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**EXAMINING THE PREPAREDNESS OF KENYA PROFESSIONAL ACCOUNTANTS  
TO TECHNOLOGICAL UNEMPLOYMENT IN KENYA**

**DENIS NYANJA**

**MBA 101013/2017**

**A RESEARCH DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR  
THE AWARD OF MASTER OF BUSINESS ADMINISTRATION, STRATHMORE  
UNIVERSITY**

**MARCH 2021**

## Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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Director, Office of Graduate Studies

## **ABSTRACT**

Despite the high risk of the accounting profession to technological displacement, there has been limited policy and academic examination in Kenya. This study sought to examine the preparedness of Professional Accountants towards Technology Unemployment in Kenya. The research specifically sought to establish the effect of professional capacity, training, and education as well as the regulatory environment towards technology unemployment among Kenyan accountants. This study is anchored on the Keynes Theory of unemployment. The study adopted a positivism research philosophy with descriptive research guiding the examination of the research problem. The population of the study was drawn from the 22,000 registered accountants in Kenya. The final study sample was composed of 360 respondents drawn from Kenyan accountants. The study relied on a mixed research approach with structured questionnaires and interview schedules being considered in the data collection process. The collected research data were analyzed using both content analysis and quantitative analysis. The quantitative analysis relied on descriptive and inferential statistics. The analyzed data were presented using charts, tables, and bar graphs. The study was able to obtain a 94% response rate. The study conducted an exploratory factor analysis and the study variables met the sampling adequacy for factor analysis. The findings indicated there is a positive correlation between professional capacity, initial professional development, and the role of regulatory bodies on the preparedness for technology unemployment. The study concludes that improving academic and professional skills will be critical to the preparedness for technology unemployment among accountants. The study also concludes that initial professional development has a positive and significant effect on preparedness for technology unemployment. On the contrary, the research found that the role of regulatory bodies does not have a significant influence on preparedness for technology unemployment. The research recommends that there is a need for better curriculum development and the creation of awareness on the threat of technological unemployment within the accounting profession. The study further recommends that accountants should focus on improving their accounting skills, computer literacy and acquire training on emerging technologies to cushion from technological unemployment.

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## ABBREVIATIONS

<b>4IR</b>	Fourth Industrial Revolution
<b>ACCA</b>	Association of Certified Chartered Accountants
<b>AI</b>	Artificial intelligence
<b>CPA</b>	Certified Public Accountant
<b>CPD</b>	Continuous Professional Development
<b>ERP</b>	Enterprise Resource Planning
<b>GDP</b>	Gross Domestic Product
<b>ICPAK</b>	Institute of Certified Public Accountants of Kenya
<b>IES</b>	International Education Standard
<b>IESB</b>	International Ethics Standard Board for Accountants
<b>IFAC</b>	International Federation of Accountants
<b>IPD</b>	Initial Professional Development
<b>KASNEB</b>	Kenya Accountants and Secretaries National Examination Board
<b>NACOSTI</b>	National Commission for Science Technology and Innovation
<b>VIF</b>	Variance inflation Factor

## **DEFINITION OF TERMS**

**Industrial Revolution** – This refers to Periods of a significant shift in technology and power. (Philbeck & Davis, 2019).

**Kenyan Accountant** – This refers to an individual in the accounting professional, duly registered with ICPAK and practicing the accounting trade in Kenya (Nation Media Group, 2018)

**Professional Capacity** - This refers to the expertise level of an accountant including their knowledge levels, responsibility, and skill-sets (Alsharari, 2017)

**Professional Development** – This refer to training provided to professionals accountants through IPD guided by IES 3, Initial Professional Development – Professional Skills (Revised) (IAESB, 2019) and CPD guided by IES 7, Continuing Professional Development (Revised) (IAESB, 2018).

**Technological Unemployment** – This is the form of unemployment due to the discovery of means of economizing labor outrunning the pace at which we find new uses for labor (Fiorelli, 2018).

**Training and Education** - This refers to the professional experience of learning the various accounting techniques and practices relevant to acquiring a professional accounting certification (Das & Singh, 2018).

## DEDICATION

First, to my dearest wife, Belinda Lumumba Ndengah, for your continued support and patience during my research and school years. My beautiful girls; Naima, Hera and Zuri. You give me joy and purpose. To the Almighty God for your Grace and Wisdom. Finally, to my late dad, Nixon Nyanja, for pushing me to get my MBA. May you rest in peace, I love you!



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## **CHAPTER ONE**

### **INTRODUCTION**

This chapter introduces the study. It is subdivided into the background study, the statement of the problem, study objectives, the scope of the study and the significance of the study to various stakeholders.

#### **1.1 Background to the Study**

The three waves of industrial revolutions since the 18<sup>th</sup> Century have been the main drivers of economic growth. The first wave brought with it steam power, which liberated the use of people, water, animals, and wind for labor. The second wave was characterized by electric power and other scientific discovery like the telephone and artificial fertilizer that increased productivity further. The third wave, which started after world war 2, brought a step-change in information theory and the power of data. It was a period of mass digitization that is characterized by an unprecedented increased transistor and computing power (Philbeck & Davis, 2019). Philbeck and Davis (2019) say that the phrase ‘fourth industrial revolution’ was coined in 2016 to refer to a transition from the digital age to revolutionary technologies such as artificial intelligence (AI), machine intelligence (learning), advanced robotics, nanotechnology, genome editing, augmented reality, ubiquitous web (that drives blockchain technology) and 3-D printing. Artificial intelligence enables computers or robots to perform tasks that can be performed by human beings. Machine learning provides a computer with the ability to recognize patterns and as a result, make predictions, such as what we see with predictive texts on smartphones (Oliver, 2016). Blockchain technology enables encryption of transactions and transmission of results and audit trails to relevant stakeholders (Smith, Quaranta, & Rhem, 2017). Each of the revolutions has resulted in a significant increase in labor efficiency. With the first wave, machines took away the onerous manual, dirty and dangerous jobs like those in the cotton gin. Waves two and three had machines taking away the dull clerical roles. The fourth industrial revolution, especially AI, involves taking away decisions (Davenport & Kirby, 2015). Labor improvements from AI will contribute up to US \$ 15.7 trillion to the global economy, which is more than half of the economic gains expected between the years 2016 and 2030 (Nagarajah, 2016). These advancements, it is suggested, could solve the problem of an aging labor force seen today in advanced and emerging economies (Chui, Manyika, & Miremadi, 2017). Technological Unemployment

### **1.1.1 Technological Unemployment**

The converse to this is that significant labor improvements go hand in hand with unemployment. John Keynes writes in his 1930 publication “Economic possibilities for our grandchildren” that only a quarter of human effort would be required to produce the same output in the fields of agriculture, mining, and manufacturing (Keynes, 1963). Demand held constant, then about three-quarters of the labor force would lose their jobs, a concept he called technological unemployment. Keynes (1963) was, however, optimistic, calling this a temporary phase of maladjustment which humankind would solve. Throughout history, we have seen this come true with the creation of previously nonexistent jobs such as those in the service industry. Keynes's temporary maladjustment has proven true for the first three revolutions. New jobs created have each time outweighed the number of jobs lost. A lot of economists however worry that this might not be the case of the fourth industrial revolution (4IR). Machines today are more intelligent and powerful than people imagined they would be one hundred years ago; millions risk being permanently displaced as a result (Akst, 2013). Economists Carl Frey and Michael Osborne have made the most mentioned attempt to analyze the impact of advancing technologies on today’s jobs. Their studies showed that 47% of occupations were at risk of automation (Frey & Osborne, 2017). The jobs at greatest risk of shrinking were middle-income ones from telemarketers to cashiers. Even those with higher pay, like lawyers and pilots, could shrink (Grose, 2017).

Technological unemployment first occurred in the shift from traditional agriculture to intensive largescale agriculture that relied on agricultural machinery, fertilizers, and modern irrigation methods (Marchant, Stevens, & Hennessy, 2014). Wladawsky-Berger (2015) reported that in 1900, 41% of Americans were employed in agriculture, yet in 2000, only 2% of Americans were employed in the same industry (Buckley, Fishman, & Kaufmann, 2015). In the manufacturing sector, the main cause of the rural-urban migration, of the 23% of Americans employed in industries, only 10% remain today, and it is expected that only 3% of Americans will still hold similar jobs by 2030 (Carboni, 2015). All these jobs will be lost to automation. Globally, between 2015 and 2020, more than 5 million people have lost their jobs (World Economic Forum, 2017). This trend is similar in all developed economies.

The 2008 financial crisis saw a change in people's views on how to measure economic success. Most people measure economic health as a variable of productivity as opposed to growth in jobs. One study carried out between 2007 and 2009 found that a 5% increase in automation resulted in a similar percentage in jobless growth (Brynjolfsson & McAfee, 2012). Another pointed that 40% of companies have incorporated new technologies since 2008 resulting in large-scale job losses and restructuring. This trend will likely persist since, in the modern world, capital is measured in the form of technology rather than labor capabilities (Frey, 2020). Further, the unprecedented growth of computational capabilities means that automation has also evolved to handle more complex tasks. Big data, machine learning, and predictive analytics are revolutionizing the potential of automation. Studies predict that commercial driving is the next frontier that will be automated (Swan, 2017; McPherson, 2015), with long-distance truck-driving being expected to be fully automated by 2025.

While evidence points to the existing technological unemployment and improved productivity with the introduction of new technologies, at no point has there been permanent technological unemployment. Alternative views suggest that technological progress should be looked at on a long-term basis, as they have potential benefits such as the creation of entirely new career options. They propose that the collective capability of humans to adapt will lead to the emergence of new categories of work in the face of changing economic circumstances (Smith, 2015; Bessen, 2019), with the capability to instigate social transformation (Boyd & Holton, 2018).

### **1.1.1 Professional Capacity in the Accounting Profession**

According to (Alsharari, 2017), professional capacity is the expertise level of accountants. This includes their knowledge levels, responsibility, and skill-sets. Accountants perceive different values from universities, organizations, and professional associations in terms of the development of skills for technology (Jackson, 2020). The perceived impact of technology on success in the accounting profession is greater among early career accountants compared to managers; and greater among accountants in large private organisations compared to those in the public sector or organisations of a different size (Andiola, Masters, & Norman, 2020).

Technology has revolutionized how accountants acquire, analyze and interpret data, resulting in enhanced decision-making within different firms. Automation has eliminated tasks that were traditionally performed by accountants and data entry clerks (McClure, 2018). Accountants are

expected to possess the requisite skills and expertise necessary to ensure that they are able to leverage new technologies to complete complex tasks faster and more efficiently. This requires that they possess professional knowledge and recognition of how technology can interact with, and potentially change, existing accounting knowledge and processes (Deloitte, 2015). While technological developments have previously generated concern about job losses in the accounting profession, many scholars are pointing to their significant positive influence on innovation which is a key driver of performance in the field of accounting (Xu, David, & Kim, 2018).

Association of Certified Chartered Accountants identifies technology as a critical driver for change. It predicts that software and systems will replace manual bookkeeping and accounting work and recommends that professional accountants acquire knowledge that would enable them to become experts in new emerging technologies (ACCA, 2016). Technological developments in the accounting profession include Robotic Process Automation, which uses robots as digital workers that perform well-defined routines such as accounts receivable and conducting audits thus impacting how data is processed and reported (Goh, Pan, Seow, Lee, & Yong, 2019). Automation in data entry ensures that data reporting becomes more consistent, reliable, and fast, increasing efficiency and accuracy. Machine learning applies analytical technologies to analyze and classify data according to human cognitive processes, and are key when making informed decisions about client preferences and devising market strategy (Ding, Lev, Peng, Sun, & Vasarhelyi, 2020). Routine tasks like bookkeeping, audit, and tax preparation are being replaced by data automation, blockchain, and Artificial Intelligence. With the ability to collect real-time data and directly link all stakeholders of a transaction, blockchain technology not only reduces the time that audit professionals need to spend in verification but also questions the need for audit (Smith et al., 2017). Cloud computing allows data sharing across multiple devices enabling faster communication between accountants and their clients.

Similar to other professions, accountants are susceptible to job loss resulting from advances in intelligent automation. Frey and Osborne (2017) put accountants among professions that were at the most significant risk of job loss due to automation at a 94% chance. Some in the accounting industry have started to react to this trend. Public accounting firms, especially the Big 4 firms, have started hiring fewer fresh graduates and replacing the work that they would have done with artificial intelligence tools (Bessen, 2016). Frey and Osborne (2017) identified specific accounting

jobs that could be outdated due to their routine nature. At the top of the list at 99% are tax preparers, new accounts clerks, and data entry clerks. Jobs that require more thought and judgment were less susceptible. These include financial analysts at 23%, financial examiners at 17%, and purchasing managers at 3%.

### **1.1.3 Response to Technological Unemployment**

Technology in the accounting profession is key to organizational success. It can create a more sustainable working environment that improves efficiency, the quality of work, and engagement with customers (Hollebeek, Sprott, & Brady, 2021). However, for organizations that cannot keep up with the appropriate technologies and expertise, the emergence of new technologies poses a challenge to their ability to attain organizational goals. This can be mitigated by having staff with appropriate skills and agility that would enable them to respond to changes in a technological environment (Andiola, Masters, & Norman, 2020). Davenport and Kirby (2015) take a similar view of automation in terms of jobs. As opposed to worrying about replaced jobs, they argue that it frees accountants to take up higher-value work (augmentation). Nagarajah (2016) categorized accounting roles in low-value roles like credit controller, finance administrators, finance, and accounting technicians, and payroll managers, and high-value roles like finance managers and directors, and business and finance management, and professionals. While lower value roles have an above 70% chance of being extinct, higher value roles risks of automation dip to below 30%. Accounting professionals are recommended to move to higher-value roles, and increase their digital skills, have a deeper understanding of business models, and be more involved in strategy. Universities, organisations and professional associations could jointly coordinate short courses, focused on areas like new software, cybersecurity and data analytics.

### **1.1.4 Accounting in Kenya**

The accounting profession in Kenya is guided by the Accountants Act No 15, 2008. Under the Act, two bodies are established to run the profession in the country; Kenya Accountants and Secretaries National Examination Board (KASNEB) and Institute of Certified Public Accountants of Kenya (ICPAK). KASNEB offers the CPA exams, which are benchmarked against various international accounting standards promulgated by, among others, the International Accounting Education Standards Board. The CPA course is comprised of eighteen papers and carried out on an average of four and a half years. Once students pass the CPA exams (referred to as CPA

finalists), they are encouraged to register as members of ICPAK as Associate Members. Institute of Certified Public Accountants of Kenya is a member of the International Federation of Accountants (IFAC), which is the umbrella body for professional accountants worldwide. It is the leading professional body of accountants in the East and Central African region and is in charge of upholding public interest, developing and regulating accountants in Kenya (Ndung'u, 2020). Part of the benefits of membership is a continuous professional development (CPD) through various training seminars offered throughout the year. On attaining three years of professional accounting experience, one is eligible to be registered as a full member, with the designation CPA (K). According to ICPAK CEO Edwin Makori, there are 22,000 registered accountants in Kenya (Nation Media Group, 2018).

## **1.2 Statement of the Problem**

The WEF (2016) reported the main drivers of change that impact business models as including processing power and Big Data, the larger middle class in emerging markets, mobile internet, cloud technologies, changing nature of work, geopolitical volatility, and consumer ethics and privacy issues. Most of these trends are directly related to technological developments and have a direct impact on how financial services industries will model their future portfolios. These changes are also predicted to impact professionals in the service industry. Technology will significantly impact the nature of work, flexibility, enhance a more stable sharing economy, enhance ethics and oversight, and change women's economic power and aspirations. Aspiring employees will have to possess social skills, cognitive abilities, human resource management and content skills, technical and complex problem-solving skills (WEF, 2016).

Frey (2013) notes that nearly 45% of current US employment opportunities will be automatized. WEF (2016) reported a loss of more than 5 million jobs worldwide between 2015 and 2020. More than half the respondents in WEF (2016) reported that the accounting profession was noticing a technological change in terms of increased use of mobile internet, advances in big data computing, advanced robotics, and the internet of things. Feldmann (2013) reported that new technologies significantly contribute to job losses, especially during the transition period. Pew Research (2016) reported that technological unemployment has significant disproportionate impacts on society. This is seen with some skills being preferred to others, placing some people in better positions to succeed while displacing others to low paying jobs or even permanent unemployment. Pew

Research also noted that the education system was ill-equipped to introduce individuals into future workplaces. White-collar jobs are also facing little interference in comparison to white-collar jobs, as are women (Swan, 2017).

Deloitte's (2015) global shared services survey' showed that 80% of shared services and global business services leaders are aware of automation possibilities of their functions through robots. The survey highlighted automation as the second most important priority for financial services after business process improvement (Deloitte LLP, 2015). Malaysian accountants saw automation as an opportunity to move to more valuable analytical work but admitted to automation introducing more competition and the industry needing the same number if not fewer accountants (Nagarajah, 2016). ACCA (2016) identified outsourced and shared services as the first possible casualty for advanced robotics.

Conversations about technological unemployment among Kenyan accountants have started to come up. Former ICPAK chair Fernandes Barasa said that there wasn't much to fear. Similar to sentiments from the Deloitte and PWC reports, he argued that new tools resulting from innovation would make accounting work more manageable and accounting services better (Ngugi, 2017). McFie (2017) notes that for professionals to manage disruption and remain relevant, they should first acknowledge disruption in their industry and prioritize getting ahead of automation. Marshall and Lambert (2018) indicate that introduction of cloud-based accounting applications has contributed to task automation, thus leading to less reliance on human-personnel within large accounting firms.

Onuonga (2016) notes that bank tellers and accountants in Kenya are highly susceptible to face automation as a result of advancements in technology within their areas of work. The study notes that emphasis on education was vital in preparing the employees. The above studies have indicated the threat of technology towards the accounting profession; however, they are limited in that they did not specifically focus on the preparedness among Kenyan accounting professions, which is the aim of this study. Further, most publications on automation among accountants in Kenya are focused on cost-saving opportunities that automation brings to the profession as opposed to how to prepare for the risks of unemployment that come with it. This paper aims to examine the preparedness of the Kenyan accountant to technological unemployment.

### **1.3 Objective of the Study**

The objective this study was to examine the preparedness of Kenya professional accountants to technological unemployment in Kenya.

#### **1.3.1 Specific Objectives**

- i. To establish the effect of professional capacity on technological unemployment among Kenyan accountants.
- ii. To determine the effect of initial professional development on technological unemployment among Kenyan accountants.
- iii. To determine the role of regulatory bodies on technological unemployment among Kenyan accountants.

### **1.4 Research Questions**

- i. What is the effect of professional capacity on technological unemployment among Kenyan accountants?
- ii. What is the effect of initial professional development on technological unemployment among Kenyan accountants?
- iii. What is the role of regulatory bodies on technological unemployment among Kenyan accountants?

### **1.5 Scope of the Study**

The study contextually examined technology unemployment among Kenyan accountants and individually examined how professional capacity, training, and education and regulatory environment impacted technological unemployment. The study was grounded on the Keynes Theory of unemployment. The study adopted a positivism research philosophy. The study was focused on 22,000 accountants who are registered with ICPAK. Accountants were selected for this study since in Kenya, as there has been little study about technological unemployment covering Kenyan accountants despite the high risk of the profession to technological unemployment. The study was conducted online in line with the social distancing guidelines of Covid 19 containment measures. The study initially scheduled to run between March 2020 and April 2020, ran to September 2020.

## **1.6 Significance of the Study**

The stakeholders to this study include professional accountants in Kenya, ICPAK, KASNEB and other academic institutions providing Initial Professional Development (IPD) training, employers of accountants and research practitioners.

### **1.6.1 To policymakers**

Providers of IPD training, led by KASNEB, could use this study to assess the adequacy of their training in preparing accountants for automation. Feedback from this study can refine their curriculum to equip accountants with what they need to be relevant beyond automation. The ICPAK, being in charge of accounting welfare, as well as providers of CPD training, can use this training to assess the risk of members to technological unemployment, assess their curriculum and get feedback from members on their impact.

### **1.6.2 To Accountants**

This study will also raise awareness among professional accountants of the conversation around technological unemployment. The study aims to trigger self-reflection on the adequacy of their professional capacity, and encourage a drift towards rightly equipping themselves for relevance. Employers of accountants could use the study useful in calibrating their job requirements and engagement letters to derive more excellent value from the changing accountant.

### **1.6.3 To future scholars**

Finally, the findings will also enhance the available scholarly work and act as reference material for future research work on technological disruption in the accounting profession.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This literature review explores classical and modern theories of unemployment. The effect of technology on these theories, as well as on professional structure, is reviewed. The researcher attempts to review related literature specific to technical unemployment in the accounting profession in Africa and Kenya, the lack of which leads to the research gap. The conceptual framework was finally constructed, and the operationalization of research variables introduced.

#### **2.2 Theoretical Review**

##### **2.2.1 Keynes Theory of Unemployment**

John Keynes came up with the Keynesian theory of employment in 1930 as a counter to the Classical Theory, which he believed failed to work during the Great Depression. Gali (2013) says the fundamental objection was in the notion that real wage determined employment rate. Keynes argued that employment was determined by aggregate demand, not real wages. Aggregate demand is the number of outputs that the firms want to produce, given the existing technology. Keynes recognized that the power of trade unions and legal backing could not be wished away; therefore, there was no forcing mechanism to restore equilibrium, leading to a less flexible wage adjustment.

Aggarwal (2015) continues to say that any nominal change in wage would result in a nominal change in prices, leaving real wage constant. Involuntary unemployment, therefore, emerges even in equilibrium, according to Keynesian theory. The only remedy for unemployment would be for the government to increase aggregate demand through public spending. Aggarwal is opposed to thinking of the two theories as conflicting, they should be complementing. The Keynesian theory can be viewed as short term, and classical theories can be viewed as long term. Both recognize unemployment as arising due to structural and frictional factors. Frictional unemployment is caused due to the time lag that takes place when the firm is looking for labor, and the laborer looking for employment. Structural unemployment occurs when technology renders a worker's current skills irrelevant, and that work has to acquire a new skill.

Gali (2015) explains that if we were to differentiate technology, we would have different outcomes in the Keynesian and Classical theories. In the classical model, an exogenous improvement of aggregate technology would raise the marginal product of labor (given employment), therefore

shifting the demand curve to the right. Employment and real wage would increase, leading to the conclusion that there is a positive co-movement between output and employment in response to technological shocks.

Taking the long-term lens, technology has always provided a replacement for the jobs displaced. Fiorelli (2018) explains of the workers in the agricultural industry, replaced by machines on their farms during the proto-industrial stage to jobs in factories. When automation got to the factory, they got jobs in the back office, where a tertiary sector that did not exist before was created. He concludes that digital technology does not create unemployment, as the balance of jobs lost, and those created have always been positive. Technological unemployment always manifests itself as frictional unemployment. In contrast, Gali (2015) argues that if the technological shock does not increase aggregate demand under Keynesian theory, then the employment rate would unambiguously reduce, as fewer workers would be needed to produce the same output. If the market for a product does not increase in the short term, there was an inverse relationship between improved technology and human labor. However, in the long term, this productivity would translate to reduced prices, increasing demand, and therefore increasing employment (Ansal & Cardullo, 1997).

The theory is thus important in elaborating the importance of accountants need to have some technological skills to enhance their professional capacity in the accounting profession which relies on emerging technologies. The accountant today has to have basic training and skills in information and technologies that have disrupted the profession and thus makes the Keynesian theory relevant to this study. The Keynesian theory also asserts the need for governments and regulators to put policies and guidelines in place to reduce the incidences of technological unemployment and thus regulators of the accounting profession are required to come up with basic qualifications and requirements of accountants in technological capabilities and also promote the use of technologies that promote efficiency in the profession and provide a supporting environment for accountants to acquire, possess, and enhance these technological capacities.

## **2.3 Empirical Review**

The study focuses on a review of various empirical studies in line with the objectives of the research. The review of the empirical studies helped in determining the various gaps that this study sought to solve.

### **2.3.1 Technology Unemployment among Accounting Professionals**

Accountants obtain their skills through training, which takes two forms; IPD, which is offered by universities and professional examination bodies like ACCA and CPD, which is implemented by Professional Accounting Associations. IFAC through IESB has published IES 7: Continuing Professional Development” to guide local accounting bodies in their management of CPD (McPeak, Pincus, & Sundem, 2012). IES 7 appreciates the ever-evolving competency required of accountants by stating that new roles and competencies that would be required of an accountant would not ideally be part of the original IPD. These two forms of education should equip the accountants with that they need to remain relevant and competent in the profession in the heat of the heightened probability of automation among accounting occupations (See Appendix IV).

Though the challenges of automation are universal, the reality of the adaptability of automation across different economies is not. Low and middle-income economies will likely experience lower technology uptake compared to more developed countries, meaning that disruption and the benefits of automation were slower. While on one side, this will give these countries more time to change their policies and be ready for the effect of automation, it will reduce their global competitiveness on the other side (Millington, 2017). The reality is that lower-income countries need to embrace automation just as fast, which added to their growing work age population, is necessary to maintain their growth aspirations (Chui et al., 2017).

Millington (2017) further argues that the nature of jobs in countries in Africa, which mostly rely on agriculture, already makes them highly susceptible to automation. Referring to the technological eras described by Davenport and Kirby (2015), most of these jobs are in the already proven and practiced development in previous technological revolutions. The Millington study predictably put the risk in automation in Africa at between 67% (as experienced in Nigeria) and 85% (as experienced in Ethiopia), against an average of 47% as per the Frey and Osborne studies. Though Millington (2017) appreciates that reforms in Africa and across specific countries take long, his advice is that the sooner a country adopts reforms, the sooner it reaps the digital benefits

and positions itself globally. Countries have to develop modern skills for education and youth by reforming education systems and, at the same time, upskill existing workers to take on roles that machines cannot take over.

Unfortunately, few universities have developed curriculums for accounting students that address future needs. Ideally, they should cover, among other topics, cloud computing, digital technology, and big data (Islam, 2017). The effect of this is the fewer enrolment of the student to accounting majors and less attractive starting salaries (Gabbin, 2002). Many practitioners admit that the education that they get is outdated, and given a chance, and they would not major in accounting again (Albrecht & Sack, 2000). The specific deficiencies and recommendations offered by Albrecht and Sack (2000) include investing in faculty to train on new skills, incorporating acting practitioners into faculty, and more responsiveness of CPAs to surveys and research. Other initiatives include providing open, affordable, and accessible training that encourages creativity and democratize knowledge (Peters, 2017).

**Table 2.1: Five paths towards Employability**

<b>Strategy</b>	<b>How one adds value</b>	<b>How you adjust</b>
Stepping up	Move up to a more significant picture position	Advance your education to get to senior management
Stepping aside	Build on non-codifiable strengths	Build on IQ strengths (e.g., networking)
Stepping In	Manage the machine, i.e., learn to change its output or function	Build on both your professional and technical knowledge
Stepping Narrowly	Specialize in something that the computer is yet to do	Look for a niche and pursue it passionately
Stepping forward	Build the next great computer application	Pursue computer science and automation. Identify opportunities for automation

**Source: Gali (2013)**

There has been little research on the effects of automation on employment opportunities in the accounting profession. Only recently, McFie (2017) notes that aligning the accountants working style to the continuing evolution of technology, as the solution to staying ahead of automation. However, there have been studies and reports that push for more significant value creation by accountants. In a study conducted in 2011 of CFOs in Kenya and their finance functions, it was established that 48% were focused on reporting (PWC Kenya, 2011). Outa (2012) used the PWC ideal finance model on accountants registered with ICPAK and established that 33.7% of respondents (39% by PWC on a different sample population) were focused on strategy for 60% to 70% of their time. These studies reveal that up to 60% of professional accountants in Kenya provide value that can be automatable.

### **2.3.2 Professional Capacity and Technology Unemployment**

Stancheva-Todorova (2018) examined how artificial intelligence is challenging the accounting profession. The study indicates that recent development in robotics and general artificial intelligence has brought professions towards future realms. The study notes that accounting professions need to be aware of the impact of AI on their roles and thus change their mindsets through developing new skills and competencies that are related to smart technologies and the augmented business applications. The study notes there is a need for the profession to bridge the gap between the accounting domain and the realm of artificial intelligence. The study relies on a review of meta-analytic data, while this study considered primary evidence in determining the preparedness of Kenyan accountants to technology unemployment.

Sumanto, Abbas, Rahmawati, and Merlinda (2020) examined if technological developments reduce unemployment in Indonesia. The study utilized panel least square in the analysis, and the findings show that technological developments positively influence the level of unemployment in Indonesia. The study notes that to alleviate technological unemployment, the government needs to enhance skills development through training, enhance professional growth through competency-based induction practices. The study is, however, not limited to technology unemployment within the accounting profession, which is the focus of this research.

Pincus, Stout, Sorensen, Stocks, and Lawson (2017) analyzed the forces for change in higher education and implications for the accounting academy. The study focused on accounting professionals in public and private institutions in Ukraine and adopted a survey research design

with questionnaires being utilized in the study. The study notes that there is a lack of accounting ethics among accountants in the country. The research found out that professional ethics need to be included in the Higher Education Institutions curriculum to improve the accounting profession and conduct among accountants. The study, however, fails to indicate how improving professional conduct influences the accountant's preparedness for technology unemployment.

Ramlall and Ramlall (2014) examined the value of soft-skills in the accounting profession. The study considered responses from 313 accounting students. The study utilized descriptive and regression analysis. The findings indicated that most accounting colleges were placing more emphasis on the soft skills development that was deemed key to expanding the career progression. The study indicates that changes in the accounting curriculum and review of the skill-sets of accounting students are deemed necessary in enhancing the value of the accountants. The study fails to indicate how the soft-skills can affect technology unemployment among accountants which is the focus of this study.

Mersha and Getahun (2019) studied the limitations of the outcome-based accounting curriculum in Ethiopia. The research employed a descriptive research design with a focus on staff within TVET institutions and professional accountants. The study indicates that accounting students need to enhance their knowledge, skills, values, and professional ethics to enhance their accounting outcomes. The research notes there is a need for the linkage between accounting competencies, skills, and the curriculum in place to improve the professional capacity of accountants in Ethiopia. The study, however, fails to examine the risk of technology unemployment among accounting professionals.

### **2.3.3 Initial Professional Development and Technology Unemployment**

Frey and Osborne (2017) found that educational attainment had a strong negative correlation with the probability of computerization. The key to workers to win the race, they argued, was to acquire new and creative skills. Fiorelli (2017) agrees and calls the continuous introduction of new training courses that would match the demand for new skills to the supply of upgraded education credentials. Without this, workers displaced by machines would find it difficult to re-integrate into the employment market, where more advanced skills are needed. The response by profession has been to push accounting from bookkeeping towards creating value. The notion that accountants are bean counters (even though they cannot grow the beans) or scorekeepers even though they

don't score was dispelled. Accountants are now viewed as business partners and sometimes co-pilots (Outa, 2012).

Davenport and Kirby (2015) suggest a different way of looking at automation in terms of jobs: that of the opportunities for higher-value work (augmentation) as opposed to worrying about replaced jobs. They propose five different strategies of reacting to automation and remaining employable. Blake (2017) advises that accountants learn how to manage integrated accounting systems and interpret their output. The research argues that by releasing accountants of onerous tasks, they have more time to gain insight into trends and patterns in their client's businesses and provide better advice and recommendations. They also have more time to speak to their clients and provide them with more assurances of their organizations' finances. Outa (2012) lists down four value roles that accountants should pursue as per IFAC.

Das and Singh (2018) conducted a comparative examination of accounting education in India and the United States. The study indicates that accounting education has evolved from a traditional scope to incorporate e-commerce software and accounting technologies in the curriculum. The study results indicate that comprehensive in-house training, financial accounting, and cost accounting were highly emphasized in India while in America, cost accounting and management accounting were highly adopted. The research notes there is a need for significant reforms to be introduced in accounting education to help reduce unemployment within the profession. The study fails to take into consideration technology unemployment within the accounting profession.

Adegbite (2019) conducted research exploring regulatory framework guiding bank employees' career advancement in Nigeria. The study employed an exploratory study design with semi-structured interviews being used in the data collection process. The study indicates that inadequate employee training has resulted in a lack of career advancement. The study notes that the competitive edge of the workers has been impacted by the lack of acquisition of skills and training that can foster the transition to new opportunities. The study is focused on institutional aspects among commercial banks staff while this study examined technology unemployment among accounting professions in Kenya.

Onuonga (2016) conducted a study focusing on the implications of automation in Retail Banking and Small Accounting Firms. The study considered 54 participants in collecting research data with quantitative statistical analysis being adopted in the research. The study results show that marketing, customer service, and personnel in high skill managerial roles were less likely susceptible to automation, while accountants and bank tellers had a higher probability of being displaced. The study indicates that emphasizing education and training on emerging impactful technologies will help the staff in their preparedness. The study, however, focussed on two accounting and banking firms while this study considered the entire accounting professionals registered in Kenya.

### **2.3.4 Role of Regulatory Bodies and Technology Unemployment**

Alsharari (2017) analyzed the development of accounting education and practice in an environment of socio-economic transformation in the Middle East. The study employed an explanatory research design with historical and statistical analysis being utilized in the research. The findings of the study show social factors, economic factors, political and cultural dimensions influence the accounting environment. The study notes that privatization efforts in the government of Jordan have a pivotal contributor to social practices, accounting, and legal change in the profession. The study, however, fails to examine how the operating environment impacts technology unemployment in the accounting profession.

Madawaki (2014) conducted a study on the impact of the regulatory framework and environmental factors on accounting practices by firms in Nigeria. The study reviewed previous empirical evidence and conducted observations among accounting professions. The study observed that accounting and reporting practices were highly influenced by the regulatory and institutional framework and indirectly influenced by the political factors during democratic eras. The study notes that privatization has mostly contributed to development in accounting regulations. The study notes that building the capacity of the professional bodies through modernization efforts and compliance guidelines can enhance accounting practice. The study fails to identify how the above factors can enhance the preparedness of accountants towards technology unemployment, which is the context of this research.

Le Roux (2018) examined the association between automation and employment in South Africa. The study notes that the wave of technological advancements is expected to contribute to the replacement of low and medium-skilled workers. The study notes that 35% of the workforce in South Africa is at risk of being potentially automatable in the future. The study notes that enhancing income distribution, creating new types of jobs, and enabling industrial growth can help in limiting the unemployment levels. The study, however, is not focused on the accounting profession, which is the focus of this research.

Mugo and Nyaegah (2018) studied the role of information technology skills on youth empowerment projects in Nakuru Town, Kenya. The study employed a case study research design, with 150 participants being considered in the research. The findings indicate that enhancing entrepreneurial skills, online financing, and internal controls can influence youth empowerment. The study notes that government intervention in improving skills development is key to empowerment among the youth. The research, however, fails to indicate how government interventions can improve empowerment within the accounting profession.

#### **2.4 Summary of the Literature and Research Gaps**

The fear disruption of employment due to technology has been consistent from the Luddite movement to modern theories. Every time, the nature of work has adapted to work with technology and improve productivity. Whether the fourth industrial revolution leads to structural displacement is still up for debate. What modernists agree on is the reality of frictional unemployment in the short run. The accounting profession, and Africa, will likely be most affected as a result of automation. The industry is increasingly making demands of the accounting profession as a result of technology pressures, including requiring value and augmentation to un-automatable roles. Adapting education to produce the future accountant is the key to remaining employable.

**Table 2.2: Summary of Research Gaps**

Author	Title	Findings	Research Gap	Focus of current study
Le Roux (2018)	Association between automation and employment in South Africa	The study notes that the wave of technological advancements is expected to contribute to the replacement of low and medium-skilled workers	The study, however, is not focused on the accounting profession which is the focus of this research	The current study reviewed the technological unemployment among Kenyan accountants
Madawaki (2014)	The impact of the regulatory framework and environmental factors on accounting practices by firms in Nigeria	The study notes that privatization has mostly contributed to development in accounting regulations	The study fails to identify how the above factors can enhance the preparedness of accountants towards technology unemployment which is the context of this research	This study reviewed the preparedness of Kenyan accountants to technological unemployment
Mersha and Getahun (2019)	Limitations of outcome-based accounting curriculum in Ethiopia	The study indicates that accounting students need to enhance their knowledge, skills, values and professional ethics to enhance their accounting outcome	The study, however, fails to examine the risk of technology unemployment among accounting professionals	The current study filled the gap by examining technological unemployment in the accounting profession
Onuonga (2016)	Implications of automation in Retail Banking and Small Accounting Firms	The study indicates that emphasizing education and training on emerging impactful technologies will help the staff in their preparedness	The study, however, focusses on two accounting and banking firms while this study considered the entire accounting profession in Kenya	The current research surveyed the preparedness of registered accountants in Kenya
Sumanto, Abbas, Rahmawati, and Merlinda (2020)	Technological developments and unemployment in Indonesia	Technological developments positively influence the level of unemployment in Indonesia	The study is, however, not limited to technology unemployment within the accounting profession, which is the focus of this research.	The current study filled the gap by reviewed technological unemployment in Kenya

**Source: Researcher (2020)**

## 2.5 Conceptual Framework

A conceptual framework outlines probable courses of action and provides favored approaches to the implementation of ideas (Maina, 2012). The below conceptual framework is a representation of the hypothesized interaction between the preparedness of professional accountants and technology unemployment in Kenya.

### Independent Variable

### Dependent Variable

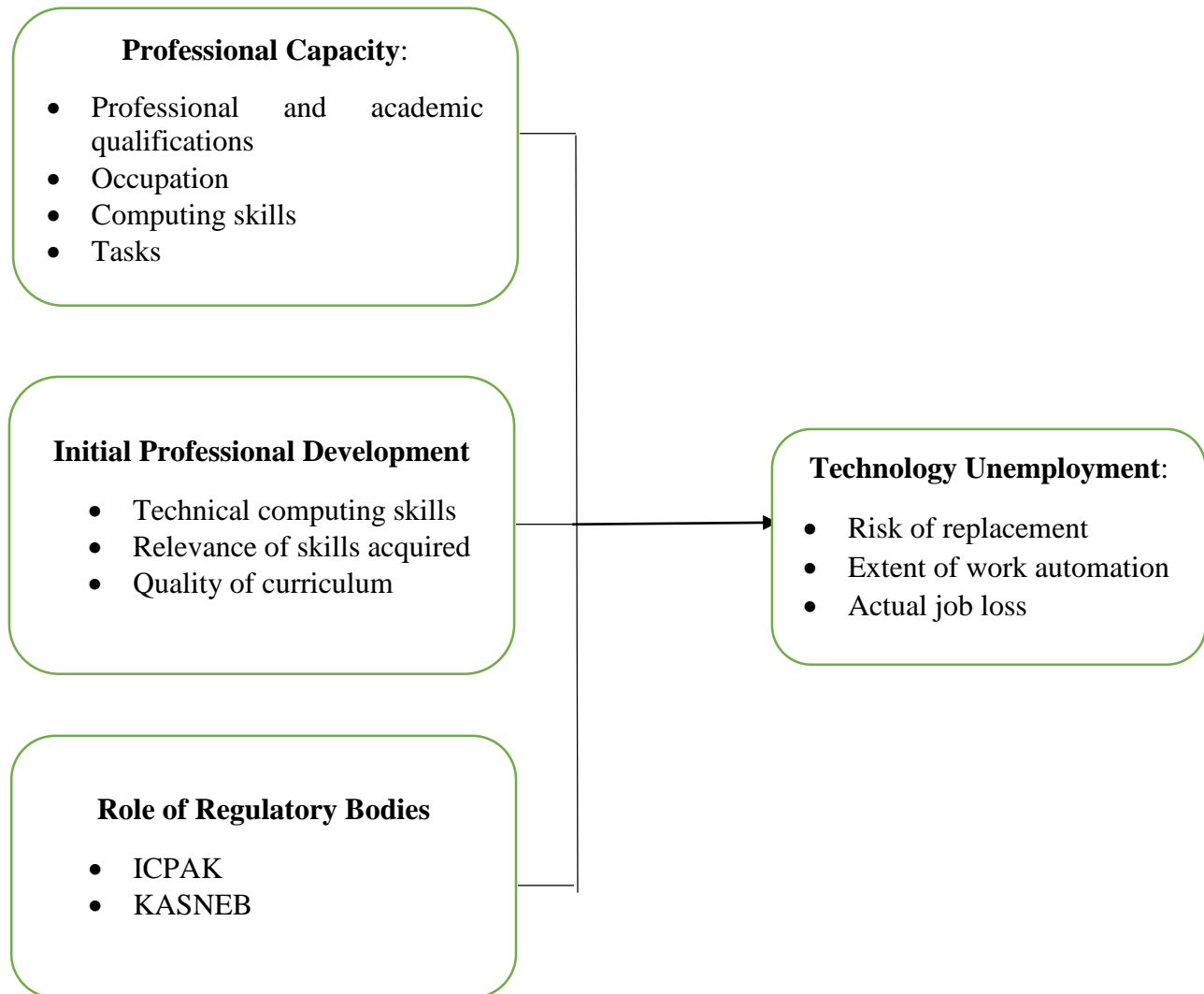


Figure 2.3: Conceptual Framework

The above conceptual framework outlines the hypothesized interaction between professional capacity, training and education, regulatory environment, and the technology unemployment within the Kenyan accounting profession. The operationalization of variables is shown below:

**Table 2.3: Operationalization of Variables**

Variable	Constructs	Data Collection Tool	Data Analysis
Professional capacity	<ul style="list-style-type: none"> <li>Professional and academic qualifications</li> <li>Occupation</li> <li>Computing skills</li> <li>Tasks</li> </ul>	Semi-structured questionnaire	Descriptive statistics Correlation tests Regression tests
Initial professional development	<ul style="list-style-type: none"> <li>Technical computing skills</li> <li>Relevance of skills acquired</li> <li>Quality of curriculum</li> </ul>	Semi-structured questionnaire	Descriptive statistics Correlation tests Regression tests
Role of regulatory bodies	<ul style="list-style-type: none"> <li>ICPAK</li> <li>KASNEB</li> </ul>	Qualitative interview schedule	Descriptive statistics Correlation tests Regression tests
Technology Unemployment	<ul style="list-style-type: none"> <li>Risk of replacement</li> <li>Extent of work automation</li> <li>Actual job loss</li> </ul>	Semi-structured questionnaire	Descriptive statistics Correlation tests Regression tests

Source: Researcher (2020)

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter explains the strategy employed to conduct the primary research, how the research was conducted, including the data that was collected and analyzed. How the study considers that research quality and ethical considerations are also addressed.

#### **3.2 Research Philosophy**

Research philosophy is the underlying basis of data collection methods (Saunders, Lewis, & Thornhill, 2009). Assumptions were always made at every stage of research work. Research designs should be philosophically-informed so that one can defend the choices made amongst many alternatives (Maina, 2012). Positivism involves using existing theory to generate a hypothesis. It also deals with causal relationships (Hughes & Sharrock, 2016). This study relied on a positivist research philosophy in examining the relationships between the study variables as anchored by a theoretical phenomenon. Thus, data collection, data analysis, and conclusions were objectively done for knowledge development (Padilla-Díaz, 2015).

#### **3.3 Research Design**

Research design is the master plan that explains the procedures and techniques that are applicable to collect and analyze the required information (Kothari, 2011). A mixed research design was adopted in order to bring to the study a diversity of views to the study (Bryman, 2006). The views of both Kenyan accountants and their regulators were important for the study. Both The researcher sought to use both qualitative and quantitative elements in conducting the study where quantitative aspect was achieved by having a structured questionnaire administered to professional accountants. The qualitative aspect of the study was achieved by conducting interviews with key informants to offer perspectives into the regulatory framework.

#### **3.4 Population and Sampling**

##### **3.4.1 Target Population**

A population is the full set of units from which a probability sample was drawn (Saunders, Lewis, & Thornhill, 2009). A population is homogeneous and has a bell-shaped distribution of units (Ponto, 2015). The population for this study are the 22,000 registered accountants with ICPAK Kenya as of 2019.

### 3.4.2 Sampling Design and Sample Size

The study adopted the simple random sampling technique to select respondents from the list of registered and active members of ICPAK from the CPA member directory. The simple random sample means that every case of the population has an equal probability of inclusion in sample. Using this list, the researcher used the Microsoft Excel program to randomly select respondents until the desired sample size was reached.

A sampling frame is the complete list of all objects of the population that the researcher desires to study (Saunders, Lewis, & Thornhill, 2014). The sample frame for this study was the 22,000 professional accountants in Kenya. The sampling techniques can either be probability or non-probability. The probability sampling technique offers each object in the population an equal known chance to be chosen (Cooper & Schindler, 2012). The study utilized a probability sampling technique specifically. The sample size for the study was calculated using the Yamane formula;

$n$  =sample size,

$N$  = population size

$e$  =level of precision.

$$n = \frac{N}{1 + N(e)^2}$$
$$\frac{22,000}{1 + 22,000 (0.05)^2} = 393$$

The sample respondents for the study was 393 respondents.

### 3.5 Data Collection Instruments

According to Ember (2009), primary data is that data collected by a researcher from the various fields for comparison purposes. This study relied on two main sets of primary data collection instruments. The study utilized a structured questionnaire to collect data from registered accountants in Kenya. Orodho (2015) defines a questionnaire as a data measuring instrument with a set of questions to be responded to by individuals. The questionnaire was composed of two main parts. Part A contained the demographic profile of the participants, while Part B contained Likert scale questions on the Independent and Dependent variables of the study. The study further utilized a key informant interview schedule to collect qualitative data from staff with ICPAK and

KASNEB, to evaluate the role of regulatory bodies in preparing accountants for technology unemployment.

### **3.6 Data Collection Procedures**

The study relied on the electronic data collection. The structured questionnaires to accountants were sent as Google forms. The interviews were conducted with a senior ICPAK employee through a Zoom meeting and a senior KASNEB employee through email. This was adopted due to social distancing guidelines following Covid-19. The study sought the permission of ICPAK Kenya to access the role of accountants in Kenya. The questionnaire contained a consent form highlighting the rights of the participants and the aims of the research. The study ensured that ethical guidelines are observed in the study process.

### **3.7 Research Quality**

A pilot study is conducted to examine the reliability and validity of the questionnaire used in the collection of primary data (Orodho, 2015). According to Kothari (2011), a pilot test is a replica and rehearsal conducted before the actual test. It is a trial run or a small-scale version that is used to test whether the questionnaire provided the desired results (Maina, 2012). The study conducted a pilot test, with 10% (n=39) of the sample respondents. These participants were not included in the results for the final study.

#### **3.7.1 Reliability of Research Instrument**

Kothari (2011) refers to reliability as a measure of consistency. It is the degree to which one may expect to obtain the same results from the sample if a measurement is repeated once or several times. Reliability was tested through a questionnaire from the pilot-tested samples. The questionnaire results from the pilot-tested sample was paired and correlated (Maina, 2012). The Cronbach's alpha was used because of its suitability in continuous and non-dichotomous data such as a Likert scale (Cronbach,1951). The alpha coefficient, which measures internal consistency, increases with an increase in correlation. The study conducted the pilot test among 33 accountants from a pretest sample of 39 (10%) participants who were not considered in the final study sample.

**Table 3.1: Reliability Statistics**

Item	N	Cronbach's Alpha	N of Items
Technology unemployment	33	.715	3
Professional capacity	33	.835	4
Initial professional development	33	.842	4

**Source: Research Data (2020)**

The reliability results indicated a Cronbach alpha score as follows; technology unemployment (n=33, alpha = .715), professional capacity (n=33, alpha = .835), initial professional development (n=33, alpha = .842). Golafshani (2003) provides the following rule of thumb: alpha score of >.8 represents Good, >.7 represents Acceptable. This indicates that all the variables were acceptable since the alpha-scores were above 0.7. Thus, the instrument passed internal consistency test hence was adopted for the research.

### **3.7.2 Validity of Research Instrument**

Validity in this context refers to whether the questionnaire developed is the right one for assessing the concepts being examined (Saunders, Lewis, & Thornhill, 2009). According to Orodho (2015), assessing validity assisted the researcher in determining the accuracy of the relationship between the measure and the trait/characteristic it was measuring. Validity is about whether the measuring instrument measured what it was intended to measure (Maina, 2012). The face validity helped to test whether the questionnaire measured the correct characteristics of each variable (Cooper & Schindler, 2012). The researcher consulted the supervisor on the suitability of the questionnaire as a measure of the variables. They had to approve the instrument upon assessing the content of the questionnaire. Content validity tested whether the questionnaire developed reflects the whole domain of the characteristics of each variable (Creswell & Clark, 2017). The researcher reviewed the research instruments for completeness and to ensure that the statements developed were able to measure the aims of the study.

### **3.8 Data Analysis and Presentation**

Before analyzing the questionnaires, a pre-processing of data to correct any errors in the raw data as well as ensuring that the data captured was not lost or duplicated in the process of obtaining the needed data characteristics was conducted (Sekaran & Bougie, 2013). The data was coded by assigning a number to the participants' responses before entering the responses in the database (Maina, 2012). Data transformation was required given that several questions were used to

measure a particular concept or construct (Saunders, Lewis, & Thornhill, 2014). Both descriptive and inferential statistics were applied for data analysis. The study presented the findings of the study using charts, tables and figures. For descriptive analysis, the study relied on sums, means, standard deviation, and variance statistics. The correlational technique was used to test the type of effect between the dependent variable and the independent variables. multiple regression analysis was conducted to establish the strength, direction, and significance of the relationship between all the independent variables on the dependent variables. The study applied the below regression model;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where;

Y = Dependent variable (technology unemployment among accountants)

$\alpha$  = the model intercept

$\beta_{1-4}$  = Coefficient of independent variables

$X_1$  – professional capacity

$X_2$  – initial professional development

$\varepsilon$  - error Term

The study utilized ANOVA tests to examine the statistical significance of the research model. Further, the study utilized collinearity and normality tests for linear regression assumptions. The study applied content analysis to examine the qualitative research data that was collected from an interview schedule to review the role of regulatory bodies based on the results obtained from secretariat members.

### **3.9 Ethical Considerations**

The topic under research is sensitive, given that it exposes the risk of loss of vocation to respondents. The study was sensitive to fears provided during respondents and kept the information confidential and for this research's purpose only. The researcher obtained informed consent from each participant (Appendix I). Participants were informed beforehand of the purpose of the study so that they can decide to either willingly take part in the study or decline. Ethical clearance was obtained from the Strathmore University Ethics Committee, and a research permit was obtained from the National Commission for Science Technology and Innovation (NACOSTI).

**CHAPTER FOUR**  
**PRESENTATION OF RESEARCH FINDINGS**

**4.1 Introduction**

This chapter presents the findings of the data analysis. First, background information of the participants and a review of the data results in line with the objectives is done. Later on, the regression summary depicting the relationship between the independent variables and the dependent variable is presented.

**4.2 Background Information**

**4.2.1 Response Rate**

The study final study sample was 360 participants since 33 participants were involved in the pretesting of the study instruments. The study was able to obtain a 94% (n=339) responses. 21 respondents, making 6% of the sampled participants did not respond. The response rate was deemed adequate for statistical analysis.

**4.2.2 Demographic Information of Respondents**

The research reviewed the demographic profiles of the study participants. The findings are presented in Table 4.1 below.

**Table 4.1: Demographic Information**

<b>Background information</b>	<b>Grouping</b>	<b>Frequency</b>	<b>Percentage</b>
<b>ICPAK membership</b>	Less than a year	61	18%
	1-5 years	166	49%
	6-10 years	85	25%
	11 years and above	27	8%
<b>Academic qualification</b>	Diploma level	14	4%
	Undergraduate degree	203	60%
	Master's degree	119	35%
	Doctorate degree	3	1%
<b>Job duties</b>	Compliance	163	48%
	Auditing services	159	47%
	Financial services	159	47%
	Budgeting and reporting	159	47%
	Tax accounting	125	37%
	Data analysis, credit control, tax structuring, job costing, credit management, data management & grants management	3	1%

**Source: Research Data (2020)**

The study asked respondents to indicate how long they have been members of ICPAK. Most of the respondents, 49%, had been members for between 1-5 years. 25% had been members for between 6-10 years, while about 8% of the respondents have been members of ICPAK for more than 11 years. These results showed that participants had undertaken IPD through KASNEB, and CPD training through ICPAK in the course of their career.

Asked about their highest education qualification, 60% of respondents said that they had attained an undergraduate degree. 35% had a Master’s degree while 3 respondents had a Doctorate degree. Participants of the study, therefore, had enough experience and academic qualifications to provide valuable insights on the study area under investigation.

Asked to check off the duties they perform at work, 48% said they were performing compliance duties. 47% of participants were performing auditing services, financial services, budgeting and reporting. 37% were performing tax accounting. The least (less than 1% of respondents) performed tasks by registered accountants include data analysis, credit control, tax structuring, job costing, credit management, data management and grants management. These results confirm that participants understood the structure of their work, and could therefore provide valuable insights to the study.

### 4.3 Descriptive Analysis

The study was based on a Likert scale questionnaire. The responses obtained were analyzed using means and standard deviation. The findings are presented in line with research objectives and presented on a 5 point Likert scale.

#### 4.3.1 Technology Unemployment among Kenyan Accountants

The dependent variable for the study was technological unemployment among Kenyan professional accountants. The result of the three statements asked are shown below.

**Table 4.2: Descriptive for Technology Unemployment**

<b>Technology Unemployment statements</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
I am aware of the threat that technology disruption poses to my employment	339	4.1770	1.01086
I have seen actual job losses as a result of technological advancements and automation	339	3.7198	1.28300
Professional accountants are at high risk of being displaced by technology	339	3.7817	1.15621

**Source: Research Data (2020)**

The results show strong agreement that technological disruption poses a threat to their employment as indicated by mean = 4.1770. With a mean of 3.7817, respondents agree that the accounting profession is at a high risk of being displaced by technology. Most respondents have seen actual job losses resulting from technological advancement and automation, seeing by mean – 3.7198. The standard deviations of these responses range from 1.01086 to 1.28300, showing a general consensus of the risk of Kenyan accountants to technological unemployment.

#### 4.3.2 Professional Capacity

The first independent variable of the study was the professional capacity among Kenyan accountants. Participants were asked four questions. The results of these are presented on table 4.3.

**Table 4.3: Descriptive Results for Professional Capacity**

Professional Capacity statements	N	Mean	Std. Deviation
My current academic and professional skills adequately reduce my risk of being displaced by automation	339	2.9204	1.39191
Most of the tasks in my current work are at risk of being automated	339	3.4690	1.28075
Most of the tasks in my current work have already been automated replacing my work-input	339	3.1593	1.35808
I have adequate computing skills to work with automated accounting tools	339	3.9971	1.13965

**Source: Research Data (2020)**

Participants strongly agreed that they had adequate computing skills to work with automated accounting tools, with a mean = 3.9971. However, they had a weak agreement as to whether their current academic and professional skills would reduce their risk of displacement by technology, seen by mean = 2.9204. Most respondents agreed that their current work was at risk of being automated (mean = 3.4690), with some already saying automation has already started replacing their work input (mean = 3.1593). Deviations to these questions ranged from 1.13965 to 1.35808, showing disagreement by participants around the effect of their professional capacity on their risks of being displaced by automation.

### 4.3.3 Initial Professional Development

The second variable of the study was the effect of initial professional development among Kenyan professional accountants and the results are presented in Table 4.4.

**Table 4.4: Descriptive for Initial Professional Development**

<b>Initial Professional Development statements</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
My IPD training provided me with skills to work with automated accounting tools	339	3.5546	1.29146
The skills learnt from my IPD training reduced the risk of being unemployed due to automation	339	3.1799	1.36093
The curriculum offered in IPD is up to date with emerging technology needs for accountants	339	3.0265	1.38756
I intend to pursue further IPD to remain relevant beyond automation	339	4.0354	1.14299

**Source: Research Data (2020)**

Participants generally agreed that their IPD training had provided them with the skills to work with automated accounting systems (mean = 3.5546). They however were neutral on whether their initial training reduced their risk of technological unemployment (mean = 3.1799), or whether the curriculum was up to date with emerging technological needs (mean=3.0265). Many of the respondents were willing to go back to pursue further IPD to remain relevant beyond automation (mean = 4.0354). With a deviation ranging between 1.14299 and 1.38756, there was disagreement among respondents about the effect of IPD in preparing them for technological unemployment. However, this ranged from strongly agreed to be neutral.

### 4.3.4 Qualitative Analysis of Role of Regulatory Bodies

The third variable of the research was the role played by regulatory bodies; The study interviewed two senior members of kasneb (KII-1) and ICPAK (KII-2), both within the curriculum development divisions of their organisations. The key informants were asked to describe the knowledge and awareness of ICPAK members to the threat of technological unemployment, KII-2 confirmed that there were relatively well informed. Through CPD events, members had been exposed to emerging technological trends such as artificial intelligence and blockchain, including the threat to their jobs. Both KII-1 and KII-2 confirmed that there were some accounting jobs at risk, based on local and global trends. KII-2 described jobs that involve mundane and repetitive

tasks. KII-1 clarified these roles as including accounting clerks and technicians, general accountants, auditors and tax specialists.

Both respondents advised that accountants should get ahead of the threat of technological unemployment by improving their professional capacity. KII-1 suggested that accountants change their attitude to thinking of ICT as a complement to their responsibilities, as opposed to a competitor. Accountants should keep think global, keep tab of global ICT trends, and pursue integrated skills beyond accounting. Both respondents proposed that accountants transform from preparers of financial statements to analysts, forecasters, advisors, decision makers and strategic thinkers. KII-2 suggested that accountants should enhance their skills and knowledge around data analytics and decisions support systems. KII-2 also advised that accountants look out for new opportunities that come with technology, for example, how to mitigate risks of cyberthreats.

The study established that both regulatory bodies had a role to play in preparing accountants for the threat of technological unemployment. Kasneb's role is to develop curriculum for the CPA examination in Kenya. Amongst ICPAK's mandate is to advise KASNEB on its curriculum using input from local members and global partners.

KII-1 mentioned that KASNEB undertakes a major review of its syllabuses every five years ( last in 2015 ) and a mid year review every two and a half years ( last in 2018 ). Amongst the factors that drove the 2018 mid year review were global trends of competencies requirements for future accountants. These included, but are not limited to trends around data analytics, ICT, public sector finance management, professional skepticism and ethics. Both respondents confirmed that these trends pointed to a need for a Competency based education system. ICPAK was a key stakeholder engaged by Kasneb in building the current Competency Based Framework.

KII-1 noted that Kasneb had enhanced ICT content in its curriculum. Among the changes is requiring that students in the upcoming curriculum to sit for a practical paper on ICT competence before qualification. Other integrated knowledge including enhancing content on leadership skills, strategic management, entrepreneurship and data analytical skills. The objectives of the paper No. 11 Management Information Systems on the 2018 CPA curriculum is to equip candidates with the knowledge, skills and attitudes that would enable them to apply informations systems effectively in solving business problems and in decision making.

KII-2 pointed to the need to provide a practical experience to accountants much early on in their experience. ICPAK, working with Kasneb, published the Trainee Accountants Practical Experience Framework (TAPEF) in 2018. TAPEF enables accounting students to register with ICPAK as early as when they register for their first accounting paper with Kasneb. As a pre-requisite to being registered members of ICPAK, accountants have to log 450 hours of practical skills over a 3 to 6 year period. Compulsory competencies include practical experience with basic IT solutions, data analytical tools, experience using the internet as a source of information and the ability to assess and manage IT risks. Both respondents suggested compelling students and members to use ICT in interacting with them. KII-1 mentioned that Kasneb was introducing online examinations that would force students to acquire basic skills. KII-2 also mentioned that ICPAK was not providing most of its CPD trainings through their virtual platform.

#### 4.4 Exploratory Factor Analysis

The study used exploratory factor analysis to examine the constructs' scale dimensionality. First, the Kaiser–Mayer–Olkin (KMO) measure of the sampling adequacy of individual variables and Bartlett's test of Sphericity were used to measure constructs validity. In order for the data set to be considered as adequate and suitable for statistical analysis, the value of KMO should be more than 0.5 and Bartlett's test of Sphericity should be greater than 150 (Kaiser, 1974). Factors were then extracted based on Kaiser's criterion of Eigenvalues. For components with Eigen values greater than 1, Varimax rotation was employed. According to Phan, Abdallah and Matsui (2011) the benchmark value of the item loadings had to be greater than 0.4 to indicate a high validity of measurement values for the statements to be retained for further analysis.

##### 4.4.1 Technology Unemployment

The study ran the dependent variable, technological unemployment, through factor analysis.

**Table 4.5: KMO and Bartlett's test of Sphericity for Technology**

Unemployment Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.587
Bartlett's Test of Sphericity	Approx. Chi-Square	164.190
	Df	3
	Sig.	.000

**Source: Research Data (2020)**

The KMO value of the data set was  $0.587 > .05$ . The Bartlett's test of Sphericity results were significant as indicated by  $\text{Chi-square} = 164.190 > 150$ ;  $.000 < .05$ . This indicated that factor analysis could be applied for the variable technology unemployment.

**Table 4.6: Factor Analysis for Technology Unemployment**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.715	57.166	57.166	1.715	57.166	57.166
2	.790	26.319	83.486			
3	.495	16.514	100.000			

Extraction Method: Principal Component Analysis.

Source: Research Data (2020)

The results showed that only 1 component had an eigen value of above 1, accounting for 57.166% change in the variable technology unemployment.

**Table 4.7: Factor Rotation for Technology Unemployment**

	Component 1
I am aware of the threat technology disruption poses to my employment	<b>.490</b>
I have seen actual job losses as a result of technological advancements and automation	<b>.435</b>

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Source: Research Data (2020)

Item loadings above 0.4 were retained for further analysis. The findings indicate that component 1 is composed of the awareness of threat of technology disruption and the actual job losses as result of technology and automation.

#### 4.4.2 Professional Capacity

The study ran the first independent variable, the professional capacity among registered accountants in Kenya, through factor analysis.

**Table 4.8: KMO and Bartlett's test of Sphericity for Professional**

Capacity Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.580
Bartlett's Test of Sphericity	Approx. Chi-Square	249.748
	Df	6
	Sig.	.000

Source: Research Data (2020)

The KMO value of the data set was 0.580 > .05 while the Bartlett's test of Sphericity results were significant as indicated by Chi-square = 249.748 > 150; .000 < .05. This indicated that factor analysis could be applied for the variable professional capacity.

**Table 4.9: Factor Analysis for Professional Capacity**

Component	Initial Eigenvalues			Extraction Sums of Squared			Rotation Sums of Squared		
	Total	Variance	Cumulative %	Loadings			Loadings		
				% of Total	% of Variance	% of Cumulative	% of Total	% of Variance	% of Cumulative
1	1.881	47.027	47.027	1.881	47.027	47.027	1.843	46.072	46.072
2	1.171	29.274	76.301	1.171	29.274	76.301	1.209	30.229	76.301
3	.568	14.200	90.501						
4	.380	9.499	100.000						

Extraction Method: Principal Component Analysis.

**Source: Research Data (2020)**

Components 1 and 2 had Eigen values above 1, and together accounted for 76.301% of the total variability. Varimax rotation was then applied to these components.

	Component	
	1	2
My current academic and professional skills adequately reduce my risk of being displaced by automation	-.533	<b>.630</b>
Most of the tasks in my current work are at risk of being automated	<b>.872</b>	-.019
Most of the tasks in my current work have already been automated replacing my work-input	<b>.877</b>	.043
I have adequate computing skills to work with automated accounting tools	.172	<b>.900</b>

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

**Source: Research Data (2020)**

The matrix gives the correlation of the variables with each of the extracted factors. The rotation matrix indicates that variables are highly loaded in one factor and less loaded towards the other factors. To identify the variables included in each factor, the variable with the value maximum in each row is selected to be part of the respective factor. The above indicates that the two factors after rotation contribute to 76.301% of the variability in the variable. The factors with the highest values are highlighted in bold and constitute each component. The first component considered

most of the tasks in my work are being automated and most of the current work tasks have been automated. The second component comprised of having adequate computing skills and current academic and professional skills reduce risk of being displaced.

#### 4.4.3 Initial Professional Development

The results of factor analysis on the second research variable, initial professional development among registered accountants, are indicated below.

**Table 4.11: KMO and Bartlett’s test of Sphericity for Initial Professional Development**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.633
Bartlett's Test of Sphericity	Approx. Chi-Square	397.184
	Df	6
	Sig.	.000

**Source: Research Data (2020)**

The findings of the tests established that the KMO value of the data set was  $0.633 > .05$  and the Bartlett’s test of Sphericity results were significant as indicated by  $\text{Chi-square} = 397.184 > 150$ ;  $.000 < .05$ . Factor analysis could therefore be applied for the variable, initial professional development.

**Table 4.12: Factor Analysis for Initial Professional Development**

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.273	56.817	56.817	2.273	56.817	56.817
2	.986	24.661	81.477			
3	.394	9.839	91.317			
4	.347	8.683	100.000			

Extraction Method: Principal Component Analysis.

**Source: Research Data (2020)**

Only factor 1 had an Eigen value above 1, and accounted for 56.817% of the total variability in all 4 constructs.

**Table 4.13: Factor Rotation for Initial Professional Development**

	Component 1
My IPD training provided me with skills to work with automated accounting tools	<b>.729</b>
The skills learnt from my IPD training reduced the risk of being unemployed due to automation	<b>.771</b>
The curriculum offered in IPD is up to date with emerging technology needs for accountants	<b>.754</b>
I intend to pursue further IPD to remain relevant beyond automation	<b>.761</b>

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Source: Research Data (2020)**

When varimax rotation was applied to component 1, all the factors had loadings above the selected threshold of 0.4. The results indicated that the component was composed of IPD has provided skills to work with automated tools, skills learnt have reduced risk of unemployment, curriculum offered is up to date with emerging technologies and respondent's intent to pursue IPD relevant to automation of accounting.

#### 4.5 Correlation Analysis

The study adopted Spearman rank correlation to examine the association between the study variables.

**Table 4.14: Correlation Matrix**

		Technology Unemployment	Professional Capacity	Initial Professional Development
Technology Unemployment	Pearson Correlation	1		
	Sig. (1-tailed)			
	N	339		
Professional Capacity	Pearson Correlation	.547**	1	
	Sig. (1-tailed)	.000		
	N	339	339	
Initial Professional Development	Pearson Correlation	.516**	.841**	1
	Sig. (1-tailed)	.000	.000	
	N	339	339	339

\*\* . Correlation is significant at the 0.01 level (1-tailed).

**Source: Research Data (2020)**

The study results with relation to the first research objective showed there exists a strong positive and significant effect of professional capacity on the technological unemployment among Kenyan

accountants ( $r = .547, p = .000$ ). In regard to the second objective the findings established there is a positive correlation between initial professional development and technological unemployment ( $r = .516, p = .000$ ).

#### 4.6 Multivariate Regression for Preparedness for Technology Unemployment

The main objective of the study was to examine the preparedness of Professional Accountants towards Technology Unemployment in Kenya. The study employed a multiple linear regression to determine the magnitude of relationship between professional capacity, initial professional development and role of regulatory bodies on the preparedness of Professional Accountants towards Technology Unemployment in Kenya.

**Table 4.15: Regression Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.557 <sup>a</sup>	.310	.306	.83283

a. Predictors: (Constant), Initial Professional Development, Professional Capacity

b. Dependent Variable: TechnologyUnemploymentPCA

**Source: Research Data (2020)**

The study regression analysis summary indicates a coefficient of determination  $R^2 = .310$ . This indicates that holding all factors constant; the professional capacity, initial professional development yield a 31% of the variations in the preparedness of Professional Accountants towards Technology Unemployment in Kenya. These findings show that atleast 69% of the changes in technology unemployment are determined by factors that were not incorporated within the research model.

**Table 4.16: ANOVA Summary**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	104.946	2	52.473	75.652	.000 <sup>b</sup>
	Residual	233.054	336	.694		
	Total	338.000	338			

a. Dependent Variable: Technology Unemployment PCA

b. Predictors: (Constant), Initial Professional Development, Professional Capacity

**Source: Research Data (2020)**

The research employed the ANOVA analysis to estimate the statistical significance of the regression model adopted in the study. The findings of the study show an  $f$ -calculated = 75.652 >  $F$ - (critical  $f$ ; 1.162) and Sig-value = .000 < .05. This implies that there is a positive and significant

relationship between professional capacity, initial professional development and preparedness of Professional Accountants towards Technology Unemployment in Kenya.

**Table 4.17: Regression Coefficients**

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.356	.045		7.910	.000
	Professional Capacity	.273	.059	.386	4.620	.000
	Initial Professional Development	.192	.084	.192	2.291	.023

a. Dependent Variable: Technology Unemployment

**Source: Research Data (2020)**

The study results note a coefficient of professional capacity ( $B_1=.273$ ) is statistically significant since  $Sig = .000 < .05$ . This shows that changing the level of professional capacity by one unit will lead to a .272 change in the level of preparedness of professional accountants for technology unemployment. The findings note a regression coefficient of initial professional development ( $B_2=.192$ ) is statistically significant since  $Sig = .023 < .05$ . This shows that changing the level of initial professional development by 1-unit will lead to a .192 change in the level of preparedness of professional accountants for technology unemployment.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### 5.1 Introduction

The fifth chapter focuses on the presentation of the summary and discussion of the study results. Further, the conclusions of the study and recommendations are presented in line with the study objectives. Finally, the chapter presents the limitations and areas for further research.

#### 5.2 Summary of Research

The disruption caused by the 4<sup>th</sup> industrial revolution has resulted in massive unemployment across industries. Research studies suggest that for professionals to manage disruption and remain relevant, they should first acknowledge this disruption and the risk to their employment, and prioritize getting ahead of automation. Despite this, there is not much evidence locally on the preparedness of Kenyan professional accountants for technology unemployment. This research sought to establish the effects of professional capacity, initial professional development, and the role of regulatory bodies in preparing Kenyan professional accountants for technology unemployment.

The research was grounded on Keynes' theory of unemployment. The theory indicates that technological unemployment always manifests itself as frictional unemployment as a result of changes within a particular industry. This forces the recognition of the threat of unemployment and allows workers to prepare themselves for the looming loss of work. According to Fiorelli (2018), people will always be able to respond to the changes through improving their preparedness. This study shows that improving professional capacity, engaging in initial professional development and receiving regulatory support (through ICPAK) can improve the preparedness for technology unemployment among accountants.

The study employed a positivist philosophy which allows for the analysis of the relationship between the study variables. The population of the study was accountants registered with ICPAK. The sample participants were 393 accountants in Kenya. The research adopted a mixed research approach with both structured and open-ended questions being utilized in the study. The study instrument was pretested among 33 research participants and all the variables of the study met the internal consistency tests. The collected research data were analyzed using descriptive, inferential techniques and content analysis. The study obtained a 94% response rate with most of the

participants have been members of ICPAK for at least 1-5 years. The study indicated that the majority of the registered accountants in the country conducted auditing, compliance, budgeting, financial services, bookkeeping, management reporting, and compliance activities. The results of the correlation tests indicated there was a strong and positive effect between professional capacity, initial professional development, and the preparedness for technology unemployment in Kenya. The regression results indicated that 31% of the variations in preparedness for technology unemployment among accountants were determined by the level of professional capacity and initial professional development.

### **5.3 Discussions of Research Findings**

#### **5.3.1 Professional Capacity and Technology Unemployment**

The study demonstrated agreement among participants that they have adequate computing skills to work with automated accounting tools. Stancheva-Todorova (2018) noted there is a need for the development of new skills and competencies that can strengthen the capacity of the accountants to be technologically smart. Sumanto, Abbas, Rahmawati, and Merlinda (2020) found out that fostering skills development and professional training will result in the reduction of technology unemployment. The respondents were in disagreement that most of the tasks in their current work are at risk of being automated. Among some of the participants, most of their tasks had already been automated. The study further indicated that the respondents' academic and professional skills adequately reduced their risk of being displaced by automation.

#### **5.3.2 Initial Professional Development and Technology Unemployment**

Most participants agreed that IPD training provided them with the skills to work with automated accounting tools. Das and Singh (2018) showed that emphasis on better accounting education will help reduce the risk of unemployment within the accounting profession. This is consistent with the study's findings, which showed that most respondents had the intention to pursue further IPD to remain relevant beyond automation. Findings showed disagreement among respondents that the curriculum offered in IPD is up to date with emerging technology needs for accountants. The results also point to disagreement that the skills learned from IPD training reduced the risk of being unemployed due to automation. Adegbite (2019) found that lack of adequate training among employees results in lack of acquisition of skills and professionalism which affects their transition within the job. Onuonga (2016) in a review of automation in accounting firms, noted that some of

the accounting tasks are at risk of unemployment due to limited training and educational competence among accountants in Kenya.

### **5.3.3 Role of Regulatory Bodies on Technology Unemployment**

Mugo and Nyaegah (2018) note that regulatory bodies can support skills development which is key to fostering professionalism. The study established that regulatory bodies in Kenya, Kasneb and ICPAK, were playing their roles effectively in preparing accountants for the risk of technological unemployment. Both regulatory bodies had worked on shifting to a competence based framework that advocates for skills that would be relevant for accountants to get ahead of accounting. This framework had provided a key input in the 2021 curriculum change, that included among other things, a practical ICT examination. Kasneb and ICPAK had also released the Trainee Accountants Practical Experience Framework (TAPEF) in 2018, which required competencies and workplace experience for registered accountants. Both agencies also shifted to online engagements with their stakeholders to expose them to ICT trends. There was however mixed opinion among already registered accountants as to whether the IPD they received or the CPD they were receiving was enough to prepare them for the risks of technological unemployment.

### **5.4 Conclusions**

The study indicated there is a positive association between professional capacity, initial professional development, the role of regulatory bodies, and the preparedness for technology unemployment among Kenyan accountants. The study concludes that there is a statistically significant influence of professional capacity on the preparedness of professional accountants for technology unemployment. The study results reveal that having most of the tasks in one's current work being automated and obtaining adequate computing skills to work in an automated environment enhances the preparedness of professional accountants for technology unemployment. The research concludes that there is a significant influence of initial professional development on the preparedness of professional accountants for technology unemployment. The study revealed that skills learned from IPD training have been integral in reducing the risks of being unemployed due to automation.

The study also concluded that ICPAK has played a key role in advancing the knowledge of members on the technological trends, building relevant CPD programs and strategically taking an advisory role both to the public and training bodies on the threats of technology unemployment

within the industry. The study further concludes that through introduction of online examinations, simulated working environment and mentorship programmes in ICT environment, KASNEB has helped strengthen the competency of accounting students. This is instrumental to advancing their technical skills which can better prepare them for real-life work environment. Lastly, the research concludes that through their integrated programmes, KASNEB has been able to stimulate the accounting students to pursue skills that go beyond traditional accounting tasks. This will go a long way in expanding their knowledge and skills to work in technology-based environments.

## **5.5 Recommendations**

### **5.5.1 Recommendations for Policy**

The study recommends that ICPAK increase awareness among its members about the risk of technological disruption to their employment. This could be done through content-specific seminars, webinars, and workshops. ICPAK should also structure its curriculum to match skills to the emerging needs of an automated work environment. Providers of accounting IPD, including KASNEB and academic institutions, have similar roles to play as ICPAK, in raising awareness and developing curriculum. The new wave of accountants should be computer literate and digitally savvy. The study recommends that with changes in technology there is need for training institutions and other players to be cognizant of the changes in the technological trends. This will enable these players to equip trainees with the necessary expertise that can help in advancing their competency for the new environment. Further, ICPAK should be able to role out virtual CPD events that can help in advancing the knowledge of the members on the changes in the accounting profession. This will expose members to the diverse areas that technology is taking root in the accounting profession such as risk management, cyber threats, fraud detection and financial modelling. This ensures that members are able to add value to the profession and be prepared for the changes taking place in the accounting body. KASNEB, has also been key to creating a positive attitude among accountants to embrace technology not as a competitor, but a complement to their accounting skills. Further, the institution is advocating for accountants to expand their knowledge on the emerging trends in particular accounting fields which may improve their specialization.

### **5.5.2 Recommendations for Practice**

The study recommends that accountants should improve their awareness of the various tasks that are at a threat of being displaced. They should also focus on improving their professional capacity.

These will help them make better decisions in the selection of professional skills that can foster their computer literacy and readiness for automation, and reduce the risks of being replaced by automated systems. The study further recommends that accountants should constantly review emerging accounting technologies as this will expand their technological competencies which can help limit the impact of technological unemployment. Further, the research recommends that accountants should learn new skills such as blockchain integration in accounting work and reliance on financial technologies as this will expand their individual capacity which can be critical to avoiding technology unemployment.

The study further recommends that accounting professions should strive to gain the right skills and ensuring that the move to the decision-making table (use of data analytics and data support systems to enable them become better business advisors) as technology takes over the lower tasks within the profession. The study also recommends that practicing accountants should undertake steps to retool themselves to work in virtual environments. This has become a priority area especially in the current global pandemic where knowledge on the various digital spheres is relevant for undertaking of job tasks. Furthermore, with developments in blockchain technologies, machine learning and advancements in data science and analytics, accountants should invest in improving their technical skills and expose themselves to practical work environments that rely on these emerging technologies.

### **5.6 Limitations of the Study**

The study was limited only to an examination of technology unemployment within the accounting profession which may limit the applicability of the study results in other fields within the economy. Further, the study was limited by poor involvement of study participants due to the pandemic which resulted in most workers not being within their job stations. The study relied on a network of accounting professionals to enhance the response rate.

### **5.7 Areas for Further Study**

The results of the regression equation show that there are other factors of significance that influence the preparedness of Kenyan accountants to the risk of automation. Further research work can be conducted to examine how the work environment and business environment can influence technological unemployment. There is also a need for further inquiry into why CPD provided by ICPAK has an insignificant influence in raising awareness and preparing Kenyan accountants for

the risk of technological unemployment. The study results indicated that more than 69% of changes in technology unemployment were determined by factors not adopted in the research hence there is need for more research work to interrogate the factors predicting technology unemployment among accountants.

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## APPENDICES

### Appendix I: Consent Form

#### LEAD INVESTIGATOR:

**PROJECT TITLE: EXAMINING THE PREPAREDNESS OF KENYA PROFESSIONAL ACCOUNTANTS TO TECHNOLOGICAL DISRUPTION TO THEIR EMPLOYMENT**

**BACKGROUND OF RESEARCH:** This questionnaire is part of a research project designed to understand how prepared Kenyan accountants are to disruption due to automation. It examines specifically;

- i. To establish the effect of professional capacity in preparing accountants for technological disruption to their employment
- ii. To determine the effect of initial professional development in preparing accountants for technological disruption to their employment
- iii. To evaluate the role of regulatory bodies in preparing the Kenyan accountant for technological disruption to their employment

**PROCEDURE OF THIS STUDY:** This questionnaire is based on multiple choice answers from accounting professionals registered with ICPAK.

**PUBLICATION:** Only general findings were reported, without reference to identifiable individual results. The results of the research formed part of my dissertation.

#### DECLARATION:

- I am a registered member of ICPAK
- I have read or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions have been answered to my satisfaction. I understand the description of the research that is being provided to me.
- I agree that my data be used for scientific purposes and I have no objection to having my data published in scientific publications in a way that does not reveal my identity
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

- I understand that each question is optional and that I am free to omit response (s) to any question without penalty
- I understand that my participation is fully anonymous and that no personal details about me was recorded
- I have received a copy of this agreement.

## Appendix II: Strathmore University Ethical Review Authorization



**Strathmore**  
UNIVERSITY

14<sup>th</sup> April 2020

Mr Nyanja, Denis  
denis.obonyo@strathmore.edu

Dear Mr Nyanja,

**RE: Determining the preparedness of the Kenyan accountant to technological unemployment resulting from the fourth industrial revolution**


This is to inform you that SU-IERC has reviewed and **approved** your above research proposal. Your application approval number is **SU-IERC0709/20**. The approval period is **14<sup>th</sup> April 2020 to 13<sup>th</sup> April 2021**.

This approval is subject to compliance with the following requirements:

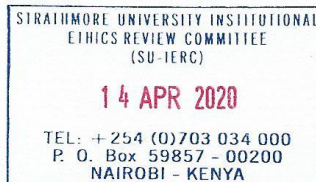
- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-IERC.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-IERC within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-IERC within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to SU-IERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,

  
Dr Virginia Gichuru,  
Secretary; SU-IERC

Cc: Prof Fred Were,  
Chairperson; SU-IERC



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Email info@strathmore.edu www.strathmore.edu

### Appendix III: NACOSTI Permit



REPUBLIC OF KENYA

Ref No: 187663



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Date of Issue: 28/March/2020

#### RESEARCH LICENSE



This is to Certify that Mr.. DENIS OBONYO NYANJA of Strathmore University, has been licensed to conduct research in Nairobi on the topic: EXAMINING THE PREPAREDNESS OF KENYA PROFESSIONAL ACCOUNTANTS TO TECHNOLOGICAL DISRUPTION TO THEIR EMPLOYMENT for the period ending : 28/March/2021.

License No: NACOSTI/P/20/4679

187663

Applicant Identification Number

Director General  
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code



NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

## Appendix IV: Research Questionnaire

The purpose of this questionnaire is to assist in examining the preparedness of professional accountants towards technology disruption to employment in Kenya. The duration to complete was 10 minutes. Your participation in this survey is purely voluntary, and you are free to terminate should you feel uncomfortable to proceed, and there were no implications. The information provided was treated with the utmost confidentiality and was used solely for the research. The findings were reported on aggregate, not on an individual basis.

Should you have any questions, kindly contact **Dennis Nyanja** on [denis.obonyo@strathmore.edu](mailto:denis.obonyo@strathmore.edu)

1) Are you a registered member of ICPAK?

Yes

No

### PART A: GENERAL INFORMATION

1) If an ICPAK member, how long have you been a member?

Less than a year

>1-5 years

>6-10 years

11years and above

2) What is your highest academic qualification?

Diploma

Undergraduate degree

Masters degree

Doctorate degree

3) Please check off as many of the below that best describes your tasks in your current job?

Auditing  Compliance

Tax accounting  Budgeting & reporting

Payments and payroll processing  Bookkeeping

Management reporting  Financial services

**PART B: TECHNOLOGY UNEMPLOYMENT IN KENYA**

Please tick the level of agreement of the following statements.

Please indicate in the table with a tick (√) or across (×) with a scale of

5= strongly agree      4= Agree    3= Moderate Agree    2= Disagree    1= Strongly Disagree

No	Technology Unemployment	1	2	3	4	5
1)	I am aware of the threat technology disruption poses to my employment					
2)	I have seen actual job losses as a result of technological advancements and automation					
3)	Professional accountants are at high risk of being displaced by technology					

**In what other ways do you feel the risk/threat of technology disruption towards your current employment?**

.....

.....

.....

**PART C: PROFESSIONAL CAPACITY**

Please tick the level of agreement of the following statements.

Please indicate in the table with a tick (√) or across (×) with a scale of

5= strongly agree      4= Agree    3= Moderate Agree    2= Disagree    1= Strongly Disagree

No	Profession Capacity	1	2	3	4	5
1)	My current academic and professional skills adequately reduce my risk of being displaced by automation					
2)	Most of the tasks in my current work are at risk of being automated					
3)	Most of the tasks in my current work have already been automated replacing my work-input					
4)	I have adequate computing skills to work with automated accounting tools					

**From your own experience in what other ways has your professional capacity prepared you for the risk of technology disruption to your employment?**

.....

.....

.....

**PART D: INITIAL PROFESSION DEVELOPMENT**

Please tick the level of agreement of the following statements.

Please indicate in the table with a tick (√) or across (×) with a scale of

5= strongly agree      4= Agree    3= Moderate Agree    2= Disagree    1= Strongly Disagree

Please Note:

**IPD** – initial professional development. Training from an academic institution or professional examiner. Examples are courses provided by academic schools like diplomas or by professional examiners like Kenya National Examination Council, e.g. CPAs

No	Initial Professional Development	1	2	3	4	5
1)	My IPD training provided me with skills to work with automated accounting tools					
2)	The skills learnt from my IPD training reduced the risk of being unemployed due to automation					
3)	The curriculum offered in IPD is up to date with emerging technology needs for accountants					
4)	I intend to pursue further IPD to remain relevant beyond automation					

**From your own experience in what other ways has your initial professional development prepared you for the risk of technology disruption to your employment?**

.....

.....

.....

**As a professional accountant in what other ways do you recommend that ICPAK can play a role in mitigating the risk of technology unemployment?**

.....  
.....  
.....

**Thank you for your Time**

**Appendix V: Interview Schedule**

- 1. How would you describe the knowledge of accounting members towards technology unemployment within the accounting profession?**

.....  
.....  
.....

- 2. Based on your own knowledge and experience which are the key accounting jobs at risk as a result of technology unemployment?**

.....  
.....  
.....

- 3. How would you characterize the response by ICPAK/KASNEB towards technology unemployment within the accounting profession?**

.....  
.....  
.....

- 4. What have been the key steps undertaken by ICPAK/KASNEB towards technology unemployment mitigation within the accounting profession?**

.....  
.....  
.....

- 5. What would you suggest that ICPAK/KASNEB members need to undertake in the face of technology unemployment risk?**

.....  
.....  
.....

**Appendix VI: Susceptibility of Occupation Automation**

<i>Rank</i>	<i>Automation probability</i>	<i>Occupation</i>
695	0.99	Tax preparers
693	0.99	New accounts clerks
691	0.99	Data entry clerks
688	0.98	Brokerage clerks
697	0.98	Order clerks
696	0.98	Loan officers
677	0.98	Credit analysts
666	0.97	Payroll and time-keeping clerks
657	0.97	Cashiers
643	0.96	Billing and posting clerks
630	0.96	Compensation and benefits managers
594	0.94	Budget analysts
589	0.94	Accountants and auditors
586	0.93	Tax examiners and collectors, and revenue agents
563	0.92	Loan interviewers and clerks
324	0.58	Personal finance advisors
217	0.23	Financial analysts
213	0.22	Statisticians
209	0.21	Actuaries
198	0.17	Financial examiners
182	0.13	Management analysts
159	0.08	Compliance officers
152	0.069	Financial Managers
111	0.03	Purchasing managers