thus, legal safeguards for

personal data must be taken into consideration (Bartosik-Purgat & Ratajczak-Mrozek, 2018). Nevertheless, the valuable advantages from BDA appear more substantial than the risks and challenges. Significant evidence shows that companies may use BDA to identify future opportunities and create value to gain competitive advantages. To fully reap the benefits of big data, managers and analysts must master the BDA skills to convert available big data into a competitive advantage for the company (Raguseao, 2018).

Applying BDA in Accounting Functions to Support Accountant Roles

The emergence of big data has a significant impact on accounting functions. BDA skills can help accountants succeed in traditional and new roles such as business scorekeeper, strategic business partner, data scientist supporter, and digital crime detector required in the digitalized business environment. Pertuit (2019) discussed the disruption that accountants encounter because of rapid technological advancements that directly affect accounting functions. Most accounting functions rely on digital storage of the underlying data that support accountants' reports and calculations. On the one hand, the digital disruption becomes an obstacle to continuing business as usual for accountants. On the other hand, it invites innovation for the accounting profession. Accountants may creatively apply BDA to a broad range of accounting functions, including financial, managerial, audit, and fraud detection, to add new values and gain insights (Schneider et al., 2015).

Financial Accounting Functions

The changes of financial accounting function resulting from BDA include the development of visualization tools (Vasarhelyi et al., 2015; Warren et al., 2015), the application of unstructured data analytics to improve accounting valuation and estimation quality (Richardson et al., 2019), and the shifting from exclusive past reporting to include real-time data reporting (Neilsen, 2018). Financial accountants may use visualization tools enabled by BDA to dynamically supplement the traditional financial reports (Cockcroft & Russell, 2018). Richardson et al. (2019) explained how accountants use visualizations to depict past analysis, such as charting information presented on traditional financial statements, or to explore the data for new insights, such as geographical data drill down, to assess product success in particular regions during specific operational periods. Scatter plots, maps, line charts, and box plot presentations are optimal for quantitative information presentation, while plot bar charts, tree maps, symbol maps, and word cloud presentations are recommended for qualitative information presentation (Richardson et al., 2019). The visualization tools enhance the reporting options for organizations, allowing a better understanding of the underlying transactions, and provide more valuable insights for strategic planning (Vasarhelyi et al., 2015; Warren et al., 2015).

Financial measurement and reporting include several estimates and valuations that may be better evaluated using BDA (Richardson et al., 2021). For example, in addition to structured internal data, financial accountants may use unstructured external data to analyze the probability of goodwill write-down, warranty claims, or the collectability of bad debts based on what customers, investors, and other stakeholders are saying about the

company in blogs and social media (Richardson et al., 2021). Warren et al. (2015) also provided examples of using unstructured visual and audio data to supplement financial statement information and assist with measurement determinations. For instance, financial accountants may use videos of company's real estate to convey the condition of properties relating to impairment valuations. With the help of BDA, financial accountants can make appropriate adjustments based on structured and unstructured data to improve the quality and relevance of financial reporting.

Other BDA-enabled advances in financial accounting measurement and reporting include the shift from exclusively past reporting to real-time reporting data to understand better financial outcomes and opportunities (Cockcroft & Russell, 2018; Neilsen, 2018). Neilsen (2018) emphasized the benefits of real-time reporting to facilitate forward view for financial statements, overcoming limitations caused by traditional past-only financial reporting. For example, Vasarhelyi et al. (2015) discussed the applicability of barcode to accounting measurement for precise, current-value, perpetual inventory, rather than traditional inventory calculations, such as first-in, first-out, last-in, first-out, and lower of cost or market.

The core function of financial accounting remains the scorekeeping for the business, with financial statements being the reports produced for external users (Huerta & Jensen, 2017). Financial accountants' traditional role focuses more on collecting, organizing, and delivering aggregated financial data related to the company's routine day-to-day operations. With BDA skills, financial accountants may become more valuable and efficient business scorekeepers.

Managerial Accounting Functions

BDA may support managerial accounting functions such as performance measurement and control, budgeting, and strategic planning. Managerial accounting involves using financial and non-financial information to devise planning and performance systems, providing expertise in financial reporting and control, and assisting management in operational strategies formulation and decision making (Spraakman et al., 2021). Appelbaum et al. (2017) recognized that ERP provides extensive data storage and enhanced computation power for analyzing internal and external data. Managerial accountants can use internal and external data to employ descriptive, predictive, and prescriptive analysis based on balanced scoreboard categories of financial, customer, internal process, and learning and growth for performance measurement purposes (Appelbaum et al., 2017). Besides, BDA can facilitate the discovery of essential measures to be incorporated in the management control system (MCS) (Warren et al., 2015). For example, employers can use metadata such as the amount of time employees spend on telephone calls to track productivity. In sales, greater phone use may indicate higher productivity, whereas the converse can be true in manufacturing. Employee emails and in-office behaviors can also be monitored for performance measures development (Warren et al., 2015). Nevertheless, a possible drawback of excessive tracking is the detrimental effect on employee motivation and creativity. Employees might fear showing their originality or initiative if they realize the constant micromanagement from their employers (Warren et al., 2015).

Budgeting represents another managerial accounting function that benefits from BDA. Currently, beyond budgeting is more popular than traditional budgeting activities, which have been criticized for being too inwardly focused, stifling creativity, and hampering competitive edge in the digitalized economy (Bourmistrov & Kaarboe, 2013). Big data, including additional streams of data outside ERP systems (e.g., climate, satellite, census, labor, and macroeconomic data) can be used to enhance beyond budgeting practices (Warren et al., 2015).

Managerial accountants may assist managers in strategic planning and decision-making with the help of BDA. By combining structured and unstructured data, managerial accountants play an active role in an organization's strategy formulation, implementation, and even monitoring (Richins et al., 2017). In the developed retailer business industry, BDA can be adopted and used to enhance profitability at each of the four levels: market, firm, store, and customer (Kumar et al., 2017). For example, BDA for customer purchase behavior may provide managers new insights and help them make their focal strategies data-driven (Kumar et al., 2017). By applying new technologies and personalized offerings based on the analysis of customers' data, retailers can enhance a customer's experience, satisfaction, loyalty, and engagement and improve operational efficiency, resulting in increased profitability. Vasarhelyi et al. (2015) noticed the accountants' ability to provide decision support for management, using structured and unstructured data relating to human resources, marketing, supply chain, and numerous other operational and strategic planning functions.

BDA is the key for managerial accountants to transform from traditional financial value reporters to strategically oriented business partners (Huerta & Jensen, 2017). To be a business partner, management accountants must know how to support the decision-making process against uncertainties. BDA may help management accountants succeed in the new role by providing insights into the unique drivers of financial performance, both internal and external and often in real-time when the data is most critical for decision-making purposes (Brands & Holtzblatt, 2015). The automation enabled by BDA poses a threat to the accounting profession, potentially replacing many of the tasks traditionally performed by accountants (Richins et al., 2017). However, BDA presents many opportunities for businesses by changing the task structures for accountants (Richins et al., 2017). For example, accountants can merge sentiment analytics of unstructured Facebook data with existing structured accounting data to develop a sophisticated business model (Richins et al., 2017). With the application of BDA tools, the accountants transform business intelligence by combining internal and external data to produce predictive, prescriptive, and adaptive value, which helps them succeed as business partners (Lawson 2019). Besides, BDA helps accountants assume the role of data scientist supporters. With strong business acumen and BDA skills, accountants may assist data scientists in filtering out irrelevant content in exploratory analysis and interpret analysis results within a business framework (Richins et al., 2017).

Auditing and Fraud Detection Functions

BDA has a significant impact on external and internal audit functions. Traditionally, external auditors assess if their clients' financial statements are materially

misstated by analyzing limited structured data generated from clients' accounting information systems. Looking forward to a Big Data future, development of in BDA techniques will allow auditors to test entire populations of structured data at one time, use non-traditional unstructured data to test hypotheses relating to financial statements assertions (Cao et al., 2015; Richardson et al., 2021) and highlight unusual or suspicious transactions subject to material misstatements (No et al., 2019). By using BDA, auditors are able to spend less time looking for evidence, which will allow more time for presenting their findings and making judgments (Richardson et al., 2021), obtaining more detailed results by grouping and comparing data according to selected criteria (Nagyte & Dagiliene, 2021).With BDA, auditors will be able to work from anywhere at any time, given the data will be at the ready, and there will no longer be a need to pull data at the client site (Richardson et al., 2021). The BDA application in external audit services includes exploratory and confirmatory analytical procedures, multivariate ratio analysis, targeted external account balance confirmation (Alawadhi et al., 2015). Furthermore, the advent of BDA presents many new opportunities for audit firms to expand their existing advisory/consulting practice to include assurance service over the veracity of unstructured data (Richins et al., 2017).

Internal audit functions replicate processes of external audits, making BDA applications for audit procedures suitable for internal audits as well (Cao et al., 2015). Internal audit functions are impacted by data availability and the ability to identify potential fraud (Richardson et al., 2019). For example, the use of drill-down capabilities and variance analysis in BDA allows accountants to gain more insight into cost behavior

and identify irregularities and potential areas of fraud (Spraakman et al., 2021). Perols et al. (2017) presented predictive big data analytics as a tool for fraud prevention and identification, using fraud prediction models for audit planning and forensic investigations. The use of BDA increases internal auditors' ability to extract value from big data, helping them enhance their efficiency and effectiveness in enterprise risk management, fraud detection, and IT risk audit (Rakipi et al., 2021).

Auditors can play the role of digital crime busters to prevent and detect computer frauds within an organization (Seetharaman, A. et al., 2017). Auditors may use appropriate technologies, including BDA and online audit software, to facilitate the audit and detect computer fraud (Seetharaman, A. et al., 2017). BDA tools support the digital fraud and crime detector role for auditors.

Challenges of BDA Application in Accounting Profession

Professional accountants face several challenges when they make decisions supported by BDA. Huerta and Jensen (2017) discussed the impact of cognitive biases and system biases in the use of big data systems. Cognitive biases such as anchoring, availability, inattentional blindness, and confirmation biases arise due to human limitations in processing information. On the contrary, system biases are biases programmed into the system due to decisions made by designers when the system is built (Huerta & Jensen, 2017). Therefore, accountants should also develop the skills to overcome these biases in addition to the technical skills required to interact with big data. Additionally, Bebbington and Unerman (2018) argued that a vast amount of unstructured

data can result in information overload, confusing auditors, and requiring auditors to have a higher tolerance of ambiguity.

Furthermore, accountants need to use healthy skepticism to evaluate BDA results. When accountants do not rely on the results produced by BDA, the insights that could be gained are lost. On the other hand, over-reliance on BDA is detrimental since accepting information without challenging it can lead to mistakes (Huerta & Jensen, 2017). It is challenging for accountants to balance the reliance act. Accountants need to approach BDA as informed skeptics, ready to challenge the analysis by asking good questions in appropriate topic areas (McKinney et al., 2017).

Another important challenge identified for BDA in accounting involves accountants' reticence, observed as accountants' lack of preparedness to use big data analytics in accounting functions and accounting firms' slow adaptation to the demand for BDA (Cao et al., 2015; Nielsen, 2018; Richins et al., 2017). Richins et al. (2017) reported that accounting firms have been slow to adopt big data analytics for audit services, an example of change reticence that the authors identified as a pattern for the profession. Gepp et al. (2018) noticed the auditing profession's apparent reluctance to engage with BDA. Conversely, Janvrin and Watson (2017) dissented from this view of change resistance, portraying the accountants as a profession of adapters are open to technological changes, as evidenced by their involvement with broad accounting and MIS.

Robotic Automation Process Skills

The adoption of automation in business operations has affected many accounting, tax, and auditing activities. At present, the accountant's workplace is the most digitized at enterprises. On average, the accountants need to work with five computers, office and communication equipment units, and about seven software products for the automation of accounting work (Zhyvets 2018). Robotic process automation (RPA) is the term used for software tools that partly or entirely automate human activities that are manual, rule-based, and repeated (Kokina & Blanchette, 2019). RPA tools are not replacements of underlying business applications. Instead, they automate the manual tasks of human workers. The worldwide covid-19 pandemic dramatically accelerated the adoption of RPA in organizations (Costin et al., 2021).

The accounting task most likely to be automated is bookkeeping (Huerta & Jensen, 2017). However, Frey and Osborne (2017) identified specific auditing and tax tasks at a high risk of automation beyond clerical accounting and tax preparation. According to Shaffer et al. (2020), basic accounting functions such as payroll, auditing, bank reconciliation, invoice payments have already been automated. Programmed software to prepare federal and state income taxes has been widely used for decades. Nowadays, accounting firms use RPA to perform internal business processes as well as tax and audit work for clients. In addition, accounting firms create consulting service lines around the implementation of RPA in clients' operations (Cooper et al., 2019).

Cooper et al. (2019) noted the skills for accountants to work with RPA include a minimum awareness of RPA, computer programming and technology experience in EPR, data analytics skills, accounting, and auditing skills. Since bots complete many mundane,

rules-based tasks, accountants are now expected to spend time on value-added activities. This requires accountants to be creative, innovative, and capable of solving problems (Cooper et al., 2019).

Use of RPA for Competitive Advantage

Accounting firms may apply RPA to gain a competitive advantage by streamlining their internal processes, increasing profits, improving work quality, and creating service lines to implement RPA software within client operations (Cooper et al., 2019). RPA can result in significant efficiency and effectiveness gains for accounting firms because Bots can run 24 hours a day, allowing for continuous services. RPA service providers estimate that bots reduce average handling times of processes by 30 to 40 percent (Accenture 2016; PwC 2017). In addition, EY (2016) estimates that average run times decrease by 76 percent with RPA. Not surprisingly, RPA also has a saving effect on the work performed in the public accounting industry related to outsourcing the tasks outside U. S. In fact, PWC (2017) estimated that RPA software can complete a business process for less than half the cost of outsourcing. Consequently, accounting firms now can re-shore the tasks for bots to perform, resulting in cost-saving and quality improvement.

The implementation of RPA by public accounting firms has led to an increase in the quality of services provided (Cooper et al., 2019). For example, the automation of basic procedures allows more time for accountants to focus on areas requiring more judgment, which ultimately increases the quality of the audit (Cooper et al., 2019). The focus on value-added activities rather than mundane tasks also creates a more engaging

work environment, which leads to reductions in attrition and an increase in the overall quality of the professional services to clients (Cooper et al., 2019).

Applying RPA in Accounting Functions to Support Accountant Roles

The emergence of RPA technology has a significant impact on various accounting functions, and RPA skills can help accountants succeed in the role of digital innovator. Currently, accounting firms such as Big 4 firms use RPA to perform internal business processes as well as tax and audit work for clients. In addition, accounting firms create consulting service lines around the implementation of RPA in clients' operations (Cooper et al., 2019; PWC, 2022). Bakarich and O'Brien (2021) indicated that public accounting firms, especially non-Big four accounting firms, have not adopted RPA at large -scale yet. However, RPA technology is predicted to significantly impact the accounting profession within the next five years.

Tax practitioners have already started to apply RPA to improve efficiency in some standard compliance functions (Mezzio et al., 2019). For example, tax preparers traditionally spent a significant amount manually extracting their clients' financial data before loading it into spreadsheets and systems. By applying RPA technology, tax professionals from Big Four firms can build bots that automatically read and extract such information, freeing up a tremendous amount of time for more strategic, valuable activities such as review and analytics (Mezzio et al., 2019). The Big 4 firms also report using RPA to review trial balances, convert data to a tax basis, and even prepare tax returns (Kokina et al., 2021). RPA can help improve the efficiency of tax functions by

reducing the risk of manual errors, enhancing quality, and saving processing hours to reduce costs.

When applied to auditing, RPA is expected to replace time-consuming and mundane audit tasks (Moffitt et al., 2018) and motivate the re-engineering of audit processes (Rozario & Vasarhelyi, 2018). In a case study, Cohen et al. (2019) demonstrated how RPA could improve the quality of employee benefit plan audits by highlighting the anomalies from automated data sources.

Currently, the development and implementation of RPA in the audit practice at accounting firms are still in an earlier and pilot stage than the other service areas due to the risks and regulations surrounding the audit of publicly traded companies (Cooper et al., 2019). For example, using a bot for confirmation may cause a backfire because the recipient's server can mark the email as junk mail which disallows the individuals or entities to see them. Alternatively, the recipient may be concerned about clicking on a link in a random email and responding to personal or business finances. In this case, the use of RPA will result in more work for the audit (Cooper et al., 2019).

Nevertheless, at a basic level, an auditor can program a bot to perform routine activities that do not require audit judgment, such as carrying forward a client's data from the prior year within the firm's audit platform (Cooper et al., 2019). Richins et al. (2017) concurred that certain audit functions such as underlying ratio and financial statement analysis used to support decisions can be easily automated. Furthermore, RPA can improve audit quality controls by delivering risk-based exceptions to auditors (Rechtman, 2021). At the current early stage of RPA implementation, an audit procedure is

recommended to be performed by a bot and members of the audit team independently to compare the outcomes for quality assurance purposes (Cooper et al., 2019). Moreover, for RPA to thrive in an audit engagement, auditors should seek support from IT departments to finetune RPA audit tools for specific audit objectives (Rozario & Vasarhelyi, 2018).

In advisory practices, accounting firms create consulting service lines around the implementation of RPA in clients' operations (Cooper et al., 2019; PWC, 2022). RPA advisory services create value for clients by identifying the process that can be automated, programming the bots, and analyzing the output (Cooper et al., 2019). The business processes suitable for RPA for advisory clients include specific finance, operational, human resource, and procurement processes that are rule-based and do not require professional judgment (Cooper et al., 2019). Yedavalli (2018) discussed how RPA can be used in advisory services related to mergers & acquisitions. For example, RPA can replace the labor-intensive task of manually integrating multiple IT systems that may arise because of a merger by automatically downloading, formatting, and reloading data to the new systems for time and cost-saving purposes.

Accounting professionals are digital innovators in the age of automation, with essential RPA skills derived from proper training (Kokina et al., 2021). Bakarich and O'Brien (2021) predicted that RPA will significantly impact the accounting profession within the next five years. Accountants know the business process, therefore, have the ability to identify RPA opportunities (Mezzio et al., 2019) that meet three essential criteria: (1) mundane, routine, and rule-based tasks (2) few exceptions (3) a significant

number of labor hours saving (Kokina et al., 2021). Additionally, with the combination of accounting and technology skills, accountants may play essential roles as explainers, trainers, sustainers, and analyzers of their organizations' automation initiatives (Kokina et al., 2021).

Costs/ Challenges of RPA application in Accounting Profession

The benefits of RPA include drastically decreasing processing time and improving accuracy for repetitive, rule-based, mundane tasks (Fernandez & Aman, 2018; Liao, 2018; Mosteanu & Faccia, 2020). However, the benefits do not come without costs. Some researchers argued that automation may cause significant job loss, unemployment, and ultimately more drastic income disparity and resultant societal problems (McKinsey Global Institute, 2017; UBS, 2016; Walker, 2017). Moll and Yigitbasioglu (2019) even questioned the legitimacy of the accounting profession, given the number of tasks that RPA has relieved them from their daily lives. However, Costin et al. (2021) argued that 100% process automation is currently impossible, so human intervention is still desirable. For example, a higher level of work with an analytical aspect cannot be completely replaced by RPA and can only be done by humans (Fernandez & Aman, 2018). Moreover, automation may present threats for disruption, and tremendous damage can occur if a bot is hacked (Kokina et al., 2021). Korhonen et al. (2020) also pointed out the risk of automation regarding information quality.

One of the challenges in implementing RPA within the advisory practice of accounting firms is that each client's business processes are different. Programmers can program bots only to the extent that client business processes conform to rules and

procedures as understood by the firm (Cooper et al., 2019). Therefore, consultants not only need to understand the underlying details of their client's business processes, but also need to thoroughly understand the capabilities of RPA software so they can ask clients the questions necessary to identify RPA use cases and successfully program bots to perform the necessary tasks (Cooper et al., 2019). Other challenges in the bot's implementation are governance, risk, and compliance issues, including appropriate controls on bot access to sensitive records and transactions (Harrast, 2020).

RPA presents both threats and opportunities for the accounting profession. The increased productivity and efficiency resulting from RPA will transform the profession, and accountants will have the opportunity to demonstrate their true value on new functions and roles within the organizations (Ferreira et al., 2021). The accounting professionals need to develop the required RPA skills to govern the implementation and use of the technology in organizations effectively (Moll & Yigitbasioglu, 2019). Otherwise, accounting job elimination will continue at an accelerated pace since more and more accounting tasks in auditing and tax areas beyond clerical accounting and tax preparation will be automated soon (Frey & Osborne, 2017).

Digital Communication Skills

The advancement in information and communication technologies is changing how businesses create and capture values and how people interact and communicate in a globalized digital world (Cascio & Montealegre, 2016). Technology permeates our world with smartphones, tablets, e-book readers, and other resources that enhance transportability and the accessibility to communication mediums (Roshong, 2019). There

are several paradigms shifts in communication due to Digital Age. First, information is no longer communicated one way since people can share messages interactively without any mediation or editing. Next, text and basic images are no longer relevant as data visualization and multimedia options are available for all forms of communication. Last, sharing information and other reporting data is now in real-time and global instead of being periodic and regionalized (Roshong, 2019).

Communication skills are interpersonal skills that enhance the employees' ability to interact with various stakeholders (Walker, 2016). Face-to-face and virtual meetings, team skills, emails, and formal presentations are communication skills that leaders consider essential (Brink & Costigan, 2015). Good communication also includes an awareness of what can and cannot be shared (Royer et al., 2022). Knowing cannot be shared means protecting the confidentiality of information in the communication.

Digital communication skills imply the ability of an accountant to use various digital tools that allow them to achieve their goals in interaction with other people in a digital environment (Makaruk, 2021). Digital communications tools include emails, memos, reports, visual output presentations, social media, and video conferencing (Bakarich et al., 2021). Modern accountants need to develop the skills to use these digital communications tools proficiently to create values.

Communication skills add value to decision-making through BDA (Spraakman et al., 2021). For example, accountants are expected to use oral and written communications to frame the problems, ask the right questions, and critically apply BDA to find solutions (Bakarich et al., 2021; Spraakman et al., 2021). Accountants also should have the ability

to communicate and present the results of BDA to senior management in a clear and readily understandable way, which often gets accomplished with the use of graphics, maps, and other data visual displays (Spraakman et al., 2021).

In addition to digital technology skills, modern accountants need to improve their communication skills to support their new roles in the digital business world. Digital communication skills support the accountant's new role as a digital innovator in the age of automation. As a digital innovator, the accountant can create and communicate business cases to support automation and use data visualization tools to tell stories (Kokina et al., 2021). Cooper et al. (2019) also emphasized the importance of oral and written communication skills for accountants in RPA application. Staff accountants need communication skills to collaborate with a team to provide value-added RPA solutions. Additionally, accountants must be able to explain RPA software and its technical capabilities to clients. Furthermore, during the Covid-19 pandemic, some accounting firms have started using different digital technologies, including digital communication platforms and document transfer, to provide faster and cheaper innovative online services to clients in financial and managerial accounting areas (Schiavi et al., 2020). The global pandemic has increased the need for accountants to have exceptional digital communication skills to add value.

Accountants' lack of digital skills

The changing roles of an accountant from lower value-added scorekeepers to higher value-added digital workforces require accountants to have digital skills. The digital skills of accounting professionals are also critical in the development and

implementation of emerging technology for organizations to gain competitive advantages (Ferreira et al., 2021). According to the 2021 CPA Evolution firm demand survey, the most important digital technology skills needed by professional staff at top 100 public accounting firms in the US are digital acumen, data analytics, IT general control, and cybersecurity (Coffey et al., 2021).

Yet the current challenge in the accounting profession is that accountants lack digital skills and are left behind or replaced by automation due to technological advancement (Huerta & Jensen, 2017). Zhyvets (2018) indicated that 69% of new accountants noted the inadequacy of the training on applied digital skills in the region of southern Ukraine. University accounting graduates stated their digital knowledge and skills corresponded only to 45% of the requirements of the modern workplaces for accountants (Zhyvets 2018). For example, one of the big data tools, interactive visualization, enables decision-makers to navigate to select data and display it at various levels of details and multiple formats. To successfully interpret visualizations in big data, the users need an interactive skillset to decode it (Perkhofer et al., 2018). A quantitative study conducted in Australia showed the accountants lacked the knowledge and familiarity with interactive visualization options (Perkhofer et al., 2018).

Nielsen (2018) also acknowledged that most practicing accountants are not trained in technology-based analytics, such as business intelligence, data mining, and data management, and suggested that additional training to gain skills such as statistics, regression analysis, econometrics, visualization techniques, and data modeling, can prepare practicing CPAs to use big data analytics. Spraakman et al. (2021) indicated that

management accountants have not taken charge of BDA opportunities. Their activities focus primarily on descriptive and financial data analytics rather than using external data, operational data, and models. Appelbaum et al. (2017) agreed that management accountants employ mostly descriptive, some predictive BDA, and a bare minimum of prescriptive BDA. Richins et al. (2017) discussed accounting firms' acute need for qualified data technicians. Still, they stressed that technological skill is not a replacement for the business acumen and reasoning skillset that traditional accountants have exemplified.

Ferreira et al. (2021) concurred that professional accountants' current digital skills profile does not correspond to market needs. Consequently, large accounting firms such as Big Four increasingly hire computer programmers and software engineers for RPA technology development (Cooper et al., 2019). According to the 2019 AICPA Trends Report, 30% of recent Big Four accounting firms' hires were non-accounting majors (Castonguay, 2021). Moreover, accounting firms of all sizes are hiring nonaccountant employees at an annual growth rate of 20% (Tysiac & Drew, 2018). Compared with the professionals from Big Four accounting firms, accounting professionals from regional and local accounting firms are even less digitally competent in terms of RPA skills due to fewer training opportunities (Bakarich & O'Brien, 2021). Regional accounting firm leaders must develop effective training strategies to help their staff accountants acquire essential digital skills to meet the market needs.

Digital Skills Development for Accountants

Developing digital skills is a must for accountants now (Huerta & Jensen, 2017). The education and training help employees upskill, promote the status of individual leadership roles, and help increase the company's profitability (Becker, 1993). Accounting education and training play an essential role in developing digital skills for accountants.

Education

Students invest in higher levels of education, hoping to get rewards of higher pay. Employers prefer to hire employees with higher degrees in the hopes of breeding higher productivity for the company (Bae & Patterson, 2014). Investing in higher education for accountants enhance the accountant's ability to meet clients' needs and create value. Carillo (2017) suggested three high education opportunities for developing accountants' digital skills (a) university Master of Science degree in data analytics, (b) concentration in data analytics in a university Master of Business Administration degree, and (c) certificate of data analytics programs, offered through a university or an independent company, such as International Business Machines (IBM). The computer information systems academic discipline may be the best choice for university data analytics training, due to the program's interdisciplinary nature and experience blending business knowledge with technology applications (Carillo, 2017). Conversely, Krahel and Vasarhelyi (2014) recommended skills upgrades through technology-based accounting information system (AIS) courses covering spreadsheet skills, statistical analysis, and ERP. Krahel and Vasarhelyi (2014) further advocated the development of a postgraduate

certification in AIS, encompassing data analytics training, ERP consciousness, supply chain exposure, security training, and data management. Zhyvets (2018) suggested that educators in universities should collaborate with specialized training firms to offer accounting internships and attest the graduates for mastering basic accounting and analytical programs. Maginnis and Wagaman (2019) concurred the need for colleges and universities as the cradles of social human capital supply and upgrade to develop relationships with practicing accountants to allow students to gain vital opportunities.

The American Accounting Association (AAA) organization has repeatedly warned accounting educator members that students entering the accounting profession require digital skills training related to BDA (Janvrin & Watson, 2017). Correspondingly, the Association to Advance Collegiate Schools of Business (AACSB), a prominent university accreditation organization for business programs, issued a White Paper in 2014 in which they urged accounting faculty members and accounting programs to expand their education and training for accounting majors to include extensive data-focused competencies, such as data analytics, mining, reporting, and storage (AACSB, 2014). Furthermore, AICPA and NSBA launched CPA Evolution initiatives, and the curriculum based on the CPA Evolution model was released in July of 2021 to help accounting educators reexamine their current curricula. To address the digital skills gap, the model curriculum emphasized technology and digital acumen to help accounting students develop essential digital skills (Vien, 2021).

Accounting educators have started incorporating digital skills development in academic courses to prepare accounting major students who want to master the

technology instead of being mastered by the technology and can thrive in the career after entering the workforce. Richardson and Watson (2021) posited revolutionizing accounting curriculums with data analytics. The new curriculum should provide students with a step-by-step framework for analyzing the data that includes using statistics and using data analytics across the accounting curriculum that builds data analytics skills for students. Qasim and Kharbat (2020) addressed the necessity of integrating digital technology topics related to BDA, blockchain, and artificial intelligence in the accounting curriculum to produce employable graduates. Suppose accounting graduates do not develop digital skills related to those emerging technologies from accounting programs.

The accounting firms might shift towards hiring IT graduates with technical skills in blockchain, BDA, and AI (Qasim & Kharbat, 2020). Lundy et al. (2021) concurred on the necessity to modernize the accounting curriculum to equip students with a toolbox full of digital capabilities, an analytics mindset, and an inclination towards continuous improvement. The authors suggested adding Excel certification to graduation requirements, incorporating exposure to data analytics and visualization, and exposing students to RPA (Lundy et al., 2021). Spraakman et al. (2021) emphasized that educational programs in management accounting with a BDA focus need to include effective use of graphics such as charts, maps, and dashboards and effective communication and public speaking to present in front of senior management. However, McKinney et al. (2017) cautioned accounting students to be skeptical of BDA results and encouraged accounting instructors to help students develop questioning skills. Bakarich

et al. (2021) proposed to add communication requirements in a digital accounting environment course to help students improve digital communication skills.

Moreover, non-traditional education programs such as vocational education programs, apprenticeships, or internships for digital skills development have become popular (Al Ebbini et al., 2021). For example, credit-bearing graduate-level certificate programs in accounting data analytics have been designed to meet the demands of the accounting workforce and provide stackable micro-credentials in the education market. Digital disruption has sparked an increasing demand for continuous learning, as more accountants recognize the constant need to upskill to prepare the merging jobs and those still unseen over the horizon (Elliott, 2022). Instead of rewarding participants with badges, certificates, or nano degrees, these initiatives focus on outputs that emphasize building skills and experiences rather than contributing to official degrees. These programs are potentially advantageous to traditional education outputs as they provide qualifications more swiftly and are more flexible to adaptations, keeping up which the pace of change with industry demands.

Training

Learning and training occur outside schools, especially on jobs, and investment in on-the-job training is almost as significant as the investment in formal education (Becker, 1993). Employees are an essential human resource of any organization (Esteban-Lloret et al., 2018). Not only does adequate employee training result in benefits for the organization, but also for the employees. Esteban-Lloret et al. (2018) stated that adequately trained employees positively influence organizational performance and help

organizations secure a competitive advantage in the market. The goal of training

employees includes serving customers better and creating job satisfaction in the

employees (Jaworski et al., 2018). A positive training experience is a solidifying factor in

a new employee's job satisfaction, greater loyalty, higher productivity and service quality,

and willingness to remain with the organization (Jaworski et al., 2018). George (2015)

stated retaining employees, particularly professional workers, is critical to any

organization because it eliminates the recruiting, selection, and onboarding costs of new

employees, thus maintaining continuity in the expertise of existing employees and

supporting a rewarding organizational culture. Employee retention can enhance

organizational productivity and effectiveness (Al Mamun & Hasan, 2017). Although the

process of developing and implementing a training program can be costly and time-

consuming, well-trained employees leave less frequently and are less stressed (Jaworski

et al., 2018). A likely goal of any organization's leader is to ensure appropriate training

practices.

Training is often one-on-one or in group settings (Jaworski et al., 2018). One-on-

one methods include options like the buddy system or an online training approach; group

training can be role-playing or demonstrating types of exercise (Jaworski et al., 2018).

Training programs can have a structured approach or mixed and integrated approaches

that include various trainee delivery methods such as classroom training, boot camp

intensive training programs, experimental learning, or mentorships (IFC, 2019; J. P.

Morgan, 2019). Additionally, the length of training does not influence the employees'

level of satisfaction regarding their training, but rather it is the quality that drives

satisfaction (Jaworski et al., 2018).

Digital Skills Training

Businesses and workers alike seek out the opportunities to upskill and reskill.

Workplace learning such as attending training about internet applications helps

employees develop multiple digital skills. Workplace learning can lead to more network

and content sharing, open the opportunities for under-skilled workers or workers who

lack experience, and improve overall job satisfaction (Carolina Feijiao et al., 2021). Some

companies have sought out third-party companies to create tailored digital skills training

programs and outsource their training. Often the digital skills space focuses on using

online courses and e-learning platforms such as Coursera, Udacity, Udemy, Skillshare,

edX to deliver key training (Carolina Feijiao et al., 2021).

Employees may also prefer self-directed learning over workplace training

programs. A continuous challenge with digital skills is the rate of change within the

technology sector. The skills needed today may not be relevant tomorrow, and employers

(and employees) need to consider this trend when developing a digital skills program.

Therefore, building a lifelong learning approach with a self-directed pace is necessary (Al

Ebbini et al., 2021).

Since accountants have not taken charge of BDA opportunities and at present,

they employ mostly descriptive, some predictive BDA and a bare minimum of

prescriptive BDA (Appelbaum et al., 2017; Spraakman et al., 2021), business leaders

should focus on predictive and prescriptive BDA skills training for their employees.

Richins et al. (2017) encouraged (a) training in business modeling, (b) extracting, cleaning, and interpreting data for better understanding, (c) learning to use a combination of structured and unstructured data, and (d) gaining a better understanding of programming languages, to allow accountants to interact with computer engineers. Doshi et al. (2020) also encouraged the accountants should learn the principle of programming to interact with data and computer scientists to improve BDA skills.

Spraakman et al. (2021) indicated that Excel is the most widely used BDA tool. Other tools include IBM's IB Cognos and SAP's Business Objects, followed by data visualization tools such as Tableau. Accountants use Excel for descriptive reporting and data presentation as well as more advanced data modeling, trend analysis, and forecasting. Widely used Excel functions include V-Lookups, pivot tables, concatenate, three-dimensional referencing, forecasting, regression analysis, and capital budgeting (Spraakman et al., 2021). Spraakman et al. (2021) claimed that Excel is a must in any training or educational efforts. Conversly, Richins et al. (2017) argued that accountants should learn to work with structured and unstructured big data using tools beyond Excel and Access and complement their accounting knowledge with business strategy and understand business models. Other recommendations from Zhyvets (2018) included that the training of accountants should focus on digital technologies relating to the company's existing software and cloud services. Besides, Doshi et al. (2020) emphasized the importance of cultivating corporate digital culture to retain talents.

Tschakert et al. (2016) suggested diverse avenues to gain the skills needed for accounting big data analytics, including internal training, mentorships, conference

training, online training courses, and software exploration. Likewise, Smith (2018) acknowledged multiple ways to gain technical competencies but stressed accountants' obligation to obtain the capabilities, proposing the analytics skillset for accountants to include cryptocurrency, artificial intelligence, and blockchain technology. Zhang et al. (2018) emphasized the effectiveness of online training courses in emerging technology topics for recent graduates who need additional technical skills and practicing accountants who wish to incorporate data analytics into their accounting service offerings. Spraakman et al. (2021) also suggested one-day workshops, online webinars for BDA skills training. The number of individuals seeking out online learning increased four times before the pandemic, and employers offered a five-fold increase in online learning opportunities (Carolina Feijiao et al., 2021). The advantages of online technology training for accountants include (a) lower price, (b) targeted skills development, and (c) time and location flexibility. Some reputable educational providers offer courses in accounting and technology online, at little or no cost, facilitated by universities or corporate organizations (Carillo, 2017; Zhang et al., 2018).

Huerta and Jensen (2017) stated that automation enabled by big data imposes a threat to the job market of accountants. Lower-level accountants need to receive more training with computer programming, creative thinking skills, and communication skills since accounting staff and senior-level employees are involved in identifying RPA use cases and deploying bots (Cooper et al., 2019). Kokina et al. (2021) suggested that RPA training for finance professionals should include data analytics, data visualization, and data science, combining domain expertise, programming skills, math, and statistics. At

the end of the training, employees may earn a digital player badge. Current RPA
enterprise platform software mainly comes from third-party vendors, such as Automation
Anywhere, UiPath, Win Automation, and Blue Prism (Cooper et al., 2019). The
advantage of adopting ready-to-use RPA tools is that they require little to no additional
programming (Rozario & Vasarhelyi, 2018). Therefore, accounting firm leaders may
invite these third-party to provide either one-to-one or group training to their employees.

Furthermore, to manage employees' resistance to change and improve the
effectiveness of RPA training strategies, business leaders must set the example by
embracing new technologies and supporting employees to update their relevant digital
skills. Additionally, they will have to coach employees through the changes with
reassurance that those who embrace the change will experience less chance of job
elimination (Shaffer et al., 2020).

Digital Communication Skills Training

Communication training can be implemented to improve employee engagement
and job satisfaction (Hynes, 2012). Roshong (2019) suggested business leaders employ
messaging platforms like Skype for Business or Slack for rapid communication without
going through the formalities of emails when communicating internally. People-centric
social intranet software can be introduced to create discussion boards, private and public
groups, and personalized profiles for various stakeholders (Roshong, 2019).
Collaborative digital workspaces and document or screen sharing applications can
increase communication agility and foster more engaging dialogue (Roshong, 2019).
Dzuranin et al. (2018) expanded on the accountant's technical skills requisites to

emphasize critical thinking skills and communication of the findings as crucial skills that accountants need. Neilsen (2018) asserted that management accountants need training for visualizations, which is one type of digital communication skill.

The Barriers/Challenges in Digital Skills Training

Resistance to change, organizational culture, and cost seem to be the main barriers to digital transformation in accounting (Gonçalves et al., 2022). Similarly, Shaffer et al. (2020) indicated that one of the biggest challenges in the digital skills re-training of accountants who have been in practice for many years to cope with digital transformation is their resistance to change. For example, while many business publications stress the importance of data analytics skills and technology, due to professional status quo biases, some accounting professionals resist moving beyond Excel tools to adopt new technologies for data analytics (Schmidt et al., 2020). New tools beyond the traditional tool of Excel spreadsheets are generally necessary because big data is structured and unstructured data generated from diverse sources in real-time, in volumes too large for traditional technologies to capture, manage, and process promptly (Errity & Lucker, 2013). New technology, such as OpenStack, NoSQL, Apache Hadoop, and Apache Spark, offers more efficient and effective options than the ubiquitous spreadsheet application for BDA purposes (Schmidt et al., 2020).

Although various styles of skills training can be effective when used correctly, implementation of each method is an important aspect to ensuring the training program is effective. In some cases, the buddy system resulted in a *sink-or-swim* style of training, which was ineffective (Jaworski et al., 2018). Al Ebbini et al. (2021) also identified the

challenges to the lifelong skills learning approach. For example, self-directed learning requires some prior knowledge to determine what skills will be needed in the future. There are also concerns over funding: is it the employer or employee who takes on the financial burden of training? Besides, the lifelong learning approach places extra pressure on employees to keep up with employers' expectations. There is a risk that putting too much responsibility on workers to develop their own skills may exacerbate pre-existing social inequalities, as those people who are permanently or temporarily out of work have less or no access to company-provided learning opportunities. Companies can facilitate this by supporting employees with self-directed learning through knowledge sharing, financial support, or developing training resources (Al Ebbini et al., 2021). Other barriers which can affect the development of digital skills include inequality of access to digital infrastructure between rural and urban areas, generation age difference, gender influence, ethnic minorities subject to social inequalities along the digital divide (Carolina Feijao et al., 2021).

Technological advancements have pressured the accounting profession to adopt digital transformation. To take advantage of the opportunity presented by the digital technology such as BDA and RPA instead of being replaced by non-accounting professionals, accountants must be ready and willing to master digital skills. According to Schmidt et al. (2020), large accounting firms and corporations have committed significant resources to develop their technological competencies. Tang et al. (2017) indicated that large firms are more likely than smaller firms to have in-house data analytic training for their employees. Bakarich and O'Brien, P. E. (2021) concurred that

Big four accounting firms have invested heavily in technology and provide more digital skills training than non-Big four firms. For example, employees at PWC have embarked on the upskilling journal to build digital acumen. PWC (2022) invested heavily in learning applications and immersive training programs for the employees to develop storytelling, data analysis, visualization, and automation skills. Consequently, accounting professionals from regional and local accounting firms are less digitally competent due to fewer training opportunities than those from Big 4 accounting firms. Digital transformation is changing the accounting industry so rapidly. Regional accounting firm leaders need the strategies to help their employees develop digital skills to survive and thrive in this digitalized business world. Therefore, I conducted a study to explore what effective strategies the leaders in regional accounting firms have used to train their accounting employees on digital skills.

Transition

In section 1, I established the foundation of the study by detailing the background, purpose, nature, and significance of the business problem. I identified a multiple case study as my research design. The research population was accounting firm leaders who have participated in the training and professional development at four regional accounting firms in Houston area. The purpose of this study was to explore the strategies regional accounting firm leaders used to implement effective training programs to improve the employees' digital skills. The literature review began with an in-depth discussion of the conceptual framework, human capital theory, and alternative and rival theories. An exhaustive review of current and historical literature further supported the study. Section 2 provided details about the research method, design, population, sampling, data collection, data analysis, and reliability and validity assurance. The information in Section 3 included an overview of the data results of the study. In Section 3, I also illustrated the business practice application, social change implication, and personal recommendations.

Section 2: The Project

In this section of the study, I provided the description, the rationale, and scholarly evidence for the design protocol of the research project exploring the digital skills training strategies for accountants. In this section, I described the reasoning for conducting the study, provided a foundation on the researcher's responsibility in securing interviewees for the research and outlined the research methods, design, and participant consent protocol. I defined the data collection instruments and techniques and described the data analysis plan.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies that accounting firm leaders used to train staff members on digital skills. This study's targeted population consisted of six partners, directors, or managers from four regional accounting firms in the Houston, Texas area, who have developed effective strategies to train staff members on digital skills. The accounting firm leaders who read the results of this study may promote social change by implementing effective training strategies to improve organizational efficiency and profitability, contributing to the local economy through tax revenue, and increasing social well-being for employees and stakeholders. The potential social impact of this study results can influence client satisfaction leading to sustainable accounting firms' business, which may also increase economic and social growth. The accounting firm leaders may also provide valuable ideas to help local universities develop effective digital skill training programs and update accounting curricula to integrate

digital skills topics. The students who acquire essential digital skills can become more competent future accounting professionals.

Role of the Researcher

I served as a primary research instrument for this qualitative multiple case study. In qualitative research, the researcher acts as one data collection method, thereby becoming an instrument in the study (Wa-Mbaleka, 2020). In addition, I worked to network, collaborate, evaluate results, and publish research findings. Researchers have various options when they choose to conduct a case study (Levitt et al., 2018). I designed a multiple case study to collect, analyze, and interpret data related to my research question. I conducted interviews to gain information on accountants' digital skills training strategies by asking open-ended questions. Researchers may employ interview protocol to ensure the equivalency of interviews across participants (Fusch & Ness, 2015) and elicit all information pertinent to the study (Yin, 2018).

At the time of the study, I had practiced in the public and private accounting field for more than 20 years as an accounting professional, which provided an experience-related interpretive tool to the data analysis process. I switched to academia about 4 years ago to teach financial accounting, taxation, and ethics courses at a local university. Although no past or present work relationships existed between participants and me, as a member of the Texas Certified Public Accountants (TXCPA) society, I was able to network with other members from the society to identify the potential interview candidates for my study.

To ensure the protection of my study participants, I followed the ethical guidance outline in the Belmont report. The Belmont report illustrated three principles of ethical research: respect, beneficence, and justice (U.S. Department of Health and Human Services, 1979). The guidelines in the report included the protection of participants, recruitment procedures, privacy measures, assurance of participants' rights, and the use of an informed consent process (U.S. Department of Health and Human Services, 1979). I adhered to the principles of the Belmont report and communicated the purpose of the study to ensure participants fully understand the risks and benefits of participation. I assured participants that I would try to keep their information confidential, and their participation would be optional. The information from the interviews and other additional information would be included in this study only for research purposes. By completing Protecting Human Research Participants (PHRP) online training (see Appendix A), I better understood the ethical research principles.

In my analysis of the case studies for themes, I remained objective and actively minimized my biases. Researcher bias is one of the threats to research reliability when the interview is employed as a data generation method in qualitative studies. According to Saunders et al. (2015), researcher bias can be any factor that induces bias in the researcher's recoding of participants' responses. The interviewer may bias the data if proper trust and rapport are not established with the participants, or when the responses are either misinterpreted or distorted, or when the interviewer unintentionally encourages or discourages certain types of responses from participants (Bougie & Sekaran, 2020).

A notable bias was my belief that most accountants felt they did not have sufficient digital skill training. To mitigate my bias, I established credibility and rapport with participants and revealed my knowledge of the subject to them before an interview. I asked interview questions in an unbiased way to motivate participants to respond honestly. As Mehra (2002) recommended, I bracketed my biases to reveal more about the subject's opinion than about my point of view during the interview process. Galdas (2017) stated that qualitative research bias might also occur from the structure of the interview questions and data collection style. By choosing a study topic about which I had no previous understanding and connection, I minimized the bias in the interview question selection.

One technique to reduce bias is to conduct interviews using the consistent question mode with slight deviation for each participant (Bougie & Sekaran, 2020). Hanson (2013) recommended using an interview protocol to standardize interviews and limit researcher bias. A reliable interview protocol is a key to obtaining good quality interview data. It facilitates the interview process involving various groups of people systematically, consistently, and comprehensively (Yeong et al., 2018). In addition, an interview protocol increases the effectiveness of an interview process by ensuring comprehensive information is obtained within the allocated time. Rich qualitative data help the researchers better understand the respondents' experience and identify crucial elements relevant to the subject matter (Yeong et al., 2018). In keeping with these recommendations, I used an interview protocol for all interviews (see Appendix B). Although structured interviews conserve time and alleviate researcher bias, structured

interviews do not allow for flexibility (Doody & Noonan, 2013). Unstructured interviews provide rich data; however, they can be time-consuming and difficult to link (Doody & Noonan, 2013). Therefore, I used semistructured, open-ended questions during the interviews with the participants.

Participants

For this multiple case study, I interviewed six experienced regional accounting firm leaders in Houston areas who have developed effective strategies to train their employees on digital skills. Choosing the right participants is crucial to ensure that the interviews' findings can shed light on the research questions (Brown et al., 2018). Moustakas (1994) suggested including participants with experience in the research topic since a participant with several years of experience working in the research topic area have an in-depth understanding of that area. I recruited study participants who were partners, directors, and managers from four accounting firms, who had a minimum of 3 years of experience and were involved in professional development and employee education. The firm partners, directors, and managers had the necessary knowledge and insight about employees' digital skills. I focused on four regional accounting firms where effective digital skill training strategies had been successfully implemented. Training strategies require continuous evaluation and effectiveness monitoring (Milhem et al., 2014). Kirkpatrick (2006) developed four levels of measurement of training effectiveness:

Level 1 is the reaction, which is trainees' immediate reaction to training.

Level 2 is learning, which evaluates acquiring new knowledge from the training.

Level 3 is behavior, which evaluates the transference of the material taught.

Level 4 is results, which examine the benefits received from the training. To determine their firms' training effectiveness, I asked the participants to provide me the result of a minimum of one level of the above measurements. The participants were asked to share further documentation such as training programs files, employees or clients' satisfaction data about their processes and strategies through announcements, emails, journal notes, and along with member checking for accuracy of interpretations.

I used my personal, professional connections, and social media to gain access to participants. I have been serving on the membership development committee for TXCPA society since 2021. During the professional development meetings offered by TXCPA society, I reached out to accounting firm leaders who fit my criteria to find participants. I also posted the interview invitation on LinkedIn. My familiarity with the Houston area and accounting firm industry allowed me to search for qualified accounting firm leaders to interview or those who could assist me in finding participants.

I selected the participants using purposive sampling. For studies requiring participants to have a specific knowledge base, purposive sampling is used to gather participants with the requisite experience (DuBois et al., 2018). Using purposive sampling provides researchers with the opportunity to select individuals who fit the criteria and are knowledgeable on the topic of research (Yin, 2018). Once I selected the potential participants, ensured they met eligibility criteria and asked them if they would be willing to participate, I explained my research to them, so they could be well informed before deciding whether to participate. I made sure that participants understood that I

valued their opinions, perceptions, and experiences and maintained the highest standard of confidentiality. Once I informed participants, I asked them if I could interview them, had access to company documentation, and began the scheduling process to find a time for the interviews of participants. I obtained voluntary written consent from each participant. The written consent forms would remain in a private file for five years.

A critical factor in gaining access to participants for interviews is their willingness and availability (Rowley, 2012). An interviewee also must feel valued by the researcher (Garcia et al., 2017; Marks et al., 2017). Interviewers should build a rapport, show respect, and establish an understanding with the participants (Bouge & Sekaran, 2020). Developing a rapport with the participants allows interviewees to be at ease and more willing to disclose pertinent information for the study (Bouge & Sekaran, 2020)). Rowley (2012) recommended establishing a clear time limit, accommodating possible participants' location requests, and requesting permission to record the interview. Therefore, I requested interviews at the convenience of participants and clearly defined the purpose and time requirements before starting the interview.

Research Method and Design

Three viable research methods include qualitative, quantitative, and mixed methods (Saunders et al., 2015). Each research option presents feasible options for use and researcher preference. After evaluating the three, I chose a qualitative method and a multiple case study design.

Research Method

I chose the qualitative methodology to research strategies that regional accounting firm leaders used to train their employees on digital skills. Early researchers did not consider qualitative research as robust and rigorous as quantitative research, and qualitative research has come a long way to be accepted as an impactful research methodology after addressing validity and reliability (Hammer & Berland, 2014; Howard-Grenville et al., 2021). Qualitative research involves collecting and analyzing nonnumerical data to understand concepts, opinions, or experiences (Phoenix et al., 2018; Saunders et al., 2015). Researchers usually use a qualitative approach to connect deeply with participants to explore phenomena and behaviors such as reasoning and opinions (Castleberry & Nolen, 2018; Yin, 2018). In addition, a qualitative method is subjective, meaning the researcher should interpret the information that participants provide and then analyze it (Olson et al., 2016). I used a qualitative approach to connect deeply with accounting firm leaders and gain insight from them through interviews. My interviews occurred in a flexible, iterative way, so participants remained comfortable and shared the information they wished; my questions were open-ended. My goal was to explore the phenomenon of digital skills training strategies in accounting firms; therefore, the qualitative research method was appropriate for my study.

The differences in qualitative and quantitative research methods include the strategies, procedures, and processes (Levitt et al., 2018). A quantitative method was unsuitable for this study . Quantitative research is a systematic empirical investigation of observable phenomena. Researchers use quantitative methods to examine variables'

characteristics to test hypotheses using the data and results of specific populations (Saunders et al., 2015). In quantitative research, researchers ensure internal validity by using randomization, which did not fit the goals of this study (Runfola et al., 2017). Using a multiple case study design, I gathered the necessary information without randomization.

In addition, the mixed-method was unsuitable for this study too. The mixed-method researcher uses quantitative and qualitative methods to collect, analyze, explore, and examine phenomena in a single study to address the research problem (McKim, 2017). The mixed methodology requires using qualitative and quantitative methods in the same research (Creswell & Creswell, 2017). Given that a quantitative method was not appropriate for this study, the mixed methodology was also not appropriate. Qualitative research methodology better suited the needs of this topic and study.

Research Design

Given my research goals, a multiple case study was the most optimal design for the study's intent. There are various kinds of qualitative research designs. My primary focus was on three significant qualitative designs: case study, phenomenology, and ethnography. A case study is an in-depth inquiry into a topic or phenomenon within its real-life setting (Yin, 2018). Case study research design allows the interactions between the researcher and the participants that quantitative design cannot provide (Atmowardoyo, 2018). As the primary collection tool for the research, my interactions with the participants were part of the data collection process. A researcher may choose a single-case design when the case has critical or unusual nature (Yin, 2018). Compared

with a single-case study, the overall multiple-case study is more robust since it is likely to produce more evidence (Yin, 2018). Researchers adopt multiple case study approach to compare the findings across cases (Saunders et al., 2015). Since my goal was to explore the strategies accounting firm leaders use to train staff accountants on digital skills, I used a multiple case study design to make my research more robust.

In contrast, the phenomenological design focuses on participants' lived experiences and their recollections and interpretations of those experiences (Saunders et al., 2015). Researchers use phenomenological studies to explore if there is a consensus-meaning dynamic that evolves from a group of people who have a shared social, emotional, or ethnic similarity (Alase, 2017). Using phenomenology, researchers attempt to understand how others attach meaning to a unique life occurrence. Consequently, a phenomenological approach was not appropriate for this study because I did not explore and ascribe meaning to the participants' lived experiences.

Ethnographic study designs are similar to phenomenological studies because they both involve lived experiences. However, the lived experiences in ethnography relate to cultural phenomena. When using ethnographic methods, researchers study the culture and social world of a group (Saunders et al., 2015). In an ethnographic study, the researchers embed themselves into a culture's actions, customs, and beliefs to better understand it (Levitt et al., 2018). Chu and Ke (2017) noted that ethnography research occurs in the participants' natural environments. My study's goal was not to focus on the meanings of participants' lived experiences nor to explore participants' culture and sociological lived experiences. Instead, I intended to explore accounting firms' strategies to train staff

accountants on digital skills. I, therefore, decided to adopt a multiple cases study approach by rejecting both phenomenological and ethnographic designs.

One of the challenges of case study research is data saturation. Data saturation occurs when no new information is being gathered from participants (Fusch et al., 2018). I asked participants to continue providing information until they thought they had provided all they wanted to share in my interview process. Besides, I ensured data saturation through member checking. Member checking is a follow-up procedure to ask participants to validate the researcher's interpretation of the information provided during the data collection process (Madill & Sullivan, 2017). As an assurance that no additional themes arise in the research, member checking helps to confirm my interpretation of the information and validate theme identification. Researchers using member checking may also increase comparison capability across companies in a multi-case project.

Population and Sampling

The goal of this study was to explore the strategies that regional accounting firm leaders used to train employees on digital skills. The target population was from four reginal accounting firms in Houston area. Study participants included at least one leader from each of four accounting firms. For this study, accounting firm leaders consisted of partners, directors, or managers with at least three years of experience who have successfully developed effective strategies for accountants' digital skills training and professional development. A study's validity can be based on the depth and quality of the information provided by participants rather than the number of participants (Yin, 2018).

According to Bornstein et al. (2013), an adequate sample size for qualitative research is between five and 50 participants. As a result, I included six cases in my study.

To select participants for this multiple case study, I used purposive sampling. Purposive sampling allows researchers to select participants who have experience and expertise in the topic at hand (Fusch & Ness, 2017). Researchers commonly use this technique in qualitative studies, as it allows the alignment of the sample with the research question (Anderson, 2017). One potential concern in using purposive sampling is the lack of randomization and subsequent data generalization (Levitt et al., 2018). As generalizability to a broader population was not a primary goal of this study, purposive sampling was an acceptable method to find participants for my study.

To participate in this study, the accounting firm leaders needed to have at least three years' experience overseeing their company's digital skills training programs in Houston area. I utilized social media such as LinkedIn to post interview invitation. I also emailed potential interviewees in my professional network with an introductory email to find participants, asking whether they felt they met my study criteria. If they responded positively, I then verified whether they were eligible to share more information on the study and its purpose. At that point, I asked them if I could interview them, have access to documentation of their results, and began the scheduling process to find a time for the participants and myself to conduct the interview. As suggested by Woodyatt et a. (2016), when an interview occurs in front of the participant, the researcher can extend the discussion to gain additional insights. Due to Covid concerns, I conducted all six

interviews on Zoom platforms. Zoom video conferencing interview is appropriate for researchers to obtain detailed information about the research question.

Additionally, it is vital for researchers not to conclude their research or consider their data to be authentic until they have reached data saturation and interviewees have no additional feedback or input to provide (Fusch et al., 2018). Interviewing all the personnel that participated in a single phenomenon from four accounting firms was a strategy that enhanced data saturation in the study. My goal was to reach data saturation to ensure I had the greatest amount of information possible. If data saturation had not been achieved, I continued interviewing to gather additional information until I reached a point where participant comments revealed no new information.

Ethical Research

I followed the well-defined ethical guidelines from Walden University to conduct this study. The design of my research project included gaining consent from each participant. Lee (2018) noted that informed consent is a type of protection for the participant against possible unethical acts by the researcher. The consent form for this study clearly outlined the risks, benefits, and participants' voluntary willingness to participate in the study (see Appendix C). Researchers must also provide a means for the study subjects to disengage freely from the study without culpability (Petrovic, 2017). Participants in qualitative studies should be able to leave a study, without penalty, at any time or to decline to answer interview questions (Yin, 2018). In reaffirming the informed consent and privacy, I informed the participants that they might withdraw anytime from this study via phone or email at any time, and for any reason without consequence. The

contact information was on the consent form. I offered a $20 Amazon e-gift card as a

thank-you token to each participant, and this explanation was also on the consent form.

To protect the privacy and maintain ethical boundaries, I complied with the

Institutional Review Board (IRB) procedures. I ensured that each person's identity

remained confidential and that there would be no names, or any other identifying

information included in the reported results from this study. I assigned an identifier of P1,

P2, P3 etc., to each participant and excluded all other identifying information from the

study. The desire for confidentiality is a challenging but necessary component of

qualitative research designs (Ngozwana, 2018). I stored and secured all data collected

during this study and used a password-protected encrypted USB electronic storage

device. I kept paper documentation and the USB device in a fire-proof combination

lockbox in my home office. These items would remain stored for five years from the

study completion date and CAO approval. After the five years, all documentation,

identifying information, and the electronic USB device would be destroyed. Before I

collected data, I completed a web-based training concerning the protection of human

subjects while conducting research (see Appendix A). I did not start to collect data until I

received IRB approval. The Walden University Institutional Review Board (IRB)

approval number for this study was 06-09-22-1014622.

Data Collection Instruments

As a researcher, I was the primary data collection instrument, conducting

semistructured interviews with each participant. In qualitative research, several potential

sources of data include archival records, direct observation, documentation, interviews,

participant observation, and physical artifacts (Yin, 2018). I collected data from two sources, including (a) semistructured, zoom interviews with participants from four regional accounting firms in Houston area, (b) review of company documents. Semistructured interviews allow the researcher to gather detailed information to further understand a specific topic from participants (Kjellström et al., 2017). I had a set of written, open-ended questions for each interview for interviewees to answer in the virtual meetings. These questions were semistructured to allow for additional questions as necessary to obtain enough information for data saturation. The benefit of recording is to capture information that the investigator may miss (Rinderknecht et al., 2017) and vary the types of data collection methods that engage the participant in a personable and preferable way (Heath et al., 2018). I used zoom recordings of the interviews to support my efforts to capture and review insights that I might overlook during the initial interview process.

The interview protocol served as a guide for all the interviews in the study (See Appendix B). When interviewing participants for data collection, using an interview protocol standardizes the interview process and ensures consistency to reduce bias (Fassinger & Morrow, 2013). Interview protocols are helpful when conducting interviews and deter deviation from the projected plan (Ivey 2012). A reliable interview protocol is a key to obtaining good quality interview data. It facilitates the interview process involving various groups of people systematically, consistently, and comprehensively (Yeong et al., 2018). Using multiple sources, such as company documentation and semistructured interviews, I supported credibility through data triangulation.

As a plan to enhance the study's validity, I employed the triangulation of multiple data sources to include the interviews, participant documents, data from open-sourced electronic media. Study validity is necessary to establish the data collection's probity and curtail the possibility of researcher bias (Bougie & Sekaran, 2020). Yin (2018) identified four types of triangulations: data, investigator, theory, and methodological used to substantiate the same phenomenon and ensure validity and reliability. Data triangulation includes strategically gathering samples; investigator triangulation involves multiple researchers gathering and interpreting data; theory triangulation uses more than one theoretical focus, and methodological triangulation varies ways of collecting data (Yin, 2018). Using supported documentation and semistructured interviews allowed me to explore the research topic and gain rich insight into regional accounting firm leaders' strategies to train employees on digital skills. I used follow-up questions as needed. I recorded all interviews to transcribe and code the information. By using multiple data collection styles, I enhanced the efficacy of the data gathering process.

Reliability of the data collection process occurs using member checking during follow-up reviews with the study participants. Member checking is a reliability tool for researchers to analyze their qualitative data by providing transcripts and thematic developments for the participants' corroboration and further input (Clark et al., 2017; Harvey, 2015). I used member checking during the follow-up communications as designated in the informed consent document to enhance the reliability of this study.

Data Collection Technique

An interview is a valuable data collection method that allows the investigator to understand participants' perceptions of a particular phenomenon under study (Carl & Ravitch, 2018; Mahat-Shamir et al., 2021)). The advantage of the interview style of qualitative research is the flexibility in the ways to conduct the interview (Carl & Ravitch, 2018). Weller et al. (2018) discussed how the interview style of data collection gives investigators options for administering the interview questions. Conversely, the disadvantage of interview-style research is similar to its advantage. Because researchers using interviews collect the conversations and recollections from participants, the information collection is dependent on the interactions between the participant and the researcher (Plakhotnik, 2017). Interviewee errors and biases may have a negative impact on data collection quality. Saunders et al. (2015) defined participant error as any factor that adversely alters how a participant performs. Participant bias is any factor that induces an incorrect response. Carl and Ravitch (2018) examined the influence dynamics between the researcher and the researched. The disadvantage of having various ways to interview a person is the challenge of knowing if the interview approach is the best style for the interviewee.

There are three types of interviews, (a) structured, (b) semistructured, and (c) unstructured. In structured interviews, the same question, order, and wording are the exact duplicate for each participant (Doody & Noonan, 2013). Although structured interviews use less time, prevent researcher bias, and are easier when coding information, the technique leaves little or no flexibility to explore questions deeper when there is a

need for additional information. In unstructured interviews, the questions are broad and unstructured, and the participant may defray and deviate from the topic of discussion (Doody & Noonan, 2013). Hence, the process does not fit into the time constraints of the study and is not sufficient to support the researcher's goal. In semistructured interviews, the questions are open-ended and allow for rich, thick descriptions of the topic. The researcher may explore additional answers to questions and inquire deeper into the subject (Doody & Noonan, 2013). Written interview protocols help to draw out thoroughly, profound responses from the participant who can express their thoughts in their own words (Ivey 2012). Using the interview protocol in this case study helped me achieve the semistructured interviews' reliability, validity, and consistency.

For this study, I used an interview protocol to conduct semistructured interviews to explore regional accounting firm leaders' strategies to train employees on digital skills. Before each interview began, I shared the purpose and expectations of the study with the participants. I reminded them of their right to decline to answer a question or end the interview for any reason without penalty. I also shared that their answers would remain confidential and that only I would have access to the data. I conducted semistructured interviews using virtual interviews through zoom video conferencing with participants. I did my best to test the technologies in advance, and during the interview, I tried my best to monitor the body language and made connections with the participants. As a researcher, I demonstrated my politeness and ability to gain other people's trust and understand nonverbal communication. Participants often benefit from researchers showing courtesy and feel more comfortable sharing the details of their experiences

(Korstjens & Moser, 2018). To best capture the information during the interviews, I took notes and utilized zoom recording for transcription after I got permission from the participants. Once the interview was underway, I asked the participants the pre-established interview questions, although I used follow-up questions and prompted to guide the participants into providing thorough and complete answers to the questions, in the interest of reaching data saturation. In the follow-up emails, I requested the company's documents such as training program files, survey data of employee satisfaction and clients' satisfaction, and employee efficiency improvement etc. Each interview took about 45 minutes, but the interview length varied, depending on how much detail the participant provided or how much time a participant took to answer a question.

I selected member checking to enhance the quality of my data collection. Member checking provides rigor to qualitative research as a validation method for the data collection protocol (Madill & Sullivan, 2017). By using member checking, I continued the engagement with the interviewees and expanded my understanding of the study context from the participant's viewpoint. Harvey (2015) stated that member checking is a way to verify the accuracy of the researcher's interpretation of the participant's presentation of information. Through member checking, I ensured the accuracy of my understanding of the context through which each participant provided their responses to the questions in the interview protocol. Also, member checking allowed gathering additional information related to the study. I supplied the member checking transcript

summary via email to each participant. No additional follow-up interviews were scheduled if the participant had no changes or additions to the member checking preview.

Data Organization Technique

Data organization techniques are crucial components of interpreting research data. Due to the large amounts of data collected, I separated different types of data, such as recordings, personal notes, and company documentation, to ensure clarity of information and prevent confusion. Each interviewee received an identifier of P1, P2, etc., to maintain confidentiality in reporting the study results. Each participant had their own file to hold relevant information. I housed transcripts and recordings on my password protected computer and in a backup drive, rather than in a cloud database. Furthermore, I locked all materials from the study, including the drive, transcripts, folders, and consent forms signed by participants, in a secure safety box that only I could have access. Yin (2018) recommended a two-pronged data storage method, followed by deletion and shredding after a finite period. Following existing recommendations, I will keep the data secured for five years, at which point I will delete the information stored electronically and shred paper files.

I took and maintained reflective notes during the session. Using a journal to record notes and reflexive information related to data collection by an interviewer is a traditional method for gathering descriptive material (Phillippi & Lauderdale, 2018). By maintaining notes on each interview session, I detailed the themes I became aware of. These notes helped define a richly descriptive narrative of what occurred during the data collection phase of the interview.

Data Analysis

I used data triangulation to analyze my study data. Triangulation in qualitative research provides the researchers with a complete picture of the data using different viewpoints for the data (Kern, 2018). According to Yin (2018), researchers may choose from four types of triangulations, methodological triangulation, data triangulation, investigator triangulation, or theory triangulation. Methodology triangulation allows the researchers to combine multiple types of primary research, such as documents, interviews, questionnaires, or surveys, to increase the amount of data, ensuring the overall research quality (Turner et al., 2017). On the other hand, data triangulation provides a method by which researchers can collect data from multiple sources that can corroborate the same finding (Yin, 2018). Data triangulation can combine primary and secondary research methods, like documents, interviews, observation, photographs, or public records, to compare varying perspectives and data points (Renz et al., 2018). By developing convergent evidence, data triangulation helps to strengthen the construct validity of case studies (Yin, 2018). I used data triangulation to analyze my literature better and connected it to my study findings. I continuously and thoroughly conducted data triangulation throughout my research process using my interviews, companies' documents, and existing research on employee training program efficacy and design. By combining my interview results, companies' documents, and my literature review, I had the opportunity to develop a more complete dataset, which helped me better understand the strategies accounting firm leaders use to help their employees improve digital skills.

The purpose of data analysis is to make valid inferences from the often-overwhelming amount of collected data (Bougie & Sekaran, 2020). I performed the five stages of data analysis suggested by Yin (2018), which are (a) compiling the data, (b) dissembling the data by grouping them into categories, (c) reassembling data into themes, (d) interpreting the information, (e) and drawing conclusions. Once I completed collecting data from the interviews, I reviewed the recordings carefully and transcribed each participant's interview. Coding is the analytic process that the researchers reduce, rearrange the collected qualitative data to draw meaningful conclusions (Bougie & Sekaran, 2020). Based on those transcripts, I began to perform open coding of the information to start to classify and identify the preliminary themes in the information I gathered. Researchers recommend open coding to effectively identify themes and outstanding questions in a study (Levitt et al., 2018). Ongoing data analysis is an inherent aspect of qualitative research, and coding should be continuous to ensure the identified themes are still relevant and pinpoint when data saturation occurs (Anderson, 2017). Afterward, I used NVivo, a qualitative software for focused coding and developing themes derived from the participant interviews. Lacoste (2016) noted that the NVivo software program allows the researcher to analyze and categorize the findings using thematic coding. As participants' repetition of various words or phrases occurred, I color-coded phrases and separated them into a new theme directly on NVivo. I compared the themes from open coding and from focused coding to form finalized themes for analysis. I used the five stages of data analysis along with NVivo software to reach the final conclusions for my study.

Besides, I assessed my identified themes with the literature I reviewed and the conceptual framework I developed. Themes should consist of how human capital and developing digital skills through training benefitted individuals, accounting firms, and society. Based on the literature review, I expected to find themes relating to the benefits and effectiveness of digital skills training strategies.

Reliability and Validity

Reliability

Reliability and validity ensure the rigor and quality of research findings. According to Bougie and Sekaran (2020), reliability refers to the consistency of observations, usually whether two or more observers, or the same observer on separate occasions, observing the same event attain the same results. The general way of approaching reliability is to make as many procedures as explicit as possible. The goal of reliability is to minimize the errors and biases in a study (Yin, 2013). Reliability in qualitative research refers to how the researcher addresses dependability, focusing on how stable the data are (Lincoln & Cuba, 1985). Dependability in research ensures that the research protocol is transparent and repeatable (Korstjens & Moser, 2018). I ensured dependability in this study by note-taking and journaling each step of the data collection process. I used reflexive journaling to detail any changes in protocol throughout the data collection and analysis process.

Besides extensive journaling and note-taking, I used member checking of the interpreted data from each interview. Member checking is a reliability tool for researchers to analyze their qualitative data and helps increase the trustworthiness of the

investigation (Harvey, 2015; Varpio et al., 2017). All interview participants received a summary of the data collected from their interview to ensure the accuracy of the interpretation. Other additional strategies that I applied to enhance the study's dependability included following interview protocol, recording the interview process, and reaching data saturation.

Validity

Validity refers to the appropriateness of research methodology, the accuracy of the analysis of the results, and the generalizability of the findings (Saunders et al., 2015). Validity is the foundation of the truthfulness of the explored phenomena. Lincoln and Cuba (1985) formulated credibility, transferability, and confirmability to address qualitative study validity.

Credibility

Credibility means conducting the research in a believable manner, and using methodological triangulation enhances qualitative research credibility (Lincoln & Cuba, 1985). Yin (2018) discussed how methodological triangulation uses more than one method of data collection and analyzing it to offer validity to the analysis method and gives a more all-inclusive view of the occurrence under study. Case study findings or conclusions are more convincing and accurate if they are based on several sources of information, following a similar convergence (Yin, 2018). I established credibility for this study by triangulating the recorded interviews, the transcribed interviews, company documentation, journal notes, and member checking for accuracy of interpretations.

Demonstrating qualitative credibility ensures that the researcher is addressing the findings from the participants' perspective.

Confirmability

Confirmability refers to the neutrality and accuracy of the data and is closely linked to dependability (Lincoln & Cuba, 1985). Researchers achieve study confirmability by reducing personal bias in qualitative research studies. Researcher bias refers to a researcher allowing their subjective view to get in the way of fairly and accurately recording and interpreting participants' responses (Saunders et al., 2015). To mitigate personal bias, I kept a journal of decisions, notes, and reflections made on aspects of the data collection as the research progresses. Impartiality by the researcher in detailing the data collection process and displaying transparency gives the reader the best opportunity to confirm the data collection process outlined in a study (Korstjens & Moser, 2018). To reduce bias and enhance the confirmability of the study, I also adopted probing strategies during interviews and follow up emails after interviews. Minimization of bias in research is imperative for the information contained in the study to have any scholarly validity and generalizability.

Transferability

Transferability refers to whether findings can be transferred to another similar context or situation while keeping the meanings and inferences from the completed study (Lincoln & Cuba, 1985). Transferability of research results may assist other organizations with similar challenges to the phenomena. (Nowell et

al., 2017). Abdalla et al. (2018) stated that while transferability is in the reader's

purview, the researcher must describe and define their research results to assist in

generalizing the findings. I ensured transferability in this study by providing a

thick description of the interview setting, atmosphere, and other contextual

information about the study location. I followed the interview protocol to

conduct each interview. I used reflexive journaling and note-taking to capture the

conditions associated with the data collection that, when detailed in the research

results and rigorous presentation of findings, increased the possibility of

transferability to the reader.

Reaching data saturation helped assure the findings' credibility, transferability,

and confirmability. Data saturation refers to when no new information or themes are

observed in the data (Fusch & Ness, 2015). Failure to reach data saturation negatively

affects the quality of the research conducted and hampers content validity. I attained data

saturation by triangulating data from the coding of interviews, reviewing secondary data

from each accounting firm, and member checking. By coding, analyzing, and comparing

the data from each resource area, I built a consensus on new themes or codes requiring

review. To identify new themes, I contacted the participants via emails to supplement the

member checking protocol in place.

Transition and Summary

In Section 2 of this document, I outlined the process used to conduct this study. I

stated the purpose of the study, addressed my role as a researcher, and detailed research

methodology and design. I also identified the participants, population, and sampling

methodology needed for the study while also describing the component of ethical research. Finally, I explained the data collection processes, including collection instruments, techniques, organization, and analysis. Section 2 concluded with the discussion of methods and techniques to ensure the reliability and validity of the study.

Section 3 included a summary of the data collection results and a discussion of coded and emerging themes resulting from the study. There was a discussion of the implications and limitations of the research information. Finally, I identified any impact on social change from conducting the study and presented recommendations for action, further research, reflections on the study, and study conclusions.

Section 3: Application to Professional Practice and Implications for Change

Introduction

In this qualitative multiple case study, I explored strategies regional accounting firm leaders used to train their employees on digital skills. The data came from documentary evidence and semistructured interviews with six partners, directors, or managers from four regional accounting firms in Houston, Texas. I performed the five stages of data analysis suggested by Yin (2018), which are (a) compiling the data, (b) dissembling the data by grouping them into categories, (c) reassembling data into themes, (d) interpreting the information, (e) and drawing conclusions. Data analysis revealed three major themes in the participants' responses: (a) digital skills needed for success, (b) demonstrating investment in digital skills training, and (c) benefits and challenges of digital skills training. The themes aligned well with the human capital theory, which is the conceptual framework used for the study.

Presentation of the Findings

The overarching research question was: What strategies do regional accounting firm leaders use to train employees on digital skills? I conducted six semistructured interviews to gain an understanding of the digital skills training strategies. Each Zoom interview lasted about 40 minutes. To protect the privacy of each participant and keep the data confidential, I used the following pseudonyms: P1, P2, P3, P4, P5, and P6. After the interviews were completed, I transcribed the audio recordings, performed the member-checking, reviewed the organizational documents, and imported the data into NVivo

software for coding and analysis. Figure 1 depicts the major themes that emerged from the data analysis process.

Figure 1

Thematic Concept Map
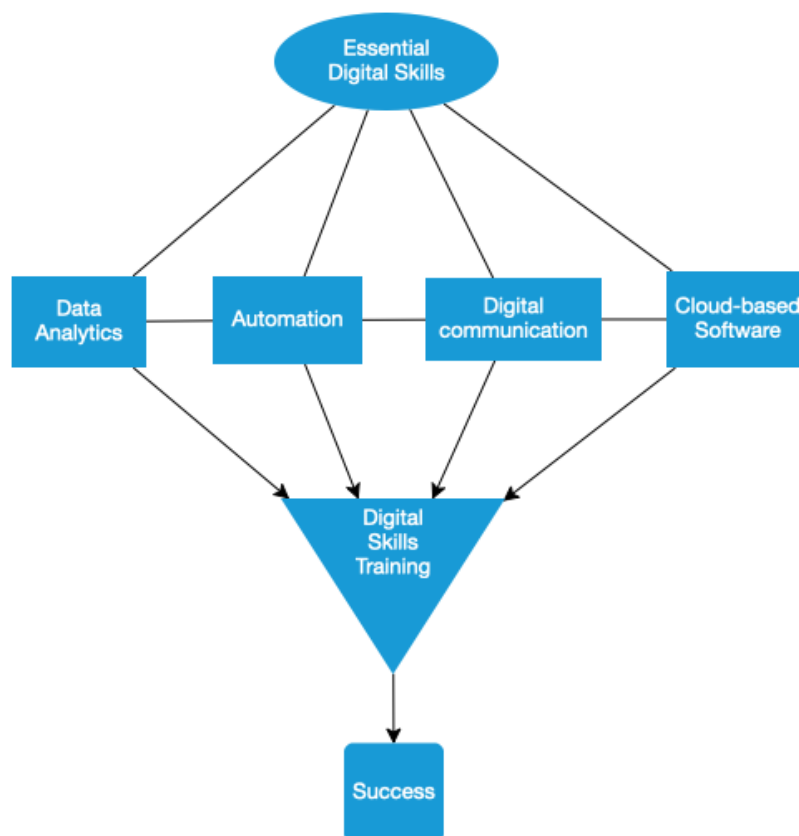
Theme 1: Digital Skills Needed for Success

The first emergent theme was the need for digital skills that were lacking in employees at the regional accounting firms. Four subthemes related to digital skills, including data analytics skills, automation and other AI-based application skills, digital communication skills, and cloud-based software skills. Each participant identified the digital skills concerns based on their interactive experience with their employees. NVivo

analysis revealed 182 references related to the themes of digital skills needed for success in the current digitalized business world. The essential digital skills mentioned by the participants appear in Table 1.

Table 1

Frequency of Digital Skills Needed Subthemes

Subthemes.	n	% Of frequency of occurrence
Data analytics	80	44
Automation & other AI apps	18	9
Digital communication	52	29
Cloud-based software	32	18

Note: n= frequency.

Data Analytics Skills

Participants considered the skills to use tools such as Excel and TeamMate Analytics essential for success. Accounting professionals have long used Excel for data storage, ad hoc evaluation, and several data analytics tasks (Schmidt et al., 2020). Spraakman et al. (2021) indicated that Excel is the most widely used data analytics tool. Excel skills are frequently cited as the top technology skill required of entry-level accountants and were the top skill students lacked upon entering the workforce (Pelzer & DeLaurell, 2018). Comments from participants aligned with prior research. For instance, P01 mentioned, "I think that there are some of the higher-level Excel skills that people have to learn, they are not taught those in college, like the pivot tables, and some of the higher-level things." P02 noted, "Excel is easy to use, and it is the most common software people use for analyzing or summarizing data." P03 noticed that during the 2022 busy season, "A couple of interns just lacked the basic knowledge of Excel, Word, and

PDF. Those are the main Microsoft functions that we use here." P03 further explained that,

> Excel was a big one that we had to catch up on to help everybody at our firm since most of our other software, like our auditing software, is basically just like a storage plant for Excel, Microsoft Word, and PDF documents.

Likewise, P04 explained that "Even though we use excel every day, but there's some more advanced feature in Excel, that's something that our employee probably is lacking." P05 observed that her firm's audit team used more advanced Excel functions such as "V lookups, the pivot tables, and data organization" to serve clients more efficiently.

For more complicated tasks, P04 identified TeamMate Analytics, an Excel add-on application: "As long as you can use Excel, you can pretty much use the TeamMate, and then they take whenever we run into a more complicated situation." To improve audit efficiency, P02's firm started requiring employees to utilize TeamMate analytics to select samples. Instead of hitting the Excel sheet 40 times, "With teammate analytics, we can just hit the button saying that well, I want to do a random selection from this population, and we just automatically pop out 40 samples."

Even though Excel is appropriate for some data analytics tasks, larger and larger data sets create challenges to its efficiency and effectiveness (Sartain, 2017). A multitude of newer tools can offer more efficient and effective options than the ubiquitous spreadsheet application for advanced data analytics purposes. However, some accounting professionals resist moving beyond Excel to adopt new data analytics technology (Schmidt et al., 2020). My findings confirmed the study by Schmidt et al. (2020). I asked

all six participants if their firms adopted advanced tools available in the market, such as

Power BI or Tableau, for more sophisticated data analytics purposes. Only P04

mentioned that "We have been using Power BI," an emerging data analytics application

beyond Excel. P04 also indicated that his firm hired a dedicated person to use ACL for

the more complex data analytics task. P06 mentioned, "We advanced enough to not be

like an outdated firm, but not to the super high technology firm, like all the software you

just mentioned, we don't use that."

Automation and Other AI-based Application Skills

Contemporary accounting is immensely data-driven and depends more on

artificial intelligence (AI) systems and their subsets, such as robotic process automation

(RPA), to improve efficiency (Kommunuri, 2022). The findings aligned with the study by

Cooper et al. (2019), who indicated that accounting firms start using RPA to perform

internal business processes as well as tax and audit work for clients. For instance, P04

explained that "On the firmwide base that yes, we do have some of the flow in the

Microsoft Power Automate, so we built a lot of flow on our intranet." However, unlike

Big Four or other larger accounting firms whose in-house development team may modify

their automation application, P04's regional accounting firm only used the third-party

software from the shelf without customization or modification. P02 mentioned that his

audit department adopted a CCH Axcess knowledge coach software to "automate the

population of audit programs to connect the different processes."

Besides automation, accounting professionals employ other AI applications to

gain a competitive advantage. Ng and Alarcon (2021) assured that both large and small

accounting firms could take advantage of AI for audits. An AI platform developed by

MindBridge Analytics Inc. can be employed to identify high-risk transactions during the

audit planning process. Bowling (2019), partner at Garbelman Window CPAs, described

that entire general ledgers from her QuickBooks clients can be uploaded directly to the

MindBridge platform, which categorizes the transactions into different risk buckets at the

transaction level. AI gives her firm a competitive advantage over firms that still use

traditional sampling because she can use AI to review all the transactions to sample the

riskiest transactions. However, P03 did not have successful experience with the same AI

application. P03 commented:

> We tried using a paid, like a subscription. I think it was called the MindBridge,
>
> which was more of a risk development software; we had to assign account
>
> groupings to all the accounts that our clients had, which was a huge time
>
> consumption for us. We've tried one or two clients with a small general ledger,
>
> and it just doesn't work out.

Bowling (2019) considered that it is normal to have a few hiccups in the

beginning stage of new software adoption. Effective communication and adequate

trainings ensure success. Compared with the professionals from Big Four accounting

firms, accounting professionals from regional and local accounting firms are less digitally

competent due to fewer training opportunities (Bakarich & O'Brien, 2021). Perhaps, after

receiving proper training and communication, P03 firm's employees may develop better

solutions for applying MindBridge's AI tool to derive value.

Digital Communication Skills

Digital communication skills imply the ability of an accountant to use various digital tools that allow them to achieve their goals in interaction with other people in a digital environment (Makaruk, 2021). COVID-19 pandemic brought a widespread shift to remote working, forcing the dispersed accounting teams to use new tools such as Zoom and Microsoft Team to communicate and collaborate with each other. Collaborative digital workspaces and document or screen sharing applications can increase communication agility and foster more engaging dialogue (Roshong, 2019). My findings aligned with the study by Roshong (2019). P01, P02, P04, P05, and P06 indicated that their employees used Microsoft Team or Zoom for internal and external communication purposes. P06 mentioned, "We have policy and procedure to make people adhere to, using Microsoft team in today's digital world. Well, you can chat with instant answer right... I said you can share your screen. They can share their screen as well." However, P06 noticed that her staff accountants lacked writing skills to communicate with clients professionally: "I see that communication, I see my staff sending out communication to client so informal, so not professional." P06 also noticed that older generation partners at her firm lacked the skills to use Microsoft Team video functions and e-Signature tools such as DocuSign to communicate with clients efficiently. P05 concurred that the young professionals can learn to use Microsoft Team tool quickly but lack the skills to communicate professionally with the tools. P05 commented:

Lot of what we do training in that basic digital space is how to use these tools to communicate with your team internally, how to communicate with clients… you are giving a professional face to our clients and internally.

Accountants should also be able to communicate and present the results of data analytics to senior management and clients in a clear and readily understandable way, which often gets accomplished with the use of graphics, maps, and other data visual displays (Spraakman et al., 2021). The employees at P01's firm lacked data visualization skills to provide more value to their clients. P01 explained:

If we could efficiently put together the charts and graphs, then we could sit down with our clients and show them trend analysis, you know, be a value add to them. But I think because we don't really utilize that efficiently, and therefore the value add is gone.

Cloud-based Software Skills

To perform various accounting, tax, and audit functions efficiently, accounting professionals need to be proficient in using industry-specific application software, which is cloud-based nowadays. Zhyvets (2018) discussed the importance of cloud-based accounting software to help accountants perform tasks. Several participants' responses revealed that their employees lacked those software skills. For instance, P06 mentioned, "So for operating system, we use the cloud base, so everything is through the cloud, and paperless." P06 continued:

The essential digital skill set that I see that the staff were lacking is the understanding how the important software that we use for tax and audit or even

accounting, bookkeeping work, because they never used it before, knowing the

software inside out in order to do that job every day needs training.

P03 emphasized the importance for the audit teams to use a helpful request list named

Suralink: "It's online, it's cloud, it is real-time. So, the second thing uploaded, we can go

on, hit refresh, and we can see that document and download it." To ensure everybody on

the same page, auditors at P03's firm just received a follow-up training on the new

functions for the Suralink platform about 2 weeks ago. For tax application, P02, P04, and

P06 all indicated that their tax professional should know how to employ cloud-based

CCH ProSystem software named CCH Engagement and CCH Axcess to prepare

individual and business tax returns.

Cloud-based systems benefit accounting professionals by enabling them to

conduct business in virtual environments (Moll & Yigitbasioglu, 2019). The COVID-19

pandemic has forced dispersed accounting teams to work from home. P04's firm made a

smooth transition so that the work efficiency was not affected due to cloud technology.

P04 commented:

Our strategy is cloud-first, so we have been doing cloud transition to get rid of

the file server… so even though they are kind of in a hybrid environment, so it

doesn't slow down anything at all, because they can pretty much access to the data

in the Cloud.

P06 strongly promoted hybrid schedule which allowed her team members to use cloud

technology to work either from office or from home: "I have been an advocate of hybrid

schedule. And because of that, especially with a pandemic, and in order to be competitive with other firms in the market, that attracting talent, you have to offer that."

Digital skills are crucial for accounting professionals to survive and thrive in the current digitalized business world. According to Zhyvets (2018), 67% of the currently required knowledge and skills of modern accountants relate to digital competence. Theme 1 aligned well with the human capital theory, which addressed the concept of gaining knowledge and skills to employ a sufficient workforce (Becker, 1993). It is essential to develop human capital with adequate digital technology skills and accounting firm leaders have a role in helping their employees gain adequate digital skills.

Theme 2: Demonstrating Investment in Digital Skills Training

The second theme that developed from the data was the investment in digital skills training. Two relevant subthemes emerged including digital skills training types and digital leadership. In discussing this theme, participants identified various effective digital skills training types. Participants also emphasized the importance of establishing digital leadership to invest heavily in digital technologies at their firms.

Digital Skills Training Types

The participants noted the four most effective digital skills training types: in-house group training, on-the-job training with mentorship or buddy program, third-party trainings outside the firms, and online self-study. There were 18 mentions from participant interviews containing the theme of digital skills training types. Table 2 displays the frequency of responses related to digital skills training.

Table 2

Frequency of Digital Skills Training Types

Name	*n*	% Of frequency of occurrence
P01	3	17
P02	1	5
P03	4	22
P04	2	11
P05	3	17
P06	5	28

Note: n= frequency.

The findings of the study support existing literature performed by Jaworski et al. (2018) who explained that training is often one-on-one or in group settings. One-on-one methods include options like the buddy system or an online training approach; group training can be role-playing or demonstrating types of exercise (Jaworski et al., 2018). During the interviews, all participants addressed at least one of the previously identified practical digital skills training methods. P01 said:

I think, the bulk of our training is, on the job training… or we utilize the software provider to provide some of the training… we had Technology Round Table and then we had a group training in the fall, and different people presented their tips and tricks.

P02 mentioned, "We generally only use group training in person, sometimes we even hire people from the external party to come to our firm to provide the training."

P04 and P02 also shared that their firm provided online self-learning resources for employees: "We do collect useful trainings from all types of different sources. We have our internal portal…we accumulate all the past historical training we have. So, people can go there, and do those training by themselves." "We have a series of different

training or webinar that we provide to employees based on their staff level or based on the department." Kristl Volfova (2022) confirmed that if correctly planned, information and communication technology (ICT) can transfer education from teacher-centered to student-centered and help employees acquire the knowledge and skills they need for lifetime learning.

P03 was considered an Excel expert at his firm and developed the in-house group training class to help the audit teams learn shortcuts in Excel to improve work efficiency. P03 also recommended his staff accountants use free online resources such as YouTube videos and Google to learn advanced Excel functions. P05's firm provided initial onboard training and lots of follow-up training on digital preparatory software for the new hires, mainly using in-house group training mode. P05 commented:

> We definitely prefer to do most of our training in house… for digital skills on software, we're not just training, like how to use it, we're training, how do we want you to use it integrated at our firm.

New employees from P06's firm received in-house group training on how to use software to prepare tax returns and had practice sessions to gain hands-on experience. Sometimes they were even sent out to attend the training provided by third parties such as CCH. The Buddy system was implemented at P06's firm to help employees improve their digital skills. P06 mentioned:

> Furthermore, each new staff, we assigned kind of like a buddy…at least one season one year and that buddy can help to answer any questions that the new staff or the intern has about how I do this in the software. That's all they help they

not answering any technical tax knowledge. They just help how to maneuver the

system.

The required competencies in the digital age are not just merely technical. In

addition to digital technology skills, soft skills such as self-management, adaptability,

communication and collaboration, problem-solving, critical thinking, creativity,

entrepreneurship, and readiness to learn are essential to employees (European

Commission, 2020; Hofmann & Ogonek, 2018). Mentoring occurs when accomplished

workers share their knowledge and skills in communication, problem-solving, and role

preparedness with less experienced workers (Jakubik, 2016; Satterly et al., 2018). P05

indicated that his firm had adopted a mentorship and leadership program to help

employees enhance their soft skills. P05 said:

> As far as soft skills, we definitely want to grow our people, we have a lot of
>
> pieces of that, like our coaching and mentoring program is made to be part of that.
>
> We also have several sorts of like internally developed leadership training.

In the follow-up email, P03 shared that to promote on-the-job training for his team's

relevant soft skills, he just started a mentorship program to allow his audit staff and

seniors to choose a manager or senior manager as a mentor. Senior workers, as traditional

mentors, share knowledge and skills with younger employees, while younger workers

share technical expertise with older, less tech-savvy employees during reverse mentoring

(Satterly et al., 2018). P06 agreed:

> With the younger generation, they're very savvy with technology. So, like I said,
>
> you know, we have no barrier is that they want training program, which is more

digital, more communication. And actually, sometimes I have to learn a lot of

tricks from them.

Traditional mentorship is beneficial for young accountants to develop soft skills, and

reverse mentorship excels in digital skills development for old generation accountants.

Digital Leadership

Organizational culture plays a critical role in helping employees improve digital

skills, and accounting firm leaders must set up the tone from the top to adopt the

technological culture. Petkov (2020) indicated that the implementation of technology in

accounting is currently limited because the management is unwilling to make the cultural

shift towards AI-based technology. My findings disconfirmed the previous study. All the

participants expressed that top management strongly promoted technological culture at

their firms by strategizing to invest heavily in digital technology and digital skills

training. For instance, P02 mentioned:

The good thing in our firm is that our partners, the senior level partners, the most

senior generation in the firm, they are actually very supportive. And they are very

curious about new technology as well. We are trying to implement a lot of the

new features such as knowledge coach, teammate analytic.

The company document provided by P05 showed that one of her firm's core values is

embracing advanced technology solutions. Consequently, her firm has been recognized

for several years as a "Best Accounting Firm to Work For" in Texas. P04 also provided

me with his company documentation to prove that a newly invested technology named

Zscaler was rolled out recently. The new platform ensured secure and direct connectivity

to private applications such as CCH Engagement or remote desktop servers at P04's firm without needing legacy VPN apps. It prevented data leakage to unauthorized cloud apps or websites.

Both P04 and P06 confirmed that training committee was established at their firms to oversee the digital skills training. P06 explained:

> We form like, training committee…we map out all the software that we are using, the type of tax returns that we want to train our staff…I do the overview training of what software that we're using, and then we break down in smaller sessions.

P06's firm paid for all the training provided by the third party: "I pay for each student; I have the firm pay for each trainer for the webinar session that CCH offer for engagement somewhere."

Theme 2 findings also aligned with a conceptual framework, human capital theory. Learning and training occur outside schools, especially on jobs, and investment in on-the-job training is almost as significant as the investment in formal education (Becker, 1993). In the long run, accounting firm leaders expect high returns from their investment in digital technologies and digital skills training.

Theme 3: Benefits and Challenges of Digital Skills Training

The final theme developed from the data was the benefits and challenges of digital skills training. All participants observed the benefits resulting in the implementation of digital skills training strategies. There were 15 mentions from participant interviews containing the theme of benefits. Table 3 shows the coded frequency of benefits resulting from digital skills training.

Table 3

Frequency of Digital Skills Training Benefits

Name	*n*	% Of frequency of occurrence
P01	2	13
P02	2	13
P03	1	7
P04	1	7
P05	4	27
P06	5	33

Note: n= frequency.

Organizations benefit from the investment in digital skills training strategies. My findings confirmed with the literature performed by Olejniczak-Szuster and Lukasik (2018) that effective training contributes to helping in creating a positive atmosphere in the company, increasing working efficiency and reducing turnover, thus affecting the improvement of quality of work at companies. P0, P03, P04, P05, and P06 all identified one of the returns from digital skills training: improved work efficiency. For instance, P03 mentioned, "That's when we'll start seeing, you know, more efficient audits. Staff being able to do higher level analytics with Excel functions." P04 concurred, "They can do their job better, they don't need their supervision or something like that." P05 resonated, "Like all of these technologies, you know, is in service of serving our clients and making us more efficient. And hopefully that means that our margin is higher."

Investment in digital technology and digital skills enhancement may also improve client satisfaction and recruitment. P06 stated:

Client do not want the information to be outsourced to India. They want to still be able to use in the US…And if we can sell to them that we do everything in

house here, but with the good price, because we utilize certain AI aspects, then we

can sell more to our clients.

P06 continued, "You can recruit better, if you have high technology, you know, your firm

can be pushed up to the next level, be able to compete with another firm in terms of

pricing." According to Porter (1985), a competitive advantage seen as being better than

others has two fundamental types: cost leadership and differentiation. Accounting firms

with digitally competent employees may achieve a competitive advantage by cutting

costs to increase margin and providing unique services to attract more technology-savvy

clients.

Besides, digital skills training strategies aid in recruiting and retaining employees.

P02 commented, "One thing I've feel I would better attract people, new people, or keep

the young people stay with us." P05 resonated:

So I think especially when we have such a young firm, like making sure that we

are staying on the front edge of technology, I think is just helpful for recruiting

and also retention… because that's going to be one of the biggest things is right,

like it always costs way more to train someone new than to get someone to stay.

Employee retention can enhance organizational productivity and effectiveness (Al

Mamun & Hasan, 2017).

Individuals also benefit from the investment in digital skills training. Employees

may achieve job satisfaction when the organization uses training to help expand

individual skills and knowledge (Olejniczak-Szuster & Lukasia, 2018). P02 mentioned,

"The implementation can improve people's knowledge and people are open about the implementation." P01 noticed:

> Staff will be happier because they're having to work less hours, and they're able to do more higher-level task as opposed to, you know, just keep punching the stuff... plus can work at home the hybrid mode is because of technology.

> Besides, individuals with marketable digital skills perceive high employability, resulting in increased self-confidence (Lissitsa & Chachashvili-Bolotin, 2019). P05 confirmed, "People can definitely see like, what they've learned and how far they've come and how they can be helpful, which I think gives people a lot of confidence." Employees with competencies developed from training may adapt to the new requirements and expectations of the labor market, improve their work efficiency, and develop strong bonds with companies (Olejniczak-Szuster & Lukasia, 2018). Employees from P05's firm "feel connected and supported" when they could use technology to perform higher-level tasks after receiving proper digital skills training.

During the interviews, the participants also acknowledged several challenges in implementing digital skills training strategies. There were 16 mentions from the interviews containing the theme of challenges. The coded frequency of challenges resulting from digital skills training appears in Table 4.

Table 4

Frequency of Digital Skills Training Challenges

Name	*n*	% Of frequency of occurrence
P01	5	31
P02	2	13
P03	0	0

P04	4	25
P05	2	13
P06	3	18

Note: n= frequency.

The main challenges in implementing digital skills training strategies include reluctance to change, costs and time constraints, and software issues from third-party providers. According to Gonçalves et al. (2022), resistance to change, organizational culture, and cost are the main barriers to digital transformation in accounting. Similarly, Shaffer et al. (2020) indicated that one of the biggest challenges in the digital skills re-training of accountants who have been in practice for many years is their resistance to change. P06 confirmed the reluctance of some old generation partners to learn new technology. P06 commented:

It is a matter that people resist learning new things with technology. Because as a partner level with the older generation, they want everything printed out for them. They review on the paper still because that's how they do things.

P05 concurred:

Obviously, there's always some like pain in implementing something new, teaching someone something new, getting people to change the way they've been doing things for maybe years. So definitely some reluctance there.

P01 was concerned about the training costs:

It would be cost prohibitive for us to have everybody in the firm where everybody has a certain level trained… Turnover in public accounting is high. And if they don't come here with those skills, then we invest those skills, and then they take those skills elsewhere.

P01, P02, and P04 also showed concern about the time constrain to learn new digital skills. P01 mentioned, "It's making the time when we get so busy in our day-to-day routine, that taking the time to learn something new takes away from client service." P04 resonated, "The challenge is the professional staff, they simply don't have enough time." Therefore, P04 did not want to rush out too many digital applications to stress the accountant professionals at his firm. Excess and undifferentiated digitization may deplete employee creativity, causing various learning, attention, and misperceptions, thus reducing a firm's ability to generate intellectual property (Nambisan et al., 2019; Tarafdar et al., 2015). P05 shared her frustration when her team members had issues with the software from third-party providers. P05 mentioned:

> As we're trying to train people, right, because we're told it will do this, and it doesn't quite are like…And so that's certainly a barrier when we use so many different software's if the software itself has its own little like, bugs or unique things, sort of that could definitely be a barrier to getting people to use.

Participants were willing to share their solutions to tackle the challenges during the interviews. For the challenge related to reluctance to change, P02's solution was to communicate with people the benefits and motivate them to learn new digital skills. P01. P05 and P06 introduced champion system, task forces, or IT support to help the older generation accountants overcome the fear to change. P04 recommended moving the in-person training to the non-busy season to save time and costs. P02 strongly encouraged employees to take advantage of free online classes on the firm's internal portal. At the same time, P03 suggested his employees follow his example to learn advanced digital

skills via YouTube and Google search. Nowadays, the digital skills space focuses on using online courses and e-learning platforms to promote a lifelong learning approach with a self-directed pace (Al Ebbini et al., 2021; Carolina Feijiao et al., 2021).

Theme 3 findings aligned well with the human capital theory, which is the study's conceptual framework. The human capital theory focuses on how society, organizations, and individuals benefit from investing in people through education and training (Becker, 1962). The sustainability of society and organizational competitive advantage depends on the investment in human capital (Amran et al., 2021; Manole et al., 2018). Employees with competencies developed from training may adapt to the new requirements and expectations of the labor market, develop strong bonds with companies, improve their work efficiency, and further the competitive advantage for an organization's quality and productivity (Ismail & Awang, 2017; Olejniczak-Szuster & Lukasia, 2018). This study's findings confirmed the benefits of implementing digital skills training strategies. The benefits include, but are not limited to, increased working efficiency, improved client satisfaction, improved employee retention, and enhanced employee satisfaction and self-confidence.

Applications to Professional Practice

Some regional accounting firms lack training programs to help professional staff embrace the digital disruption in the accounting profession (Bakarich & O'Brien, 2021). According to Zhyvets (2018), 69% of new accountants noted inadequate training on applied digital skills. This study aimed to explore what effective strategies have been used to train the employees on digital skills at regional accounting firms. The findings

section includes the collected research data, data analysis, interpretation of results with linkages to the literature review, and conceptual framework. Employers and accounting firms can utilize the study findings to enhance the digital skills of employees, which can promote organizational productivity, employee job satisfaction, as well as better service to clients in the digitalized business world.

Analysis of the interview data and company documentation using NVivo software yielded the following three themes: (a) digital skills needed for success, (b) demonstrating investment in digital skills training, and (c) benefits and challenges of digital skills training. Theme 1 helps accounting firm leaders realize that four essential digital skills needed for success in accounting practice nowadays are skills related to data analytics, automation and other AI applications, digital communication, and cloud-based software skills. Excel is still the most popular application for data storage, ad hoc evaluation, and several data analytics tasks at regional accounting firms. However, some advanced data analytics tools and AI applications have been implemented in the early stages. Theme 2 highlights the importance of digital leadership in implementing digital skills training strategies. Supportive leaders are willing to invest in technology and training and motivate employees to overcome reluctance to learn new digital technology. Theme 2 also makes accounting firm leaders aware and adopt the strategies of training staff accountants on digital skills. Digital skills training strategies may contribute to firms' competitive advantages and sustainability by providing a secure advantage for improving performance, increasing productivity and creativity, and facilitating innovation (Martin, 2020). Accounting firm leaders may formulate effective training strategies by

adopting the training methods that emerged from theme 2, such as in-house group training, on-the-job training with mentorship or buddy program, outside training provided by third-party, and online self-study. The last theme upholds the evidence of human capital theory by revealing the benefits form digital skills training. Accounting firm leaders may also get inspiration on overcoming the common challenges related to digital skills training by reading the solution section in theme 3.

The findings included in the emerging themes of this study may contribute to the existing literature on the topic of human capital theory, as the knowledge from the results may indicate the importance of providing additional education and training in digital skills for accountants. This additional gained knowledge can assist leaders in strategies to increase the knowledge and development of accountants. Accountants may benefit from continuing education and training to improve their work performance to increase client satisfaction and sustain company business.

Implications for Social Change

Digital transformation is having a profound impact on accounting practice. The survival and growth of accounting firms depend mainly on the people employed who are able to utilize modern technology proficiently to add more value. Employees can improve work efficiency, achieve job satisfaction, and develop strong bonds with companies when the organization uses training to help expand individual skills and knowledge (Olejniczak-Szuster & Lukasia, 2018). Therefore, the results of this study can aid local businesses in ensuring that the budget reflects ample funds geared towards updated digital technology adaptation and digital skills training for accountants.

Accounting firm leaders with effective strategies for digital skills training may help staff accountants develop the perceptions of high employability, which is an individual's chance of qualifying for positions within the internal and external labor market (Lissitsa & Chachashvili-Bolotin, 2019). Since current digitized workplaces increasingly favor digital technology-savvy workers, individuals with high perceptions of their marketability should have an increased sense of self-confidence. Besides, employees with adequate digital skills may work from home to achieve work-life balance (Figueroa, 2022). Remote working enables the organization to meet the needs of its employees better while helping them balance work and personal life and maintain good health. Consequently, it enhances productivity, lowers stress associated with communication, and reduces time spent working and commuting to and from work (Figueroa, 2022). Business leaders may promote positive social change by equipping companies with viable employees who receive essential digital skills training. When employees demonstrate proficiency in digital skills, their clients in the community receive better service (Huerta & Jensen, 2017).

To recognize the rapidly changing skills and competencies the practicing accountants requires today and in the future due to technology disruptions, AICPA, and National Association of State Boards of Accountancy (NASBA) initiated the CPA Evolution to transform the CPA licensure model and will launch a new uniform CPA exam in 2024 (Behn, 2021). A curriculum based on the CPA evolution model was released in July of 2021 to help accounting educators reexamine their current curricula. The model curriculum emphasized technology and digital acumen to help accounting

students develop essential digital skills (Vien, 2021). Losi et al. (2022) recommended universities to provide data analytics training to prepare aspiring accountants for future employment. Therefore, the results of this study may contribute to change in university accounting curriculums to include essential digital skills training. Furthermore, the results of this study may promote new organizations to provide more online digital skills training, or universities may increase hiring to support certificate programs to meet the accountants' training needs. The subsequent success of employees and businesses improves local communities' economic stability and growth.

Recommendations for Action

There is an increased need to provide digital skills training to accountants, to enhance the accountant's ability to employ digital technology to improve work efficiency and add more value to their clients' services. Accountants without adequate digital skills will soon be replaced by AI, which can perform more mundane accounting tasks. Accountants must upskill or reskill to stay competitive in the digitalized business world. My recommendations for accounting firm leaders from this study are: (a) establishing digital leadership, (b) providing digital skills training programs, (c) implementing an intergenerational mentorship system, and (d) increasing collaborations between accounting practice and academics.

My first recommendation is for regional accounting firm leaders to establish digital leadership to promote data-driven culture. Accounting firm leaders should set up the tone from the top to embrace the digital transformation in accounting practice. They may have to sacrifice current income to invest in updated digital technology and digital

skills training for employees, expecting to reap long-term benefits. Advanced tools such as Power BI, and Tableau may be explored instead of mainly clinging to the Excel blanket. Furthermore, they should ensure accounting professionals in applying technology to improve work efficiency. Digital leadership is crucial in motivating employees to upskill to stay competitive advantage.

My second recommendation for accounting firm leaders is to provide various training programs to help employees improve their digital skills. In-house group training, on-the-job training, training provided by outside third-party, and online self-study are all beneficial for employees. New digital technologies emerge at an accelerating pace, so employees should be encouraged to develop the digital mindset to be lifelong learners.

The third recommendation is for accounting firm leaders to adopt an intergenerational mentorship program. Intergenerational mentoring emphasizes the development of collaborative relationships with learning from each other as the goal. Each generational leader has something to offer within the context of such a communal relationship (Satterly et al., 2018). Besides digital skills, soft skills still contribute significantly to the success of accounting professionals. Therefore, both old and young accountants may benefit from intergenerational mentorship by helping each other improve soft and digital skills. Both parties may experience humbleness and self-confidence since everyone leads and everyone learns. Intergenerational mentorship might be one of the solutions to help old accountants overcome the resistance to embracing digital transformation.

Institutions of higher learning should also pay attention to the results of this study. Accounting educators should incorporate digital skills training in accounting curriculum and develop training certificate programs for accounting firms. For instance, aware that Microsoft Excel skills are often presumed in the workplace today and serve as the foundation of many analytics tools, accounting faculty may require business students to obtain the Excel Expert certification prior to graduation (Lundy et al., 2021). Advanced data analytics and visualization software packages such as Tableau and Microsoft Power BI, can be introduced to students in a management accounting course or data analytics course (Lundy et al., 2021). Leading automation vendors like UiPath and Blue Prism offer free learning resources that academics can incorporate into existing courses (Lundy et al., 2021). Besides, accounting departments should consider the expertise of their faculty, especially assistant professors, who seem to have more knowledge of data analytics than any other rank (Losi et al., 2022).

My last recommendation is for accounting practitioners and academics to seek increasing collaboration to graduate in digital skills development. Working with accounting firm leaders who employ accountants can aid universities in helping employers discover well-rounded accounting recruits. The collaborative efforts of employers and universities can provide additional perspectives on the essential digital skills needed for employability.

Recommendations and findings from this study are relevant to the regional accounting firm leaders responsible for training the employees on digital skills. I plan to publish this study via ProQuest to allow access to students and researchers studying this

topic. The study participants will receive a summary of the findings and action recommendations. I will pursue opportunities to present and discuss the results of the study at TXCPA society meetings and training events. I will also seek to publish my study findings in a peer-reviewed journal.

Recommendations for Further Research

For this study, I used a purposeful sampling method to gather regional accounting firm leaders to interview. Analyzing data collected from semistructured interviews allowed me to align identified digital skills training strategies with Becker's human capital theory. However, I noticed areas for further research and inherent limitation. Two main limitations were the location of the accounting firms in the Houston area and the number of data sources used for analysis. Future researchers may consider using a larger sample size from other geographical regions. The data sources included the collection of company documents relevant to the study and interviews with six leaders from four CPA firms.

Future research could propose new digital skills requirements in accounting in the wake of fast-changing business scenarios (Kommunuri, 2022). With the focus being placed on digital transformation, data-driven culture and a more open-minded or innovative workforce can facilitate the transformational process. Future research may focus on how the new digital skills and different training backgrounds contribute to the data-driven culture in organizations (Wang, 2021). Furthermore, additional understanding may stem from quantitative approaches involving business performance indicators such as customer satisfaction and employee turnover. A quantitative approach to this study

could also provide insight into the significant themes and strategies outlined in the findings.

Reflections

The development of my research question for this study began because some accounting practitioners in the TXCPA society complained about their newly hired accounting graduates who lacked digital skills. I became aware that digital skills related to data analytics and automation have been a hot topic in the accounting profession for a few years. Therefore, I decided to explore and better understand the importance and strategies regional accounting firm leaders used to train their employees on digital skills. As a researcher, I avoided bias by conducting interviews using appropriate interview protocol. I did not include any previous employers or coworkers in my participant pool. I developed a new professional and personal relationship during the process and will continue to contribute to experiences and knowledge by conducting future research related to the topic of study.

The data collection process for this study proved to be very challenging. I posted my interview invitation on LinkedIn and emailed to about 100 potential candidates within one month. However, only a few responded, and one became one of six participants. I gained access to the remaining five participants through word of mouth and networking. The learning process and the magnitude of the research process was a difficult yet rewarding endeavor. It was a test of my ability and perseverance. I have expanded my knowledge to the next level and learned much from fellow students, faculty, and business professionals.

Conclusion

The purpose of this qualitative multiple case study was to explore training strategies that accounting firm leaders in the Houston area used to improve their employees' digital skills. Six leaders from four regional accounting firms participated in semistructured interviews with open-ended interview questions. During data analysis, I identified three themes related to my research question (a) digital skills needed for success, (b) demonstrating investment in digital skills training, and (c) benefits and challenges of digital skills training. Findings from this study revealed the significance of digital skills to modern accountants and the variety of effective strategies available to train employees on digital skills under digital leadership. Even though it is still at the beginning stage, regional accounting firms have started preparing to encompass more advanced digital technologies in accounting.

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Appendix A: Training Certificate

CERTIFICATE
OF COMPLETION

PHRP Online Training, Inc. certifies that

Limin Zhu

has successfully completed the web-based course "Protecting Human Research Participants Online Training."

Date Completed: **2022-03-29**   Certification Number: **2978645**

PHRP
Protecting Human
Research Participants
Online Training

Appendix B: Interview Protocol

Interview Title: Exploring strategies regional accounting firm leaders use to develop employees' digital skills by interviewing all leaders who participate in the training, and professional development process.

1. The interview session will commence with greetings and introductions.

2. The study participants will have previously read or will read the informed consent form and provided their consent via e-mail, agreeing to participate in the research. I will thank the participant for their agreement to participate in the research study. I will also provide information regarding the member checking process that will follow the transcription and interpretation of the data. Following my initial interpretation of the collected data, I will email the interview participants the information for member checking procedures to assist with ensuring the reliability and validity of the data.

3. I will email the participant a copy of the informed consent or I will give the participants a hard copy for their records.

4. I will turn on the zoom recording function.

5. I will indicate the coded sequential representation of the participant's name e.g., 'Participant P01' on the recording, documented on my copy of the consent form and the interview will begin.

6. Each participant will be given the required time to fully answer each predetermined interview question in detail (including any additional follow-up/probing questions).

7. At the close of the interview, I will thank each research participant for their

time and participation in the study.