UNDERSTANDING THE SOCIETAL RESISTANCE TO THE UPTAKE OF AI AND OTHER EMERGING TECHNOLOGIES IN AUDITING FIRMS: A SOUTH AFRICAN PERSPECTIVE

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I could not have completed this dissertation without the support of my grandparents. Although they are no longer mentally with us, they've continuously pushed me to exceed expectations and shoot for the moon. I can only imagine their faces beaming with pride.

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ABSTRACT

Digital transformation has seen the uptake of emerging technologies at a rapid rate, now more than ever after the COVID-19 pandemic. Audit firms are no exception to this, yet many auditors and audit trainees still show a reluctance towards integrating technology into their work processes. Considering that almost 80% of all Fortune 500 accounting functions will be automated within the next decade, it is imperative to analyse the areas that South African firms can improve in, to gain a seat at the global table, enhance their competitive advantage and leverage technology to improve socio-economic issues like unemployment that plague the South African economy. Using Qualtrics as a method of enquiry and descriptive analytics to determine the average mean for each category of question, 100 usable questionnaire responses from varying age groups, roles and firm sizes demonstrate that social factors, such as, the lack of support from senior management, as well as limited training and guidance relating to technology integration, are still holding them back. The resource gap between small and large firms seems to be increasing with the onset of emerging technologies altering the audit landscape, as small firms are constrained by financial and non-financial constraints such as costs and lack of dedicated IT personnel. Luckily, these constraints are not deterring small firms from seeing the benefits of audit integration, while large firms are pursuing it at a rapid rate.

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Acronym	Explanation
AI	**Artificial Intelligence**
AR	**Augmented Reality**
BDO	**Binder Dijker Otte**
BPM	**Business Process Management**
EY	**Ernst & Young**
IoT	**Internet of Things**
IPA	**Intelligent Process Automation**
ISA	**International Standards of Auditing**
IT	**Information Technology**
KPMG	**Klynveld Peat Marwick and Goerdeler**

PwC	**PricewaterhouseCoopers**
RPA	**Robotic Process Automation**
UTAUT	**Unified Theory of Acceptance and Use of Technology**
VR	**Virtual Reality**

CHAPTER 1: INTRODUCTION

Digital transformation is occurring at the height of the fourth industrial revolution (Industry 4.0) with changes being seen in business models, products, processes, and structures (Ribeiro et al., 2021). This extends beyond just impacting individual businesses, to full scale industry change. Robotic Process Automation (RPA), Artificial Intelligence (AI) and other forms of emerging technology are examples of tools that should be considered an enabler of Industry 4.0 and digital transformation as it supports business process transformation (Siderska, 2020). The Information Age is also an important piece of digital transformation and refers to how technology allows increasingly rapid distribution of information and knowledge, which has opened access to massive amounts of data (Stehr, 2007).

Auditing firms are no exception to this rapid move towards digitization. Emerging technologies have been used to transform the traditional business processes utilized in auditing and accounting firms, which has led to efficiency and quality now being placed above profitability (Moffitt et al., 2018). Advancements in technology and data can be capitalized by audit firms as a way of creating value for their clients through more efficient processes, while maintaining a competitive position (Khan, 2021).

Auditing has moved through various stages since the 1800s, starting as a convergence role and transforming into an enhancing role. It has continued to play an enhancing role since the late 1970s and is now expected to move into a new role of convergence (Md Ali & Teck-Heang, 2008). The traditional model of auditing has focused on looking at historical information, which encompasses a backward-looking model where significant events have been identified long after they've occurred. There are many obstacles preventing the work of audit from evolving, such as using sample-based methodology, which fails to take advantage of the emerging Information Age that is heavily under-utilized in the realm of audit (Alawadhi et al., 2015). Therefore, this evolution of the business landscape, because of emerging technologies and increasing competition, means that audit firms need to adapt or die to remain competitive (Khan, 2021) and with the rapid uptake in the use of AI comes the emergence of the new digital operating model (Iansiti & Lakhani, 2020).

Within the finance function alone, it is estimated that 40% or more of jobs will be either completely or partially automated within the next decade, with as many as 80% of

Fortune 500 companies automating their accounting functions (Chheda et al., 2021). 53% of survey participants saw finance as being a key area benefiting from the implementation of emerging technology such as Intelligent Process Automation (IPA) (Harvard Business Review Analytic Services, 2019). Kend and Nguyen (2020) performed a study on how successfully AI and emerging technologies had been adopted by auditing firms in a developed market such as Australia and found that they were still in the innovation stage, namely due to the social system component of the theory. It has therefore become essential to reconsider the approach to automating auditing and accounting to drive cost-efficiency and improve the quality of audit work in areas such as workflow and time, repeatable judgements, and stochastic judgements (Moffitt et al., 2018).

The Harvard Business Review (2019) has identified South Africa as one country that is paving the way for digital technology to translate into economic growth and development, job creation and innovation. Using their research, the Harvard Business Review was further able to develop a framework called the African Leapfrog Index to identify whether African countries have the potential to develop and implement a global digital strategy. The results of this framework revealed that South Africa was leading in the creation of digital jobs because of consumers having a strong demand for digital business. In addition, the results also suggest that South Africa has implemented quite a few innovative emerging technologies such as biometric data and mining drones. The World Economic Forum also ranked South Africa as 19th globally for being a financial hub (Chakravorti & Chaturvedi, 2019). However, despite this, African countries have always fallen behind the rest of the world when it comes to technological advancements. Even though African countries have managed to leapfrog different technologies, they are always left to play a game of catch up, indicating that the pace at which their technology is changing outweighs their ability to achieve meaningful progress in the emerging technology space (Gilbert, 2020).

This paper aims to fill the gap by understanding how the societal and technical factors keep auditing firms in South Africa from immersing themselves in emerging technologies and taking advantage of the benefits that it brings. The main issue stems from the societal aspect and more specifically, the feelings of all levels of employees towards senior management's support in the use of the technologies utilised within the firms. Using these findings, a system towards implementation for firms of all sizes can

be developed to digitize the audit process, remove redundant work, add to quality of work produced and contribute towards job creation and employment by working with technology, instead of against it. As a result, the following research questions and hypotheses will be addressed:

RQ 1: Which of the two broad categories of challenges (societal and technical) is contributing most to the reluctance shown by South African audit firms and employees to integrating automation into their business processes?

H1: Considering that the successfulness of automation is driven by the people who work with it, the societal aspect is expected to be the biggest contributor to holding South Africa back.

RQ 2: Do South African audit firms see automation of business processes as necessary for driving improved quality and maintaining a competitive advantage?

H2: Once audit firms see the success and the role that automation plays in other audit firms, they will start to see the necessity of automation. However, until tangible results have been witnessed, they will remain reluctant.

RQ 3: Do South African audit firms believe that they could contribute to solving the country's socio-economic challenges by using AI and other emerging technologies?

H3: Audit firms and employees believe that automation using AI and emerging technologies will contribute to the growing unemployment rate as employees become replaced by machines.

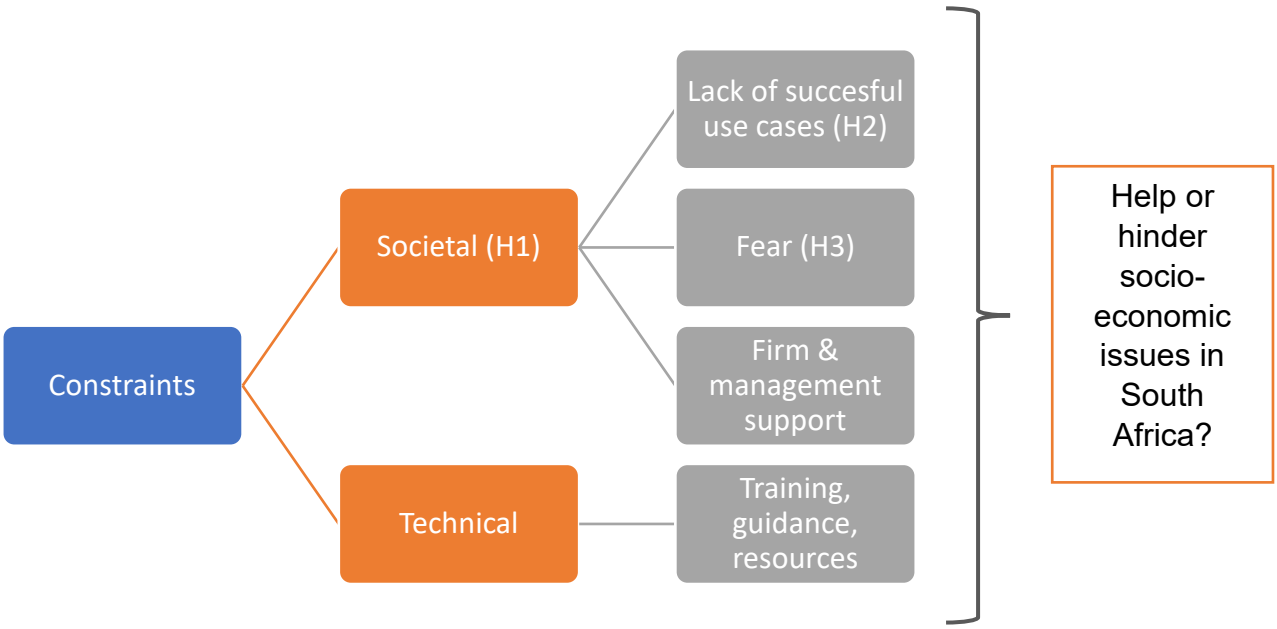

Figure 1: Summary and flow of hypotheses (Author's own)

The remainder of this minor dissertation is structured as follows: Chapter 2 analyses the literature that currently surrounds the topic of emerging technology use in auditing firms, both globally and locally, as well as the benefits and downfalls that automation brings to Business Process Management. Chapter 3 illustrates how a questionnaire is used as a method of inquiry to collect responses. Questions were set up on Qualtrics and were designed using Venkatesh's (2003) Unified Theory of Acceptance and Use of Technology model surrounding the perceived usefulness, social influence, and attitude towards technology, which will be incorporated with the social system aspect of the Diffusion of Innovation Theory. Chapter 4 will conduct an analysis using descriptive analytics. This analysis will involve categorizing responses based on firm size, role within the firm, and age group mean scores as these have been chosen as important comparative metrics to analyse within the auditing space. Finally, Chapter 5 will provide a conclusion on each of the research questions identified above as well as provide recommendations of areas for future research such as policy and university curricula.

CHAPTER 2: LITERATURE REVIEW

Technology is a broad term, with more than one definition and there exist various subsets within it. When researching technology, it is important to define the subset of technology that it falls within. This dissertation will focus on the use of emerging technologies within auditing and accounting firms in South Africa. Communications Space & Technology Commission (2021) define emerging technologies as technologies that represent technological innovations that provide a competitive advantage over current technologies and represent a significant step in progression within a certain field. They further state the emerging technologies do not fall under Information Technology (IT) which includes software, systems, networks, and technologies that are designed to collect, process, store and analyse data.

Emerging technologies are evolving at a rate that is difficult to keep track of, with 250 emerging technologies existing 10 years ago. PricewaterhouseCoopers (PwC) identified the Essential Eight emerging technologies that would have the biggest impact on a multitude of industries. The Essential Eight include Artificial Intelligence (AI), Augmented Reality (AR), blockchain, drones, Internet of Things (IoT), robotics, 3D printing and Virtual Reality (VR) (PricewaterhouseCoopers, 2022). Auditing firms, in general, are making use of predictive analytics, RPA, blockchain, machine learning and AI across their workflows (Qureshi, 2020). With so many technologies available for workflow integration, it is imperative to investigate how the users of these technologies really feel about using them.

2.1. THEORETICAL FRAMEWORKS

Building on previous research (Lee & Joshi, 2017; Kend & Nguyen, 2020; Bengtsson et al., 2019; Schmidt et al., 2020), this study identifies the following relevant theories:

1. Status quo bias perspective
2. Legitimacy theory
3. Diffusion of innovation theory

2.1.1 Status quo bias

Status quo bias has been used to understand the resistance that people display towards adopting new technologies and intends to highlight the key issues contributing to this resistance so that entities can efficiently implement new technologies (Lee &

Joshi, 2017). As a result of biases present in individuals, Samuelson and Zeckhauser (1988) found that individuals prefer to resist change by sticking to the status quo. Senior management in an organisation are guilty of sticking to the way things are, as they fear the potential damage that their decision-making has on the organisation, which makes them unable and unwilling to explore new innovations (Dlamini, 2021). One example of this is the resistance of traditional accounting firms, who use Excel extensively, towards incorporating data analytics into their Excel function (Schmidt et al., 2020). New technologies, such as AI, have already moved Excel to the bottom of the log. As a result, investigating management's status quo bias with respect to newer technologies, will assist audit firms in their integration of these technologies into their workflows.

2.1.2 Diffusion of innovation theory

Rogers (2003) found that individuals are more likely to accept and implement technological innovation if there is an ease in observing the results of it. Essentially, there are five elements involved in adopting IT, according to this model, which include innovation, adopters, communication channels, time, and social system. Adjacent to that, there are five stages of decision-making which include awareness, persuasion, decision, implementation, and confirmation. An innovation needs to be adopted at a large scale in order for it to be self-sustaining (Kend & Nguyen, 2020). The diffusion of innovation curve is thus based on the number of users that successfully adopt and implement the technology (Woodside et al., 2017). Kend and Nguyen (2020) performed a study on how successfully AI and emerging technologies had been adopted by auditing firms in Australia and found that they were still in the innovation stage, namely due to the social system component of the theory. This study expects to see a similar result.

2.1.3 Legitimacy theory

Legitimacy theory is defined by Suchman (1995) as being the generally held perception that the actions an entity takes are appropriate according to a particular set of beliefs, values, or a constructed system. Legitimacy theory is broken down into three main segments, namely, pragmatic legitimacy, moral legitimacy, and cognitive legitimacy.

Pragmatic legitimacy refers to the business case of an organization committing to an action, in other words, the ability of the organization to obtain a benefit from engaging in a particular action (Thomas & Lamm, 2012). Moral legitimacy looks at whether a policy is the right thing to do, regardless of the potential cost or benefit to the company (Thomas & Lamm, 2012). Suchman (1995) defined cognitive legitimacy as whether an organization is appropriately organized in such a way that will achieve its outcomes efficiently and effectively, in other words, whether the organisation has the necessary tools and resources needed to achieve the expected outcomes of technological integration.

Legitimacy considers society as a whole rather than a sum of individual parts and is concerned with the relationship between an entity and society, where society will allow the entity to continue its operations for the period where the societal benefits outweigh the cost (Deegan, 2002). Therefore, auditing firms need to consider legitimacy in all decision-making activities to continue with their operations (Bengtsson et al., 2019). They will achieve this by considering the benefit offered from using technology, whether integrating technology into their workflows is the appropriate course of action and whether all resources are in place to achieve the outcomes required from this technological integration.

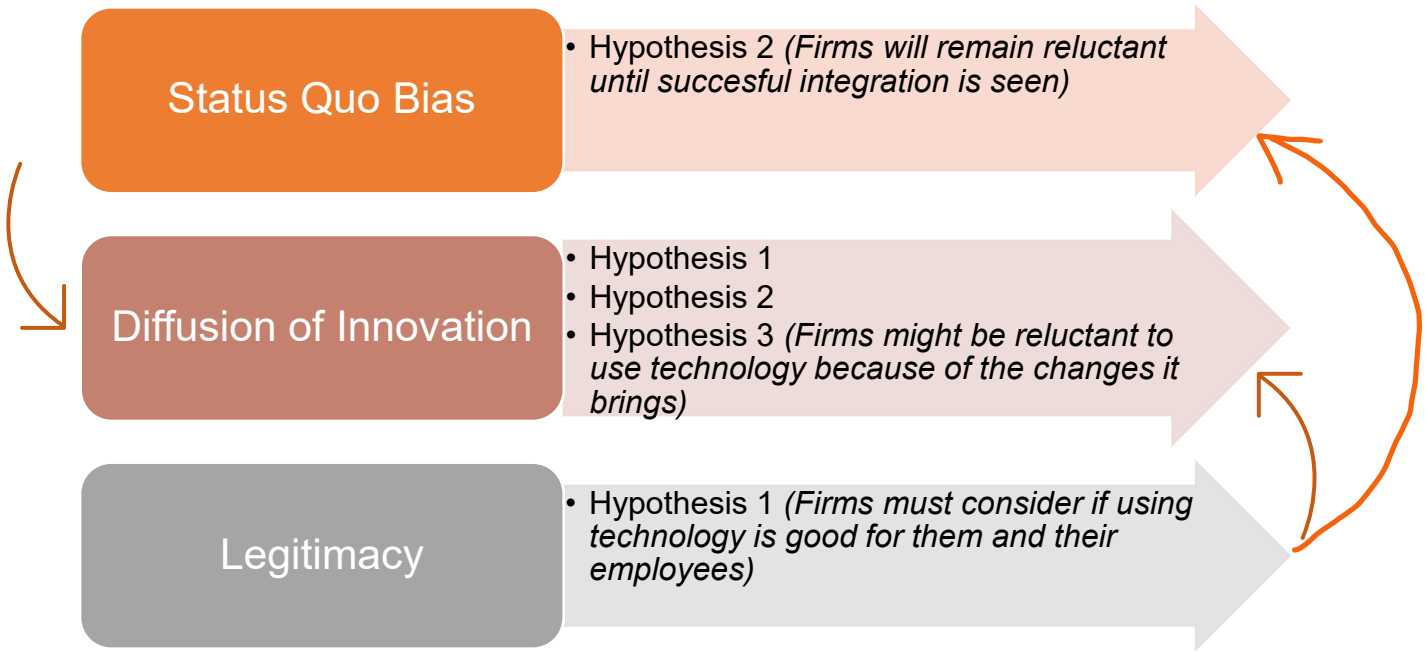

Figure 2: Research framework (own source)

Figure 2 demonstrates how a firm's legitimacy will affect the uptake of technology use within the firm. However, this uptake is directly impacted by status quo bias and how reluctance to use the technology due to unfamiliarity might affect that. Firms may avoid tarnishing their legitimacy by sticking to the way things have been for years, as this is tried and trusted. Overall, this slowed uptake of technology, due to the various factors, will put firms at a competitive disadvantage as they are unable to keep up with the pace of innovation.

2.2 EMPIRICAL LITERATURE REVIEW

The concept of audit automation is not new. As far back as 1998, studies were being carried out on the nature and extent of audit automation used within certain audit firms (Manson et al., 1998) and results were not far off from what is being seen in 2022. Initially, it was determined that globalization was the driving force behind audit automation (Manson et al., 1998). Similarly, Industry 4.0 and digital transformation are now the driving forces behind workflow integration and the use of emerging technologies within audit firms (Chheda et al., 2021).

Due to the nature of auditing, highly skilled and qualified staff are required to carry out their functions with an above par amount of professional judgement and professional scepticism. Audit automation tools are thought to deliver higher quality audits and evolved to keep up with changing client business environments (Catacutan, 2019). RPA is an example of an automation tool, which is programmed to execute routine and repetitive tasks. This has allowed auditors to place more focus and emphasis on professional judgement as opposed to the mundane tasks, which will allow employees to shift their focus to more meaningful and purpose-driven areas of audit (Khan, 2021).

Repetitive tasks can be done by robots while junior trainees become more engaged in tasks requiring a higher level of judgement. Testing of controls can be automated, allowing auditors to shift their focus to more value creation centred activities. Finally, automation will expand testing to entire populations beyond the use of CAATs, allowing for higher quality audit opinions to be expressed (Gotthardt et al., 2020). Therefore, by eliminating the human error that is inherent in tasks of this nature, the reliability of the output produced by these tasks can be greatly improved, being the financial statements (Zemankova, 2019).

There is some doubt about whether digital transformation leads to improved performance, however, Zhai et al (2022) hypothesized that firms implementing digital transformation perform better than those that do not for three reasons. Firstly, it highlights the firm’s commitment to value creation and maximizing its own value through integration of technology into everyday business processes. Secondly, there is more effective communication between different levels of the hierarchy leads to cost-savings and thirdly, it provides a competitive advantage through innovation by essentially being able to capitalize on the synergies created by the combination of

artificial intelligence and machine learning through more motivated employees, higher quality work performed and shifting focus to more crucial parts of value creation (Devarajan, 2018).

All the advantages associated with automation and digitization emphasize the usefulness of Business Process Management (BPM). BPM refers to redesigning information systems to support the workforce as an overall method to improve business processes within the organisation (Mendeling, 2018). It drives cost-effectiveness by shifting entity focus to be more consumer centric and agile in uncertain business environments, whilst generating a profitable return on investment (Capgemini, 2021). Figure 3 illustrates the flow of BPM.

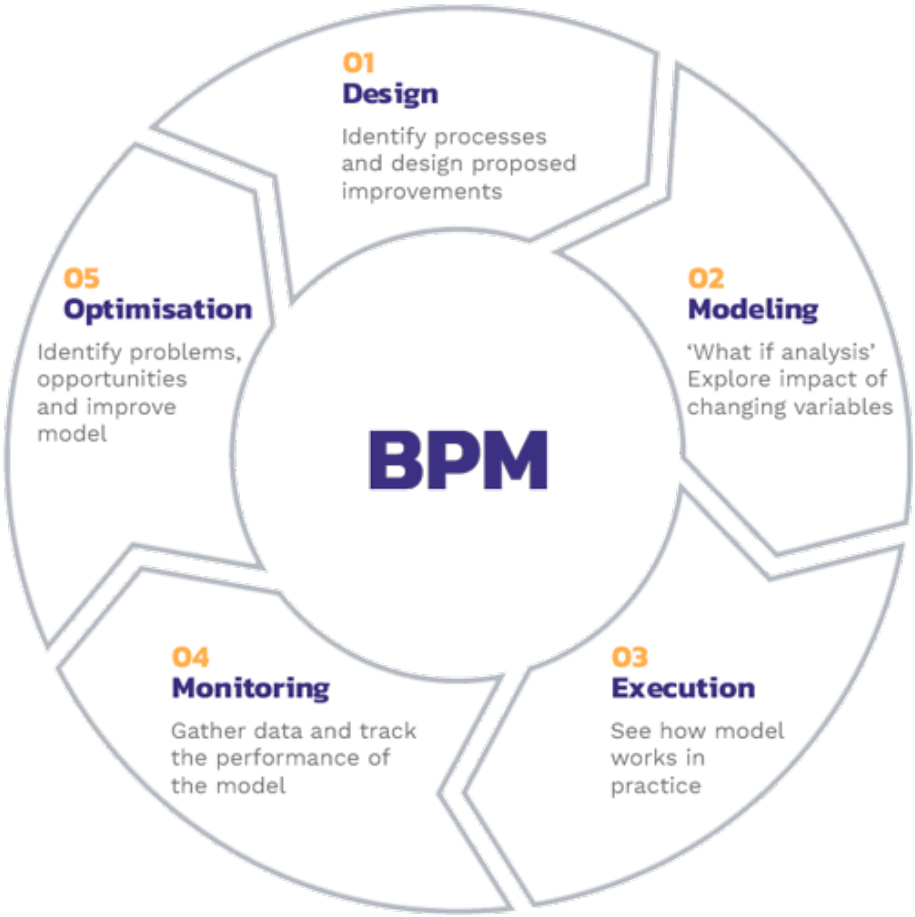

Figure 3: Illustration of Business Process Management (Illes, 2019)

Essentially, identifying processes suitable for automation integration involves meeting three requirements: Firstly, is it a routine process that follows a defined set of rules? Secondly, are there very few exceptions to the definitive set of rules? And thirdly, will automation save a material amount of labour hours? Accountants have the professional judgement and knowledge to not only answer these questions, but also

to quantify the number of exceptions and the labour savings, which means they are in a prime position to identify and recommend business processes for automation (Kokina et al., 2021).

Finally, considering the high volume of data that audit and accounting firms are exposed to, automation can assist in data collection from various sources, data sorting by removing duplicates, controls testing such as segregation of duties, exception handling and access controls, risk assessment to collect data and analyse trends and lastly, reconciliation against a pre-defined set of rules (Devarajan, 2018). Audits by nature require a significant amount of data to be performed and audit procedures can easily follow a pre-determined set of instructions which will see audits reaching completion at a faster pace (Dickey et al., 2021).

Despite the obvious synergies that the integration of emerging technologies can bring into an entity, it remains in the early stages of adoption which may be partially attributed to the cost and perhaps to the skills needed to integrate it into current business processes (Gotthardt et al., 2020). As digital transformation is undertaken by audit and accounting firms, the skillset and competencies of accountants will need to undergo a similar transformation through acquiring additional technical skills to assist in their crucial roles as identifiers, explainers, trainers, sustainers, and analysers (Kokina et al., 2021). Major challenges identified in integrating emerging technologies with BPM include employment, acceptance of technology, ethics, job design, social integration, and regulation thereof (Mendling, 2018).

Contrary to popular belief, not all processes are able to be automated, particularly processes requiring extensive human judgement, tasks with significant ambiguity, tasks with uncertain outcomes that cannot be predicted and tasks with a heightened degree of complexity (Moffitt et al., 2018). This is especially relevant to the auditing profession due to the fundamental concept of professional scepticism when evaluating audit evidence. The International Standards of Auditing (ISAs) define professional scepticism as, “An attitude that includes a questioning mind, being alert to conditions which may indicate possible misstatement due to fraud or error, and a critical assessment of audit evidence.” Professional scepticism plays a crucial role in the quality of an audit engagement (IAASB, 2019) and based on the definition; it is an inherent human trait which invites some degree of subjectivity. Therefore, considering

the need for professional scepticism as prescribed by the ISAs, one of the key downfalls associated with automation is identifying processes that are appropriate for automation since the cost associated with choosing the wrong process can outweigh the expected savings (Hindel et al., 2020).

There has been wide acceptance of automation techniques with the Big Four audit firms, which include Deloitte, Klynveld Peat Marwick and Goerdeler (KPMG), Ernst & Young (EY) and PricewaterhouseCoopers (PwC) (Statista Research Department, 2022). Deloitte makes use of machine learning through Argus which reads documents such as leases. PwC has a similar tool called Halo which analyses journal entries (Dickey et al., 2021). In 2017, EY announced its partnership with Automation Anywhere to integrate emerging technologies such as intelligent automation into their business processes to enhance their digital workforce and product offering (Automation Anywhere, 2017). Similarly, KPMG in the United States also partnered with Automation Anywhere in 2017 with the purpose of adding intelligent automation to their business model (Automation Anywhere, 2017). Binder Dijker Otte (BDO) seems to be dominating in the automation space with their Automize application, which supports tier 1 apps and services globally to improve their focus on end-users (Johnsen, 2022).

Professionals from the Big Four firms revealed that one of the biggest challenges related to integration of emerging technologies is client reluctance as they do not fully understand what bots are or what they are capable of. Clients also become concerned that their employee's job security may be compromised as well as concerns relating to data security issues (Cooper et al., 2018).

It has become necessary to assess the willingness of workers to accept technological advances and implementations in the workplace. Venkatesh (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which identified four determinants that would influence user acceptance and usage, namely, performance expectancy, effort expectancy, social influence and facilitating conditions. Within each of these broad categories are small sub-categories. For example, under performance expectancy is perceived usefulness. All categories and sub-categories are illustrated in Figure 4.

Bagozzi's (2007) criticism of the UTAUT model is that it has far too many variables and leaves out some fundamental predictors which creates the risk of technology adoption being misguided due to the overwhelming number of variables to take into consideration. Essentially, decision-making related to implementing technology should be a function of goals, motives, or values that the entity hopes to attain (Bagozzi, 2007).

Identifying the linkages between entity value hierarchies and individual values can be the independent predictors of perceived ease of use or perceived usefulness. This goal-setting approach also provides a situation-specific approach as opposed to the general, one-size-fits-all approach (Bagozzi, 2007). The reality is that the success of implementing any technology into the workplace relies on incorporating social factors into the decision-making process (Niehaves et al., 2012), particularly a collaborative consideration, which most models lack consideration of, as they only isolate decision-making by individuals. It is therefore critical to consider group, cultural and social aspects in technology acceptance (Bagozzi, 2007).

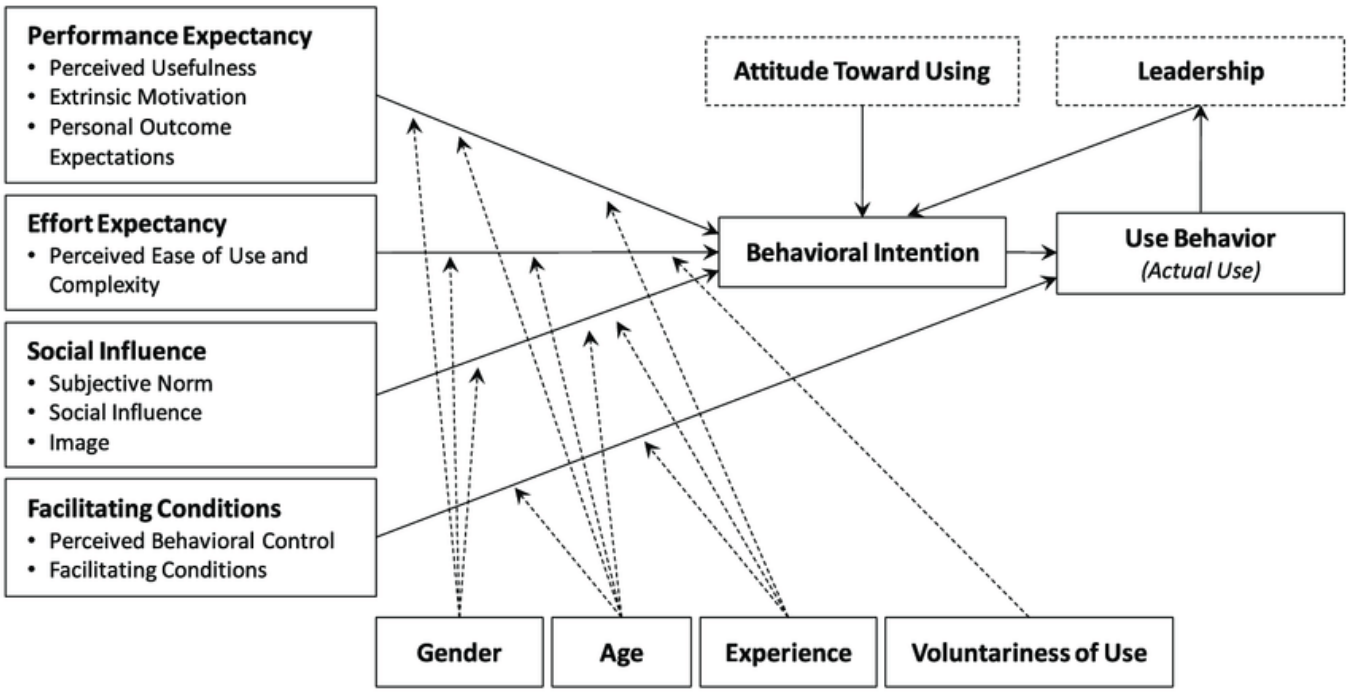

Figure 4: Modified UTAUT model (Benmessaoud et al, 2011)

Technical challenges refer to the ability, skills, and resources to make use of the technology, which speaks to Venkatesh's effort expectancy sphere of the UTAUT Model. Another area of consideration is the facilitating conditions which refers to the

organizational and technical support made available to be able to use the technology (Venkatesh et al., 2003). Clearly, there is some overlap here between technological aspects and social aspects. As a result of this overlap, the facilitating conditions sphere will have a large degree of focus.

Alongside the social and technical factors, a key consideration in determining the acceptance of technology is how the integration of this technology will help or hinder job satisfaction. Artificial Intelligence can contribute to job satisfaction through a reduced workload, additional support during busy periods and by aiding with repetitive tasks so that employees can put more effort into tasks that require critical thinking (Nguyen & Malik, 2022). Therefore, this is a crucial factor in an employee's intention to use a technology, which links to the performance expectancy, namely perceived usefulness, metric of Venkatesh's UTAUT model.

Niehaves et al (2012) findings identified that behavioural intention is influenced by Social Conformance, Secondary Sources Influence, Social Status, Social Facilitating Conditions and Social Externalities, which are defined in Table 2, which are linked to the social influence sphere of the UTAUT model. Behavioural intention looks at how likely an individual is to continue using the technology.

Table 1: Terms used in a modified UTAUT model with more focus on social integration

Social Conformance	People close to an individual that believe it is necessary to use the technology.
Secondary Sources' Influence	How secondary sources such as social media, TV and others influences behaviour (Venkatesh, 2003).
Social Status	How one's status in the workplace improves or becomes more prestigious as a result of using technology.
Social Facilitating Conditions	How an individual believes their peers, colleagues et cetera, will support the use of technology through assisting them if they encounter issues using the technology.

Social Externalities	The number of people in the organisation who are using the technology, which links the growing number of users to an increase in the value of adopting a certain technology.

Source: Niehaves et al (2012)

One of the areas of analyses will refer to the users' age. The societal aspects of technology acceptance will be compared using an analysis of the users' age in determining the impact of the respondent's age on their willingness to accept technology in the auditing firm, since this has been found to have a generational dimension (Asoba & Mefi, 2022). The age groups will be classified according to the following groups (Dimock, 2019):

- Boomers (1946 – 1964)
- Gen X (1965 – 1980)
- Millennials (1981 – 1996)
- Gen Z (1997 – 2012)

This is particularly relevant according to the results of Asoba & Mefi (2022) which found that Millennials are more open to using technology to accomplish their tasks, whereas Gen X appear to not trust technology to the same extent.

2.2.1 Societal focus in a South African context

Culture is an important implementation factor that determines the success of an automation tool within audit firms (Manson et al., 1998). South Africans have taken a firm stance against the disruption that is set to be brought on by Industry 4.0, however, the effects of COVID-19 have caused the way South Africans live, work, and interact to change, which means that South Africa is forced to adapt to remain relevant in the global space (Jegede, 2021). Sethibe and Naidoo (2021) conducted a quantitative study which involved interviewing 59 professional auditors and 26 non-auditors, all of whom are involved in auditing in South Africa, in order to understand their perceptions on the use of robotics in auditing. Their findings identified six critical barriers to the adoption of emerging technologies in audit in South Africa, namely, lack of support from management, lack of technological skills, high quality data unavailability, limited time for research and implementation, lack of financial resources and practical

trainings (Sethibe & Naidoo, 2021), which emphasizes the need for a study that focuses on studying these societal constraints in more detail so that South Africa is able to move forward.

In a teaching case study done by Willcocks et al (2017), the head of human resource management at a global professional services firm identified that high employee turnover was the result of monotonous work processes and when introducing tasks that required a higher degree of creativity and analytical thinking, employees were able to reposition their focus. Automation is clearly a rapidly expanding area of interest, with many entities recognizing the contribution it can make to their organisation's employee morale, efficiency, and overall long-term growth (Siderska, 2020).

In the audit space, fears relate not only to being replaced but also how the skill set of an auditor might change in the near future (Moffitt et al., 2018). However, in reality, the introduction of automation does not threaten the services provided or the job market but rather changes how their services are delivered (Khan, 2021). In fact, the role of the auditor is set to become even more critical and specialised with the implementation of intelligent automation as humans will essentially be the driving force behind how the machine learns and the quality of the data that it uses to learn from. That being said, humans are prone to certain biases in data selection, providing another kink that needs to be ironed out in this unexplored field (Dickey et al., 2021).

Furthermore, automation will require a managerial mindset revamp and open-mindedness as business objectives are changed which will bring about additional challenges that management will need to assess considerably (Ng et al., 2021). Machines and humans will need to work together in a hybrid work environment (Siderska, 2020) and employees will need to be adequately trained to work in synchronous harmony with their bot counterparts (Ng et al., 2021). In a survey sponsored by Oracle, two thirds of participants said that most important success factor for integration into the AI-driven economy is having an organisational culture that supports data-based methods of decision-making (Harvard Business Review Analytic Services, 2019).

Currently, very little research has been conducted on using automation to offer auditing as a global business service (Fernandez & Aman, 2018). There also appears to be a focus on bigger entities, with smaller entities being left out of the loop entirely

when it comes to automation decisions (Gotthardt et al., 2020). The reality is that entities small and large understand the synergies that are brought about through automation (Harvard Business Review Analytic Services, 2019). Further to this, automation is seen as disruptive to global business services as it reduces the need to utilise offshore services in order to achieve process standardisation and cost-saving (Tarsh, 2017). Especially given the impact of the COVID-19 pandemic over the last two years, the entire landscape of global business services has undergone a rapid change as leaders turn to automation to allow employees to work in a hybrid work environment consisting of partly in office and partly remotely (Chheda et al., 2021). Many business leaders fear for the productivity of their employees when it comes to a remote working model, however in research conducted with 50 global business service providers, over 90% positively stated that scaling to a remote working model showed no productivity losses and both client and employee experiences remained on par with expectations (Chheda et al., 2021).

Hindel et al (2020) found that while the promises of RPA efficiencies are overrated and constitutes hype, the ability to combine it with other emerging technologies creates the hope of more superior automation, which will pave the way for businesses to capitalize on growth opportunities through improved scalability (Zemankova, 2019). Particularly from an audit firm point of view, the use of digital technologies will allow shared service centers to use staff in more value-adding functions to increase efficiency (Suska & Weuster, 2021).

Clearly there is a need to align auditing and accounting firms with a global business service model as the efficiencies and cost-savings are obvious (Tarsh, 2017). The challenge comes with the time needed to introduce these investments as well as the financial outlay. The initial financial investment in automation is perhaps the most important and this applies to the more short-term RPA solutions as much as it does to long-term solutions such as AI or machine learning (Suska & Weuster, 2021).

South Africa is clearly in a prime position to take advantage of digital transformation to address some of the socio-economic challenges it has faced for decades. The focus of this study will be on the societal component of the implementation of emerging technologies as this is often the most undermined area of consideration, which is the major driver behind the success of implementation within the entity.

CHAPTER 3: METHODOLOGY

3.1 RESEARCH METHOD

Research can take on either a quantitative or qualitative form or in some cases, a mixture of both. The research presented in this study is quantitative in nature. A multiple-choice survey has been identified as the best way to gather data for the research questions outlined in the introduction. It is a means of identifying observable, empirical and measurable evidence (Hesse-Biber, 2016). The use of descriptive statistics to analyse the mean of the responses is quantitative in nature.

3.2 RESEARCH DESIGN – QUESTIONNAIRE

Primary data will be obtained from questionnaires distributed to various levels of employees in audit firms of varying sizes, namely, Big Four, medium-sized, and small in South Africa. Considering that this study aims to focus on the effect of social factors on the acceptance on technology, Niehaves et al (2012) study will be useful here where defined social factors were identified by analysing a host of existing acceptance models such as UTAUT. Questions are extracted from the UTAUT model and adapted for the accounting and auditing profession, refer to Figure 5.

Qualtrics was the software used to construct the questionnaire and gather the responses. The questionnaire asks respondents to identify their firm size, role within the firm and age group for the purposes of analysing the question answers against these independent variables. The survey is designed in such a way that respondents who do not meet the criteria are easily filtered out through the initial questions, namely:

- Do you agree to the informed consent?
- Do you work in auditing and accounting in South Africa?

If “No” is selected for either of those questions, the survey is designed to end and thank the respondent for their time.

The questions will be answered using a 5-point Likert scale where respondents will choose from strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4) or strongly disagree (5).

For the purposes of the analysing the data sets, the following numbering system will be used to interpret the results:

1-1.5 – Strongly agree

1.5-2 – Somewhat agree

2.5-3 – Neither agree nor disagree

3.5-4 – Somewhat disagree

4.5-5 – Strongly disagree

The questionnaire can be found in Annexure A.

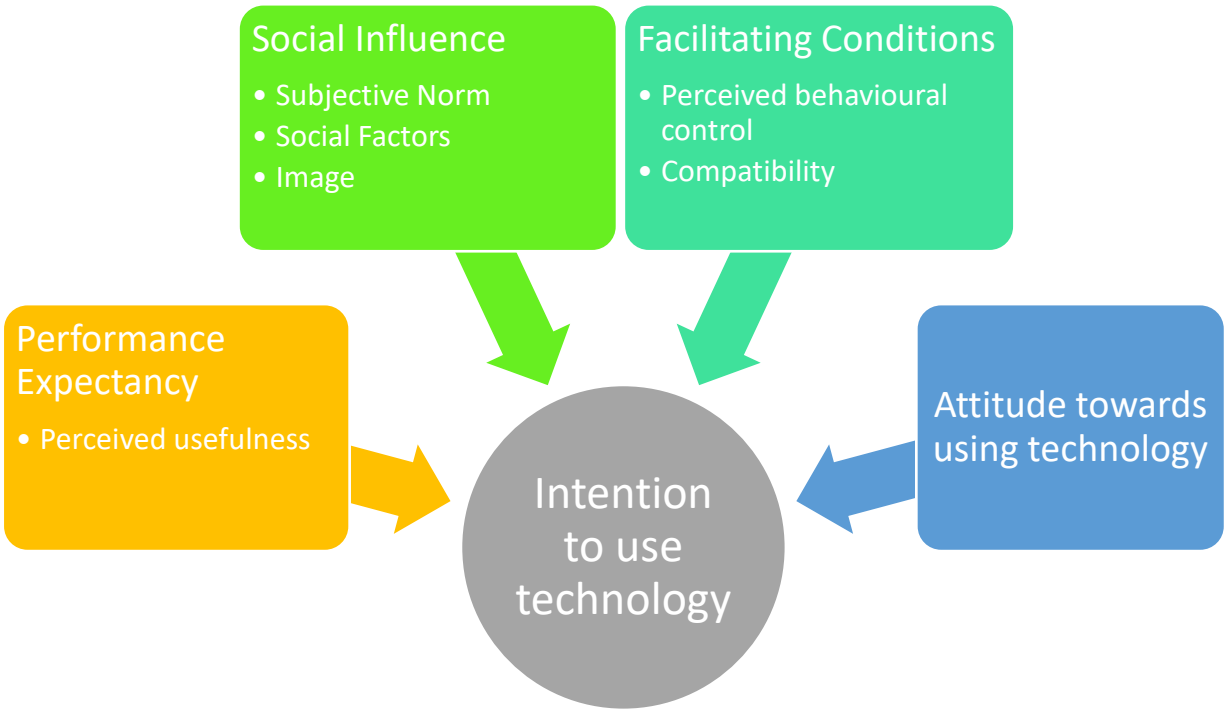

Figure 5: UTAUT adapted for this study (authors own)

3.3 POPULATION AND SAMPLE SELECTION

The survey was distributed to employees of varying roles, such as trainee, manager, and partner, within the audit and assurance division in various sized firms in South Africa. The objective of this study is to identify the extent of technology integration within audit firms, specifically within South Africa and assess whether any information asymmetry exists within the firms with regards to the extent of technological integration. If technology has not been integrated into the work processes, the questionnaire attempts to understand why.

The questionnaire was distributed on social media platforms such as LinkedIn, Instagram, WhatsApp, and Facebook.

3.3.1 Scope Limitations

Unfortunately, it was difficult to garner responses from older age groups such as Gen Y and Millennials, which would have provided valuable insight into the generational gap that exists and whether this could have been disproved.

3.4 DATA COLLECTION

3.4.1. Sample

The survey was published on 15 October 2022 at 9:00 and closed on 13 November 2022 at 17:00 (two weeks). During this period, 168 total responses were collected, with 100 usable responses, giving a response rate of 60%. A usable response must meet the following criteria:

- Informed consent is agreed to; and
- The respondent works in auditing and accounting in South Africa; and
- All questions were answered.

3.4.2. Respondent Profile

Table 2: Respondent Profile

Characteristic	Number	Percentage
Firm Size		
Big Four	60	60%
Medium-sized	31	31%
Small	9	9%
	100	**100%**
Role		
Trainee	55	55%
Manager	39	39%
Partner	6	6%
	100	**100%**
Age Group		
Gen Z (20-25 years old)	36	36%
Millennials (26 – 41 years old)	57	57%
Gen X (42 – 57 years old)	5	5%
Boomer (older than 58)	2	2%
	100	**100%**

Referring to Table 3, most respondents were from Big Four firms, which was to be expected given the magnitude of Big Four networks that exist across South Africa. Trainees were the most frequent role to respond, and Millennials were the biggest contributor in terms of age group.

3.5 DATA ANALYSIS

The data was exported from Qualtrics, and IBM SPSS Statistics was used to analyse the data. Using descriptive statistics, the mean per question of UTAUT was analysed against the supporting factors such as firm size, age, and role to understand the relationships that exist between these factors and the mean answer obtained for the category's questions. Figure 6 provides a summary of the methodology followed in this study.

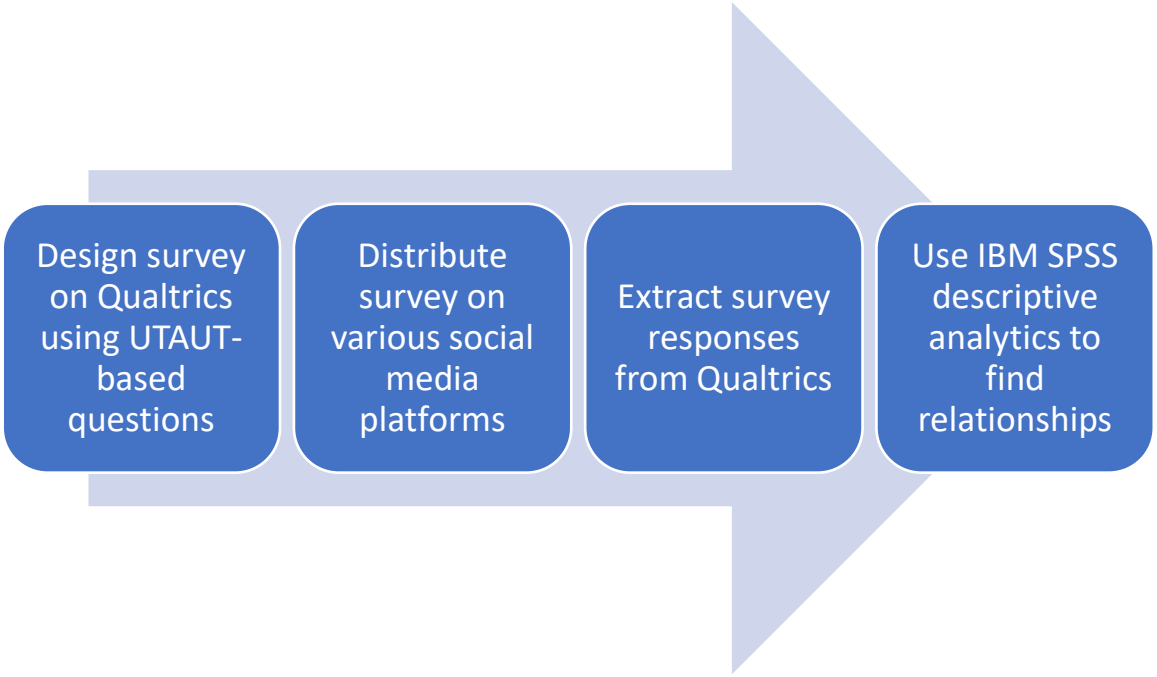

Figure 6: Methodology for data collection and analysis

CHAPTER 4: RESULTS AND DISCUSSION

The results of the research are presented in this chapter. Three categories will be used to interpret the results: the perceived usefulness of the technology concerning firm size and roles within the firm, social influence encompassing compatibility, social factors, and facilitating conditions for technology use. The final category analyzes the results based on attitudes toward using the technology.

Tables 3 and 4 analyze the perceived usefulness of technology from the firm's perspective and various roles within the firm. Tables 5 and 6 analyze compatibility, again considering the firm's perspective and roles within the firm, respectively. Tables 7 and 8 examine the social factors influencing technology use based on firm size and age, while Table 9 analyzes social factors according to the roles within the firm. Tables 10 and 11 explore facilitating conditions supporting technology use from the perspectives of firm size and roles within the firm. Finally, Tables 12, 13, and 14 investigate attitudes toward technology from three different perspectives: firm size, age, and roles within the firm, respectively

4.1 PERCEIVED USEFULNESS

Table 3 and Table 4 analyse the results of the survey for the perceived usefulness of technology by computing the mean according to firm size and then by role within the firm.

Table 3:Perceived Usefulness by Firm Size

	Firm size	Mean
Using this technology will allow me to be more efficient in my job by accomplishing tasks more quickly.	Big 4 (Deloitte, KPMG, EY, PwC)	1.58
	Medium-sized firm	1.42
	Small firm	1.44
I believe that using this technology will increase my productivity.	Big 4 (Deloitte, KPMG, EY, PwC)	1.63
	Medium-sized firm	1.42
	Small firm	1.33
I believe that using this technology will allow me to focus my efforts on more interesting aspects of my job.	Big 4 (Deloitte, KPMG, EY, PwC)	1.52
	Medium-sized firm	1.52
	Small firm	1.78

Source: IBM SPSS Statistics

Table 4: Perceived Usefulness by Role

	Role	Mean
Using this technology will allow me to be more efficient in my job by accomplishing tasks more quickly.	Trainee	1.42
	Manager	1.64
	Partner	1.67
I believe that using this technology will increase my productivity.	Trainee	1.49
	Manager	1.59
	Partner	1.67
I believe that using this technology will allow me to focus my efforts on more interesting aspects of my job.	Trainee	1.45
	Manager	1.64
	Partner	1.67

Source: IBM SPSS Statistics

Table 3 illustrates that small and medium-sized firms have a stronger inclination towards strongly agreeing with technology's efficacy in enhancing work efficiency and increasing productivity, while the Big Four lean more towards somewhat agreeing, suggesting a degree of skepticism. Interestingly, in all three questions, trainees ranked the highest for perceiving the usefulness of technology in their roles. These results illustrate that the use of the technology is beneficial for job performance and will be useful in executing their role within the firm. This provides support for H2 since it appears that respondents have already been observing the benefits of technological integration and this may be reducing the reluctance to use it. These results also align with the study conducted by Zemankova (2019) which identified that human error can be eliminated from routine tasks and the financial statements, being the output produced, can be greatly improved. Dickey et al (2021) and Devarajan (2018) echo this sentiment by finding that the high volume of data involved in audits can be processed at a quicker pace.

Interestingly, Table 4 highlights that trainees scored the highest for perceived usefulness and were closer to strongly agreeing than their more senior counterparts. Considering that trainees are often subject to the more "boring" and tedious aspects of audit work, it would make sense that they expect to see the most benefit of technological integration in their roles, as it will allow them to focus on more interesting and stimulating aspects of the work, such as drawing conclusions from the results

obtained as opposed to the normal ticking-and-bashing used to obtain the results (Gotthardt et al., 2020). The breakdown according to role further corroborates H2 as this perceived usefulness will link to job satisfaction and greater results from technology usage which is in agreement with the findings of Khan (2021) who found that work becomes more meaningful and purpose-driven with the use of technology as employees can focus on areas with a greater degree of professional judgement.

4.2 SOCIAL INFLUENCE

4.2.1. Compatibility

Tables 5 and 6 assess respondents' perceptions of technology's compatibility with the available resources in their workspace

Table 5: Compatibility by Firm Size

	Firm Size	Mean
I believe that I have the resources needed at my firm to use the technology.	Big 4 (Deloitte, KPMG, EY, PwC)	1.80
	Medium-sized firm	1.87
	Small firm	3.00
I believe that using the system is compatible with all aspects of my job.	Big 4 (Deloitte, KPMG, EY, PwC)	2.02
	Medium-sized firm	1.94
	Small firm	1.89

Source: IBM SPSS Statistics

Table 5 suggests that small firms remain neutral on whether they have the necessary resources required to use the technology, which speaks to the challenges related to cost and training that are affecting the small firms' ability to fully integrate their work processes with emerging technologies, especially since most software require licensing fees and technical training, which smaller firms do not have the financial resources for (Bellinga et al., 2022). There are also some non-financial costs to consider such as changing deadlines, IT mistakes, hiring new staff who are competent in IT and adapting to clients' needs as they evolve (Arnold, 2022).

Table 6: Compatibility by Role

	Role	Mean
I believe that I have the resources needed at my firm to use the technology.	Trainee	1.96
	Manager	1.97
	Partner	1.33
	Trainee	2.00

I believe that using the system is compatible with all aspects of my job.	Manager	2.03
	Partner	1.50

Source: IBM SPSS Statistics

Table 6 illustrates that partners strongly agreed with how compatible the technology is with their job, as well as strongly agreeing with having the necessary resources needed to use the technology. This is an interesting result when compared to the perceived usefulness, where trainees had the highest mean for how well the technology aligned with their job. This could potentially be due to the varying job responsibilities at each level within the firm as seen in Figure 7 below. This could be explained by the findings of Khan (2021) where technology is allowing employees to place more focus on professional judgement as opposed to mundane tasks leading to more meaningful and purpose-driven work. Although the above is positive, the diffusion of innovation theory still needs to be carefully considered especially in a developing country such as South African, given that developed countries such as Australia are still in the innovation stage due to the social component (Kend & Nguyen, 2020).

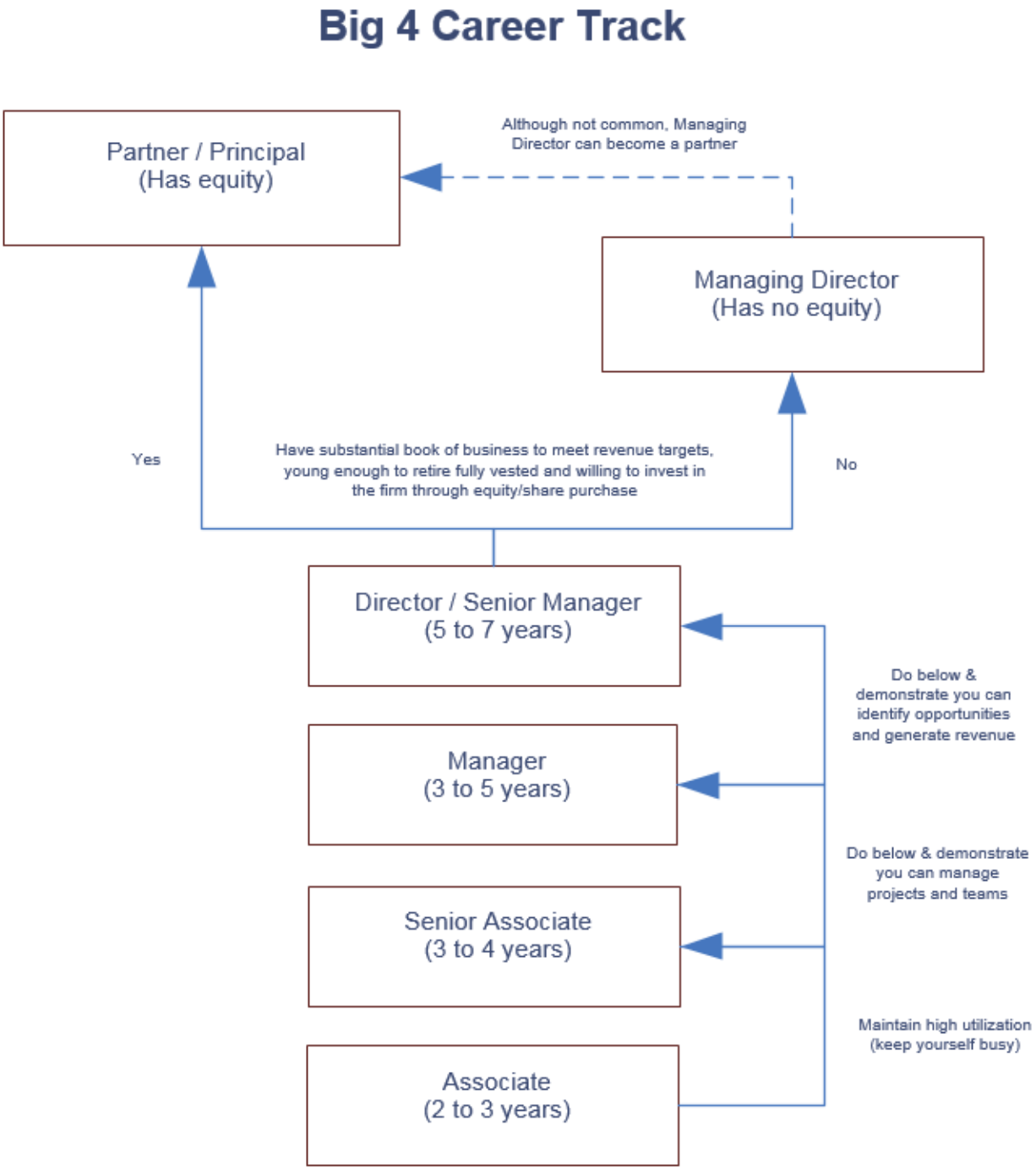

Figure 7: Typical hierarchy in a Big 4 auditing firm (Kyo, 2017)

4.2.2. Social Factors

Table 7 and Table 8 illustrate the social factors that affect technological integration according to firm size and age. Table 9 analyses the social factors from the perspective of the employee's role within the firm.

Table 7: Social Factors by Firm Size

	Firm Size	Mean
Senior management in the audit firm have been helpful in the use of this technology OR I believe that senior management will be helpful in the use of this technology	Big 4 (Deloitte, KPMG, EY, PwC)	2.43
	Medium-sized firm	2.26
	Small firm	2.89
In general, the audit firm has supported the use of the technology OR I believe the audit firm would support the use of the technology.	Big 4 (Deloitte, KPMG, EY, PwC)	1.55
	Medium-sized firm	1.84
	Small firm	2.11
I use the technology because of the number of my colleagues who are using the technology OR I would use the technology if a number of my colleagues were using the technology.	Big 4 (Deloitte, KPMG, EY, PwC)	2.25
	Medium-sized firm	2.32
	Small firm	2.56

Source: IBM SPSS Statistics

Table 8: Social Factors by Age

	Age	Mean
Senior management in the audit firm have been helpful in the use of this technology OR I believe that senior management will be helpful in the use of this technology	20 - 25	2.78
	26 - 41	2.25
	42 - 57	2.00
	58+	2.00
In general, the audit firm has supported the use of the technology OR I believe the audit firm would support the use of the technology.	20 - 25	1.86
	26 - 41	1.56
	42 - 57	2.00
	58+	1.50
I use the technology because of the number of my colleagues who are using the technology OR I would use the technology if a number of my colleagues were using the technology.	20 - 25	2.31
	26 - 41	2.26
	42 - 57	2.20
	58+	3.50

Source: IBM SPSS Statistics

Table 7 demonstrates that small firms are closer to neutral when looking at senior management's helpfulness and support in using the technology. Similarly, Table 8 shows that Gen Z felt more neutral towards senior management's involvement, whereas Boomers and Gen Y felt the firm and its senior management were supportive. Assuming that a large majority of Boomers and Gen Y are in manager and partner positions, there is a degree of bias involved. One bias, in particular, that individuals in more senior decision-making positions are prone to is optimism bias. Optimism bias refers to the tendency for an individual to overestimate the possibility of experiencing a positive outcome and underestimate the possibility of experiencing a negative outcome (Kahneman, 2011). These individuals are unlikely to believe that their decision to integrate technology into their work processes will result in failure and underestimate the chances of negative outcomes.

In the majority of audit firms, most employees will only remain in the firm for three to five years before moving on, which means that senior managers are not highly focused on day-to-day tasks, but rather there is a larger emphasis on client relationships,

acquisition, and retention (Khan, 2021). Therefore, senior management may give less importance to training when it comes to new technologies.

When looking at the resources available to the different firm sizes, typically, big firms have sector-specific departments located within their audit and assurance division, as seen in Figure 8, whereas small and medium-sized firms have partners making decisions for the firm as a whole (Figure 9). This contributes negatively to two aspects. Firstly, the small and medium-sized firms do not have the necessary resources to prioritise any technology-related training and secondly, management in small and medium firms are of a poorer quality since they cannot dedicate their time, knowledge, and experience to technology only, due to the lack of oversight (Financial Services Agency, 2022). This aligns with the findings of Sethibe & Naidoo (2021) who identified a lack of financial resources and practical trainings as two barriers to the adoption of emerging technologies.

Although, there are proven benefits associated with using emerging and innovative technologies in auditing, the cost savings produced through the increased efficiency and effectiveness of audit procedures are not instant nor automatic since specialists need to be engaged, training provided and software and hardware acquired (Feliciano & Quick, 2022). Auditing firms need to consider the legitimacy theory in all decision-making activities surrounding technology integration if they wish to continue with operations, as reiterated by Bengtsson et al (2019). It is high time that small and medium firms performed the necessary cost-benefit analysis of integrating technology into their work processes by allocating the required resources to training and oversight related to the use of technology.

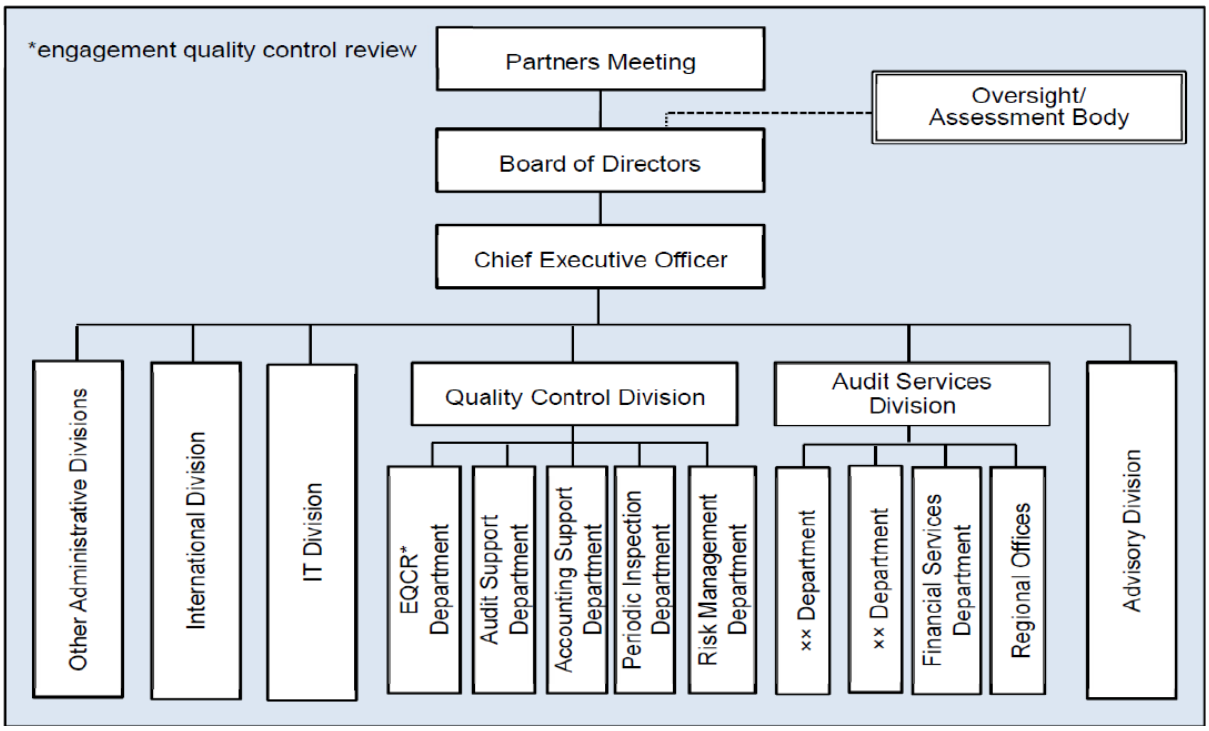

Figure 8: Organisational structure of a large audit firm

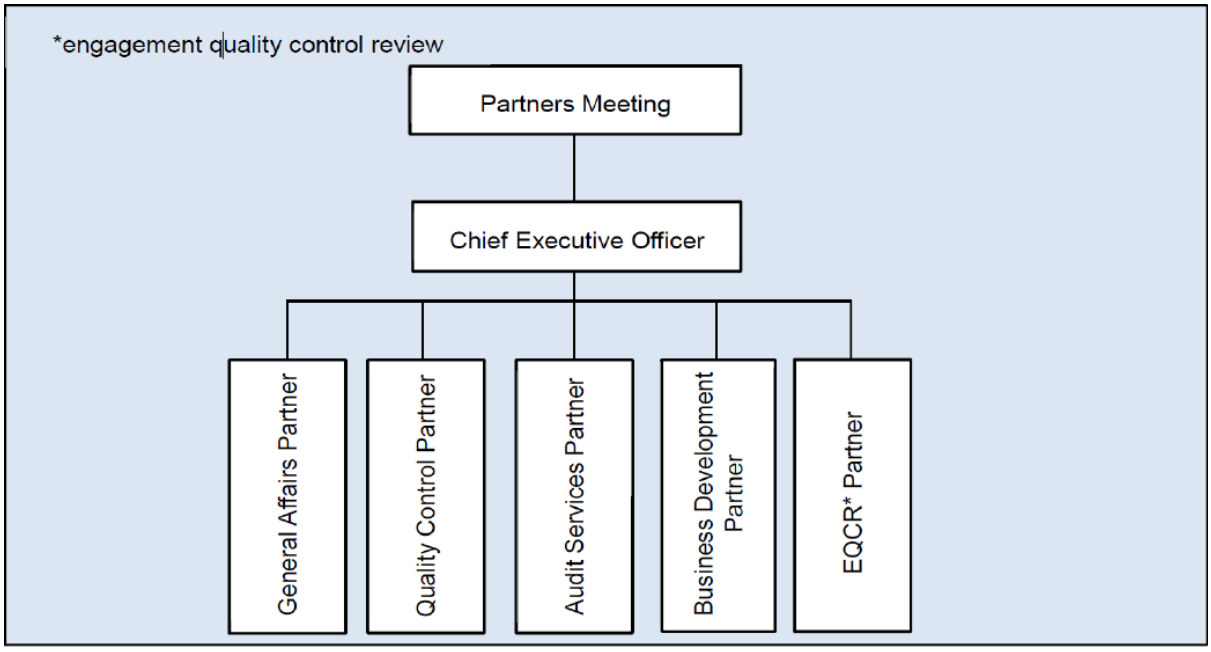

Figure 9: Organisational structure of small and medium-sized audit firms

The use of emerging technologies is still relatively new and unexplored in the realm of auditing, since COVID-19 only ended a short while ago (Sharma et al., 2022), therefore, it is going to take some time for audit firms to adapt to seeing themselves working with the technology and preparing the firms adequately for that purpose.

Table 9: Social Factors by Role

	Role	Mean
Senior management in the audit firm have been helpful in the use of this technology OR I believe that senior management will be helpful in the use of this technology	Trainee	2.73
	Manager	2.10
	Partner	1.67
In general, the audit firm has supported the use of the technology OR I believe the audit firm would support the use of the technology.	Trainee	1.82
	Manager	1.54
	Partner	1.50
I use the technology because of the number of my colleagues who are using the technology OR I would use the technology if a number of my colleagues were using the technology.	Trainee	2.29
	Manager	2.38
	Partner	1.83

Source: IBM SPSS Statistics

Table 9 highlights how trainees show more neutrality when it comes to senior management's helpfulness, with neutrality turning to more agreement as the role within the firm becomes more senior. Partners appear to use the technology because their colleagues are using it which hints at status quo bias. Trainees and managers are more neutral when it comes to social conformance.

Similarly, Table 10 illustrates that firms of all sizes felt neutral about senior management's support in the process. Small firms remained neutral on whether the audit firm as a whole would support the integration, whereas Big Four and medium-sized firms felt that the firm was supportive, which again speaks to the cost affordability and economies of scale involved in integrating emerging technologies into work processes as the size of the firm increases.

Essentially, the humans involved in the digital transformation process are the ones who are going to drive the success of technological integration; therefore, support from

senior management and the firm as a whole remains the most important factor in any sort of digitization (Almeida et al., 2020).

Social desirability is one reason why respondents may elect a neutral response, as they do not want to give an opinion that does not fit the status quo or goes against the grain (Krosnick et al., 2002), which aligns with the status quo bias. In this particular study, respondents were asked to voice their opinions on senior management and their employer (the firm as a whole), which means they are unlikely to give their true opinion.

Although it cannot be deciphered from a neutral opinion whether respondents were leaning more towards agreeing or disagreeing, lack of management support remains a barrier to technological integration as identified by Sethibe & Naidoo (2021).

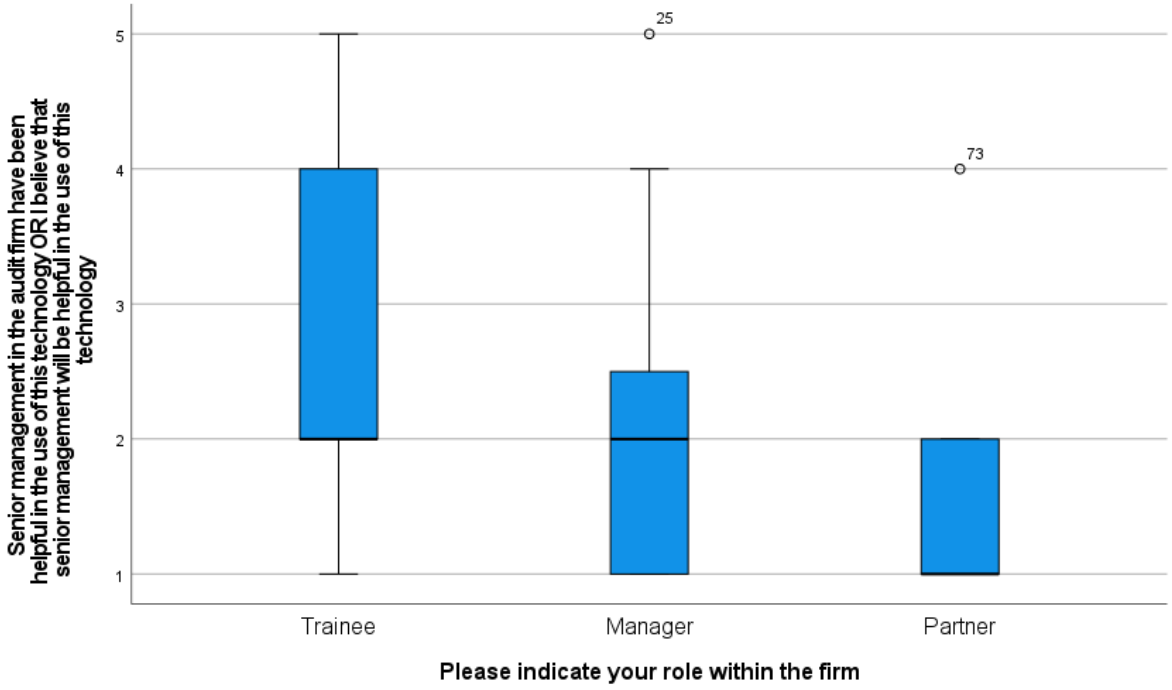

Figure 10: Stem and Leaf Diagram of feelings towards senior management (Source: IBM SPSS Statistics)

Taking a closer look at the breakdown of the responses in Figure 10, trainees felt the least supported by senior management, whereas partners felt the most supported. Very little literature exists on why trainees might feel more neglected than their more superior colleagues, however, de Vries et al (2018) found that most junior trainees just follow the senior as opposed to asking questions for clarification or further guidance

indicating a reluctance to speak out which could carry over into technological integration and ultimately lead to inefficiencies.

4.2.3 Facilitating Conditions

Table 10 and Table 11 analyse the facilitating conditions that enable the use of technology within the firm according to firm size and role.

Table 10: Facilitating Conditions by Firm Size

	Firm Size	Mean
Guidance and training was made available to me for the use of the technology OR I believe that guidance and training would be made available to me to be able to use the technology.	Big 4 (Deloitte, KPMG, EY, PwC)	1.68
	Medium-sized firm	1.77
	Small firm	2.00
There is/I believe there would be a specific person or department that is available to assist me with any difficulties surrounding the technology.	Big 4 (Deloitte, KPMG, EY, PwC)	1.83
	Medium-sized firm	1.71
	Small firm	2.22

Source: IBM SPSS Statistics

Small firms are more neutral on whether there is a specific person or department to assist with technological difficulties, as shown in Table 10. This aspect ties in with the discussion under social factors, specifically Table 7, where small and medium sized firms are limited with regards to their organisational structure and therefore, lack the people and finances to dedicate resources to technology specifically (Financial Services Agency, 2022).

Table 11: Facilitating Conditions by Role

	Role	Mean
Guidance and training was made available to me for the use of the technology OR I believe that guidance and training would be made available to me to be able to use the technology.	Trainee	1.84
	Manager	1.67
	Partner	1.33
There is/I believe there would be a specific person or department that is available to assist me with any difficulties surrounding the technology.	Trainee	1.95
	Manager	1.72
	Partner	1.50

Source: IBM SPSS Statistics

In India, some of the biggest barriers to integrating emerging technologies into the auditing process of small and medium-sized are IT infrastructure to support AI implementation and training of the workforce to support the efficient use of emerging technologies (Sinha & Segupta, 2020). This is echoed by the findings of Sethibe & Naidoo (2021) which identified lack of financial resources as a critical barrier. In Table 10, smaller firms are closer towards a neutral rating when it comes to guidance and training being made available, as well as having a specific person or department to report to regarding technology matters. This is in favour of what has been found by Sinha & Segupta (2020), since smaller firms lack the necessary resources to properly integrate emerging technologies into workflows.

Table 11 provides evidence that partners are leaning closer towards strongly agreeing, whereas trainees and managers are leaning more towards somewhat agreeing, indicating that there remains some room for improvement when it comes to providing guidance and training. This echoes the findings of Harvard Business Review Analytic Services (2019) where the study found that two thirds of participants said the most important success factor for technological integration is having an organisational culture that supports this data-based method of decision-making, where guidance and training are key aspects of this culture.

4.3 ATTITUDE TOWARD USING TECHNOLOGY

Table 12, Table 13 and Table 14 demonstrate the respondent's attitude towards the use of technology according to firm size, age and role within the firm.

4.3.1 Attitude towards behaviour

Table 12: Attitude by Firm Size

	Firm Size	Mean
I feel/would feel apprehensive about using the technology because I am not sure of how it fits into my job description	Big 4 (Deloitte, KPMG, EY, PwC)	3.90
	Medium-sized firm	3.81
	Small firm	4.22
I am reluctant to use the technology because I haven't seen examples of technology implementation being a success	Big 4 (Deloitte, KPMG, EY, PwC)	4.03
	Medium-sized firm	4.10
	Small firm	3.89
I believe that technology will eventually replace me in my job	Big 4 (Deloitte, KPMG, EY, PwC)	3.80
	Medium-sized firm	3.55
	Small firm	3.89

Source: IBM SPSS Statistics

Small firms are the least apprehensive about using technology, as seen in Table 12. Further, all size firms have little fear of being replaced by the technology, which goes against H3, and supports the idea that technology can be used to improve socio-economic challenges in South Africa, such as unemployment. This can be emphasised by the findings of Zhai et al (2022) which found that firms with digital transformation perform better as they offer additional value creation, effective communication along the hierarchy which results in cost-savings and a competitive advantage through innovation. The results of this study dispute the findings of Schmidt et al (2020) which found that because of the status quo bias, employees in audit firms are resistant to even use the most basic audit technology such as incorporating analytics in Excel.

In Delphi, Germany, a study examined the impact of digitization on auditors (Tiberius & Hirth, 2019). Their results revealed that 97% of respondent auditors rejected the idea of all manual audit processes being completely replaced by automated

processes. This is because humans prefer and trust the work done by other humans. This is relevant in all audit firms, regardless of size as humans will tend to place more trust in the judgement of other humans, rather than machines. This is most likely why a large majority of the firms in this study had little fear of being replaced by machines. This speaks to the findings of Mendeling (2018) which found that the two biggest challenges in the integration of technology were acceptance and social integration. Therefore, during integration firms will need to be mindful of not losing the "human" component.

Table 13: Attitude by Age

	Age	Mean
I feel/would feel apprehensive about using the technology because I am not sure of how it fits into my job description	20 - 25	4.33
	26 - 41	3.58
	42 - 57	4.20
	58+	4.50
I am reluctant to use the technology because I haven't seen examples of technology implementation being a success	20 - 25	4.31
	26 - 41	3.93
	42 - 57	3.60
	58+	3.50
I believe that technology will eventually replace me in my job	20 - 25	3.92
	26 - 41	3.54
	42 - 57	4.60
	58+	3.50

Source: IBM SPSS Statistics

In Table 13, it can be seen that Gen X have the least fear of being replaced by technology, whereas Gen Z are the least reluctant to use technology. As a general assumption, Boomers tend to focus on the past, whereas Millennials are worried about the future. Gen X lives in between these two generations and are more focused on the present and how they can change the now (Prentice, 2019). This explains why Gen X are the least worried about technology taking over, since they are more focused on what they can achieve in the here and now.

Gen Z's have grown up in a world surrounded by technology (Mihelich, 2013). This explains why they are the least reluctant to use the technology. Gen Z also value flexibility and personal freedom as part of their work ethics, which the use of

technology allows (Bascha, 2011), as part of a hybrid working environment which allows a mixture of office-based and home-based working (Chheda et al, 2021). Interestingly, Boomers are the least apprehensive about using the technology.

Moneypenny, an entity providing live chat, phone answering and customer solutions, surveyed 1,000 people across various businesses in the United States and found that 67% of Boomers were “very confident” with using technology in the workplace, compared to only 57% of Gen Z being very confident (Sampson, 2022). Boomers have developed a resilience when it comes to industrial revolutions and moving through the change from manual labour to factory machines, means that moving from manual labour to technology, is not that different. The U.S. Bureau of Labor Statistics echoed this finding by releasing statistics that Boomers are the most adaptable to new technology (Galles, 2019).

Table 14: Attitude by Role

	Role	Mean
I feel/would feel apprehensive about using the technology because I am not sure of how it fits into my job description	Trainee	3.84
	Manager	3.87
	Partner	4.67
I am reluctant to use the technology because I haven't seen examples of technology implementation being a success	Trainee	4.22
	Manager	3.79
	Partner	4.00
I believe that technology will eventually replace me in my job	Trainee	3.51
	Manager	3.87
	Partner	4.83

Source: IBM SPSS Statistics

According to the results presented in Table 14, partners are the least apprehensive about using the technology. Trainees are the least reluctant to use it, whereas managers appear to be more reluctant to use it. Partners have the least fear surrounding being replaced by technology, whereas trainees seem to fear it to a higher degree. Clearly, the results of the partners are echoing the results of Catacutan’s (2019) study which shows that audit automation tools are thought to deliver higher

quality audits and evolve to keep up with changing client business environments. This translates into a higher bottom line for partners who partake in profit-sharing.

Overall, the attitude towards using technology appears to be more positive than expected in H3. When looking at firm size (Table 12), role (Table 14) or age (Table 13), all respondents are displaying a productive attitude towards technology implementation. This rejects the findings of Asoba & Mefi (2022) that Milennials are open to using technology, whereas Gen X does not appear to trust technology to the same extent since all age groups are displaying a positive attitude towards the use of technology. Some hesitation naturally still exists but it becomes less and less prominent as the results of using the technology are observed. These results provide further support for H2 as respondents were able to see how the technology fits into their job and they've observed the implementation of technology being a success.

Venkatesh (2003) found that anxiety was not a direct determinant of an intention to use technology, however, it provides an indirect link between the user's intention to use the technology and other direct determinants such as performance expectancy, facilitating conditions and social influence. When assessing managers' intentions to invest in intangible assets such as technology in the emerging market of Colombia, Lerma (2022) found that technology anxiety offsets management's intention to use a technology and, therefore, a negative correlation exists. Similarly, in South African audit firms, the lower anxiety is contributing to a higher intention to use the technology.

Table 14 shows that audit partners appear to show the least anxiety towards using technology as they felt no apprehension towards using the technology and they felt no fear towards being replaced by technology. Younger employees are more inclined to use new technologies to get better benefits and higher salaries, whereas older employees are likely to value social influences and effort expectancy more. Finally, employees who have more work experience and have been in the company for longer are likely to find new avenues for added support throughout the firm leading to a greater intention to use the technology (Venkatesh et al., 2003).

Audit partners are likely to be the more experienced personnel. Their anxiety towards using the technology appeared to be lower, which is in line with what Venkatesh (2003) predicted, regarding the role that experience plays in the intention to use technology. More recently, Ferri et al (2020) found that those higher up in the hierarchy make less

use of new technologies. While the extent of using technology was not observed, trainees are typically doing the groundwork, while partners are overseeing the quality of the audit. Considering the type of work being performed by trainees, it is reasonable that they are experiencing higher job satisfaction as found in the study performed by Nguyen & Malik (2022). Their findings attributed this job satisfaction to a reduced workload, additional supporting and allowing employees to take on more critical thinking tasks while leaving the mundane tasks up to automation.

Surprisingly, all levels of employees within the firm were able to see the benefits of the technology's use in their work and believed they would be more efficient, their productivity would increase, and they'd be able to focus their efforts on more interesting aspects of their job.

4.4 RESULTS SUMMARY

When looking at compatibility under facilitating conditions, which includes the resources needed to use the technology, it appears that the general consensus among the categories described in Table 10 (firm size) and Table 11 (role) is to agree that their job is compatible with the use of technology and the firm supports the use of this. However, when looking at the social factors in Table 7 and 8, the results have a wider variation and there is a lot more leaning towards neutral as respondents did not feel supported by senior management in the use of technology. In perceived behavioural control under facilitating conditions in Table 11, which looks at guidance and training and the existence of a technical department, partners tend to strongly agree, whereas managers and trainees more somewhat agree. This indicates that the technical aspects of technology integration are not the issue, whereas a consensus is lacking when it comes to social factors such as senior management's support in using the technology. Although, not entirely black and white, the distribution of the results between the two categories indicates that H1 is supported and that social factors are the more challenging arena in technology integration. This aligns with Mendeling's findings where acceptance and social integration remain a key challenge in integrating emerging technologies in the workflow.

In terms of age groups, Kim (2016) found that older generations appear to have a greater resistance to technology. Interestingly, the older generation as seen in Table 13, from 42 onwards, appear to be the least reluctant and apprehensive towards using

new technology. Genesys, a research company conducting research in Australia and New Zealand, found that older generations appear to be less threatened by AI and are more open to it than their younger counterparts, which essentially debunks the myth that older people are more technologically averse (Hilton, 2019). Similar results are seen in Table 13, where Gen Z and Boomers are more open to integrating technology into their workflows.

In terms of firm size in Table 12, Big Four and medium-sized entities are able to see the potential success of technological implementation in their work processes, which may be a result of higher AI usage in firms of these size due to economies of scale and cost affordability, when compared to smaller firms (Eurostat, 2021). This research emphasises the findings of Siderska (2020) where many entities are recognising the contribution that technology integration can make to employee morale, efficiency and long-term growth, despite the constraints that are still present.

When looking at the results of this research, it ties in with the Diffusion of Innovation Theory (Rogers, 2003), in that technology adoption will increase as users begin to see the results of using it. So far, constraints such as a lack of use cases and risk aversion mean that audit firms are unwilling to venture too far from what is tried and tested, therefore, this lines up with Kend & Nguyen's (2020) findings that technology will remain in the innovation stage as a result of societal factors.

Many studies have been done on the use of technology within auditing firms, the benefits and challenges, the downfalls and so forth. However, very few speak to the social barriers to implementation in order to successfully integrate the technology within the firm and with its employees. Overall, this is a relatively unexplored area within the realm of auditing and accounting, therefore, this study provides a contribution towards assisting auditing firms in overcoming the social barriers in order to move forward with successful technological integration into their work practices.

Table 15: Acceptance or rejection of hypotheses

Hypothesis	Reasons for Acceptance or Rejection
H1: Considering that the successfulness of automation is driven by the people who work with it, the societal aspect is expected to be the biggest contributor to holding South Africa back.	The UTAUT factors that were selected for use in this study indicate that H1 is supported since social factors remain the challenging arena in technological integration in audit firms, rather than the technical factors. Conclusion: Accepted
H2: Once audit firms see the success and the role that automation plays in other audit firms, they will start to see the necessity of automation. However, until tangible results have been witnessed, they will remain reluctant.	Table 3 which illustrates the perceived usefulness of technology according to firm size supports H2 as the results indicate that respondents have already been observing the benefits of technological integration which is reducing the reluctance towards using it. Table 4, which breaks down the perceived usefulness according to role within the firm further supports H2 as this will link to job satisfaction and great results from using technology. Finally, Table 14, which looks at the attitude towards technology based on the role within the firm, provides additional support for H2 as respondents agreed that they were able to see how technology fits into their job and that they've observed the implementation of technology being a success.

	Conclusion: Accepted.
H3: Audit firms and employees believe that automation using AI and emerging technologies will contribute to the growing unemployment rate as employees become replaced by machines.	Table 12, 13 and 14 which analysed the attitude towards technology using firm size, age and role respectively demonstrated that little fear existed of being replaced by technology. Conclusion: Rejected

CHAPTER 5: CONCLUSION & RECOMMENDATIONS

5.1 RESEARCH QUESTION ONE

The findings of this study appear to align with the critical barriers to adoption identified by Sethibe & Naidoo (2021), specifically lack of support from management and lack of financial resources. This is demonstrated by small firms clearly being able to identify the usefulness and benefits of integrating emerging technologies into their work processes but feeling the lack of support more severely due to higher costs and fewer resources. In line with Siderska (2020), the contribution to employee morale and efficiency is clearly being seen as most respondents believed in the technology's contribution to productivity, efficiency and focus on more interesting aspects of their jobs.

The wheels driving the audit firm, being the people who work in it, need to feel supported in order to successfully change the work processes. Aligning individual values with firm values and finding out what employees, at each level of the hierarchy, need in order to successfully integrate their job with this technology, is going to be the key to successful and harmonious technological integration. Partners are strong advocators for the use of technology in the audit process, where there is strong belief in the resources and job compatibility, which is comforting as the tone from the top is essentially going to drive the overall attitude towards technology integration.

5.2 RESEARCH QUESTION TWO

It is clear that regardless of the role within the firm or the size of the audit firm, respondents are seeing the benefits of integrating emerging technologies into their work processes, which could be attributed to a host of reasons, including, involvement in work that requires more critical thinking, focusing on value creation within the firm and unlocking innovation through eliminating the repetitive processes that are easily automated (Gotthardt, et al., 2020).

Whilst it is refreshing to see how the attitude towards technological integration is changing, there exist some areas which have plenty of room for improvement. The area with the most room for improvement appeared to feature in senior management's role in technology integration. This is greatly dependent on firm size, since bigger firms have more resources to invest in technology, whereas small firms do not. Another area of improvement lies within the guidance and training that exists within firms of all sizes.

This could help to eliminate the anxiety surrounding the use of the training and should be prioritized more to see those cost savings come through. In the end, much remains to be seen with how well the uptake of emerging technologies will position South African audit firms in the global market.

5.3 RESEARCH QUESTION THREE

The fear around being replaced by technology is diminishing as the extent of technological integration increases, thereby increasing the understanding of how the technology fits alongside humans rather than replacing them. It is being seen that the technology does not threaten the existence of auditors and audit trainees, but merely changes how they deliver their service. There is a greater understanding that humans and machines can work together harmoniously in a hybrid environment (Siderska, 2020). Rather than switching to an entirely digital operating model, as described by Iansiti & Lakhani (2020), audit firms are making use of a hybrid environment. It would appear that COVID-19 is to thank for overcoming the resistance to working with technology in audit firms since auditors now appear to display a strong unity for the use of emerging technologies in the auditing process as a way to increase audit quality (Sharma et al., 2022).

5.4 RESEARCH CONTRIBUTION

This research contributes to the current body of knowledge surrounding technology integration into auditing firms by investigating the effect on small firms and their attitudes towards the technology. The biggest barrier towards their drive to technological integration is cost and resources, which provides an area to be further explored. Further, this research adds to the understanding of societal challenges that are holding South African audit firms back from embracing emerging technology integration into their business processes.

The World Economic Forum and Digital Cooperation Organization have recently launched the Digital FDI Initiative, which aims to identify the largest barriers surrounding the digital economy and to implement policies that will make investment arenas most digital-friendly. Pakistan and Rwanda are the first countries selected to explore this new initiative, which will allow emerging markets to get onboard and not get left behind in the digital transformation race (Word Economic Forum, 2023). This provides an incredible opportunity for South Africa to get involved with something that

will boost foreign direct investment and stimulate fintech and create entrepreneurs, which will play a crucial role in addressing the unemployment crisis. Digital transformation is no longer an option, but a necessity for creating meaningful progress in our socio-economic challenges.

5.5 AREAS FOR FUTURE RESEARCH

In November 2022, OpenAI released Chat GPT. This advanced language model chat bot uses large volumes of data and computing techniques to put words together in a way that makes sense (Sundar, 2023). In essence, it is a search engine and a writing tool put together, which has a remarkable ability to understand questions, source information and provide an unbiased response (Seymour, 2023).

ChatGPT has taken the internet by storm since its release only two short months ago. It is being used for building trading models, answering any and all questions with extreme accuracy and, more relevant to this study, it has been used to design audit procedures. In a LinkedIn video, Christiaan Coetzee, a Chartered Accountant, is seen using EndType, ChatGPT and Google Sheets to design procedures for testing fixed assets in a number of a seconds. Tom McLeod, a Chief Risk Officer, wrote an article about how internal audit is going to be affected by this revolutionary tool.

McLeod (2022) identified that audit reports might be a thing of the past, more organisational policies and assurance becoming real-time. This will have an impact on internal and external auditing alike and it will be interesting to see how ChatGPT changes the world of auditing, and more specifically, the scope of auditing work in the near future as it is evolving at a rapid rate. This could be a relevant emerging technology to research in the sphere of digital transformation.

A huge area for research would include looking at the new ethical responsibilities that arise when using AI, as this is quite an unchartered space. Auditors are expected to maintain professional scepticism and professional judgement but how does the use of AI in the workflow affect this and how could policies be defined to address this?

As mentioned by a few studies, a change of auditor skillset is inevitable when it comes to integrating emerging technologies into the workflow, therefore, studying the effect of automation on university curricula could be a relevant research area to identify how

the next auditors can be best prepared to perform their role within the Fourth Industrial Revolution.

Finally, considering the diversity of a country like South Africa, factors such as race, gender and technological literacy could be useful parameters to better understand the barriers to technological implementation. Technological literacy, in particular, is a key parameter as most universities in South Africa have yet to incorporate technological aspects into their learning modules so possessing a degree does not imply technological literacy.

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ANNEXURE A: QUESTIONNAIRE

Consent

Dear participant

What the study is about

You are invited to participate in a Masters research study about the extent of AI and emerging technologies used in South African auditing firms and what barriers are contributing most to this technology resistance. The goal of this research study is to obtain an understanding of which barrier (social or technological) is contributing the most to this resistance to integrating technology into work processes as a way to establish how to overcome it so that work can become more meaningful and efficient and pave the way for more jobs to address South Africa's socio-economic issues.

My name is Jayde van Staden and I am currently pursuing a Masters degree in Financial Reporting, Analysis and Governance at the University of Cape Town**. The aim of this research is to understand the resistance to the use of Artificial Intelligence (AI) and other emerging technologies in auditing firms.** The questions in this survey revolve around anxiety towards the technology, facilitating conditions that enable the successful usage of the technology and corporate culture.

Approval and length

This research has been approved by the Commerce Faculty Ethics in Research Committee. Your participation in this research is entirely voluntary and you may choose to withdraw from the research at any time. **This questionnaire consists of 23 multiple choice questions and will take approximately 15 minutes to complete.**

Confidentiality

You will not be requested to supply any identifiable information, therefore ensuring anonymity of your responses. Information collected pertains to your role, size of your firm and age, all of which make it difficult to specifically identify you. All personal information, such as age, that is collected and published will be anonymised. Information such as your IP address or location will NOT be stored.

Participation criteria

The following criteria must be met to participate in this study:

- Work in audit and assurance in South Africa (no international or network firms will be considered)
- If your firm does not currently use any AI or other technology, please continue to fill out the questionnaire.

Should you have any further questions or concerns, do not hesitate to reach out to me.

Jayde van Staden (jayde.vanstaden@uct.ac.za)

Agreement to provide consent

Please click "Yes, I agree," if you have read the informed consent information above and agree to participate in this survey. Please click, "No, I do not agree," if you do not wish to participate in this study.

General Questions

1. Do you work in audit and assurance in South Africa?
2. Does your firm use any form of technology, such as chatbots, automated sample selection, data analytics in risk assessment, automated journals testing, continuous auditing, data collection et cetera, in the audit process?

   Please note: The above list of examples is NOT exhaustive.
3. Please select the size of your firm (Big 4, medium-sized, small)
4. Please select the age group that you belong to (20 – 25, 26 – 41, 42 – 57, 58+)
5. Please indicate your role within the firm (trainee, manager, partner)
6. Has your firm indicated that they wish to automate more audit functions and processes?

Performance Expectancy

Perceived Usefulness

7. Using this technology will allow me to be more efficient in my job by accomplishing tasks more quickly
8. I believe that using this technology will increase my productivity

9. I believe that using this technology will allow me to focus my efforts on more interesting aspects of my job

Social Influence

Subjective Norm

10. People who influence my behaviour at work, such as my colleagues and managers, believe that I should use the technology.

Social Factors

11. Senior management in the audit firm have been helpful in the use of this technology OR I believe that senior management will be helpful in the use of this technology
12. In general, the audit firm has supported the use of the technology OR I believe the audit firm would support the use of the technology.
13. I use the technology because of the number of my colleagues who are using the technology OR I would use the technology if a number of my colleagues were using the technology.

Image

14. I believe that people in the firm who use the technology are ranked higher.
15. I believe that using the technology will improve my social status within my firm

Facilitating Conditions

Perceived behavioural control

16. I believe that I have control over using the technology.

Compatibility

17. I believe that using the system is compatible with all aspects of my job.
18. I believe that I have the resources needed at my firm to use the technology.
19. Guidance and training was made available to me for the use of the technology OR I believe that guidance and training would be made available to me to be able to use the technology.
20. There is/I believe there would be a specific person or department that is available to assist me with any difficulties surrounding the technology.

Attitude towards using technology

Attitude toward behaviour

21. I feel/would feel apprehensive about using the technology because I am not sure of how it fits into my job description
22. I believe that technology will eventually replace me in my job
23. I am reluctant to use the technology because I haven't seen examples of technology implementation being a success