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IT professional's perceptions of Robotics, Artificial Intelligence and Automation (RAIA) as a source of job satisfaction and job insecurity in the IT sector

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IT Professional's Perceptions of Robotics, Artificial Intelligence and Automation (RAIA) as a source of Job Satisfaction and Job Insecurity in the IT sector

Masters Research Report

By

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A research report submitted in partial fulfilment of the requirements for the Degree of Master of Commerce in the Faculty of Commerce, Law and Management at the University of the Witwatersrand

ABSTRACT

In the twenty-first century, robotics, artificial intelligence, Internet of Things, and automation (RAIA) have touched every element of human life. RAIA technology provides a wide range of possibilities, which companies and people can take advantage of. Every opportunity, however, comes with a risk. The issues that come with technology have been noted within the RAIA sphere as having the potential to disrupt the labour market in ways we do not yet comprehend. The expanding use of temporary employment, as well as the increasing rate of organizational change and expectations for work-life flexibility, are seen as indicators of a more insecure workforce. Professionals tend to be more concerned about the rise of automated and self-sufficient robots, with some fearing that technological advancements will eliminate their jobs.

There is a substantial amount of work on the implications of RAIA on the labour market, specifically on the influence of RAIA technology on technical unemployment and how such technology may contribute to job dissatisfaction. However, there is a scarcity of research on the perceptions of RAIA technologies and the effects thereof on job insecurity and job satisfaction within the South African IT industry. As a result, the objective of this research was to gain a better understanding of IT professionals' perspectives on RAIA technology and the mediating role that job insecurity plays in job satisfaction.

The research design was deductive and quantitative in nature. Data was collected using a survey methodology and employed a structured questionnaire instrument. The sample consisted of 290 participants from the South African IT sector. Correlation analysis was performed, and measures were tested for reliability and validity prior to testing the hypothesised model. The model was tested using regression techniques and the results showed that there was a statistically significantly positive association between the perception of RAIA (PR) and job insecurity (JI). Furthermore, it was proven that there was a statistically significant negative total effect for perceived RAIA and job satisfaction. The research proved that the effect of the perceptions of RAIA technology on Job Satisfaction is indeed mediated by Job Insecurity.

This research provides an alternative context to the existing research as it moves away from looking at the effects of technology but rather focuses on the perceptions of

technology. Not only does the research investigate perception but it provides a lens into the views of IT professionals. The practical implications of the study may influence both employees and employers to respectively understand how RAIA technologies affect existing labour market conditions.

Keywords: Job Insecurity, Technology, RAIA, Job Satisfaction, Robotics, Automation, Artificial Intelligence

DECLARATION

I, Palesa Precious Mashego (Student number: 2324639) am a student registered for master's in commerce information systems by coursework in the year 2021. I hereby declare that the research paper submitted for the Master of Commerce degree was written entirely by me and that it has never been submitted, in whole or in part, for any other degree. The work offered is all my own, unless otherwise stated by reference or acknowledgment.

I understand that plagiarism (the use of another's work without their permission and/or without attributing the original source) is unethical.

When citing the opinions and ideas of others, I observed the proper protocols.

I understand that if it is suspected that this is not my own unassisted work or that I have omitted to recognize the source of the ideas or words in my writing, the University of the Witwatersrand may take disciplinary action against me.

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Palesa Precious Mashego **Date**

Master's In commerce

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CHAPTER ONE

1. BACKGROUND AND OVERVIEW OF THE STUDY

1.1 Introduction

The world is currently in the Fourth Industrial Revolution (Schwab, 2015) which is characterized by the use of technological developments such as Robotics, Artificial Intelligence (AI), the Internet of Things (IoT), Automation, and other technologies (hereafter referred to as RAIA technologies). These technologies are used to boost productivity, efficiency, and competitiveness, as well as to streamline operations and reduce costs (Mfanafuthi et al., 2019). Some of the examples of such technologies include driverless vehicles, self-checkout systems and chatbots.

Automation first appeared in the early nineteenth century, when the textile and manufacturing industries began using assembly lines to reduce the time it took to produce goods (Mfanafuthi et al., 2019).Since then, RAIA technologies have been used to produce goods and services in a variety of economic sector (Min, 2010). As an example:

- In the supply chain and logistics industries, artificial intelligence is used as a forecasting tool (Min, 2010)
- The agricultural sector has seen an increase in the use of automated milking systems (Driessen & Heutinck, 2015)
- Service robots expedite booking processes in the hospitality and tourism industries (Ivanov & Webster, 2017)

All these examples demonstrate how RAIA technologies have infiltrated our lives and altered the way businesses operate. Although RAIA technologies can replace certain jobs, they also provide new opportunities. First, they can create new jobs because new technology requires people to build and maintain it. RAIA technologies boost productivity by delegating mundane tasks and redirecting employees to meaningful and fulfilling tasks (Brougham & Haar, 2018) where this increased productivity leads to price reductions, and increased product demand which results in a greater demand

for employees. Taking this into account, a net positive employment effect is possible (Appelbaum & Schettkat, 1995). As a result, some employees do not necessarily perceive their jobs as being threatened by technological advancements, and they do not anticipate that technology will be able to replace them (Dengler & Gundert, 2021).

In contrast, a recent population study in the United States found that many people are concerned that RAIA technologies will result in job losses (European Commission, 2017). In support of the European Commission's findings, Etzioni and Etzioni (2017) discovered that some people believe that such technologies are here to replace traditional jobs and see them as a threat to their job mobility. Job mobility is the ability for an individual to move from one job to another or to move from one position to another (Keim et al., 2014). However, because the world of technology is rapidly evolving, the skills held by existing IT professionals may become obsolete, thus affecting their job mobility. Consequently, previous research has shown a link between job mobility and age, where it was found that older employees showed lower levels of perceived job mobility and therefore showed greater dependence on their jobs thus leading to an increased inclination to feeling uncomfortable about their employment (Keim et al., 2014). These findings show that age and job mobility influence ones feeling of job security.

The disparity in findings demonstrates that empirical research on the subject has thus far produced contentious results. Previous research indicates an ambiguous relationship between technological advancements and job insecurity (Brougham & Haar, 2018; Dengler & Gundert, 2021)

Job insecurity, according to Dengler and Gundert (2021) is a prominent topic in sociology that has received considerable attention for its individual and societal consequences. According to the literature, there are two types of job insecurity: quantitative and qualitative. Quantitative job insecurity refers to “the perceived threat of job loss and the worries associated with the threat” (Fischmann et al. 2015, pp. 153-154), whereas qualitative job insecurity refers to the perceived threat of job quality, such as deterioration of working conditions or decreased wages (Schumacher et al., 2015)

Job insecurity is an important topic because it causes increased stress and has negative effects on the psychological well-being of employees, but it also has a

significant impact on the organization (Schumacher et al., 2015). Given the changes in RAIA technologies, a portion of this study focuses on IT professionals' concerns about the future of their jobs.

A gap in the existing literature was identified at the time of this study. There has been little research on IT professionals' perceptions of job satisfaction, job insecurity in the context of RAIA technologies in the South African IT sector and their potential impact on future jobs. An earlier study by Gallie et al. (2017) supported this finding by discovering a scarcity of empirical evidence on the relationship between subjective job insecurity and technology. As a result, this study will take a quantitative approach to job insecurity. The purpose of this research is to close the gap by determining how RAIA technologies contribute to subjective job insecurity and how these two factors influence job satisfaction.

1.2 Background of the study

Scientists such as Bill Gates and Stephen Hawkin have once cautioned that RAIA technologies would lead to mass unemployment (Bort, 2014; Lynch, 2015). The replacement of human labour by technology has always been a fear for the working class (Lynch, 2015). This fear dates as far back as the 19th century when the Luddite movement was established. According to research, employees were opposed to assembly lines in the nineteenth century because they believed employers were using machines to circumvent labour laws. They destroyed manufacturing equipment to demonstrate their concerns (Campa, 2018). These workers were concerned that they had spent their time learning new abilities just to be replaced by machines, leaving them feeling devalued, disillusioned, and angry at their bosses, leading in job discontent. The word Luddite was coined to describe people who are opposed to industrialisation, technical developments, and automation as a result of this protest (Sako, 2020).

This kind of technological modernism that has been witnessed throughout history is described as ‘creative destruction’. Creative destruction is a process of industrial mutation through innovation where the innovation incessantly destroys the old innovation and creates a new one (Elliott, 1980). In contrast, Bill Gates believes that technology will not create new jobs but will instead eliminate traditional jobs through software technology such as automation and robotics. He further states that over time

technology will reduce the demand for jobs, particularly those defined as low skilled jobs: he has termed this view as “software substitution” (Bort 2014, p.1).

The above is exemplified by comparing today's Big Three technology companies of Silicon Valley (Google, Facebook and Apple) to Detroit’s 1950’s Golden-Age Big Three (Chrysler, Ford, General Motors), the comparison can be seen in table 1.1 below.

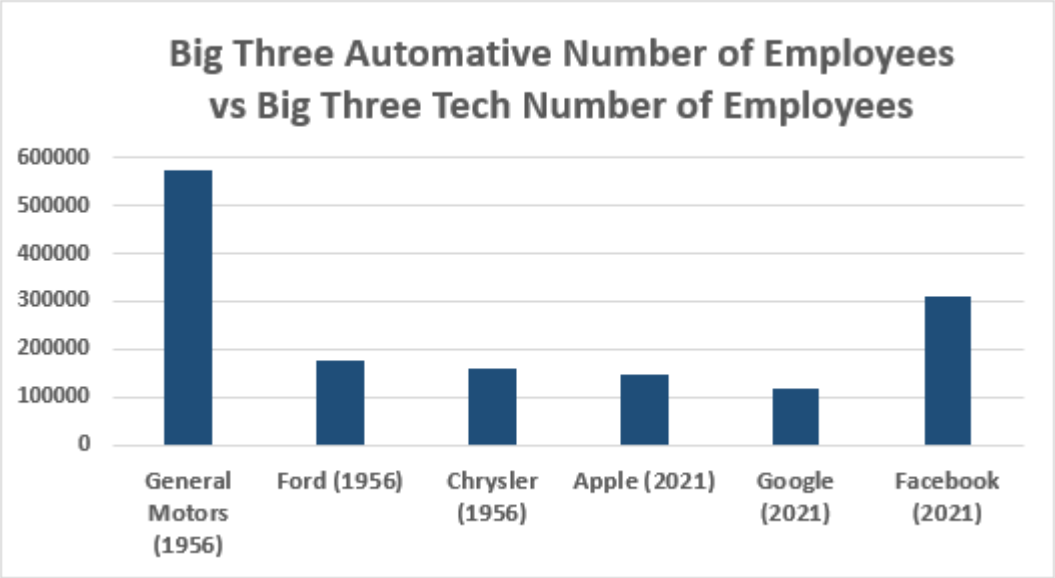
Table 1.1 Tech Big Three Revenue to Employee Ratio

	Apple	Facebook	Google	Combined Revenue and Employee Count
Revenue	$2.169 tln.	$670 bln.	$1.171 tln.	$506 bln
Employees	147000	119000	45000	311000

Source: adapted from Lynch (2015).

In the late 1950s, these three automotive companies (Table 1.1) dominated the US car market with a share price of over 90 per cent. Today, companies from a similarly small region have the same economic dominance as the Golden-Age Big Three (Madrigal, 2017). However, the difference between the two is that the technology labour force is a fraction of the automotive industry. The combined revenue of the tech companies exceeds trillion dollars. However, they only employ a combined total of 311000 employees. In comparison, the automotive industry had total revenue of $36 billion and employed close to a million workers (Lynch, 2015). These results are significant as they show that tech companies employ far lessor workers than the automotive industry irrespective of the considerable revenue earned by tech companies: this illustration is demonstrated in figure 1.1 below.

Figure 1.1 Detroit's Big three vs Silicon Valley's Big Three Number of Employees



Source: (Madrigal, 2017)

Research shows that creative destruction creates a net positive effect for the overall workforce where innovation such as RAIA technologies eliminates some jobs (Lynch, 2015). Many industries have long debated whether RAIA technologies will replace jobs. Views differ by industry, with some seeing RAIA technology as a tool used to free employees from mundane tasks and place them in higher-value jobs (Levy, 2018) while others see it as a tool designed to replace employees (Frank et al., 2019). According to Bowen and Mangum, "technology eliminates jobs, not work" (Bowen & Mangum 1966, p.9)

Research supports the statements made by Bowen and Mangum (1966). It has been shown numerous times that technology eliminates repetitive, manual, and physically demanding jobs for example jobs in the customer service industries are now being replaced by chatbots (Bughin et al., 2018; A. Smith, 2016) and this results in increases in the demand for STEM occupations: STEM is an acronym used to denote Science, Technology, Engineering and Maths (White, 2020). This study focuses on the 'T' aspect of STEM, where the 'T' denotes information technology professionals consisting of information systems specialists, software developers, computer programmers, data scientists, artificial intelligence specialists and robotics developers.

According to (Risen, 2015), the demand for occupations that use computers to assist workers with their tasks is more likely to increase. A recent study by (Alekseeva et al., 2021) supports Risen's (2015) findings; the study found that given the increasing importance of artificial intelligence, AI-related skills grew in demand where the increase was ten-fold between 2010 and 2019. They further found that this increase in demand focused on Manufacturing, Finance, Professional services, and Information Technology sectors. (Risen, 2015) further states that the issue is not that automation will eliminate workers but that another person with specialized skills could replace the worker.

According to Walsh (2015) Pricewaterhouse Coopers (PwC), one of the big four accounting firms, has recommended that organizations should "future proof jobs" by learning skills in STEM (Walsh 2015, p.1). Walsh believes that by following PwC's recommendations, employees will never have to worry about being replaced by RAIA technologies; he believes that employees should upskill in skills such as science, maths, technology, and engineering. In contrast, Oxford University has reported that STEM jobs are the most future proof but are not the safest jobs (Frey & Osborne, 2013). The report by Oxford University further states that some of the activities and tasks are done by STEM workers are the ones that are best done by machines through automation and robotics, hence the belief that these jobs are not the safest (Frey & Osborne, 2013; Walsh, 2015).

As a result of the internet's rise, rapid Information Technology innovation, and the expansion of the information environment, organizations now compete for limited resources. This is due to an increase in the demand for IT professionals, but a lack of supply. The following creates a difficulty for all firms in various industries that want to keep their current IT staff while also hiring new ones (Ang & Slaughter, 2004; BusinessTech, 2019).

The turnover rate among information technology/systems experts, according to Ghapanchi et al. (2013) is a constant difficulty faced by all enterprises in the twenty-first century. According to them, "the problem worsens as the labour market in IT contracts due to the rapid growth of IT applications in organizations and the ongoing decline in the supply of IT graduates" (Ghapanchi et al. 2013, p.98)

To address the skills scarcity, technology companies identified this gap and have since started creating technologies that can automate some of the tasks performed by IT professionals. They refer to these technologies as AutoAI (Wang et al., 2019). One such example of AutoAI is in the data science field, where technologies such as Google's AutoML, DataRobot and H20 is used. Another illustration is MATLAB, a programming environment for analyzing data, developing models, and developing algorithms.

These systems employ machine learning to automate the data science workflow. According to Wang et al., (2019), If these technologies can automate data science, it's safe to infer that they'll help close the gap between present high and low need for IT professionals. The question then becomes: how do IT professionals feel about their future in their current positions? Given that there is a possibility that some or all the tasks they perform can be automated?

> Mark Cuban once said, "*What is happening now with artificial intelligence is we will start automating automation. Artificial intelligence will not need you or me to do it, and it will be able to figure out itself how to automate [tasks] over the next 10 to 15 years. Now the hard part is not whether or not it will change the nature of the workforce — it will*" (Burton, 2018).

The anticipated shortage of IT professionals in the twenty-first century motivates researchers and organizations to learn how IT employees view RAIA technologies and how they might be incorporated into their daily duties or used to replace portions of their work practice (Ghapanchi et al., 2013)

In South Africa, discussions regarding unemployment tend to centre on apartheid's legacy, low labour demand, a lack of skills, and economic hardship, with little attention paid to unemployment induced by technological advancements (Brynjolfsson & McAfee, 2011).

Despite the numerous advantages that RAIA technologies provide, not all employees are enthusiastic about technological improvements. Some people fear the effects of technology and such people are reffered to as technophobes. It is however important to understand that technophobes are not inherently anti-technology; rather, they are concerned about losing their jobs to technology, than the technology itself. Their main

concern is that RAIA technologies exacerbate economic inequality by undervaluing their skills (Crespi- Vallbona & Mascarilla-Miró, 2018; Islam, 2003)

As a result of the ambiguity and uncertainty around prospective retrenchments produced by new technology, such persons suffer from increased sadness, anxiety, poor health, and other mental health disorders. There has been minimal research on how RAIA technologies affect job satisfaction and job insecurity in STEM occupations.

Figure 1.2 below provides South Africa's labour market statistics from 2019 to 2020. The figure shows that South Africa had an unemployment rate of 30.1 percent in the first quarter of 2020 which is a 2.5% increase from 2019 where in 2019 the unemployment rate was sitting at 27.6%.The trend illustrates that the unemployment rate is not getting better but that it is increasing and research as also shown that South Africa is one of the most unequal economies in the world making it a fascinating case for this research report (BusinessTech, 2020).

It is therefore important for the person reading this research report to have an understanding of the South African labour market context as there is a possibility that employed people care about high uneployment rates even though they themselves are employed. High unemployment rates have been reported to instill fear amongst the employed as it triggers the question of whether or not they will be retrenched in the future (Brynjolfsson & McAfee, 2011; Ekkehard, Merola & Samaan, 2018; Sako, 2020).

Companies in South Africa have chosen to use RAIA technologies, according to Bhorat et al. (2015) contributing to the country's high unemployment rate.

As a result, the focus of this research is on the influence of RAIA technologies on job insecurity and job satisfaction in the South African IT sector, with the IT sector's scope broadened to include IT professionals in the banking, retail and services sectors (for example, data scientists, programmers, developers, systems analysts, IT project managers and those working in artificial intelligence and robotics within the banking, services and retail sector).

Figure 1.2 Labour Market Indicator

	Jan-Mar 2019	Oct-Dec 2019	Jan-Mar 2020	Qtr-to-qtr change	Year-on-year change	Qtr-to-qtr change	Year-on-year change
	Thousand					Per cent	
Population 15–64 yrs	**38 283**	**38 727**	**38 874**	**147**	**591**	**0,4**	**1,5**
Labour force	**22 492**	**23 146**	**23 452**	**306**	**960**	**1,3**	**4,3**
Employed	**16 291**	**16 420**	**16 383**	**-38**	**91**	**-0,2**	**0,6**
Formal sector (non-agricultural)	11 220	11 331	11 282	-50	61	-0,4	0,5
Informal sector (non-agricultural)	2 933	2 918	2 921	3	-13	0,1	-0,4
Agriculture	837	885	865	-21	27	-2,3	3,3
Private households	1 301	1 286	1 316	30	15	2,3	1,2
Unemployed	**6 201**	**6 726**	**7 070**	**344**	**869**	**5,1**	**14,0**
Not economically active	**15 791**	**15 581**	**15 422**	**-159**	**-369**	**-1,0**	**-2,3**
Discouraged work-seekers	2 997	2 855	2 918	63	-79	2,2	-2,6
Other (not economically active)	12 793	12 726	12 504	-222	-290	-1,7	-2,3
Rates (%)							
Unemployment rate	27,6	29,1	30,1	1,0	2,5		
Employed/population ratio (absorption)	42,6	42,4	42,1	-0,3	-0,5		
Labour force participation rate	58,8	59,8	60,3	0,5	1,5		

Due to rounding, numbers do not necessarily add up to totals.

Source: (BusinessTech, 2020)

1.3 Problem Statement

Employee job satisfaction and job insecurity have been extensively studied in the domains of human resources and psychology, with the primary focal areas being the relationship between job satisfaction and turnover in the manufacturing and construction industries (Lumley et al., 2011; Naidoo, 2018 & van der Walt, 2016).

Furthermore, in South Africa, research on the effects of RAIA technology on job satisfaction has concentrated on the industrial sector (Parschau & Hauge, 2020). To the best of the researcher's knowledge, little study has been done on the impact of RAIA technologies on job insecurity and job satisfaction in the South African IT sector.

Little research has been done on how IT professionals view their employment in the fourth industrial revolution era, leaving a void in the literature (Brougham & Haar, 2018). Employee satisfaction is crucial to an organization's performance, and because technology is at the heart of that success, it's now more important than ever for companies to keep their present IT staff (Mafini & Pooe, 2013).

As a result, labour market changes in the IT sector have expanded employment options for IT professionals, with a higher demand but a limited supply resulting in foirms being unable to recruit new employees and retain existing ones. This has led to employers realizing that the their most valued assets are their employees (Beaudry et al., 2016). Scholars have therefore stressed the necessity of examining aspects that influence job staisfaction, such as job insecurity's role (Abuhashesh et al., 2019).

Both researchers and employers are always looking into new factors that influence job satisfaction and altering organizational policies to keep current employees happy. This study discovered that while there is a considerable body of literature on RAIA technologies and their effects on the labour market, little research has been done in the South African environment, particularly in the IT sector.

RAIA technology research is primarily focused on the industrial and construction industries. From the perspective of IT professionals in the South African IT sector, this study aims to bridge information gaps by evaluating the existing relationship between RAIA technologies, job insecurity, and the influence on job satisfaction.

1.4 Purpose of the study

The purpose of this research is to learn more about how IT professionals perceive RAIA technologies' impact on job insecurity and satisfaction.

1.4.1Research Goal

This study attempts to develop a job satisfaction framework targeted for IT professionals using existing job insecurity and satisfaction theories.

1.4.2The objective of the study

The following research objectives will be addressed by this study:

1. To conduct an investigation of the job satisfaction levels of IT professionals in South Africa's IT sector, bearing in mind that the IT sector has spillover effects into other industries such as banking and retail.

2. To ascertain the association between RAIA technologies and degrees of job insecurity among South African information technology professionals.

3. To determine the association between job insecurity and work satisfaction among South African information technology professionals.

4. To explore the factors affecting the job satisfaction of IT professionals in the South African IT sector.

1.4.3Research Questions

This research study will be guided by the following research questions

1.4.3.1 Primary Research Question

To what extent do IT professionals Perceptions of RAIA technologies influence Job Satisfaction and Job Insecurity in the South African IT sector?

1.4.3.2 Secondary Research Questions

1. What factors contribute to job insecurity?
2. To what extent does job insecurity affect job satisfaction?
3. To what extent does an IT professional's perception of RAIA technologies influence job insecurity and job satisfaction?

1.5 Intended Contribution of the study

The study will make the following contributions to both the Information Technology/Information Systems literature and practice:

1.5.1 Theoretical Contribution to IT/IS literature

At the time of this study's inception , there was limited research on RAIA technologies and their effects on the South African IT workforce. Additionally, the survey examines IT professionals, providing insight into a distinct category of employees. Additionally, this research shifts away from technology-centric outcomes such as system use or adoption and toward a more holistic assessment of the perceived impact of RAIA technologies on job satisfaction and insecurity. By giving this alternative context, this research hopes to contribute to the literature.

1.5.2 Practical Contribution to IT/IS sector

According to Mncwango and Winnaar (2009) the success and continued existence of an organization are dependent upon the active involvement and job satisfaction of its employees, as well as on placing that employee's job satisfaction at the centre of attention. Employees are more likely to express greater job satisfaction when they believe their expertise, capabilities, and values can be used by the companies for which they work and that these businesses will reward and opportunity them in return (Oosthuizen, Coetzee & Munro, 2019).

South African authorities are aware of the concept of employee value and have made steps to ensure that employee well-being is prioritized. Between 1996 and 1998, the South African government promulgated three significant pieces of legislation: the Basic Conditions of Employment Act 75 of 1997, the Labour Relations Act 66 of 1995, and the Employment Equity Act 55 of 1998. As a result of these legislations, there has been considerable interest in their impact on the state of workers in South Africa. (Mncwango & Winnaar, 2009).

Despite this, little empirical research has been conducted on workers' values and attitudes about their jobs. Mncwango and Winnaar (2009) recommended in their study that researchers should go beyond speculation when conducting organizational health research and should analyze factors affecting job satisfaction. Numerous studies have been conducted to ascertain job satisfaction in the South African environment, however these studies have been limited to the construction, healthcare, and education sectors. (Pillay, 2009; Mohase & Khumalo, 2014; Lesailane, Aigbavboa &

Thwala, 2016; Chipunza & Malo, 2017). The purpose of this study is to broaden the background by examining a different sector.

Thus, the study aims to add to the body of knowledge regarding the perceived impact of RAIA technologies on job satisfaction and insecurity. It tries to shed light on why certain IT professionals are more content than others. IT firms can use the findings to review their human resource policies and strategies and to develop work environments that minimize job insecurity and increase job satisfaction. As a result, companies should see a decrease in turnover intentions.

1.5.3 Practical Contributions to IT education

In the 3rd quarter of 2020, statistics SA reported that 1.8% of the unemployed graduated and held a higher education degree (STATSSA, 2021). However, data indicates that demand for IT professionals outstrips supply, indicating that the number of graduates falls outside the IT sector. As a result, higher education institutions must be cognizant of this issue. This could help higher education institutions restructure their information technology programs and make them more appealing to students.

1.5.4 Practical Contribution to labour policies

This study will shed light on how RAIA technologies affect the labour market, particularly in terms of skill development. Both private and public organizations must develop new and more effective methods for training and upskilling IT staff, and they can use the research findings to prepare for prospective changes.

1.6 Delimitations of the study

This study was conducted at a time when high unemployment rates were prevalent in the South African macro environment and at a time when the world was going through a pandemic that has also resulted in job losses throughout various industries, yet supply shortages are evident in the Information Technology environment. The study could have also been constrained by the relational research design, as it is not possible to probe 'why' related responses, which could have helped to uncover IT professionals' personal experiences and subjective feelings. The study relies on

primary data obtained via questionnaires, which may be skewed by respondents' bias. The study is limited to IT professionals in the South African IT sector, which means that researchers cannot generalize the findings.

1.7 Conclusion

The first chapter provides an overview of the study that is being conducted, highlighting the situation and the study's goal. The study's goal was to investigate the perceptions of South African IT professionals on the effects of RAIA technology on job insecurity and the resulting total effects on job satisfaction.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

The research problem is divided into two components: job insecurity and job satisfaction in South African IT sector. This chapter summarizes the current discussion regarding the perceived influence of RAIA technology on job satisfaction and insecurity.

The future of work debates are concentrated on the perceived influence of emerging technologies (such as smart factories, self-driving cars, and service robots) powered by artificial intelligence and their potential to supplant human talent. Until recently, academics believed that technology would never be able to entirely replace jobs that require human comprehension (Kaplan & Haenlein, 2019). However, when considering technologies such as Alexa and Sophia, it becomes clear that RAIA systems are capable of cognitive and emotional intelligence (McStay, 2020).

These technologies are applied in sectors that previously necessitated the employment of human abilities and intelligence alone (Rainie & Anderson, 2017). As a result, there is rising worry about the ability of RAIA technology to displace workers (Pettersen, 2019). According to researchers, many professionals will face the prospect of being unable to work. The prospect of technological unemployment or the eventual abolition of labour as a result of automation instills panic in employees (Brynjolfsson & McAfee, 2011; Ekkehard, Merola & Samaan, 2018; Sako, 2020).

2.2 Job Satisfaction

Job satisfaction is described as an individual's sense of fulfilment with their job (Reid et al., 2008). It is the sense of accomplishment that occurs as a result of an employee successfully completing a task. It is the employee's attitude toward his or her job that matters – whether he or she finds the job satisfying enough to continue doing it (Bhattacharya, 2011; Reid et al., 2008). Job satisfaction as it is widely defined was coined by an author named Locke (1965). He defined job satisfaction as a joyful or

positive emotional state coming from a positive evaluation of one's work or work experiences (Locke, 1965). Locke based his evaluation on job attributes such as task importance, task identity, abilities, and other psychological elements that contribute to the employee's sense of purpose and fulfilment (Nwobodo-anyadiegwu, Mbohwa & Ndlovu, 2018). According to Bhattacharya (2011), these criteria define an individual's resulting state of contentment. When an employee is intimidated, they are unable to acquire this condition of pleasure, which results in unhappiness.

2.3 Job dissatisfaction

According to researchers, work unhappiness is a result of employee insecurity (Khan et al., 2012) Employees with unfavourable attitudes regarding their jobs exhibit reluctance, tiredness, and a desire to escape. Kumbali (2014) asserts that supervisors can identify job discontent when an employee exhibits the following characteristics: burnout, frequent processing errors, absenteeism, and quitting. Additionally, he asserts that unsatisfied employees are introverted, emotionally unstable, unsociable, and distressed.

2.4 Job Insecurity

Every employee seeks some level of job security, and this is a generally recognized fact by both organizations and academics (Smith & Speight, 2006; Vieitez et al., 2001; Yoon & Guimaraes, 1995). Job insecurity is a significant element affecting employee commitment and the overall success of an organization. Vieitez et al. (2001) discovered that workers experience elevated levels of sadness, poor health, and anxiety when they consider their positions to be threatened, which includes the uncertainty of prospective layoffs and organizational conjecture about who would be on the 'chopping block.'

According to stress theory, ‘job insecurity’ refers to an individual's subjective assessment of future work or unemployment status. This impression indicates instability, powerlessness, and insecurity when one is unclear about the stability of one's career. Thus, "job insecurity" is defined as "the perceived inability to sustain desired continuity in a challenged job scenario" (Sora et al., 2010, p. 59). Readers are advised to apply this definition when going through this study. Job security and job

insecurity are opposites. Job security refers to the assurance of an individual's employment, whereas job instability refers to the uncertainty of one's occupation in the near future (Sora et al., 2010).

2.5 IT Sector in South Africa

Since 1995, South Africa's adoption of information technology has accelerated, with technology services increasing by 20% throughout the 1990s. South Africa was the twentieth largest country offering ICT products and services in 1995. (Smith & Speight, 2006). Due to the continued growth of the ICT market, demand for IT professionals has increased proportionately, prompting organizations to develop retention measures to ensure that IT employees remain in their organizations.

One of the most significant difficulties facing the South African information technology business is the high rate of turnover of competent IT employees. South Africa's market for competent IT professionals is extremely competitive due to a significant disparity between demand and supply, where demand exceeds supply (Naidoo, 2018). Due to the dearth of IT professionals, current professionals are driven by better earnings and seek employment with higher-paying organizations. According to Naidoo (2018) South African IT professionals were less likely to demonstrate loyalty to a single organization as a result of the following trends: (1) Increased remote work opportunities for offshore enterprises, (2) opportunities for relocation, (3) contract work, and (4) career mobility. Given the fight for scarce resources, firms must do more than merely pay employees fairly.

2.6 The context of IT Professionals

The role of information technology professionals is rapidly evolving what was once a department that provided support to businesses has evolved into a broader function in which IT professionals no longer provide only technical support but also power the business through business-focused IT professionals (Thompson, 2008). The pervasiveness of IT in all aspects of our life has resulted in an exponential increase in the number of roles available in the IT sector. For example, within the information

technology industry, some companies specialize in areas such as business transformation and change. The evidence indicates that the boundaries between an IT professional's competency and that of other professions such as finance, procurement, training, and personnel management are porous (Thompson, 2008).

The following groups are addressed for this study: IT project managers in the software development industry, computer systems analysts, software developers, programmers, IT consultants specializing in robotics, such as UiPath consultants, data scientists, and artificial intelligence engineers. The target population is drawn from a list of employees in the robotics and artificial intelligence fields. This demographic Is deliberately chosen since this study is primarily concerned with the individuals who contribute directly or indirectly to the development of RAIA technologies, and it includes those who work with such technologies as well.

2.7 Importance of Job Satisfaction

When employees are unsatisfied, they lack motivation, exhibit bad energy, and attitude, and perform poorly in general; the organization suffers from excessive absenteeism, a lack of commitment, increased sick leave, inefficiency, and turnover. As a result, this has a direct detrimental influence on the profitability and quality of goods and services provided by the business (Crespi- Vallbona & Mascarilla-Miró, 2018)

Employees therefore have the power to make or break a company. Job satisfaction is a critical factor in determining an organization's performance and it ensures that the best employees stay with the company. Furthermore, job satisfaction increases organizational efficiency by keeping employees motivated and engaged (Johnson, 2018). Job satisfaction has been found to reduce job-related stress and attrition (Ghapanchi et al., 2013) Job satisfaction serves as an incentive for employees to continue working, thus contributing to the overall effectiveness of the business; as a result, the value of job satisfaction "cannot be overstated" (van der Walt 2016, p.149).

2.8 RAIA technology in perspective

Despite the numerous advantages associated with automation using RAIA technology, not all personnel embrace technological advancements (le Roux, 2018). These individuals suffer from anxiety and other mental health issues, which has a cascading effect and impairs their performance (Rule, 2017).

There are divergent views on RAIA technologies, with one side believing that automation will eventually supplant humans. Simultaneously, the opposing camp argues that RAIA technology may liberate employees from routine duties and redirect them to more useful, meaningful, and gratifying work (Campa, 2018; Huang & Rust, 2018). The following are two viewpoints on RAIA technologies:

a) From the Researchers' Point of View - Doomsday

The Doomsday Perspective is one of the perspectives identified by Frank et al. (2019, p2). According to this idea, while technology may improve human labour, there is a distinct risk that it may result in obsolescence through labour substitution. According to doomsday proponents, this labour replacement highlights the issue of technical unemployment. They argue that the influence of RAIA technologies on jobs, perceived job instability, and unemployment should not be overlooked.

Campa (2018) defines technological unemployment as “unemployment resulting from technical progress, which only applies to workers whose skill set is redundant due to the changes in production methods, where machines substitute their services”. One study examined the influence of RAIA technologies on employment in the United States and discovered that 47% of jobs were at high risk of computerization (Frank et al., 2019).

According to some academics, RAIA technologies significantly raise the value of skilled workers while diminishing the value of semi-skilled and unskilled people. (Ransbotham et al., 2016). According to one of the few studies conducted among United States workers addressing their impressions of technology, 13% of employees expressed anxiety about their ability to maintain the technical skills necessary by firms while implementing RAIA technologies.

In comparison, 11% of employees believed that their employer will replace some human workers with technology (Smith, 2016).

b) From the Researchers' Point of View - Optimists

In contrast to Doomsday scenarios, optimists argue that while RAIA technology may eliminate some employment, the efficiency gains outweigh the transition costs. They bolster this argument by arguing that technology frequently creates jobs (Levy 2018, p.410) hence improving employment for individuals who are not directly competing (Frank et al. 2019, p.2).

Autor (2015) argues in favor of this position; he believes that organizations will boost productivity by automating some processes, and that higher productivity will result in an increased need for labour.

Additionally, the skill requirements for skilled workers evolve in response to changing labour needs. Typically, technologies purported to increase unemployment have been found to do so only temporarily. Eventually, the economy adjusts and labour is redirected toward productive endeavors (Subramanyam & Patagundi 2018, p.152). This adjustment is expected to occur more quickly than the unemployment produced by technological developments, and hence compensates for the continual displacement effect of labour (Ransbotham et al. 2016, p.7). Additionally, academics have focused primarily on existing jobs and rarely on jobs created by technology, implying that current employees can upskill and be absorbed by firms once they acquire the necessary abilities. Nonetheless, it is critical to remember that not everyone has an aptitude in math, science, or technology. .

Smith (2016) did an analysis of all US jobs. The findings indicated that several employees recognized that RAIA technologies will have an effect on certain jobs, particularly manual, repetitive, and physical jobs. In this study, manual labourers expressed a greater level of anxiety than those whose employment did not require manual labour.

c) Perceptions of RAIA technologies among employees

According to Brougham and Haar (2018) when firms actively pursue RAIA technology in order to replace employees, employees view themselves to be undervalued and unimportant to the organization. Their study contradicts Smith's findings: they discovered that individuals who reported high levels of anxiety worked in well-compensated middle-class positions, with the majority in the service industry. With the possible introduction of RAIA technology and the early notice that one's work is in jeopardy, this may motivate employees to choose new jobs.

Currently, the world's labour force is divided in such a way that the younger generation finds technology easier to utilize. They are more adaptable, more willing to upskill, and more receptive to new technology than the elder generation. Shoukat and Hira (2017) discovered that as people age, their perceptions of RAIA technology change. One group will almost certainly experience greater job insecurity and satisfaction than the other.

2.9 Conclusion

This chapter delves into the details of RAIA technologies and their effect on job insecurity and job satisfaction. Additionally, it discusses employee opinions of the effects of RAIA technologies on current tasks and jobs.

The present literature indicates that technology advancements have a detrimental effect on employment via the displacement effect, for example automation software performs tasks which were previously performed by humans. Additionally, research demonstrates that technology increases productivity by making activities easier to accomplish and reassigning individuals from monotonous, mundane duties to more demanding, challenging and important tasks. While the literature indicates that technology typically has a positive influence on productivity and displacement, RAIA technologies have a more strong displacement effect (Brown, 2020).

The South African labour market, like the global labour market, suffers from a skills mismatch. A contributing cause to South Africa's high unemployment rate (Bhorat et al., 2015). This means that individuals learn talents that are not required by the labour

market (Abel et al., 2014). One part of the literature that has been overlooked is the perception of those who develop these RAIA technologies. The prospect of IT professionals losing their employment to the exact things they invented is both perplexing and intriguing. As a result, the researcher for this study believes that this subject is intriguing and deserving of additional inquiry.

CHAPTER THREE

3. THEORETICAL BACKGROUND

3.1 Introduction

Numerous satisfaction theories have been created throughout the years to explain the job satisfaction phenomenon, with one of the first theories dating back over 60 years (Maslow, 1943). The quest for a better understanding of job satsifaction has never ceased. This is because work environments and employee perspectives are always changing, necessitating the modification or replacement of previous models in order to address newly found gaps and accommodate shifting perspectives.

The many job satisfaction theories are classified into two categories: process theories and content theories (Thiagaraj & Dr Thangaswamy, 2017). Job satisfaction is conceptualized specifically in process theories, and content theories examine motivation as a mediator of job satisfaction. Job satisfaction research has shown a link between job satisfaction and motivation, with motivation being proven to result in satisfaction (Badubi, 2017). As a result, this paper briefly discusses some process theories. This is purely for the purpose of demonstrating the connection between motivation and job satisfaction.

3.2 Theories contributing to job satisfaction

There are several job satisfaction theories. However, the below section discusses some of the existing content theories to show the evolution between Maslow's Hierarchy of Needs (1943), Alders ERG Theory (1969), and Herzberg's theory (1987). The section starts by introducing the content theory, followed by the limitations of each theory. It ends with a brief discussion on the process theories. The theories discussed in this section were used to develop the conceptual framework formulated in this study

3.2.1 Content Theories

Content theories, often known as needs theories, examine motivation through the lens of an individual's needs and goals. These theories analyze motivation in terms of the manner in which these wants or goals are met (Thiagaraj & Dr Thangaswamy, 2017).

3.2.1.1 Maslow's Hierarchy of Needs

Built on the assumption that humans have a hierarchy of requirements that are grouped in a pyramidal fashion. According to this view, needs can be classified as physiological or self-actualization (Maslow, 1943). According to this view, employment does not satisfy an individual's wants because individuals have complicated and diverse demands, which means that employees provide gratifying needs (Mbhele, 2019).

The following hierarchy depicts Maslow's five levels:

1. Physical requirements include shelter, food, and clothing.
2. Safety Requirements: This pertains to physical protection.
3. Social Needs: the ability to interact with others
4. Esteem Requirements: This category encompasses aspects such as self-esteem, acknowledgment, and attention.
5. Self-Actualization Requirements: Achievements and Possibilities for SelFulfillment

Figure 3.1 Maslow's Hierarchy of Needs



Source:(EPM, 2019)

Limitations of Maslow's Hierarchy of Needs

According to Maslow's Hierarchy of Needs, human beings will not be motivated by higher-order needs unless lower-order needs are addressed. This creates complications because no one measurement can effectively assess an individual's satisfaction with lower-order needs before progressing to higher-order needs. Additionally, there is a generalizability issue, as the majority of these work satisfaction models were established by American researchers. This indicates that the theory will fall short of properly accounting for cultural variations, much more so in a country like South Africa, where diversity is valued and plays a large role in organizations. As a result, researchers have difficulty generalizing these needs across populations.

3.2.1.2 Alders ERG Theory

Alderfer (1969) modified Maslow's Hierarchy of Requirements to solve the theory's inadequacies by reducing the five needs to three categories. He did so because he considered that several of Maslow's classes overlapped, and he categorizes them as "Existence," "Relatedness," and "Growth," abbreviated as ERG (Alderfer 1969, p.142). Alder defined the lowest level of existence in this new concept as one concerned with survival, which comprises food, water, and shelter. He remarked that lower-level demands can all be met through money, implying that they can be met as long as one earns a living (Thiagaraj & Dr Thangaswamy, 2017).

The second need, which he refers to as 'Relatedness,' is concerned with interpersonal connection, the gratification that comes from receiving emotional support from others, and a sense of belonging and respect. Coworkers and family members can assist in meeting these needs. The final level is the requirement for progress; this encompasses both personal and professional development, as defined by one's aspirations or goals. (Caulton, 2012).

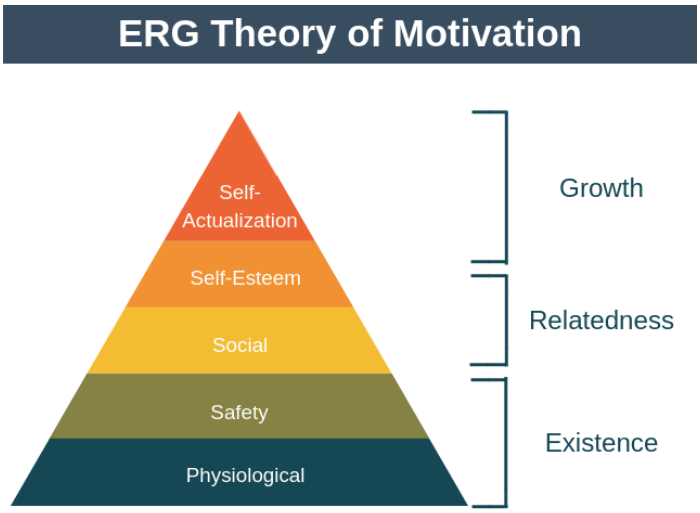
In terms of applicability, the ERG theory differs from Maslow's. According to ERG, an individual is not required to remain on a lower level need until that need is met; in fact, this theory states that an individual might progress to higher-level needs without satisfying the lower-level need. Maslow felt that a person could not go to the next level unless the requirements of the group in which they were participating were

addressed; ERG asserts that a person's needs can be met concurrently. (Young, 2018).

Limitations of ERG

The ERG theory does not provide a framework for determining which need is more vital to an individual; rather, it acknowledges that individuals value needs differently. Nonetheless, it provides little guidance on how to quantify its worth (Young, 2018).

Figure 3.2 ERG Theory of Motivation

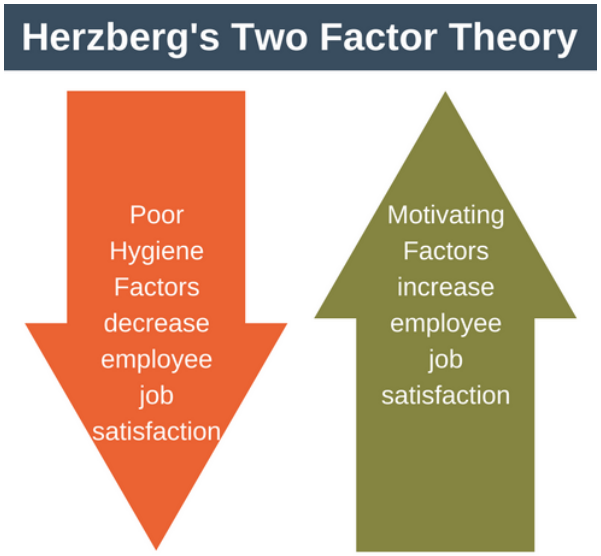


Source: (EPM, 2018a)

3.2.1.3 Herzberg Two-Factor Theory

Frederick Herzberg was intrigued by what people desired from their work in the early 1950s. He then conducted a survey of 200 engineers and accountants in Pittsburg. The poll consisted of questions that elicited responses from the population sample regarding occurrences that made individuals feel happy or negative about their jobs. The study's findings helped him establish his theory of job satisfaction, which includes two dimensions:'motivator' and 'hygiene' aspects. According to this theory, motivational variables are those that contribute to job satisfaction. (Herzberg, 1987).

Figure 3.3 Herzberg's Two Factor Theory

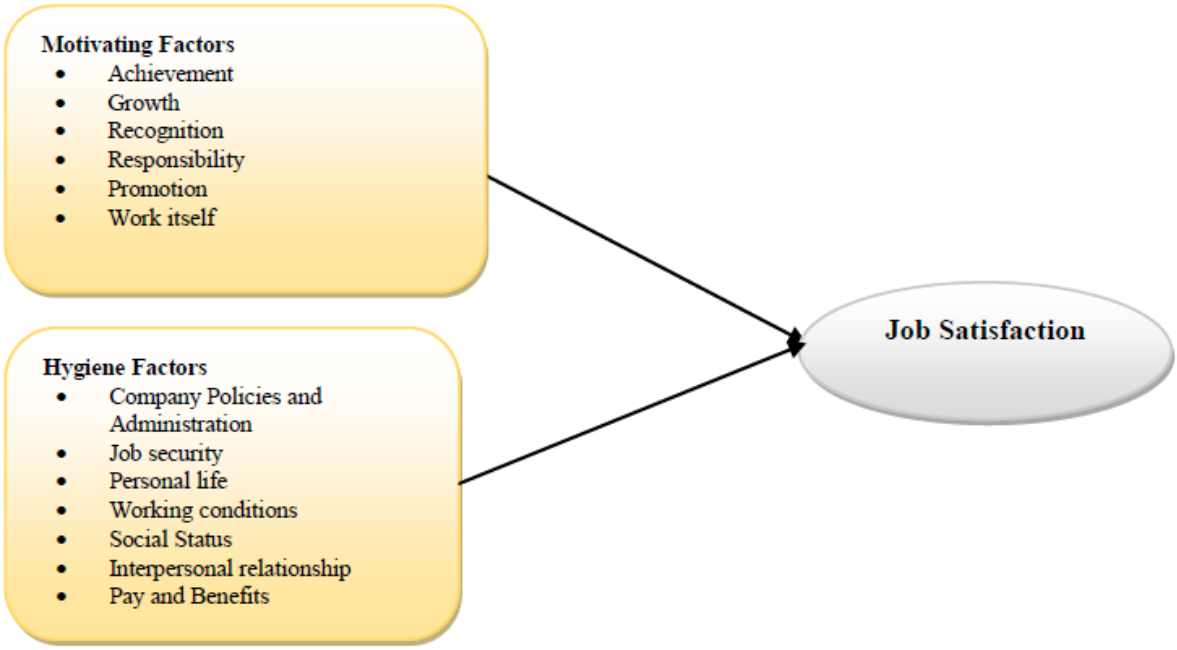


Source: (EPM, 2018b)

According to his idea, job satisfaction is not determined by 'hygiene' variables. They can, however, mitigate work unhappiness, which means that they may result in dissatisfaction if these factors are not met. The components discovered by Herzberg are depicted in Figure 3.4, where the Hygiene factors include organizational policies, working environment, remuneration, supervision, and interpersonal ties. Motivators, on the other hand, include job recognition, obligation, acknowledgment, growth prospects, and the job itself, as well as accomplishment and progression. Herzberg claimed that employees must be motivated in order to remain productive. (Mbhele, 2019).

According to Naidoo's (2018) study, a pay is considered as an incentive to improve job satisfaction. He discovered that salary satisfaction had a substantial impact on the views of South African IT professionals. Ghapanchi and Aurum (2011) discovered that IT professionals are motivated by a variety of factors, including promotion, perceived fairness, and income (figure 3.4).

Figure 3.4 Job Satisfaction Model Adapted from



Source: (Jan, Raj & Subramani, 2016)

Herzberg believes that managers should prioritize giving opportunities for advancement in order to ensure employee satisfaction; he also suggests that managers should ensure that employees have sufficient opportunities to reach their full potential and recognize and acknowledge employee contributions. Finally, he asserts that managers should delegate authority to staff.

Limitations of Herzberg's Two-Factor Theory

Researchers fault this idea for failing to explain how cleanliness and motivational elements are examined; additionally, the strategy disregards individual differences (Hackman & Oldham, 1976).

3.2.2 Process Theories

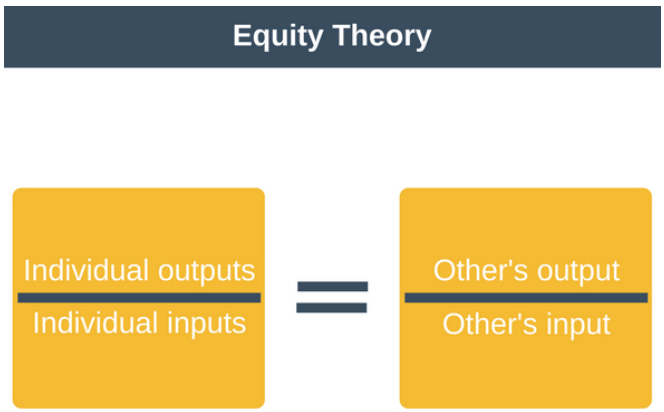
Process theories are exclusively concerned with how individuals are motivated; they are more precisely concerned with how motivation is activated. These theories place a premium on people' strategies for setting goals and how they achieve those goals. (Thiagaraj & Dr Thangaswamy, 2017).

3.2.2.1 Equity Theory

This theory is concerned with the relationship between an employee's effort and production. This theory constantly assesses the level of fairness in a work setting (Mulder, 2018). According to the theory, employees should compare what they get out of their jobs using an input-output ratio that considers their age, education, performance, aptitude, seniority, and experience as inputs. On the other hand, results refer to the compensation that an employee receives, such as salary and other benefits (Adams, 1963).

According to the Equity Theory, an employee's worth is established by comparing his or her efforts and incentives to those of others. Thiagaraj and Dr Thangaswamy (2017) expand on this finding by stating that equity is analogous to the perception of fairness; they state that equity envisions similar outcomes for similar inputs and that if an employee believes that others are receiving greater rewards for similar inputs, the employee will withhold some of their efforts. Figure 3.5 summarizes the notion of Adam's Equity Theory.

Figure 3.5 Adam's Equity Theory



Source: (EPM, 2018a)

Limitations of the Equity Theory

This theory is based on an individual's viewpoint and ignores other potential motivators. Because the theory is dependent on an individual's perception of input-output ratios, it is difficult to quantify due to the fact that individual perceptions vary. Their respective ratios will vary (Thiagaraj & Dr Thangaswamy, 2017).

The theory does not adequately forecast overpayment situations or how individuals respond to them. This idea falls short of explaining how individuals behave when they are dissatisfied. This idea is unable to account for what individuals do when they are dissatisfied (EPM, 2017).

3.2.2.2 Locke's Goal-Setting Theory

According to Locke's Goal Setting Theory (1965), employees need clarity in the duties assigned to them by management or organizations. The job or task description should be exact and straightforward; it should not be ambiguous. A well-defined job is more manageable. Additionally, the theory suggests that employees enjoy complex or challenging jobs because they inspire them to perform better and exert maximal effort, while also allowing them to demonstrate their abilities. The notion predicated on an individual's 'self-efficiency,' or the employee's belief in his or her ability to perform the assigned task (Thiagaraj & Dr Thangaswamy, 2017).

Figure 3.6 Locke's Goal Setting Theory



Source: (EPM, 2018c)

Organizations establish both individual and organizational goals in order to improve performance. These objectives, among other things, aim to reinforce performance, which results in increased employee job satisfaction (figure 3.6).

Limitation of Locke's Goal Setting Theory

This theory does not address how management can recognize unethical behaviour as a result of employees who are unable to accomplish their objectives. According to Schweitzer et al. (2004) employees are more dishonest when their goals are too difficult.

Concluding remarks

Maslow's work remains influential in identifying an individual's behaviour depending on a range of motives, drives and needs. Maslow's ideas have been incorporated by organizations to assist in matters concerning management styles, reward systems and work design. Maslow's perspective is that a need cannot be a motivator until the lower-level needs have been somewhat satisfied. He further states that individuals have a desire to move up the hierarchy to satisfy the higher-level needs. However, frustration comes into play when they cannot satisfy the lower-level needs (Maslow, 1943). This can adversely affect an individual's satisfaction levels. This theory does not assist in predicting individual behaviour; however, it remains relevant in today's world.

According to (Bozkurt et al., 2017), there are two dominant theories that researchers have used to investigate employee motivation: process-based theories and the needs or content-based theories. Process-based theories are good at explaining the consequences and antecedents of motivation. Furthermore, they clarify how employees' expectations, values, and needs link to his/her responsibilities and result in motivation (Bozkurt et al., 2017).

The goal-setting theory is used in this study because the basic premise of this theory claims that predetermined goals are performance inducers. This theory states that employees value challenging tasks. Some researchers view RAIA technologies as a tool used to free employees from performing mundane tasks and placing them in

higher-value jobs (Levy, 2018); this view ties in with the beliefs set out in process-based theories. According to EPM (2018c), the goal setting provokes energy and attention from the employees, and the ultimate achievement of the goal creates satisfaction. In contrast, unaccomplished goals could potentially lead to dissatisfaction.

Another theory discussed is the ERG theory, and this theory is built on the premise that when a lower-level need is neglected, the more likely will employees desire the need. For, example if salary needs are neglected by management, they will be desired by employees (Young, 2018). Meaning that when faced with the possibility of unemployment, employees will start desiring their jobs, and they will start thinking more about the potential financial loss.

According to Herzberg's Motivator-Hygiene Theory, eight hygiene factors could lead to job dissatisfaction. One of the hygiene factors is salary; Herzberg argues that when an employee's salary is threatened or does not receive a satisfying amount, it could lead to dissatisfaction. Other hygiene factors include the size of the office, a person's rank or title. Job security is also vital as it gives employees assurance that they are safe from losing their position in an organization or even employment altogether (EPM, 2018b; Herzberg, 1987).

In conclusion to the above theoretical discussion, we can say that each of the discussed theories contributed towards understanding elements that lead to employee satisfaction. Various theorists have studied job satisfaction over the years, and their research work helps organizations better understand how job satisfaction, motivation, and employee perceptions can be incorporated in the workplace (EPM, 2019).

Some of the discussed theories are predominantly used to explain employee motivation; however, according to (Badubi, 2017), motivation leads to job satisfaction, process theories clearly explain this. Due to this reason, this research utilizes Herzberg's Two-Factor Theory to conceptualize a framework that can help explain how external factors such as RAIA technologies influence job satisfaction, with job insecurity being a mediating factor.

3.3 Theories contributing Job Insecurity

According to Greenhalgh and Rosenblatt (2010) insecurity in the workplace was not a common managerial concern during the 1950s and 1960s. because employees worked in mostly stable surroundings, except for those in cyclical industries, such as those driven by defence appropriations, whose employment fluctuated throughout boom-and-bust periods. Employees were aware during those years whether they were working in stable or cyclical businesses, and as a result, their expectations were appropriately managed and aligned with what employers delivered. The fact that people were aware they worked in a cyclical business does not mean they did not experience some amount of job insecurity; scholars simply did not perceive job insecurity as a factor affecting daily work behaviours and attitudes. (Greenhalgh & Rosenblatt, 2010).

In the 1970s and 1980s, management techniques began to alter, with firms beginning to prioritize shareholder interests and using business process reengineering to achieve lean operations. One of the objectives was to eliminate surpluses from organizations. It, therefore, became normative for management to lay off dispensable workers; this resulted in short-term profitability gains (Greenhalgh & Rosenblatt, 2010). By the new century, managers identified unexpected negative consequences on organizational effectiveness because of the change in employee attitudes. As a result, job insecurity became a phenomenon that needed to be explored and understood, and a new theory was developed to explain the dynamics and antecedents of job insecurity.

Greenhalgh and Rosenblatt (1984) defined job insecurity in terms of a framework. During the years when the framework was developed, they discovered a dearth of literature on job insecurity and that while research touched on the subject, job security was viewed as a subset of job motivation or satisfaction at the time (Herzberg, 1987; Maslow, 1943) and there was no such thing as a job insecurity construct. Their paradigm has been adopted as the standard for examining employment insecurity (Dachapalli & Parumasur, 2012; Greenhalgh & Rosenblatt, 2010; Shoss, 2017). Four themes arose from their description of job insecurity: desired continuity, threat, job characteristics at risk, and powerlessness.

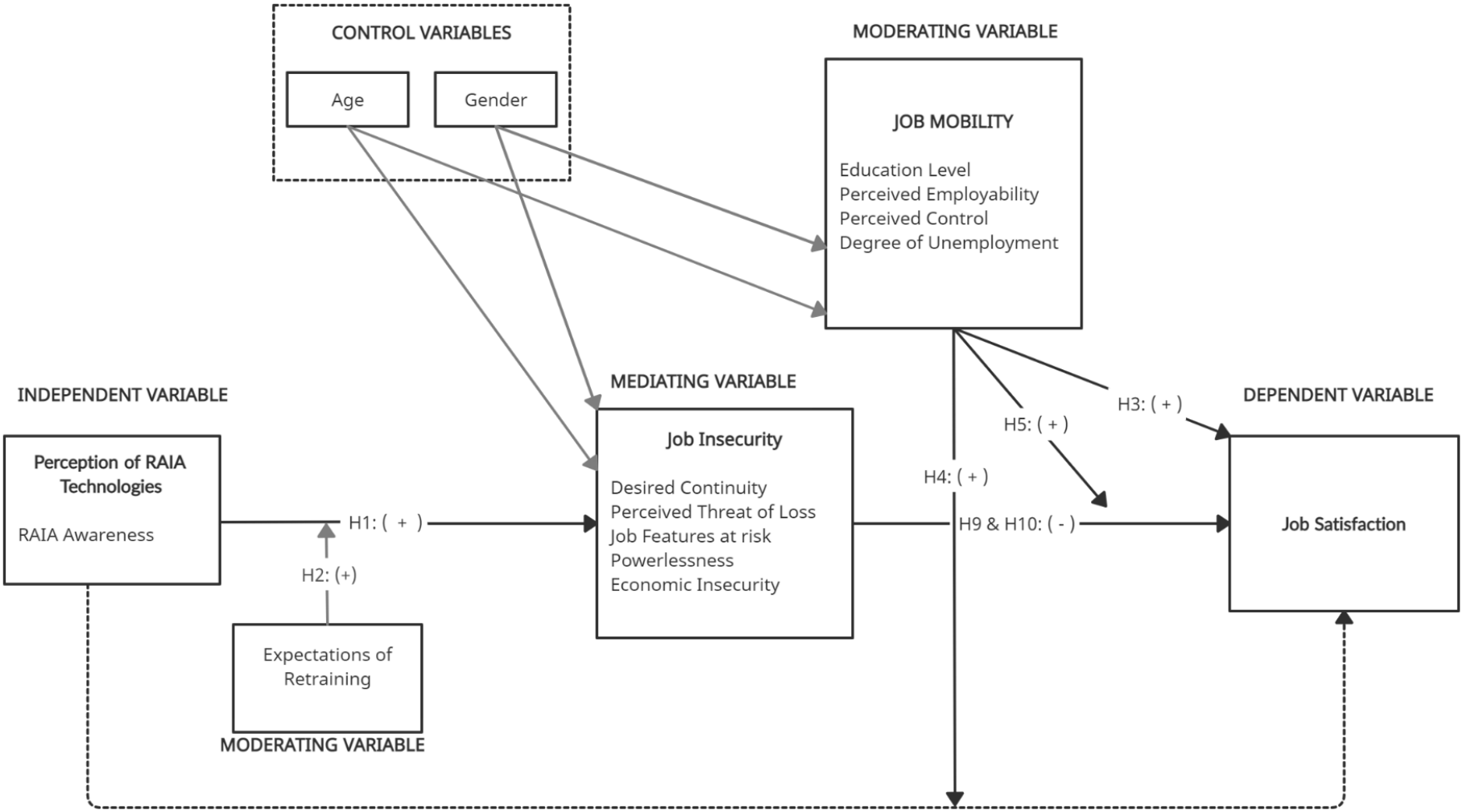
3.4 Research Model and Hypotheses

One of the study's objectives is to construct a framework for determining the extent to which perceptions of RAIA technologies influence job insecurity and its associated effects on job satisfaction. Additionally, the project intends to empirically validate the framework in a real-world information technology environment. The researcher begins by introducing the framework that is used in this study, followed by an explanation of the rationale for developing the framework and a definition of the concept

3.5 Research Model

Figure 3.7 below depicts the research model deveoped for this study. The model was built by reviewing the existing literature on job satisfaction and job insecurity and it depicts the hypothesised effects of RAIA technologies. The research depicts three main constructs which have either a direct or indirect effect on job satisfaction.

Figure 3.7 IT Perceptions of RAIA Technologies: Research Model



Adapted from (Brougham & Haar, 2018)

3.5.1 Conceptual Definitions for Models Constructs

3.5.1.1 Control Variables

Following the lead of comparable studies, this study's two demographic control variables are gender and age (Brougham & Haar, 2018). These two variables are used to assess their unique effects on job insecurity.

3.5.1.2 Age

Bustillo and Pedraza (2010) demonstrate that the older generation faces greater job insecurity than younger generations. Job insecurity is exacerbated among the older generation, as it is significantly more difficult for them to find work following job loss.

Earlier research has established a positive association between age and job satisfaction. As one ages, their income increases and they are given more responsibilities, their degree of contentment increases (O'Brien & Dowling, 1981). These findings are logical, given that an individual's age is proportional to his or her level of experience and compensation . However, in the information technology sector, technology changes at a breakneck pace, necessitating the acquisition of new abilities, and if one does not upskill, the learned skills become obsolete. Shoukat and Hira (2017) assert that age has an effect on an employee's job satisfaction. Their research discovered that the younger generation is more receptive to technology advancements because they believe it is easier to upskill. In comparison, the older generation has been more hesitant and hence has lower job satisfaction levels as a result of an increased fear of being replaced by machines.

Younger employees, according to study, respond differently to RAIA technologies. According to Shoukat and Hira (2017), the elder generation is fearful of technological advancements and is less technologically aware than the younger generation. As a result, the older generation believes that obtaining work elsewhere will be challenging if they were to quit or lose their job. Whereas the younger generation is less scared by technology because they are more aware of the consequences of RAIA

technologies and the possibility that such technologies would eventually replace their occupations. This finding is corroborated by (Brougham and Haar (2018) who hypothesized in their study that the younger generation would have a greater awareness of technology, which would mitigate the impact of technological advances.

3.5.1.3 Gender

Several academics have examined gender's moderating effect on job instability and its overall effect on well-being and contentment. According to the study's findings, job insecurity is less distressing for women than for males (de Witte, 1999). These findings corroborate the gender role theory's assertion that family responsibilities such as being a spouse or mother are more central to a woman's identity than they are to a man's identity. In comparison, work roles such as breadwinner play a larger importance in defining a man's identity. As a result, males will experience considerably more employment insecurity as a result of gender roles (Gaunt & Benjamin, 2007).

3.5.1.4 Independent Variable

3.5.1.4.1 Perception of RAIA Technology

a) RAIA Awareness: Brougham and Haar (2018) discovered a link between automation knowledge and job insecurity in a recent study. In their study, they defined “the extent to which employees viewed the likelihood of technologies such as Smart Technology, Artificial Intelligence, Robotics and Algorithms (STARA) impacting on their future career prospects” (Brougham & Haar 2018, p.239).

H1: *Perception of RAIA technology will be positively correlated to job insecurity such that the higher the Perceptions of RAIA the higher job insecurity will be and the lower the Perceived RAIA the lower the job insecurity level*

3.5.1.5 Moderating Variable

3.5.1.5.1 Expected Retraining

Those who have been retrained are frequently far more prepared for changes in their occupations or duties, and they also exhibit significantly decreased levels of job insecurity than employees who have not been retrained. (Lingmont & Alexiou, 2020). This study, therefore, posits that:

H2: *Employees with higher expectations of retraining have significantly lower levels of perceived job insecurity*

3.5.1.5.2 Job Mobility

This variable relates to one's perceptions regarding their ability to find work quickly. According to (Naidoo, 2018), the South African IT sector is currently faced with a situation where there are limited IT skills and high demand for those skills, which has resulted in voluntary turnover and includes job hoping. Additionally, Naidoo highlights that while South African IT professionals can easily locate new positions, they must also pay for job adjustment fees. The expense they expend may have an effect on their impression of their mobility. The capacity to obtain work fast creates the illusion of greater control over one's job. As a result, younger and older generations will have varying reactions to the apparent effects of RAIA technologies on control, based on their distinct viewpoints. Between employees' locus of control and job insecurity, there will be a negative association. Individuals with an internal locus of control face less job insecurity than those with an external locus of control (Keim et al., 2014).

H3: *Job mobility will be positively correlated to job satisfaction such that the higher the perceived job mobility the higher the job satisfaction level.*

H4: *The indirect effects of the perceptions of RAIA technologies on job satisfaction via job insecurity will be moderated by perceived job mobility, such that the indirect relationship becomes stronger as job mobility strengthens (moderated mediation)*

a) **Education Level**: Bustillo and Pedraza (2010) discovered that employees with a higher degree of education experienced less job insecurity because they had more control over their employment future. Whereas, individuals with lower education levels, a lack of abilities, and a lack of work experience have fewer opportunities; as a result, when they believe their employment to be threatened, they exhibit increased degrees of job insecurity.

According to research, women are more content with their work than men are because women are more family focused, have fewer financial requirements, and are less

ambitious. This finding is corroborated by Lim's (2008) study, which discovered that female workers were much more satisfied with their occupations. The finding by Lim (2008) is supported by (Zou, 2015). Research conducted by (White, 2020) contradicts this finding. White (2020) discovered that more women are pursuing STEM degrees (science, technology, engineering, and mathematics), hence reducing the gender gap. Females desire organizations that treat them equally and equitably. Females who work in a gender diverse setting report higher levels of happiness and are less likely to fear their organizations would ignore them for promotional opportunities or will discriminate against them based on their gender (White, 2020). Lim (2008) argues in favor of the concept of equity. He discovered that promotions are based on merit and an employee's ability to perform the job; he also discovered that employees who perceive more promotion prospects as a result of their talents are more satisfied.

Bhagwatwar et al. (2014) discovered that a degree alone is insufficient; information technology is a dynamic field that is always developing and evolving. As a result, employees are always asked to learn and maintain their abilities. IT professionals must write certification examinations to ensure that their degree does not become obsolete. For instance, in order to be recognized as an UiPath consultant, one must have certification in UiPath. These certificates are used to evaluate an employee's competence and expertise in a certain field. For example, software consultants write annual maintenance certification exams, which are tracked via a checkbox on their key performance indicators and ultimately factor into their salary. The Human Capital Theory corroborates this notion, stating that "education and experience make an employee more marketable" (Ghapanchi et al. 2013, p.100).

H5: *A negative relationship will be observed between an IT employee's education level and job insecurity such that IT employees with less education will report greater job insecurity than those with higher education level* (Keim et al., 2014).

b) **Perceived Employability/Mobility:** Employability is a term that relates to an individual's capacity to get and keep employment. Personal qualities such as age, skills, and expertise all contribute to an individual's employability (Yeves et al.,

2019). According to Yeves et al. (2019), older workers regard themselves as less employable than younger workers. However, both generations may fall on either side of the coin depending on the employer's preferences; for example, if the employer values experience, the older generation will have a better chance of finding work. According to Naidoo's (2018) findings, there is a scarcity of skilled IT professionals, which indicates that those who do exist will quickly find other jobs if their current employment situation changes. However, because the world of technology is rapidly evolving, the abilities held by existing IT professionals may become obsolete, affecting their employability status.

H6a: *Perceived Job Mobility will a) interact with the Perception of RAIA technology*

H6b: *Perceived Job Mobility will a) interact with the Perception of RAIA technology and b) job insecurity towards job satisfaction, with higher job satisfaction occurring for those with higher perceived Mobility*

H7: *A negative relationship will be observed between an IT employee's perceived employability and job insecurity such that IT employees with lower employability perception will report greater job insecurity than those with higher employability perception.*

c) **Perceived Control**: According to research conducted, work satisfaction increases for IT professionals when their jobs are fascinating, demanding, and fulfilling, and they have some control over the trajectory of their careers. According to Keim et al. (2014) individuals with an internal locus of control believe themselves to have greater control over life events and view their employment continuity as being up to them, not the companies for which they work, resulting in reduced anxiety about job losses. Higher-ranking employees are more satisfied with their jobs. The higher the rank of an employee, the more skilled and valuable the individual is to the firm (Crespi- Vallbona & Mascarilla-Miró, 2018). IT professionals enjoy labour market power, and the position they hold provides them with some level of leverage that they may use as a bargaining chip when it comes to mobility (Naidoo, 2018).

H8: *A negative relationship will be observed between employees perceived control and job insecurity such that employees expressing an internal control will report less job insecurity compared to those employees expressing external locus of control* (Keim et al., 2014)

3.5.1.6 Mediating Variable

3.5.1.6.1 Job Insecurity

Additionally, this study will examine the mediating effect of job insecurity on job satisfaction. According to Brougham and Haar (2018) employees' awareness of the possible threat to job security as a result of radical technological developments in an organization leads in employees acknowledging the growing threat to their job security, which affects their behavior and job satisfaction. Job insecurity is almost certain to have a negative impact on job satisfaction. Employee views of job insecurity will most likely be shaped by RAIA technology disruptions.

H9: *Job insecurity will be negatively correlated to job satisfaction and mediate the effects of the perceptions of RAIA technologies*

3.5.1.7 Dependent Variable

3.5.1.7.1 Job Satisfaction

Job satisfaction refers to the sense of well-being that employee experiences as a result of their work. Employees that are more satisfied with their jobs perform better, which contributes to the overall success of the firm (Reid et al., 2008). As numerous job satisfaction theories have stated, jobs are critical for humans because they enable individuals to pursue personal objectives and meet necessities such as shelter and food. (Mbhele, 2019). Job insecurity and job satisfaction have historically been found to be adversely associated (Reisel et al. 2007, p.108); this research expects that the same pattern will be detected. Therefore, this study posits that:

H10: *Perceived Job Insecurity is negatively correlated to job satisfaction, where job satisfaction increases with a decrease in job insecurity.*

The proposed research model consists of four main constructs, namely: RAIA technologies, Job Satisfaction, Job Insecurity and Job Mobility. The model's aim is to help understand the constructed hypothesis and enable in testing the said hypothesis. Table 3.1 below provides a summary of topics aligned to relevant hypotheses as well as the literature used to guide in formulating the research model and hypotheses.

Table 3.1 Summary of Topics and Proposed Hypothesis

Topic	Hypothesis #	Hypothesis	Resource
Perception of RAIA technology	H1	"Greater RAIA Awareness will be positively associated with job insecurity."	(Brougham & Haar, 2018)
Expected Retraining	H2	"Employees with higher expectations of retraining have significantly lower levels of perceived job insecurity"	(Lingmont & Alexiou, 2020)
Perceived Job Mobility	H3	"Job mobility will be positively correlated to job satisfaction such that the higher the perceived job mobility the higher the job satisfaction level"	(Brougham & Haar, 2020)
Perceived Job Mobility	H4	"The indirect effects of the perceptions of RAIA technologies on job satisfaction via job insecurity will be moderated by perceived job mobility, such that the indirect relationship becomes stronger as job mobility strengthens (moderated mediation)"	(Brougham & Haar, 2020)
Perceived Job Mobility	H5	A negative relationship will be observed between an IT employee's education level and job insecurity such that IT employees with less education will report greater job insecurity than those with higher education level	(Keim et al., 2014)
Interaction of Perceived Job Mobility and Perception of RAIA technology	H6a	Perceived Job Mobility will a) interact with the Perception of RAIA technology	(Yeves et al., 2019).
Perceived Job Mobility	H6b	Perceived Job Mobility will a) interact with the Perception of RAIA technology and b) job insecurity towards job satisfaction, with higher job satisfaction occurring for those with higher perceived employability	(Yeves et al., 2019).
Perceived Job Mobility	H7	A negative relationship will be observed between an IT employee's perceived employability and job insecurity such that IT employees with lower employability perception will report greater job insecurity than those with higher employability perception	(Yeves et al., 2019) and (Naidoo, 2018)

Topic	Hypothesis #	Hypothesis	Resource
Perceived Control	H8	"A negative relationship will be observed between employees perceived control and job insecurity such that employees expressing an internal control will report less job insecurity compared to those employees expressing external locus of control"	(Keim et al., 2014; Naidoo, 2018)
Job Insecurity	H9	"Job insecurity will be negatively correlated to job satisfaction and mediate the effects of the perceptions of RAIA technologies"	(Reisel et al., 2007)
Job Satisfaction	H10	Perceived Job Insecurity is negatively correlated to job satisfaction, where job satisfaction increases with a decrease in job insecurity	(Reisel et al., 2007)

3.6 Conclusion

This chapter drew on the past literature on job insecurity, job satisfaction and RAIA technology along with arguments from job satisfaction and job insecurity theories to develop a model of how RAIA technologies affect job insecurity and job satisfaction. Furthermore, the chapter presented the hypothesis developed for this study. The next chapter describes the research methodology undertaken in this research to test the study's hypotheses.

CHAPTER FOUR

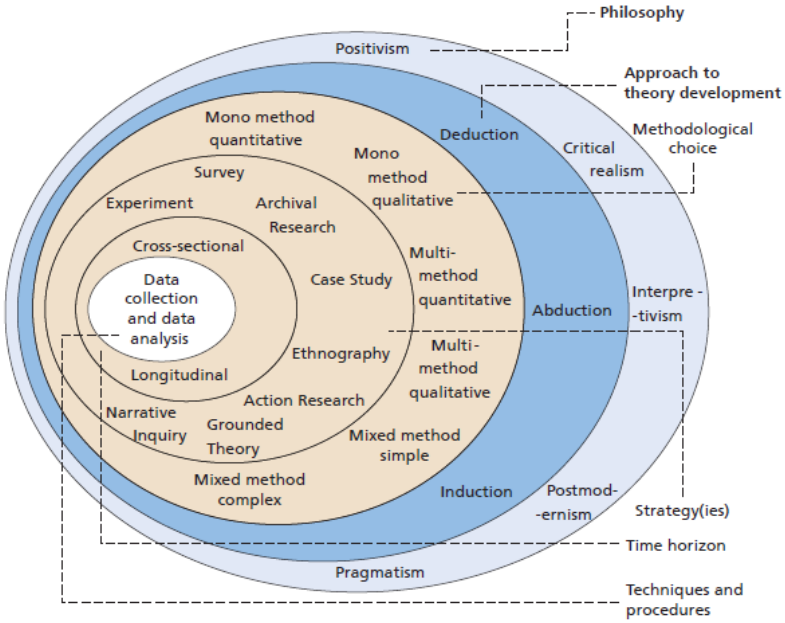
4. RESEARCH METHODOLOGY

4.1 Introduction

This chapter outlines the preferred research methodology employed in this study. The author uses Saunders et al. (2019) research onion to guide the selected methodology as depicted in the below image. The research onion is a guideline used to lay the foundation for this research paper. According to Saunders, Lewis and Thornhill (2019) the research process involves a process similar to peeling off the layers of an onion until one reaches the onion's core, representing data collection and analysis.

The chapter starts with stating the research objective and research questions, followed by an overview of the research design. In section 4.1 the author delves into the suitability of the chosen methodology (i.e., population sample, data collection strategy, operationalization of instruments). Furthermore, this chapter address's reliability and validity issues and finally discusses the ethical considerations. Section 4.5 of this chapter outlines the adopted data analysis procedures for the collected data.

Figure 4.1 Research Onion



Source: (Saunders, Lewis & Thornhill, 2019)

4.2 Research Paradigms and Approaches

Scientific study aims to find laws and propose ideas that may be used to explain natural or social occurrences, or to expand scientific knowledge. Logic and evidence are used to arrive at scientific rules or theories. Scientific knowledge is built on two pillars: logic (theory) and evidence (observations). Theories and observations are inextricably linked in science and cannot exist without one another. Theories give meaning and value to what we see, and observations aid in the validation or refinement of current theories or the development of new ones (Bhattacherjee, 2012)

Scientific research, according to Bhattacherjee (2012) has two levels: a theoretical level and an empirical one. The theoretical level is stated to be concerned with the formation of abstract conceptions about a natural or social phenomenon and their relationships, whereas the empirical level is concerned with the testing of theoretical concepts and relationships. Depending on the researcher's interest scientific inquiry can take one of two forms, namely: inductive or deductive. These two inquiries are referred to as research paradigms (Bhattacherjee, 2012).

A researcher's purpose in inductive research is to derive theoretical notions and patterns from observed facts. The researcher's purpose in deductive research is to examine notions and patterns derived from theory using new empirical data. Inductive research is also known as theory-building research, whereas deductive research is known as theory-testing research (Bhattacherjee, 2012)

Researchers use two broad paradigms in their research: positivist and interpretive. These two paradigms are discussed in the following sections.

4.2.1 Positivist Paradigm

According to literature between the years 1798 and 1857 a French philosopher, Auguste Comte, pioneered the positivist paradigm, which holds that universal rules can explain the world and that the world is unchangeable (Kivunja & Ahmed, 2017). A positivist researcher examines and documents occurrences and phenomena occurring within a certain situation in order to ascertain these rules. They determine the principles that created the incident through their observations. Positivists are

stated to think that reality exists independently of the observer. They think that subject and object are distinct entities; hence, their ontology is dualism (Webber, 2004).

According to Webber (2004), positivists favour quantitative research methods such as laboratory experiments, surveys, and field experiments over qualitative research methods. Positivists look for empirical facts that they can analyse using statistics to find abnormalities. Interpretivists, on the other hand, favour qualitative research methods such as phenomenography, ethnography, ethnomethodology, grounded theory, and case studies as their preferred research method. They claim that these strategies allow them to have access to the subjective experiences of the participants (Webber, 2004).

Positivists believe that if the results of the conducted research can be replicated by either him/herself or other researchers then that proves that the research is reliable. It is believed that if there are elements of bias or if one chooses to use a different context or if measurement errors exist this would lead to inconsistencies thus resulting in the research being unreliable(Webber, 2004).

4.2.2 Interpretivist Paradigm

In contrast to the positivist research paradigm, the interpretivist paradigm presupposes that social reality is never static but is always altered by social context. Unlike positivists, interpretivists argue that the observer of reality and reality cannot be considered distinct entities, and they believe that the researcher becomes immersed in the social setting of the research. They believe that an observer's life experiences shape their perspective on the world (Thomas, 2010; Webber, 2004).

According to Saunders, Lewis, and Thornhill (2009) deductive approaches are used when developing a theory and a hypothesis (or hypotheses). When, on the other hand, the research comprises the collection of data and the development of a hypothesis based on the facts acquired, the approach selected is termed inductive. Positivist researchers rely heavily on deduction, whereas interpretivists rely heavily on induction.

4.2.3 Research Paradigm

The research problem addressed by this study is on the lack of adequate research on the effects of the perceptions of South African IT professionals on RAIA technology and how those influence the relationship between job insecurity and job satisfaction. The study aims to bridge information gaps by evaluating the existing relationship between the aforementioned factors. Therefore the aim of this research is not to describe RAIA technology and the effects on job insecurity and job satisfaction, but rather to find if there is a statistical relationship between RAIA technology, job insecurity and job satisfaction and therefore the study restricts itself to what can be observed through measurement and does not provide an in depth view of an IT professionals subjective feelings. Due to this reason this study is thus informed by a positivist perspective.

The positivist research paradigm informs this study primarily because the paper seeks to explain how variables interact. It presents ideas and connections between variables based on existing research on job insecurity and job satisfaction. Additionally, quantitative measures are used to evaluate the claims. The next layer of the research onion is concerned with the research methodology.

4.3 Research Design

The process of generating and selecting a blueprint of actions required to satisfactorily answer the research questions provided by researchers is known as research design (Bhattacherjee, 2012). The third layer of the research onion outlines the author's tentative plan for addressing the research question. Exploratory research, descriptive research, relational research, experimental research, and explanatory research are all common research designs, and these will be discussed in the next sections.

4.3.1 Exploratory Research Design

Exploratory research is used when little is known about a topic; as a result, this sort of study is used when there are few or no previous studies in the area of interest that the

researcher desires to pursue (Neuman, 2002). The goal of this form of research is to obtain a better understanding or insight into a phenomenon by looking into specific research questions.

Exploratory research, according to Neuman (2002) does not strive to provide conclusive solutions to identified problems or a plan of action in decision-making. The research focuses on a problem that has yet to be adequately characterized. Rather of testing a hypothesis, this form of research usually produces one. "Researchers who perform exploratory study must be innovative, open-minded, and flexible; adopt an inquisitive perspective, and examine all sources of knowledge," says Neuman (2002, p.38)

4.3.2 Descriptive Research Design

In order to characterize people, situations, or things, descriptive research adheres to specific principles. Descriptive research can't definitively address the why issue, but it can explain what, who, when, and how. The basic goal of descriptive research is to collect data on a phenomenon and characterize the numerous variables that make up that phenomenon. Variables are defined, explained, and validated in this type of study (Neuman, 2002). Descriptive research is frequently observational, but it is not restricted to observations when it comes to data gathering methods; case studies and surveys are also viable options.

4.3.3 Relational Research Design

The term ‘relational/correlation study’ refers to a study that needs one to comprehend the relationship between variables. A study that analyzes the statistical relationship between two or more variables (i.e., correlation) with no manipulation of the independent variable is known as relational research. It is the attempt to explain a phenomenon using conditional statements such as "if X, then Y." This sort of study examines how a specific modification affects pre-existing assumptions or conventions (Neuman, 2002). The goal of such research is to see if there is any of the following:

a) Positive Correlational: When variables move in the same direction, they are said to be positive correlational.
b) Correlation is negative when variables move in opposite directions.
c) Zero Correlation: The variables being measured have no relationship.

4.3.4 Experimental Research Design

Experimental research design is a scientific method of doing research in which an independent variable is changed and applied to dependent variables in order to determine the correlation between the independent and dependent variables. To allow researchers to draw solid conclusions about the relationship between the measured variables, the effect is frequently observed and quantified throughout time(Neuman, 2002).

4.3.5 Explanatory Research Design

Explanatory study seeks to explain phenomena in a causal manner. It explains ‘how’ and ‘why’ there is a link between phenomena. Explanatory studies are generally integrated with descriptive investigations since they are more interpretative(Neuman, 2002).

4.4 Research Methodology

The third layer of the research onion outlines the author's tentative plan for addressing the research question. This section discusses the chosen approach.

Following on from the previous section, this study adopted a relational research design because of its aim to establish if a relationship exists between two or more potentially related variables that describe a phenomenon.

According to Webber (2004), positivists favour quantitative research methods such as labouratory experiments, surveys, and field experiments. Positivists strive to identify abnormalities in empirical data through statistical analysis; they describe their subjects in terms of observed behaviour.

The aim of the research is to provide directionality of the existing relationships between perceived RAIA technology, Job Insecurity and Job Satisfaction and therefore causation does not form the basis of this study. Correlational research is a term that refers to a study that examines the statistical relationship between two or more variables (i.e., correlation) without manipulating the independent variables. It makes an attempt to explain a phenomenon using conditional statements such as 'if X then Y' (Dixon & Hart, 2010).

The methodology selected for this study is the survey methodology. Saunders et al. (2019) state that this method is frequently employed in quantitative/deductive studies. It is used to provide information on what, who, where, how many, and how much. Surveys are widely used because they: Allow researchers to collect data from a large sample size in an economical manner; they can be administered using questionnaires and are easily comparable, they can be quantitatively studied using statics and they enable researchers to make hypotheses about the causes of the association between variables Saunders et al., (2019).

4.4.1 Suitability of the Research Design and Methodology

By emphasizing the research method's advantages and disadvantages. This section analyses the appropriateness of the research approach and design chosen.

4.4.1.1 Survey Design: Strengths

Creswell (2014, p.41)provides the first strength of a survey design: by stating that it “provides a quantitative or numeric description of some fraction of the population (the sample) through the data collection process of asking questions”. The second strength of a survey is that surveys assist in gathering large scale data that can be used to make generalizations as the respondents come from a diverse and broad population (Cohen, Manion & Morrison, 2007).

This study’s data was collected by means of an internet-based survey.

The first strength of this approach is that it allows researchers to reach individuals whom they might have not been unable to reach via a paper-based approach (Stern, Bilgen & Dillman, 2014). There are several advantages in using an internet-based approach as compared to using a paper-based approach: for example, it reduces costs (printing, ink, paper, postage), it reduces the time spent sending out posts or

handing out and collecting the surveys, data distributed via a web portal or via the internet is accessible immediately, and the results can be processed automatically, this method allows researchers to reach a broader and larger audience, researchers can reach complex populations under the anonymity cover, respondents can answer the questionnaire from anywhere where they feel comfortable and around familiar settings(Cohen et al., 2007; Creswell, 2014). Furthermore, surveys can generate statistically manipulable data (Cohen et al., 2007).

Additionally, this design enables the researcher to create findings that are representative of a specific group without requiring the entire population to participate in the study (Bhattacherjee, 2012). A large amount of data can be collected using this method with relatively low-cost implications. The other advantage of the quantitative survey approach is that the surveys can be evaluated and administered promptly. There is no need for the researcher to be onsite, and the results can be tabulated in a short time frame. In addition, according to Yauch and Steudel (2003), numerical data obtained through this type of approach helps determine the extent of disagreement between participants.

4.4.1.2 Survey Design: Weaknesses

On the other hand, surveys do have certain disadvantages. As a result, the method's virtues can also be its weaknesses. For example, the population sample's features, such as their perceptions, cannot be understood in isolation from the local area in which the individuals live. The other disadvantage is that quantitative research of this type necessitates a high sample size in order to collect significant data. The other shortcoming of surveys is that they do not collect detailed descriptions of participants' experiences and emotions (Yauch & Steudel, 2003).

The first consideration is ethical, as respondents may prefer to maintain their anonymity even from the researcher. For instance, if the survey contains items that could result in criminal prosecution, it seems logical for the responder to request anonymity. However, the inability of respondents to be traced can provide a dilemma for the researcher, particularly if the researcher identifies a follow-up question and wishes to have the same group of respondents answer it (Cohen et al., 2007). To

calm respondents and alleviate any fear they may have about answering the researcher's questions, the researcher has promised the respondents that their information will be kept confidential and POPIA rules would be applied. Respondents have been given surety that their responses will be used solely for research purposes.

The second disadvantage of online surveys is the risk of non-response and volunteer bias. Volunteer bias is a concept that refers to subjects who participate in research on a voluntary basis; nevertheless, the difficulty is that these volunteers differ from the general population in some ways research (Cohen et al., 2007). Due to volunteer bias, the results are not representative of the population and hence cannot be generalized. Volunteer bias is an issue of external validity. To address this issue, the researcher emphasized to respondents that their comments will stay anonymous and will be used solely for research reasons; by following this strategy, the researcher hopes that it instilled confidence in the targeted persons to respond or participate in the research (Cohen et al., 2007).

The third issue with internet-based surveys is the format in which they are created. According to Stern, Bilgen and Dillman (2014), there is evidence that a large percentage of people have migrated away from desktop computers and toward smartphones for daily tasks. As a result, they emphasize the need of employing formats that take up less space, are easily readable on smartphones, and do not require several pages.

Another difficulty with quantitative surveys is that they are objective and do not provide sufficient context for the researcher, which means that the researcher knows very little about the respondent's qualities, which forces the researcher to make assumptions when interpreting the results. The absence of context demonstrates a difficulty in eliciting information about a respondent's past. These difficulties demonstrate how surveys frequently lack validity (Babbie, 2013). To address this concern, the researcher has asked questions that elicit information about the respondent's background.

4.4.1.3 Conclusion on the suitability of the selected method

Despite the flaws mentioned above, this data collection method was deemed to be the preferable alternative due to its ability to get the necessary data to answer the study's

research question. A survey was the best way to ensure that the results truly reflected the population sample chosen, because surveys reach a wide number of people.

4.5 Data Collection Methods

Once a research strategy has been identified, the next step is to establish the researcher's method to collect data (Naoum, 2012). Researchers can choose from a wide range of data collection methods; however, the most common are experiments, unobtrusive research, case research, interpretive, evaluation research and survey research (Babbie, 2013; Bhattacherjee, 2012).

According to Bhattacherjee (2012), experimental research involves the manipulation of variables by the researcher. The research subjects are then randomly assigned to experiment groups, and the results from the experiment groups are observed. Bhattacherjee further states that experimental research is unique because it has high levels of internal validity due to its ability to link cause and effect (Bhattacherjee, 2012). This type of data collection method is suitable for explanatory research where the goal of the study is purely to identify the cause-and-effect relationship between variables (Babbie, 2013; Bhattacherjee, 2012).

Another standard data collection method is the unobtrusive method. This method refers to a method whereby data is collected through studying research participants. However, this method is unique because the researcher does not interact with the individuals being studied. (Babbie 2013, p.332) defines this study as “a method of studying social behaviour without affecting it”. This type of method can be used for both qualitative and quantitative research.

Alternatively, researchers can employ case research, also known as case studies; this type of research involves studying a phenomenon within its natural setting over a period of time. Multiple data collection methods can be used with case studies such as observations, pre-recorded documents, secondary data, and interviews. The benefits of a case study are that the results are often rich and contextualized. A case study can be used for either theory testing or theory building. The drawbacks of case study research are that there is no experimental control, and therefore, the internal validity of such a study remains weak. Internal validity is an issue with all other methods except for experiments,

and this drawback can be addressed by using natural controls (Bhattacherjee, 2012). The second drawback is that case studies rely heavily on the researcher's integration. In such cases, experienced researchers tend to quickly identify concepts and patterns, whereas a novice researcher might not. Hence (Bhattacherjee, 2012) sees case studies as being subjective.

Another standard data collection method used is the survey method. Survey research uses a standardized questionnaire or interview to collect data systematically; its core aim is to collect data about individuals' preferences, behaviours, and thoughts. This type of research is popular within the social science field and can be used for explanatory, exploratory and descriptive research. Bhattacherjee (2012), states that this type of data collection method is best suited for studies where the unit of analysis is individual people. In addition, Babbie (2013, p.254), has found that surveys as a data collection method are the most appropriate for "collecting original data for describing a population too large to observe directly". This studies aim was to understand IT professionals' perceptions; to generalize the results, the researcher had to obtain a large sample size in a relatively short period, and the data had to be representative of IT professionals at large. In addition, the study is relatively new within the select unit of analysis. Over and above that, surveys are less expensive than other techniques. They can be administered quickly, and due to these reasons, this study adopted the survey data collection method.

4.5.1 Instrumentation

The following section discusses the structure of the survey used in this study. The section includes an outline of the questionnaire, how the pre-pilot and pilot tests were conducted and discusses the format of the questions.

4.5.1.1 Question Format

According to De Vaus (2002), participants can use two types of responses in survey studies. They can respond in open-ended (unstructured) or close-ended (structured) format or respond through both formats. Open-ended surveys are the opposite of closed-ended surveys; here, the researcher provides respondents with a textbox, which prompts respondents to write a unique response (Bhattacherjee, 2012; de Vaus, 2002).

Open-ended questions are suitable for studies that describe a phenomenon, trend or pattern and are used in exploratory research. Open-ended surveys motivate respondents to express their feelings or experiences (Naoum, 2012). According to Naoum (2012), predictability for an open-ended type of questionnaire is more difficult to interpret, and in addition, because this format is open-ended and allows respondents to provide broad answers, it becomes difficult to analyse.

A closed-ended survey is a method used by researchers where respondents are provided with questions, but those questions have a set of predefined options; they take the form of multiple-choice questions where participants choose from that predefined list (Bhattacherjee, 2012). Closed-ended questions are used to collect quantitative data, which is used to determine some statistical significance.

The closed-ended format has a few problems: (1) answers can sometimes provoke respondents to select options they would not have otherwise selected had the answers not been part of the options; (2) respondents might find that the provided options do not represent their views; at this point, they might skip through the question or randomly choose from one of the options; (3) providing respondents with too many choices can lead to confusion; (4) it is difficult to establish which respondents misunderstood the question and, as a result, selected the incorrect option (Bhattacherjee, 2012). However, unlike the open-ended format, the closed-ended format requires the respondents to provide answers through short responses that can be converted into a scale; for instance, respondents can choose between yes or no, agree or disagree and so on (Naoum, 2012).

The survey instrument that was used in this study was an online-based questionnaire. A questionnaire is described as a tool for collecting data through standardised questions that follow a fixed scheme (Saunders, Lewis & Thornhill, 2009). Due to the nature of this study's research questions, a closed-ended questionnaire format was employed. The survey used in this study used scales to collect data from respondents. Scales are defined as a "composite measure of a concept that is created by examining a person's responses to a set of questions and then combining answers into a single composite measure of the underlying concept" (De Vaus 2002, p.168).

When a survey is designed, the following scales may be used: the first is the dichotomous (binary) scale – this type of scale provides opposite options such as true or false, yes or no, fair or unfair and so forth. With this type of scale, respondents cannot be neutral; the

scale provides a clear binary answer. The other scale is the rating scale; this scale uses statements such as, on a scale of 1 – 10, how confident is the respondent that their job is not at risk and the most common ratings are 1-10, 1-7 and 1-5 (Likert scale). When using the rating scale, it is essential to note that the difference in the outcome depends on the chosen scale; the variance is more significant in larger scales, which has led to the Likert scale being the most used rating scale. The last scale is the semantic differential scale. This scale asks respondents to "indicate their opinions or feelings toward a single statement using different pairs of adjectives framed as polar opposites" (Bhattacherjee 2012, p.48).

According to De Vaus (2002), the use of scales increases the number of valid measures, enables greater precision, assists in interpreting complex concepts, and simplifies data analysis. This study used the Likert scale to collect data; this type of scale consists of worded statements where respondents indicate their agreement or disagreement on a five or seven-point scale. According to Bhattacherjee (2012), Likert scales allow for granularity than binary scales, and it shows when respondents are neutral to certain statements.

4.5.1.2 Self-Administered Questionnaire

This section outlines the questionnaire chosen in this study. According to Bhattacherjee, (2012, p.74), a questionnaire "is a research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner." This study used self-administered questionnaires. A self-administered questionnaire is a structured form consisting of either closed-ended questions, open-ended questions, or a combination of two. It is called self-administered because the respondents complete and interpret the questionnaire without the assistance or interference of the researcher. In self-administered questionnaires respondents receive the questionnaire via an online portal or tool such as survey monkey.

Due to the nature of this study being exploratory, there were limited instruments the researcher could adopt. Therefore, the researcher used the existing literature to develop the survey items according to the research questions. The process followed to create the research instruments involved developing a wide range of questions; this was followed by an elimination process where the researcher identified whether the question will aid in

answering the broader research question (this was achieved by asking if the question is needed). The final step involved grouping the questions into themes. Some of the questions and themes were adopted from the research conducted by (Brougham & Haar, 2018).

The questionnaire used in this study was divided into six parts as described below.

Part 1: Demographic Information

The first section of the questionnaire (part 1) aims to understand the gender and educational level of the participants; the distribution of the participants gender was collected through a binary scale where 0 denoted male and 1 denoted female, and the educational level was collected through a nominal scale. In addition, part one provides the age group to which participants belong, which was also accomplished using a nominal scale.

Part 2: The perception of RAIA technology

The second section of the questionnaire (Part 2) aims to understand the perception levels of South African IT professionals on RAIA technology. The total for this construct is 4 questions The response options are the 5-point Likert scale ranging from strongly disagree to strongly agree.

Part 3: Job Insecurity

The third section of the questionnaire (Part 3) investigated the Job Insecurity construct. This part of the questionnaire consists of 11 questions. The response options are the 5-point Likert scale ranging from strongly disagree to strongly agree. This section is closely linked to section four, it explored the IT professional's perception of their job insecurity levels, where the level of insecurity will either negatively or positively affect job satisfaction.

Part 4: Job Satisfaction

The fourth section of the questionnaire (Part 4) pertained to the Job Satisfaction construct. The part of the questionnaire consists of 20 questions. The response options are the 5-point Likert scale ranging from very dissatisfied to very satisfied. This section explores IT professional's job satisfaction levels. Section four is followed by section five (5),

Part 5: Perceived Job Mobility

The fifth section of the questionnaire (Part 5) pertains to the perceived job mobility construct. This part of the questionnaire consists of 5 questions. The response options are the 5-point Likert scale ranging from strongly disagree to strongly agree. This section explores IT professional's beliefs regarding their perceived job mobility/employability. Questions regarding control and power are included in this section as those questions were assumed to help understand the level of control that the participants have over their jobs and therefore these helped explain the perceived job mobility.

Part 6: Expected Retraining

The sixth section of the questionnaire (Part 6) pertains to the expected retraining construct. This part of the questionnaire consists of 2 questions. The response options are the 5-point Likert scale ranging from strongly disagree to strongly agree. This section investigated the level of expected retraining from the participants. As technology within organizations changes so does the skills requirements, it is therefore important for employees to continuously advance themselves and learn new technologies for them to remain relevant. Therefore, this question was important to ask as it illustrated whether employees believe that they should be retrained or if they believe that their skills will become obsolete and therefore lose their employment.

4.5.2 Pre-Test and Pilot Test Strategy

Prior to distributing the survey to the intended participants, the survey instruments needed to be tested for reliability and validity. A pilot test was conducted to validate the questionnaire as a suitable instrument for this study. Pilot testing a questionnaire is essential in research. It helps identify issues with the structure of the questions, helps identify leading questions, and helps identify questions that might lead to bias. According to Cohen, Manion and Morrison (2007), researchers need to run through a pilot and a pre-pilot test as the difference between the two is significant. They further highlight that a pre-pilot test consists of open-ended questions that generate the categories for the closed multiple-choice questions. The pilot test tests the actual instrument. Pilot testing is a great tool to ensure face validity (Bhattacherjee, 2012). For this study, the following was done to conduct pre-test and piloting:

The researcher selected five experts within the Information Technology sector. The researcher found a range of different IT professionals representing the target population. The aim of this test phase was to simulate how the actual questionnaire will be distributed and answered, meaning that the testers were sent a link to the online questionnaire. At this point, the five respondents were advised to take note of any errors they might see and to provide those results to the researcher. The group of participants did not provide significant changes to the questionnaire and there was therefore no need to repeat the pre-pilot test.

Upon the completion and review of the pre-pilot test, the researcher distributed the questionnaire to thirty (30) randomly selected people to complete the survey from start to finish. This step of the process is known as the pilot test.

The researcher was provided with comments from the respondents, where the comments stated that:

a. The wording on the questions was ambiguous, out of the 30 pilot test participants 9 of them skipped through vital questions, the reason for them skipping those questions was because they believed that the researcher was asking the same question differently and therefore treated those questions as duplicate entries. However, the researcher purposefully added those questions to test whether or not respondents were consistent when answering questions.

To resolve this issue the researcher made these questions mandatory, and respondents could not skip through these questions.

b. Another comment stated that the use of terminology influenced the way respondents answered the questions. An example provided by one of the respondents stated that one of the questions asked if the respondent believed that they could be fired due to technology, whereas the other question asked if the respondent believed that they could be dismissed. The respondent felt that the two questions were leading them to a specific response where fired seems harsh and makes it appear like the respondent participated in misconduct and therefore their response to that question would always be no. However, they felt that dismissed was the equivalent of retrenched and felt like they could agree to that question.

4.5.3 Population Sample and Context

With non-favourable time constraints and limited resources, it would have been difficult for the researcher to study the entire population of interest; hence the researcher pulled a sample from the intended population. The aim was to distribute the survey to a minimum of 350 IT professionals. According to Bhattacherjee (2012), two broad sampling techniques can be used in such research, namely: non-probability sampling and probability sampling. Non-probability sampling is a technique where the researcher does not randomly select the participants but uses subjective judgement to select the participants. This technique is usually used in qualitative research and includes convenience sampling, purposive sampling, snowball sampling and voluntary response sampling (Bhattacherjee, 2012).

On the other hand, probability sampling is a technique used by researchers to choose a sample from a large population randomly. Probability sampling allows researchers to generalize their findings, and it is the recommended sampling technique for survey-based research (May, 2011). The generalizability of this study's results is essential, and due to that reason, this study applied the probability sampling technique.

The South African IT sector falls within a greater sector called the MICT (Media, Information and Communication Technologies) sector. This sector consists of five

interconnected sub-sectors: information technology, film and electronic media, telecommunications, electronics, and advertising. According to (MICTSETA, 2021), the MICT sector comprises 28 829 categories spread across the five sub-sectors, with the Information Technology sector being the largest sector accounting for 51% of the employers. The IT sector is then followed by the electronics and telecommunications sector, each accounting for 13%, closely followed by the advertising sector accounting for 12% of the employers and followed by the film and electronic media, accounting for 11% of the employers in the MICT sector. Employment in the MICT sector has grown over the past few years, reaching 2,315,009 employees as of August 2020.

This study's main objective was to acquire a greater understanding of South African IT professionals' perceptions of RAIA technologies on job insecurity and its moderating effect on job satisfaction. Therefore, the study focused on the broad MICT sector but only looked at the IT sub-sector with a special focus on IT project managers within the software development space, computer systems analysts, software developers, programmers, IT consultants working in robotics for example UiPath consultants, data scientists and those working in artificial intelligence. To allow the researcher to reach the desired population the researcher had to acknowledge that there was evidence that showed that there were fluid boundaries between an IT professionals competence where IT can be found to play a role in other professions such as Finance, Procurement, Retail, Professional Services and even in Human resource (Thompson, 2008). Due to this reason the researcher expanded the population scope by researching the perceptions of IT professionals within the banking and retail industry space as well.

4.5.4 Questionnaire Administration

This section describes the procedure used to distribute the questionnaire to prospective participants. For the survey to be distributed effectively and to large sample size, it was found that distributing the survey over the internet would be the most effective tool. Thus, the survey was administered using an interactive online form called SurveyMonkey. Post conducting the pre-pilot and pilot test, the researcher tested for and ensured that the survey met all the reliability and validity requirements, the researcher then drafted a brief description of the survey and posted the brief

together with the survey online. The survey was distributed on the researchers LinkedIn profile, Facebook and Twitter accounts. LinkedIn was the perfect social media platform to use as it already has access to IT professionals. The researcher used filters to ensure that the survey reached the intended participants: where the participant met the following criteria (1) must be an IT professional, (2) must be in the Information Technology and Services Industry within the specified categories as listed in section 4.5 and (3) must work in South Africa.

4.5.5 Operationalization/Measurement

The process of establishing indicators or items for measuring theoretical notions is known as operationalisation (Bhattacherjee, 2012). This study went through past literature to obtain the proposed constructs. The constructs presented below were conceptualized using content and process theories presented in chapter three. For this research paper, job satisfaction was treated as the dependent variable, and job insecurity as the independent variable where the perception of RAIA technology was the antecedent variable.

4.5.5.1 Antecedent Variable: The perceptions of RAIA technologies:

The perception of RAIA technologies was measured using the 4-item STARA awareness questionnaire created by (Brougham & Haar, 2018).

The four items were: (1) “I think RAIA could replace my job”, (2)” I am personally worried that what I do now in my job will be able to be replaced by RAIA”, (3) “I am personally worried about my future in my organisation due to RAIA replacing employees”, (4) “I am personally worried about my future in my industry due to RAIA replacing employees”. These were measured using a 5-point Likert scale coded as 1 = strongly disagree, 5 = strongly agree (Brougham & Haar, 2018). In their study this item showed a very good reliability where the reported alpha was 0.85. Due to this reason this study adopted this measure as it had already been tested and proved to have good reliability measure.

4.5.5.2 Independent Variable: Job Insecurity:

The global measure of Job Insecurity is the 11-Item questionnaire developed by De Witte. This scale was tested for reliability and showed a reliability of 0.86, and it has proven to be a valid scale in explaining variance in job satisfaction (De Cuyper 7 De Witte, 2005). For this reason, this study used the Job Insecurity Questionnaire (JISQ) to study job insecurity levels amongst IT Professionals.

4.5.5.3 Dependent Variable: Job Satisfaction

To measure job satisfaction, the Minnesota Satisfaction Questionnaire was used. The Minnesota Satisfaction Questionnaire is designed to measure an employee's job satisfaction. It asks respondents to rate themselves on 20 questions, using a 5-point Likert scale. This questionnaire was tested at selected organizations in South Africa by Buitendach and Rothmann (2009) and they found that it is a reliable instrument to assess job satisfaction. Their study reported an alpha coefficient of 0.96, and the test-retest reliabilities were between 0.70 and 0.80, which proves that internal consistency was established, which shows that the items measured on the job satisfaction questionnaire are closely grouped. Due to this reason this study uses this measure-to-measure IT professionals satisfaction levels.

4.5.5.4 Moderating Variables - Expected Retraining

The expectations of retraining were measured on a two-item questionnaire adapted from Kraimer et al. (2010). This study showed an alpha of 0.92. Some of the questions used were "If some tasks I perform now for my job will be replaced RAIA technologies, I expect my organization to provide opportunities for me to adapt to the new job description.", "When my organization replaces employees with RAIA technologies, I expect my organization to have career development programs that help employees develop specialized functional skills and expertise for new jobs". The reported alpha coefficient for this measure proves that reliability was once established and that gave this study reason to re-use this measure to measure the expectations of IT professionals with regards to retraining.

4.5.5.5 Moderating Variable

4.5.5.5.1 Perceived Job Mobility:

The degree of unemployment and perceived employability was measured using the two-item measure for job mobility created by Tepper (2000). This measure has the following items “If I were to quit my job, I could find another job that is just as good” and “I would have no problem finding an acceptable job if I quit”. This item measure uses the following codes 1 = strongly disagree, 5 = strongly agree (Tepper, 2000). This study has chosen to use this measure as it has previously reported a Cronbach’s alpha coefficient of 0.78, which shows that reliability was established in their study.

4.5.5.5.2 Education Level:

Education was measured by assigning numerical values with the following codes: 1=No formal schooling, 2=Primary School, 3=High School, 4=Diploma, 5=Undergraduate Degree, 6=Post Grad Honors Degree, 7=Post Grad Master’s Degree, 8= PhD

4.5.5.5.3 Perceived Control:

This variable was measured using the 3-item powerlessness questionnaire created by Ashford, Lee and Bobko (1989). The scale was evaluated using a 5-point scale where 1 denotes totally disagree and 5 denotes totally agree. This study showed that the alpha coefficient was 0.83 thus showing a good reliability and thus the reason for its adoption in this study.

4.5.5.6 Control Variables

Following the example of similar studies e.g., Brougham and Haar (2018), the variables to control for this study included Age and Gender. The gender variable was coded as 0 denoting males and 1 denoting females. The Age control variable was measured through grouping age groups based on the below table:

Table 4.1 Age Grouping

Grouping	Year	Age Range
Boomers	1946 - 1964	56 -74
Generation X	1965 -1980	40 - 55
Millennials	1981 - 1996	24 - 39
Postmilennials	1997 - 2002	18 -23

4.6 Data Analysis Methods

The following section discusses the chosen method to process and analyse the data acquired from the questionnaire. A quantitative study aims to collect numerical data; therefore, the collected data was converted into numerical values. This process was achieved through a two-stage approach where the data collected was automatically converted using Survey Monkey and thereafter data was cleaned.

Once data was cleaned the next process was to determine the validity and reliability of the measuring instruments. It is important for researchers to show that the measurement items used in their studies demonstrate adequate discriminant and convergent validity. Convergent validity ensures that two constructs that should be related explained the bulk of the variation in the underlying items, i.e., how close, or how much the items converge on the construct. Discriminant validity states that items should correlate more strongly among themselves than with items from other constructs that aren't meant to correlate. To test for discriminant validity one can, use either of the following methods: (1) Chi-Sqaure – this method allows the researcher to compare two models, one in which the constructs are associated and one in which they are not. The constructs have discriminant validity when the test is significant. (2) O-Sorting - The goal of the Q-sorting process is to segregate objects in a multi-dimensional construct into domains. (3) Average Variance Extracted Analysis - In an AVE analysis, researchers look to check if the square root of each latent construct's AVE value is substantially larger than the correlation between any two latent

constructs. The explained variance of the construct is measured by AVE. When comparing AVE to the correlation coefficient, researchers are looking to see if the construct's items explain more variation than the other constructs' items. This study demonstrated discriminant validity by applying average variance extracted analysis (Zait & Bertea, 2011).

This research paper has one moderator variable which is used to measure the strength between RAIA perceptions and job insecurity. This moderator variable was tested using moderator analysis; this type of analysis is done to establish whether the relationship between the perception of RAIA technologies and job insecurity depends on the value of the moderator variable.

4.6.1 Data Cleaning, Coding and Missing Values

Data coding was done on the data first. Data coding is the process of putting data into a numeric format that computer systems can understand in order to do statistical analysis (Bhattacherjee, 2012). Data cleansing is the second task completed. The goal of data cleaning is to detect any inaccuracies and correct them as soon as possible so that any impact on the results is minimal. To improve the accuracy of the data, it had to be prepared in terms of coding and cleaning before it could be analyzed (Pallant, 2020).

4.6.1.1 Coding

The completed questionnaire data was exported into a Microsoft Excel file from SurveyMonkey. After that, the quantitative data was analyzed using a statistical analysis tool (SPSS). To improve the accuracy of the data, it had to be prepared in terms of coding and cleaning before it could be analyzed (Pallant, 2020). Table 4.2 illustrates the coding used in this study. After that, an Excel codebook was created to define and label all the variables from the questionnaire, as well as assign numerical values to all the responses based on the chosen Likert scale used for that part of the questionnaire.

Table 4.2 Coding Results

Construct	Response	Response Code Mapping
Part 2 (PR)		
Perception of RAIA	Strongly Disagree	1
	Strongly Disagree	2
	Disagree	3
	Neutral	4
	Agree	5
Part 3 (JI)		
Job Insecurity	Strongly Disagree	1
	Disagree	2
	Neutral	3
	Agree	4
	Strongly Agree	5
Part 4 (JS)		
Job Satisfaction	Very Dissatisfied	1
	Dissatisfied	2
	Neutral	3
	Satisfied	4
	Very Satisfied	5
Part 5 (PJM)		
Perceived Job Mobility	Strongly Disagree	1
	Disagree	2
	Neutral	3
	Agree	4
	Strongly Agree	5
Part 6 (ER)		
Expected Retraining	Strongly Disagree	1

Construct	Response	Response Code Mapping
	Disagree	2
	Neutral	3
	Agree	4
	Strongly Agree	5

4.6.1.2 Missing Value Analysis and Data Cleaning

The data in the Excel spreadsheet was checked for any missing information (for example, this would include questions that were not answered). 389 participants started the questionnaire, with 296 responding to all 45 questions, resulting in a completion rate of 76 %, which is an acceptable percentage (Baruch & Holtom, 2008). Due to this reason, the researcher excluded all the incomplete responses from further analysis leaving the sample population as 296.

4.6.1.3 Transformation Process

Reverse Coding

Before data values can be usefully evaluated, they must sometimes be transformed. For example, reverse coded items should be reversed (e.g., in a 1-7 interval scale, 8 minus the observed value reverses the value) before being compared or mixed with things that are not reverse coded. Producing scale measures by adding individual scale items, creating a weighted index from a set of observed measures, and collapsing numerous values into fewer categories are all examples of transformations (e.g., collapsing incomes into income ranges) (Bhattacherjee, 2012). In this study three items from the job insecurity section of the questionnaire were negatively worded (JI1, JI2, JI3) and therefore required the researcher to reverse code these items. Figure 4.3 below illustrates the reverse coding applied.

Table 4.3 Table Reverse Coding

Item Construct	Code	Reverse
JI1: “I think that I will be able to continue working here.”	1	5
	2	4
JI2: “There is only a small chance that I will become Unemployed”	3	3
	4	2
JI3: "I am very sure that I will be able to keep my job"	5	1

A data set was created from the responses to the study questions. Following that, the responses were analyzed using SPSS version 26.0, AMOS and PROCESS. The initial results are presented in numbered Tables and Figures for each category.

The second stage included cleaning the data gathered; the data cleaning process removed responses that were not completed and responses that had proven to be outliers compared to the other responses

4.6.1.4 Skewness and Kurtosis

The skewness and kurtosis values of the variables was tested. The value for skewness is indicative of the symmetry of the distribution, while the value for kurtosis is indicative of the peakedness of the distribution, where data with high kurtosis tend to be heavily tailed whereas lower kurtosis tend to be lightly tailed (Pallant, 2020). Based on previous literature, skewness and kurtosis values between −1 and +1 were considered excellent, while values ranging from −2 to +2 were considered acceptable (Pallant, 2020). Table 4.4 displays the skewness and kurtosis values for the stated variables in this study.

Table 4.4 Skewness and Kurtosis

Variable	*n*	*mean*	*sd*	*median*	*min*	*max*	*skewness*	*kurtosis*
PR1	296	3.58	1.17	4	1	5	-0.68	-0.45
PR2	296	3.81	1.04	4	1	5	-1.06	0.71
PR3	296	3.80	1.12	4	1	5	-1.08	0.49
PR4	296	3.80	1.11	4	1	5	-1.11	0.60
JI1	296	4.17	1.17	5	1	5	-1.45	1.23
JI2	296	3.53	1.49	4	1	5	-0.67	-1.10
JI3	296	4.38	0.85	5	1	5	-2.18	5.95
JI4	296	4.18	1.11	5	1	5	-1.27	0.36
JI5	296	4.35	1.06	5	1	5	-1.69	1.75
JI6	296	3.68	1.41	4	1	5	-0.58	-1.25
JI7	296	4.08	1.21	5	1	5	-1.13	-0.13
JI8	296	4.26	1.08	5	1	5	-1.46	0.98
JI9	296	4.15	1.16	4	1	5	-1.64	1.80
JI10	296	3.84	1.36	4	1	5	-0.76	-0.99
JI11	296	4.23	1.12	5	1	5	-1.45	0.94
JS1	296	1.99	0.79	2	1	5	1.12	2.23
JS2	296	2.03	0.82	2	1	5	1.10	1.85
JS3	296	1.76	0.76	2	1	5	1.08	1.61
JS4	296	1.80	0.82	2	1	5	1.31	2.48
JS5	296	2.11	0.96	2	1	5	0.94	0.83
JS6	296	2.18	0.93	2	1	5	0.88	0.69
JS7	296	2.00	0.99	2	1	5	1.25	1.53
JS8	296	1.90	0.83	2	1	5	1.13	1.92
JS9	296	1.80	0.77	2	1	5	1.23	2.57
JS10	296	2.03	0.69	2	1	5	0.65	1.34
JS11	296	1.76	0.80	2	1	5	1.32	2.65
JS12	296	2.22	0.91	2	1	5	0.76	0.54
JS13	296	2.71	1.11	3	1	5	0.45	-0.48
JS14	296	2.22	1.02	2	1	5	0.91	0.54
JS15	296	1.99	0.87	2	1	5	1.10	1.55
JS16	296	1.91	0.83	2	1	5	1.13	1.92
JS17	296	2.05	0.90	2	1	5	1.09	1.63
JS18	296	1.94	0.86	2	1	5	1.22	2.19
JS19	296	2.14	0.93	2	1	5	1.05	1.22
JS20	296	1.89	0.83	2	1	5	1.17	1.98
PJM1	296	2.24	0.96	2	1	5	0.66	0.16

Variable	*n*	*mean*	*sd*	*median*	*min*	*max*	*skewness*	*kurtosis*
PJM2	296	2.47	1.06	2	1	5	0.50	-0.22
PJM3	296	3.05	1.13	3	1	5	-0.11	-0.79
PJM4	296	2.71	1.10	3	1	5	0.28	-0.72
ER1	296	1.94	0.99	2	1	5	1.31	1.60
ER2	296	1.80	0.89	2	1	5	1.36	2.09

Skewness values for the included items ranged from -1.64 to 1.36 and were considered acceptable as they fell within the range of -2 to 2. The values for kurtosis ranged from -1.25 to 2.57, which was considered acceptable. All values for kurtosis within the limit of -2 to 2 except for five items which had values > 2. However, these values do not violate the strict values of normality. Only JI3 had kurtosis values > 3 and was excluded in the exploratory factor analysis step.

4.6.1.5 Descriptive Statistics

Counts and percentages were used to summarize categorical variables (ordinal or nominal), while mean ± standard deviation was used to summarize the distribution of continuous variables, such as years of experience, Likert scale items, and factor scores.

4.6.2 Exploratory Factor Analysis

4.6.2.1 Number of Factors

Exploratory factor analysis was performed to assess the underlying structure of the included items. Principal axis factoring (PAF) was used for factor extraction based on the correlation matrix as it can recover weak factors more than the maximum likelihood estimator. PAF can be used if the assumption of multivariate normality is severely violated (Fabrigar et al., 1999). Promax (oblique) rotation was used to take into account the expected correlation between latent factors. Factors with an Eigenvalue greater than one were retained in the final model. All indicators were initially included in the analysis. Indicators were excluded from the analysis in a stepwise fashion based on loadings (low loadings or commonalities) and cross-loadings (loading on more than one latent factor). Items with a low loading (less than 0.3) were excluded from the

analysis. Items were also examined for cross-loadings (loading on a factor other than expected or loading on more than one factor). These items were excluded.

4.6.2.2 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)

In order to determine the factorability of the data gathered, Pallant (2020) suggests using two statistical tests to determine the factorability of the collected data: the Bartlett's Test of Sphericity and the Kaiser-Meyer-Oklin Measure of Sampling Adequacy (KMO). The KMO and Bartlett's test of adequacy measures the data's suitability for factor analysis. The test measures the adequacy of the presented variable within a model and for the complete model. The Kaiser-Meyer-Olkin (KMO) statistic, which ranges from 0 to 1, measures how well each variable in a set can be predicted without error by the other variables.

The KMO statistic was used to assess sampling adequacy. The value for KMO ranges between zero and one, with values closer to one indicating better adequacy. Values > 0.9 were considered excellent, while 0.6 was considered the minimum acceptable value. The descriptive statistics of the construct variables are shown in the first table, followed by the KMO and Barlett's values in the following tables.

4.6.2.3 Convergent and discriminant validity

Convergent validity was assessed by examining manifest variables' loadings (correlation) on their corresponding latent variables. Loading scores greater than 0.3 were considered adequate. Discriminant validity was assessed by examining the correlation between factors. The correlation between any two factors was not to exceed 0.7.

4.6.2.4 Reliability

Reliability analysis tests the internal consistency of a set of items or how coherent they are (Sekaran & Bougie, 2009). Reliability can be assessed using methods such as Cronbach's alpha (α) and Composite Reliability (CR). Cronbach's alpha (α) coefficient

is the most used measure of internal consistency. It represents the average inter-item correlation for the scale. The recommended lower bound of acceptance for Cronbach's α is 0.7 (Pallant, 2020)

4.6.3 Confirmatory Factor Analysis (CFA)

CFA was performed to assess whether the proposed model of latent constructs was a good fit for the data. The following model parameters were estimated and assessed:

4.6.3.1 Convergent and Divergent Validity

The construct's convergent validity was assessed using the average variance extracted (AVE). An AVE greater than 0.5 was considered acceptable. However, no strict thresholds should be set for AVE. If the AVE is less than 0.5, but composite reliability (CR) is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981). Divergent validity was assessed by comparing the correlations between latent variables to the square root of the average variance extracted (√AVE). The divergent validity was met if none of the correlations between latent variables was higher than the AVE's square root. Individual indicators were allowed to load on only one factor, and the latent variables were allowed to freely co-vary. The model fit was improved by co-varying the errors terms of items (within the same latent factor) with high correlations.

4.6.3.2 Model Fit

The overall model fit was assessed using Chi-Square Test ($\chi 2$), Tucker–Lewis index (TLI), Comparative Fit Index (CFI), C min/df, Root Mean Square Error of Approximation (RMSEA), P close

The chi-square test can be used as a fit measure for models with a sample size of 75 to 200 cases. However, in a larger sample size (> 400 or more), the chi-square tends to be statistically significant, as it is affected by the degrees of freedom that depend on the sample size. It is also affected by the size of the correlations in the model. Thus, alternative measures of fit have been developed (Hu & Bentler, 1999).

C min/df: It is an old fit measure with no universally agreed-upon standard for a good and a bad fitting model. However, a value below five is usually suggested as a cutoff

value in the literature. The TLI and RMSEA are based on this measure(Hu & Bentler, 1999).

TLI: The TLI (non-normed fit index or NNFI) provides a penalty for adding parameters to the model. It can be greater than one. The lower the chi-square to df ratio (as long as it is not less than one), the higher the TLI implying a better fitting model. Its penalty for complexity is χ2/df.

CFI: This incremental measure is directly based on the non-centrality measure. If the index is greater than one, it is set at one, and if it is less than zero, it is set to zero. The interpretation is similar to that of the TLI. The CFI is always greater than the TLI. CFI pays a penalty of one for every parameter estimated. The TLI and CFI depend on the average size of the correlations in the data (Hu & Bentler, 1999).

TLI and the CFI values greater than 0.90 were deemed acceptable. For the RMSEA, the upper bounds for good fit were .08 and .10, respectively. C min/df < 5 and P close > 0.05 are considered acceptable and indicate good model fit. The upper 90% confidence interval for RMSEA should be lower than 0.08. These cutoff criteria for model fit were used as previously defined (Hu & Bentler, 1999)

4.6.4 Structural Equation Modelling

To explore the relationship between variables the researcher used structural equation modelling (SEM). Structural equation modelling combines multiple regression approaches with factor analysis (Tabachnick & Fidell, 2007). Following the exploratory factor analysis, a structural equation model is used to improve the model fit of the theoretical constructs. The initial stage was to create a measurement model, which was accomplished using an additional statistical software called Analysis of Moment Structures (AMOSTM).

The measurement model, however, does not distinguish between independent and dependent variables and is solely used to improve the model fit of the theoretical constructs (Tabachnick & Fidell, 2007). The creation of a measurement model improves the model's fit based on pre-determined criteria. A measurement model's goal is to ensure that all constructs are producing a model that fits. A measurement

model is an illustration of the underlying theory that shows how measured variables might be used to describe constructs (P. J. Hu et al., 1999).

4.6.4.1 Path Analysis and Hypothesis Testing

Structural equation modelling (SEM) was used to assess the association between latent factors based on a pre-suggested hypothetical model. Standardized path coefficients were examined to assess the magnitude and direction of effect. The coefficients represent the increase in the dependent variables (DV), in standard deviations, for each standard deviation increase in the independent variable (IV). Standard errors were calculated, and the 95% confidence intervals around the coefficients were constructed to test the statistical significance of the coefficients. Hypothesis testing was performed by examining the path coefficient in the structural model. Maximum likelihood estimation was used for SEM.

4.6.4.2 Moderation Analysis

According to (Yay, 2017), the purpose of analyzing a mediating variable is to investigate the relationship between an independent and dependent variable. This type of analysis goes beyond the scope of testing whether or not the independent variable affects the dependent variable, but it also seeks to find out if there is a third variable that explains the relationship between the dependent and independent variable and if it is found that there is a third variable then that variable is called a mediator (Yay, 2017).

Figure 4.2 is an illustration of the mediation model used in this study where perceptions of RAIA technologies (X) is the independent variable, Job Insecurity (M) is the mediating variable and Job Satisfaction (Y) is the dependent variable.

The hypothesis that Job insecurity is negatively correlated to job satisfaction and mediate the effects of the perceptions of RAIA technologies is tested by regressing (1) job insecurity on the perceptions of RAIA technologies, (2) job satisfaction on perceptions of RAIA technologies (3) job satisfaction on both perceptions of RAIA

technologies and job insecurity. This process follows a procedure for mediation which was introduced by (Baron & Kenny, 1986).

Figure 2.2 Mediation Analysis

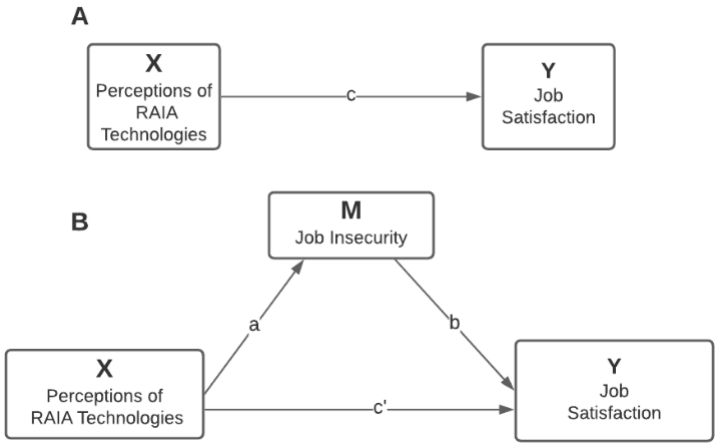


Figure 4.2 above is an A) Illustration of a direct effect. Perceptions of RAIA technologies(X) affects job satisfaction (Y). (B) Illustration of a mediation design. Perceptions of RAIA technologies (X) is hypothesized to exert an indirect effect on job satisfaction (Y) through job insecurity (M)

Evaluating the significance of a mediating variable has been at the centre of research, where in the past researchers relied on the Sobel test also known as the delta method. However, the Sobel test has been found to be unreliable when the sample size is less than 100 where the distribution would be skewed when the indirect effect is nonzero and therefore this test has been found to yield better results only in large samples (Edwards & Konold, 2020).

Another issue that has been found with using the Sobel test is that the Sobel test assumes that the sampling distribution of *ab* is normal; however, this is not always the case. According to (Edwards & Konold, 2020) studies that have used the Sobel test have found that this test is less powerful when compared to other tests such as Bootstrapping. Furthermore, it is often advised that this type of test should only be used when the researcher has no access to raw data. For this research, the researcher

had access to the raw data and therefore chose to test for mediation using the bootstrap method.

Bootstrapping offers a better alternative, and it does not impose the normality assumption. The bootstrap approach involves a process where a random sample is repeatedly drawn and estimates of *ab* are obtained with each bootstrap (Edwards & Konold, 2020). The goal of this process is to obtain the confidence interval of the indirect effect. The resampling process is done thousands of times which then results in k estimates of ab and those are then used as an empirical sampling distribution of the statistic (Özdil & Kutlu, 2019)

Factor scores were imputed, and the imputed scores were used for moderation analysis, this was achieved using regression weights in AMOS. Prior to the analysis, factor scores were standardized to reduce multicollinearity between the interaction terms and the independent variables. Interaction terms were constructed by multiplying the standardized factor scores.

4.6.4.3 Mediation Analysis

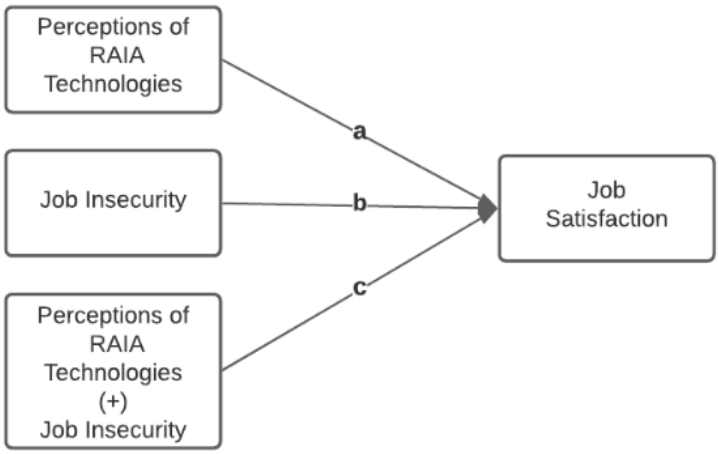
According to (Yoon, 2020), a moderator variable is a variable that affects the strength between an independent and dependent variable. Yoon further states that the regression coefficient is used to measure the causal relationship of moderator variables. When a moderator variable is found to be significant it can cause a weakening or amplifying effect between the dependent and independent variable.

According to Baron and Kenny (1986, p.1174) in “a correlation analysis framework a moderator variable takes the role of a third variable that affects the zero-order correlation between two other variables”.

Figure 4.3 illustrates three casual paths that feed into the outcome variable, which in this instance the outcome or dependent variable is job satisfaction. Path (a) denotes the impact of the predictor variable (RAIA technologies), path (b) denotes the impact of controllability as a moderator variable (Job Insecurity) and the interaction of these two is path c. Based on this model the moderator hypothesis is supported if path c is significant. Results may also show significant effects of paths a and c but these will

not be conceptually relevant in testing the moderator hypothesis (Baron & Kenny, 1986). In addition to the provided considerations Baron and Kenny state that it is “desirable for the moderator variable be uncorrelated with both the predictor and the criterion (the dependent variable) to provide a clearly interpretable interaction term” (Baron & Kenny, 1986).

Figure 4.3 Moderation Model



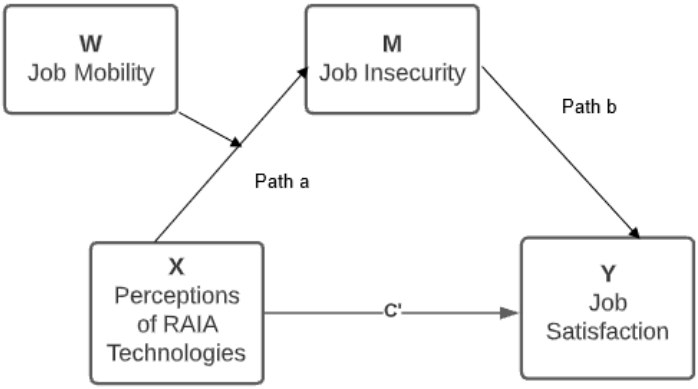
Descriptive statistics and exploratory factor analysis were performed using SPSS v 26. Confirmatory factor analysis and structural equation modelling were performed using AMOS v 26. Maximum likelihood estimation was used in AMOS. Bootstrapping using 1000 bootstrapped samples was used for mediation testing. The bootstrapped 95% bias-corrected confidence intervals and p-values were used to test the indirect effects.

4.6.4.4 Moderated Mediation Analysis

This research tested the moderated mediation hypothesis. According to Yoo and Lee (2019) moderated mediation is a process in which the mediation effects are dependent on the level of the moderator variable, meaning that when the moderator variable changes so will the effects of the mediating variable. This study tests the moderating variable (job mobility) as a boundary condition and therefore tests the mediation moderator model illustrated in figure 4.4. According to Brougham and Haar (2020),

such an approach provides nuanced findings and will enable the researcher to investigate the indirect effects of the perceptions of RAIA technologies on job satisfaction (with job insecurity mediating) changes based on the strength of job mobility. Therefore, in this study, it was assumed that when the level of job mobility changed so did the relationship between job insecurity and job satisfaction.

Figure 4.4 Moderation Mediation Model



Moderated Mediation (figure 4.4) can be tested through the use of bootstrap confidence interval evaluations. Based on this approach a confidence interval that has non-zero proves that the indirect effect is moderated. Another test for moderation mediation is through a method called the piecemeal approach, this approach involves a process in which moderation and mediation are tested separately and then the results are jointly interpreted (Edwards & Konold, 2020).

4.7 Ethical Considerations

This study followed a quantitative approach where data was collected through an online questionnaire. Participants might have felt reluctant to participate in the study if they believed that their responses or opinions would be exposed. To alleviate such feelings the researcher followed the below strategies:

4.7.1 Informed Consent:

Participants were briefed by the researcher regarding the purpose of the research being conducted. Furthermore, the researcher notified the participants that the research was purely for academic purposes. This was done online by adding a brief summary detailing the purpose of the research being conducted. This brief summary was achieved by means of the researcher posting on LinkedIn, Twitter and Facebook. Below is a sample of one of the posts posted on the researchers LinkedIn account

Figure 4.5 Sample of Questionnaire Brief



4.7.2 Harm and Risk:

The researcher safeguarded participants from any harm or risk by ensuring that all participants responses did not result in either of them being harmed in any way and this was achieved by not including questions that collect data on personal information such as ID, the company they work for, name etc. participants remained anonymous throughout the questionnaire.

4.7.3 Confidentiality and Anonymity

Participants personal information including information that could potentially reveal the participants identity were not be required to complete the questionnaire. Participants were informed that their participation was anonymous.

4.7.4 Voluntary participation

Despite the above mentioned, participation from the participants was completely voluntary and should a participant have wished to stop taking part in the survey they could have done so at any point while they were going through the survey questions.

4.8 Limitations, Internal and External Validity

4.8.1 Limitations

The findings of this study cannot be generalized, as the study focused on IT professionals in South Africa. According to Bhattacherjee (2012) when a sampling frame is used, the sampling frame may not be representative of the entire population. For example, the South African unemployment rate may have an effect on how IT professionals regard RAIA technology. By contrast, in a country with a high rate of employment, professionals may be unaffected by the rate of employment. This research study collected data using a survey, which may be subject to respondent bias (Bhattacherjee, 2012). This study focused on IT professionals' perceptions of RAIA technologies, not on the actual impact of RAIA technology implementation.

4.8.2 Threats to Internal and External Validity

- **History**: This study was one of the first studies to be undertaken during the Covid-19 pandemic, and many organizations were still suffering the consequences of months of inactivity. Given that some organizations had begun retrenching employees, there was a slight possibility that the pre-test would have been conducted while the organization were in the process of announcing retrenchments, and that by the time the post-test was conducted, the organization

may have been forced to retrench employees, resulting in stressed participants and therefore distorting the results.

- **Maturation**: Because IT companies are subject to job hopping, they are constantly hiring and training new staff. As a result, it is probable that some employees will be new and still on probation at the time of the pre-test, implying that their job insecurity levels will be slightly greater than those of permanent employees during that period. However, by the time a post-test is administered, the employees' attitudes may have shifted dramatically, as they may have completed the probationary period.

- **Attrition**: Participants could have withdrawn from the study at any time during the trial. Assume the researcher takes an excessive amount of time conducting the post-test. If disgruntled personnel have already left the organization before the post-test is completed, the results may suffer. This would imply that the total findings would demonstrate an increase in the percentage of satisfied personnel.

4.9 Conclusion

The study technique was explained in this chapter, with a focus on the deductive research design and survey methodology. The survey data collection methods were discussed, as well as the variables' measurement. Given the limited time and resources available for the study, the non-probabilistic sampling procedures used in this study were a practical decision. The correlation and regression approaches utilized to analyses the acquired data and test the hypothesised model, as well as measures to ensure the work's dependability and validity, were described. Ethical considerations were discussed, as well as the work's limits.

The outcomes of the data analysis and hypothesis testing are reported in the following chapter.

CHAPTER FIVE

5. RESULTS

5.1 Introduction

The preceding chapter discussed the approach used to gather data for this research study. This chapter compiles the study's findings from the questionnaire in order to conduct a thorough analysis and assess whether RAIA technology influences job insecurity and job satisfaction. The initial results give descriptive statistics for the analysed quantitative data in the form of graphs, cross tabulations, and other figures. Due to the ordinal nature of the data, inferential procedures involve the use of various non-parametric tests. The data's sample profile is discussed next, followed by the procedure followed to cleanse data.

5.2 Response Profile

5.2.1 Description of the Demographic Information of the study population

This section summarizes the respondents' biographical information by means of discussing the participants' gender, age, educational attainment, and the IT sector in which they work. The statistical data is presented in the form of numbered figures and frequency tables. A numbered Table summarizes the initial analysis, and a numbered Figure illustrates the same results.

*5.2.1.1 **Gender***

Table 5.1 Participants Gender (n=296)

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	178	60.1	60.1	60.1
	Female	118	39.9	39.9	100.0
	Total	296	100.0	100.0	

Figure 5.1 Participants Gender Distribution

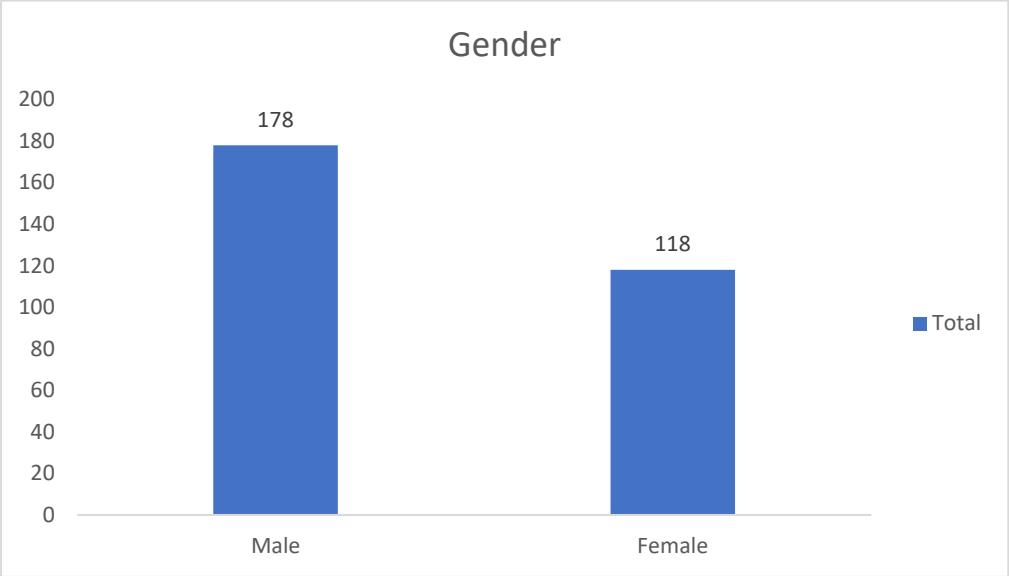


Figure 5.1 depicts a bar graph that illustrates the gender distribution. Figure 5.1 shows that most of the respondents were male with a participation rate of 60.1% and females 39.9%. In relation to gender table 5.1 also provides the same information as the graph but it also shows the number of males and females who participated in the study.

It is not surprising that 60.1% of the participants are male given that the South African IT sector is dominated by males and similar gender imbalances have been reported in other studies e.g.,(Malinga, 2021; Trauth, 2013). This research asked participants to indicate their gender mainly because the subject matter is on Information Technology which forms part of STEM careers which is a known male dominated industry.

5.2.1.2 Age

Table 5.2 below illustrates the sample's age distribution. The bulk of responders were millennials, defined as those aged 24 to 39 years. This age group accounted for a whopping 73% of responses. The second largest group of responders was generation X, defined as those between the ages of 40 and 55. This category

accounted for 17.6% of the respondents, followed by postmillennial accounting for 7.4% of the respondents and boomers with 2%.

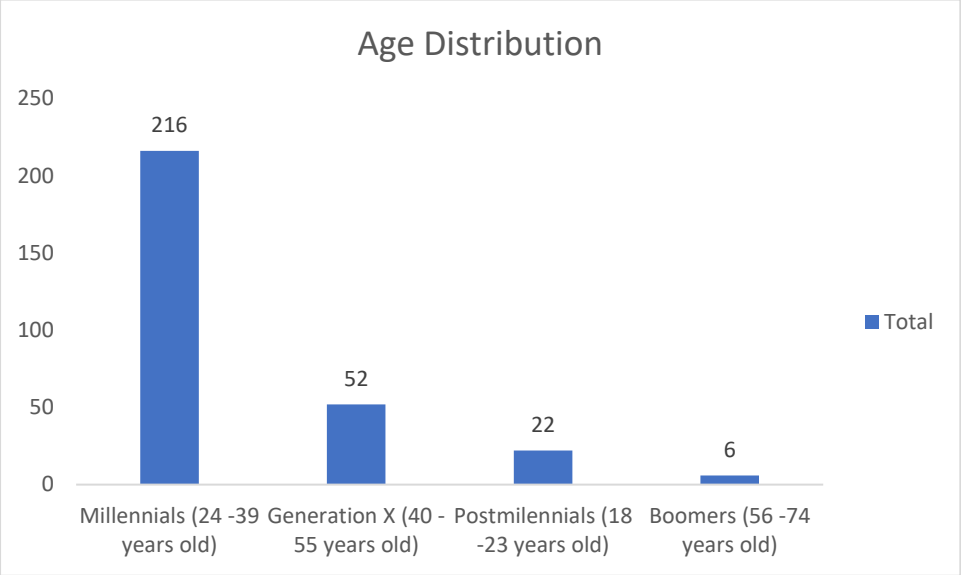
The results show that most respondents fall within the tech savvy age group, this is the group that is exposed to technology and are aware of most of the technology that is out there. Therefore, their pre-exposure to technology could influence their perceptions. Over and above that research has shown that the older generation tends to face greater job insecurity compared to the younger generation. It is therefore important to bear this in mind when interpreting the results, especially because majority of the respondents are between the ages of 24 and 39 (Bustillo & Pedraza, 2010; Shoukat & Hira, 2017).

Table 5.2 Age Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boomers (56 -74 years old)	6	2.0	2.0	2.0
	Generation X (40 - 55 years old)	52	17.6	17.6	19.6
	Millennials (24 -39 years old)	216	73.0	73.0	92.6
	Postmillennial (18 -23 years old)	22	7.4	7.4	100.0
	Total	296	100.0	100.0	

The chart below (figure 5.2) illustrates the frequency distribution of respondents' age groupings.

Figure 5.2 Age Distribution



5.2.1.3 Highest Educational Attainment

Table 5.3 below illustrates the educational levels of the respondents. In a survey of 389 respondents, only 2.4% had a PhD degree and 15.5% had a master's degree. Figure 5.3 below also shows that the highest educational level for majority of the respondents was an undergraduate degree (32.4%) followed by 22% respondents with a postgraduate honors degree, whilst 20.9% comprised of respondents with a diploma and 6.8% of the respondents have a high school certificate. These results reflect that many of the respondents are educated with 72.3% of the respondents with at least a bachelor's degree.

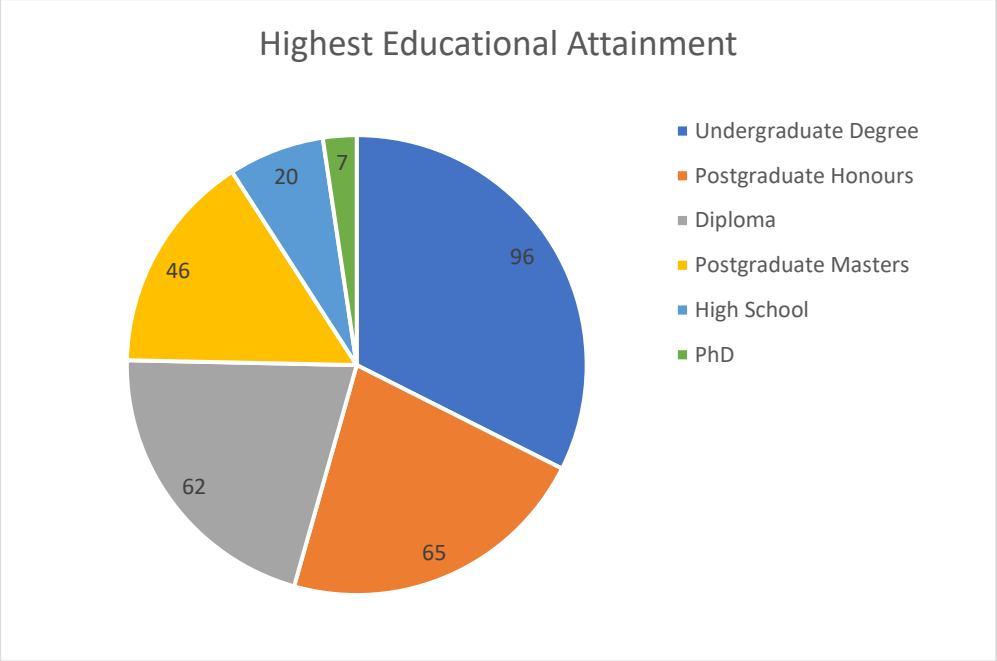
According to Ghapanchi et al. (2013) education is one of the characteristics that make a person marketable, meaning that should one lose their job it will be easier to find another job. Therefore for the purposes of this study it was important to determine the education level as it might help explain the overall results.

Table 5.3 Highest Educational Level

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	20	6.8	6.8	6.8
	Diploma	62	20.9	20.9	27.7
	Undergraduate Degree	96	32.4	32.4	60.1
	Post Grad Honors Degree	65	22.0	22.0	82.1
	Post Grad Master's Degree	46	15.5	15.5	97.6
	PhD	7	2.4	2.4	100.0
	Total	296	100.0	100.0	

Figure 5.3 Highest Educational Level



5.2.1.4 Distribution of IT industry

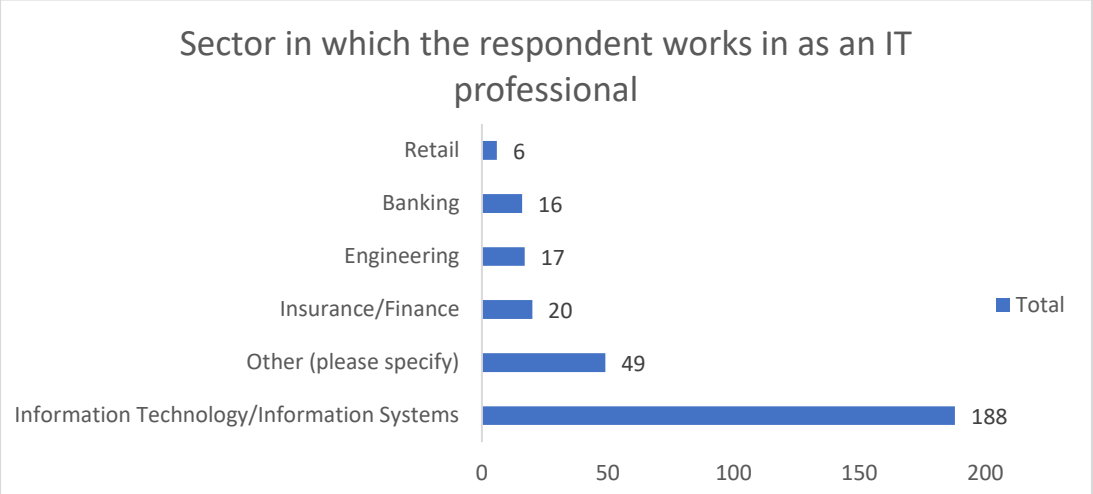
Table 5.4 and figure 5.4 below illustrate the distribution of IT industry the respondents belong to. In a survey of 296 respondents, 63.5% of the respondents considered themselves to be in pure IT, followed by 16.6% who selected other and 6.8% being IT

professionals working in the insurance and finance sector, followed by 5.7% of the respondent being in the engineering sector, followed closely by 5.4% of the respondents being in Banking IT and the remaining 2% being in retail. Based on this studies definition of IT professional it is not surprising that some of the respondents are in industries such as engineering and banking.

Table 5.4 Distribution of IT industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Banking	16	5.4	5.4	5.4
	Engineering	17	5.7	5.7	11.1
	Information Technology/Information Systems	188	63.5	63.5	74.7
	Insurance/Finance	20	6.8	6.8	81.4
	Other (please specify)	49	16.6	16.6	98.0
	Retail	6	2.0	2.0	100.0
	Total	296	100.0	100.0	

Figure 5.4 Distribution of IT industry



5.2.2 Part 2: Data analysis in relation to the perception of RAIA technology

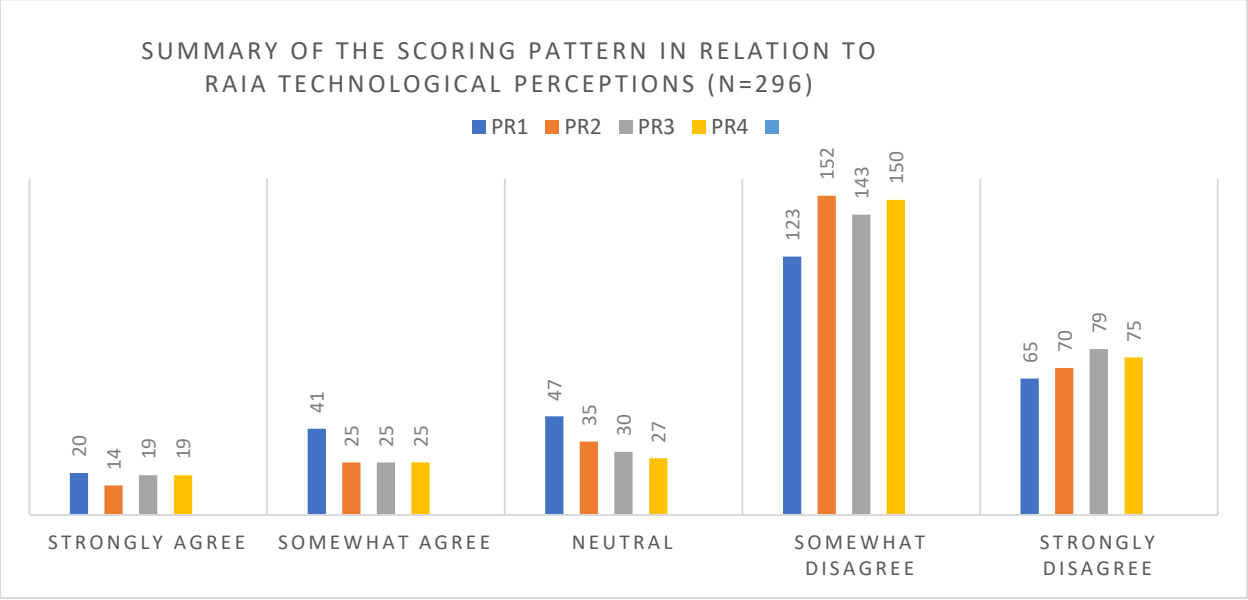
The results of the questionnaire on the perceptions of RAIA technology are presented in this section. The percentile summary of the scoring patterns linked to perceptions of RAIA technology is shown in the table below. The levels of disagreement were combined to form a single category of disagreement, and the levels of agreement were treated in the same way. The findings are shown in the graph below, with percentages for each variable of the sub-statements that make up each category.

Table 5.5 Patterns of scoring pertaining to RAIA technological perceptions

Statement		Responses	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Total
PR1	"I think my job could be replaced by RAIA technology"	Frequency	20	41	47	123	65	296
		Percentage	7%	14%	16%	42%	22%	100%
PR2	"I am personally worried that what I do now in my job, will be replaced by RAIA technology"	Frequency	14	25	35	152	70	296
		Percentage	5%	8%	12%	51%	24%	100%
PR3	"I am personally worried about my future in my organisation due to	Frequency	19	25	30	143	79	296
		Percentage	6%	8%	10%	48%	27%	100%

Statement		Responses	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Total
	RAIA replacing employees"							
PR4	"I am personally worried about my future in my industry due to RAIA replacing employees"	Frequency	19	25	27	150	75	296
		Percentage	6%	8%	9%	51%	25%	100%

Figure 5.5 Summary of the scoring pattern in relation to RAIA technology perceptions



The scoring patterns for RAIA technology perceptions are summarized in Table 5.5 and Figure 5.5, respectively. According to the PR1 statement, most respondents (42%) do not believe that RAIA technology will be able to replace their jobs. Figure 5.5 and table 5.5 also show that the statement for PR2 asked respondents if they were concerned that the jobs, they were doing now could be replaced by RAIA technology, and the results for this statement showed that most respondents (51 %) did not believe this was true, thus disagreeing with the statement. Furthermore, as shown in figure 5.5, the statement for PR3 demonstrated that 48 % of respondents were not concerned that RAIA technology could jeopardize their employment in the organization where they work. This means that only 6% of respondents were concerned about

being replaced by RAIA technology. According to Statement P2, 51% of respondents were unconcerned about the effects of RAIA technology on the IT jobs. Only 6% of respondents firmly believed that RAIA technology would have an impact on their future. These findings are like those of Brougham and Brougham and Haar (2018), who found that employees were unconcerned about technological advances like artificial intelligence, smart technology, and robotics.

5.2.3 Part 3: Data analysis in relation to Job Insecurity

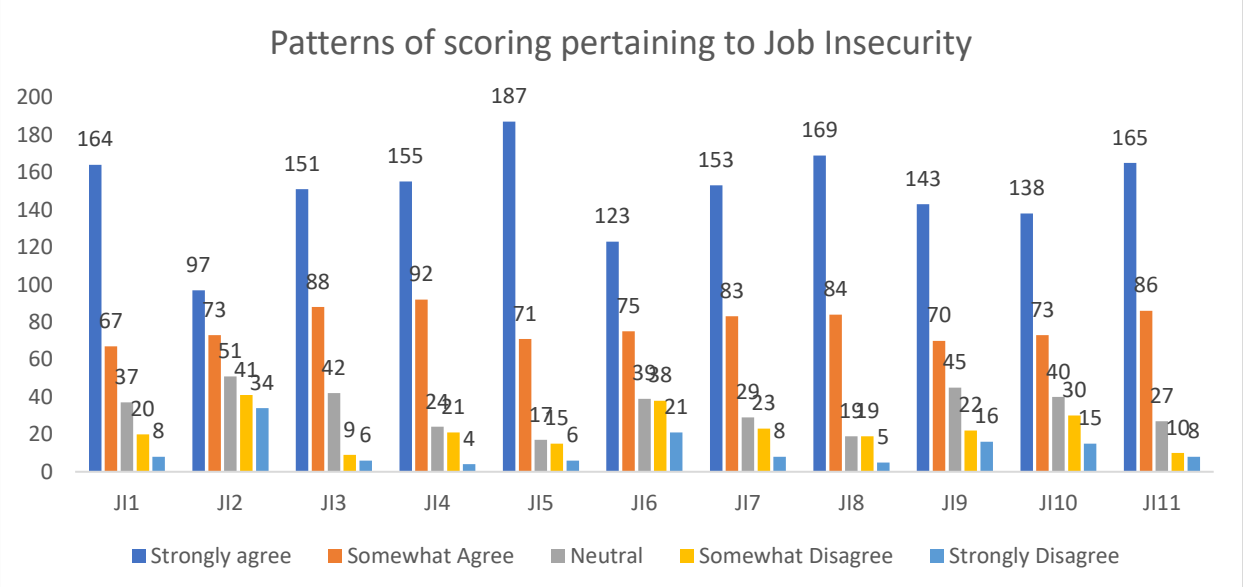
The results of the survey on job insecurity are presented in this section. The percentile summary of the job insecurity scoring patterns is shown in Table 5.6 below. The levels of disagreement were combined to form a single group, and the levels of agreement were treated similarly. Figure 5.6 shows the results, which are provided as summarised percentages for the variables of the sub-statements that make up each category.

Table 5.6 Patterns of scoring pertaining to Job Insecurity

Statement		Responses	Strongly agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	Total
JI1	"I think that I will be able to continue working here."	Frequency	164	67	37	20	8	296
		Percentage	55%	23%	13%	7%	3%	100%
JI2	"There is only a small chance that I will become Unemployed"	Frequency	97	73	34	41	51	296
		Percentage	33%	25%	11%	14%	17%	100%
JI3	"I am very sure that I will be able to keep my job"	Frequency	151	88	42	9	6	296
		Percentage	51%	30%	14%	3%	2%	100%
JI4	"I think that I might be dismissed in the future"	Frequency	4	21	24	92	155	296
		Percentage	1%	7%	8%	31%	52%	100%
JI5	"I fear that I might get fired"	Frequency	6	15	17	71	187	296
		Percentage	2%	5%	6%	24%	63%	100%

Statement		Responses	Strongly agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	Total
JI6	"It makes me anxious that I might become unemployed"	Frequency	21	38	39	75	123	296
		Percentage	7%	13%	13%	25%	42%	100%
JI7	"I feel uncertain about the future of my job"	Frequency	8	23	29	83	153	296
		Percentage	2,70%	7,77%	9,80%	28,04%	51,69%	100%
JI8	"There is a possibility that I might lose my job in the near future"	Frequency	5	19	19	84	169	296
		Percentage	2%	6%	6%	28%	57%	100%
JI9	"I am certain/sure of my job environment"	Frequency	143	70	45	16	22	296
		Percentage	48%	24%	15%	5%	7%	100%
JI10	"I worry about the continuation of my career"	Frequency	15	30	40	73	138	296
		Percentage	5%	10%	14%	25%	47%	100%
JI11	"I fear that I might lose my job"	Frequency	8	10	27	86	165	296
		Percentage	3%	3%	9%	29%	56%	100%

Figure 5.6 Patterns of scoring pertaining to Job Insecurity



The scoring patterns for employment insecurity are summarized in Figure 5.6 and Table 5.6. According to statement JI1 many respondents (55 %) believe they will continue to work despite the implementation of RAIA technology at their current jobs. This assertion appears to be confirmed by statement JI2, which reveals that the majority of respondents (33%) believe there is a limited possibility they will be unemployed in the future. However, when compared to JI1's responses, one would anticipate the percentage to be similar or identical; however, the number of people who strongly believe that their employment is safe declined. 25 % of respondents "somewhat agree" that there is a small possibility they will be unemployed, but 17 percent strongly disagree that the chances of them being unemployed are minimal, meaning that this group believes the likelihood of being unemployed is significant. This indicates that some of the participants' comments are a little hazy.

Figure 5.6 and table 5.6 also revealed that the statement for JI4 suggested that 52% of the respondents disagreed that they might be dismissed in the future, these results correlate with the results of JI5. Statement JI5 revealed that 63 % of respondents were not fearful of being fired, while 24 percent were not so sure and responded that they slightly disagreed with the statement. Only 2% of the respondents strongly agree that they are terrified of losing their jobs. According to this analysis, there are higher degrees of disagreement.

Powerlessness in the workplace, according to Karkoulian et al., (2013) predicts and exacerbates job instability. It is also claimed that when a person is faced with the risk of losing their work but has the power to avert it, they do not feel threatened. The levels of insecurity in the workplace are influenced by labour laws and the organization's own standard operating procedures; the law prohibits employers from terminating employees without cause. Discipline and firing employees who are unable to perform their jobs are legitimate grounds for dismissal (Karkoulian et al., 2013). As a result of these factors, respondents are likely to feel safe, as indicated by the great majority of respondents (63%) who claim they are not worried of being fired. This is evidenced by the results of statement JI3, in which most respondents answered that they are highly confident in their ability to keep their jobs. In their study Greenhalgh and Rosenblatt (2010) discovered that the absence of fair dismissal procedures resulted in higher levels of job insecurity.

Furthermore, most respondents (42%) disagreed with statement JI6, which questioned respondents whether they felt apprehensive about being unemployed (figure 5.6 and table 5.6). 25% of those polled disagreed with the statement in some way, while 7% firmly agreed. Respondents were also asked whether they were confident in their future; this was captured under statement JI7, and the results showed that 51.69% of respondents were confident in their future, while 2.7% were uncertain. These findings are consistent with the findings from statement JI8, with 57 % of respondents disagreeing with the statement that there is a chance they will lose their employment; only 2% of respondents agreed with the statement that there is a chance they will lose their work.

The statement for JI9 reveals that the majority of respondents are confident in their work environment, with 48% of respondents strongly agreeing with the assertion. Only 5% of those polled said they were unsure of their job situation. According to a study done by Låstad et al. (2015), a person's surroundings and how they interpret those circumstances can influence the establishment of work insecurity views. As a result, making meaning of events and situations at work can influence the interpretation of job insecure feelings. This could explain why these respondents expressed such high levels of assurance in their work situations.

Despite the current economic climate in South Africa and the fact that many companies have experienced layoffs because of the global pandemic, the majority of respondents report low levels of job insecurity and do not appear to be concerned about technological advancements and their potential to displace them. This is supported by the results obtained from statement JI10 and JI11 where 47% of the respondents indicated that they do not worry about the continuation of their career and 56% of the respondents indicated that they have no fears that they might lose their jobs. Only 5% of respondents agreed that they were concerned about their careers continuing, and only 3% were concerned about losing their positions.

5.2.4 Part 4: Data analysis in relation to Job Satisfaction

IT/IS professional turnover has long been a studied topic among academics due to its detrimental effects on organizational performance, with work satisfaction being the most recognized antecedent of turnover (Zolbanin et al., 2014). This section of the descriptive analysis presents the results from the job satisfaction survey. The

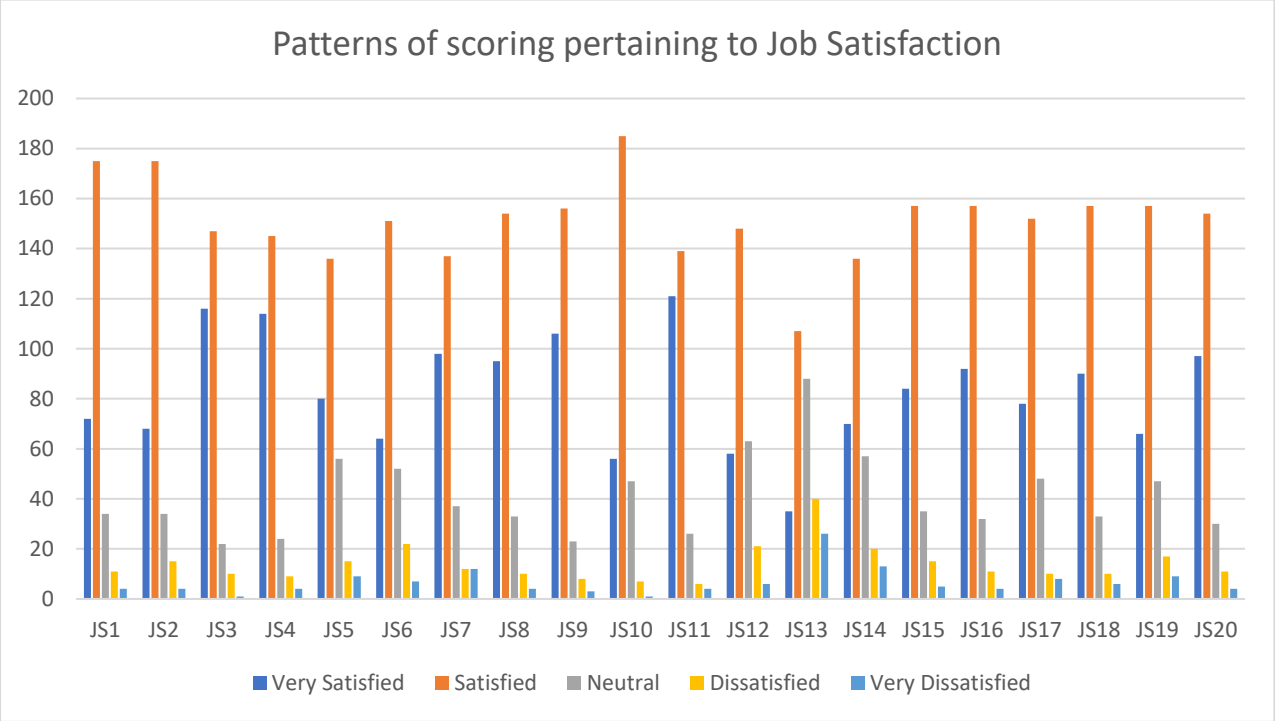
Minnesota Satisfaction Questionnaire (MSQ) was used to collect data This segment of the poll included 20 questions categorized as P4A to P4T. The questions were scored using a 5-point Likert scale ranging between very satisfied to very dissatisfied and the result are summarized in table 5.7 and figure 5.7 respectively.

Table 5.7 Patterns of scoring pertaining to Job Satisfaction

Statement		Responses	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Total
JS1	"Being able to keep busy all the time"	Frequency	72	175	34	11	4	296
		Percentage	24%	59%	11%	4%	1%	100%
JS2	"The chance to work alone on the job"	Frequency	68	175	34	15	4	296
		Percentage	23%	59%	11%	5%	1%	100%
JS3	"The chance to do different things from time to time"	Frequency	116	147	22	10	1	296
		Percentage	39%	50%	7%	3%	0%	100%
JS4	"The chance to be 'somebody' in the community"	Frequency	114	145	24	9	4	296
		Percentage	39%	49%	8%	3%	1%	100%
JS5	"The way my boss handles his/her workers"	Frequency	80	136	56	15	9	296
		Percentage	27%	46%	19%	5%	3%	100%
JS6	"The competence of my supervisor in making decisions"	Frequency	64	151	52	22	7	296
		Percentage	22%	51%	18%	7%	2%	100%
JS7	"Being able to do things that don't go against my conscience"	Frequency	98	137	37	12	12	296
		Percentage	33%	46%	13%	4%	4%	100%
JS8	"The way my job provides for steady employment"	Frequency	95	154	33	10	4	296
		Percentage	32%	52%	11%	3%	1%	100%
JS9	"The chance to do things for other people"	Frequency	106	156	23	8	3	296
		Percentage	36%	53%	8%	3%	1%	100%
JS10	"The chance to tell people what to do"	Frequency	56	185	47	7	1	296
		Percentage	19%	63%	16%	2%	0%	100%
JS11		Frequency	121	139	26	6	4	296

Statement		Responses	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Total
	"The chance to do something that makes use of my abilities"	Percentage	41%	47%	9%	2%	1%	100%
JS12	"The way company policies are put into practice"	Frequency	58	148	63	21	6	296
		Percentage	20%	50%	21%	7%	2%	100%
JS13	"My pay and the amount of work I do"	Frequency	35	107	88	40	26	296
		Percentage	12%	36%	30%	14%	9%	100%
JS14	"The chances for advancement in this job"	Frequency	70	136	57	20	13	296
		Percentage	24%	46%	19%	7%	4%	100%
JS15	"The freedom to use my own judgment"	Frequency	84	157	35	15	5	296
		Percentage	28%	53%	12%	5%	2%	100%
JS16	"The chance to try my own methods of doing the job"	Frequency	92	157	32	11	4	296
		Percentage	31%	53%	11%	4%	1%	100%
JS17	"The working conditions"	Frequency	78	152	48	10	8	296
		Percentage	26%	51%	16%	3%	3%	100%
JS18	"The way my co-workers get along with each other"	Frequency	90	157	33	10	6	296
		Percentage	30%	53%	11%	3%	2%	100%
JS19	"The praise I get for doing a good job"	Frequency	66	157	47	17	9	296
		Percentage	22%	53%	16%	6%	3%	100%
JS20	"The feeling of accomplishment I get from the job"	Frequency	97	154	30	11	4	296
		Percentage	33%	52%	10%	4%	1%	100%

Figure 5.7 Patterns of scoring pertaining to Job Satisfaction



The survey is divided into two sections: the first looks at feelings about the nature of one's employment, and the second looks at feelings about extrinsic job satisfaction, which assesses feelings about situational job aspects. Respondents were asked to rate their level of satisfaction with statements regarding their jobs. JS1, JS2, JS3, JS7, JS8, JS9, JS10, JS11, JS12, JS13, JS14, JS15, JS17, and JS18 statements asked respondents to express their level of satisfaction with the job itself, and most respondents indicated that they were satisfied with the statements. With 52% of respondents reporting that their current jobs provide stable employment, 32% stating that their employment is highly stable, and only 3% stating that they are not satisfied,

Statements JS1 through JS3 focused on the interpersonal aspects of respondents' professions, such as "how satisfied they felt with being able to work alone," and most respondents said this aspect of their occupations was satisfactory.

Because of the hard and stressful nature of their employment, IT/IS personnel want to be actively involved with their managers and seek help from them as well as their employer (Zolbanin et al., 2014). Statements JS5 to JS6 probes respondents' attitudes

toward supervision in their current workplaces. The majority of respondents thought their boss's handling of employees and their superiors' decision-making process were satisfactory. Statements JS4 and JS14 analyze how respondents evaluate their prospects in promotion opportunities; the results suggest that the majority of respondents (46%) are content with their promotion opportunities, while statement JS4 shows that 49% of the respondents were satisfied that they could become something in their communities. Statement JS13 asks respondents to rate their level of satisfaction with their present wage in relation to the work they do. The results show that 36% of respondents are satisfied, with 30% of respondents indicating that they are neither satisfied nor unsatisfied. 14% of respondents were dissatisfied, with 9% expressing extreme unhappiness. Only 12% of those polled were extremely satisfied with their income. The survey reveals that respondents generally felt satisfied with most aspects of their job.

5.2.5 Part 5: Data analysis in relation to Perceived Job Mobility

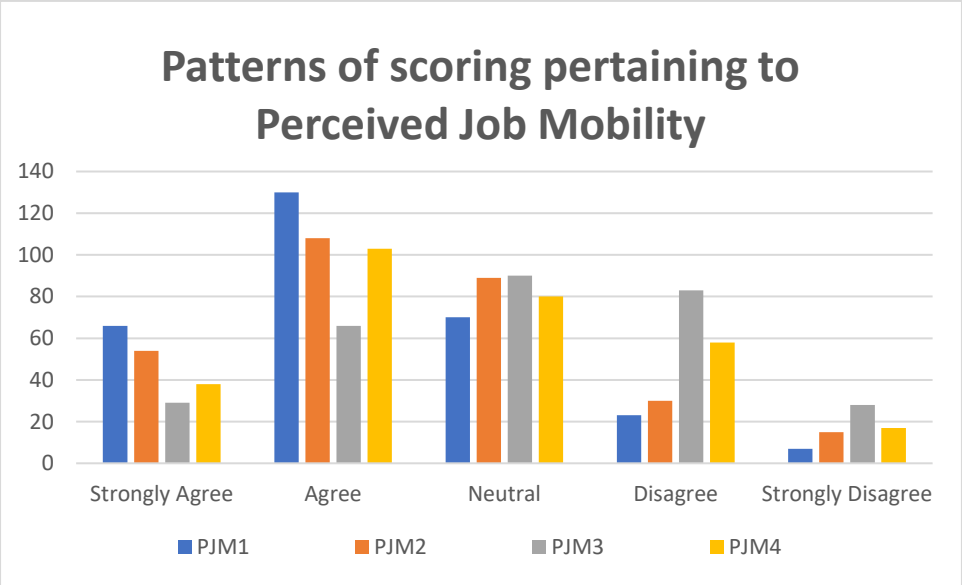
The results of the survey on perceived job mobility are presented in this section. The percentile summary of the perceived job mobility scoring patterns is shown in Table 5.8 below. The levels of disagreement were combined to form a single group, and the levels of agreement were treated similarly. Figure 5.8 shows the results, which are provided as summarised percentages for the variables of the sub-statements that make up each category.

Table 5.8 Patterns of scoring pertaining to Perceived Job Mobility

Statement		Responses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
PJM1	"If I were to quit my job, I could find another job that is just as good"	Frequency	66	130	70	23	7	296
		Percentage	22%	44%	24%	8%	2%	100%
PJM2	"I would have no problem finding an acceptable job if I quit"	Frequency	54	108	89	30	15	296
		Percentage	18%	36%	30%	10%	5%	100%

Statement		Responses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
PJM3	"I have enough power in this organization to control events that might affect my job"	Frequency	29	66	90	83	28	296
		Percentage	10%	22%	30%	28%	9%	100%
PJM4	"I understand this organization well enough to be able to control things that affect me"	Frequency	38	103	80	58	17	296
		Percentage	13%	35%	27%	20%	6%	100%

Figure 5.8: Patterns of scoring pertaining to Perceived Job Mobility



This section of the survey asked respondents to indicate how they perceived their job mobility in their current environments, and they were asked to consider the possibility of RAIA technology being implemented. According to the findings for this section, most respondents (44%) agreed that they could easily find another job if they decided to leave their current job, and this statement was backed up by statement PJM2, which stated that 36% of respondents had no trouble finding alternative employment. Employees in higher hierarchical positions, according to Taduvana (2017) have higher

capabilities, which allows for a broader scope of employment, better financial stability, and hence greater job mobility. These findings are supported by the results from this as most respondents have some form of post-matric certificate, with 32.43% having an undergraduate degree, 21.96% having a postgraduate honours degree, 20.95% having a diploma, 15.54% having a master's degree, and 7% having a doctoral degree.

The last part of section 5 sought to determine the respondents' level of control in their organization. This section is made up of statements PJM3 through to PJM4. The results suggest that most respondents (30%) did not agree or disagree with statement PJM3, with 28% disagreeing with the statement, 22% agreeing with the statement, and 10% strongly agreeing and 9 percent strongly disagreeing with the statement. Individuals with an internal locus of control, according to Keim et al. (2014) experience less job insecurity because they believe that finding alternative employment is not difficult. According to a study by Bustillo and Pedraza (2010) those with a higher education had less job instability and more job mobility since they had more control over their future employment. The results are rather contradictory when comparing statement PJM3 and PJM4 as the results from PJM3 showed that the majority of the respondents felt that they had no control over things that affected their job however statement PJM4 shows that the majority of respondents (35%) felt they have control over things that affect them on a personal level.

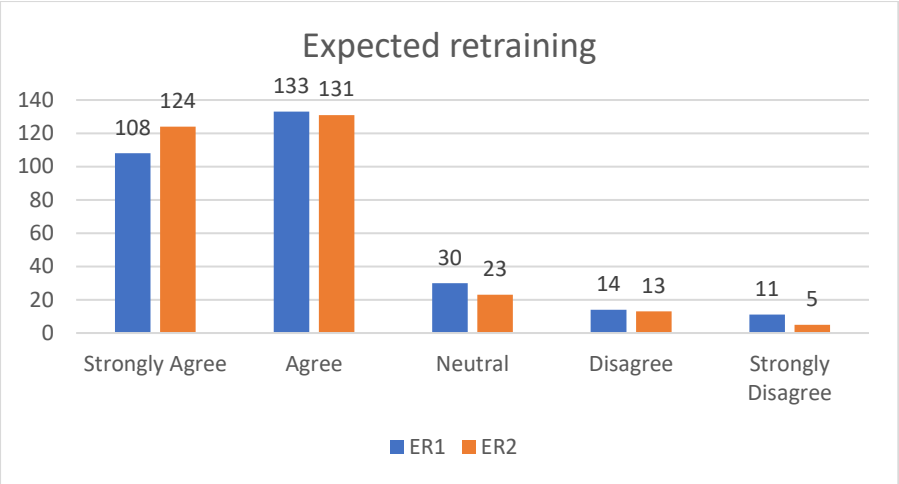
5.2.6 Part 6: Data analysis in relation to Expected Retraining

The results of the survey on expected retraining are presented in this section. The percentile summary of the perceived job mobility scoring patterns is shown in Table 5.9 below. The levels of disagreement were combined to form a single group, and the levels of agreement were treated similarly. Figure 5.9 shows the results, which are provided as summarized percentages for the variables of the sub-statements that make up each category.

Table 5.9 Patterns of scoring pertaining to Expected Retraining

Statement		Responses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
P6A	If some tasks I perform now for my job will be replaced by RAIA technologies, I expect my organization to provide opportunities for me to adapt to the new job description	Frequency	108	133	30	14	11	296
		Percentage	36%	45%	10%	5%	4%	100%
P6B	When my organization replaces employees with RAIA technologies, I expect my organization to have career development programs that help employees develop specialized	Frequency	124	131	23	13	5	296
		Percentage	42%	44%	8%	4%	2%	100%

Figure 5.9: Patterns of scoring pertaining to Expected Retraining



5.3 Exploratory Factor Analysis

Table 5.10 below provides the results from the conducted exploratory factor analysis. Three items were reversed prior to EFA as these items were negatively worded (JI1, JI2, JI3). The following items were removed as they did not load adequately (< 0.03), loaded on a factor that was not expected, or loaded on more than one factor: JI1, JI2, JI9, JS1, JS2, JS3, JS10, and JS11. Five factors were extracted based on the PAF method. Factor loadings were > 0.5 except for six items (PJM3, PJM4, JS4, JS8, JS9, and JI3). However, these items were not removed as they did not load on any other factor. The α was also acceptable for all five factors.

Table 5.10 Final Pattern Matrix

	JS	JI	PR	PJM	ER
α	**0.916**	**0.883**	**0.792**	**0.742**	**0.78**
PR1			0.562		
PR2			0.747		
PR3			0.771		
PR4			0.69		
JI3		0.393			
JI4		0.698			
JI5		0.87			
JI6		0.624			
JI7		0.747			

	JS	JI	PR	PJM	ER
α	**0.916**	**0.883**	**0.792**	**0.742**	**0.78**
JI8		0.877			
JI10		0.423			
JI11		0.777			
JS4	0.395				
JS5	0.836				
JS6	0.782				
JS7	0.353				
JS8	0.384				
JS9	0.473				
JS12	0.809				
JS13	0.611				
JS14	0.684				
JS15	0.674				
JS16	0.697				
JS17	0.817				
JS18	0.591				
JS19	0.781				
JS20	0.674				
PJM1				0.786	
PJM2				0.775	
PJM3				0.364	
PJM4				0.352	
ER1					0.864
ER2					0.754

α: Cronbach's alpha
Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization

Table 5.11 below provides the results from the conducted KMO test. The rule of thumb when evaluating the results from the KMO test suggest that a KMO value between 0.8 and 1 is indicative that the sample is adequate, whereas a KMO value less than 0.6 indicates an inadequate sampling and remedial intervention would be required. The following conditions must be met for factor analysis to be considered appropriate: Bartlett's Test must be significant, which means the p-value must be less than 0.05. (Pallant, 2020). Furthermore, the KMO index should be greater than 0.6.

Table 5.11 KMO and Bartlett's test of adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.889
Bartlett's Test of Sphericity	Approx. Chi-Square	5346.887
	df	561
	Sig.	< 0.001

For this study the tests revealed that the value for KMO was ~ 0.9 and was > 0.6, which is considered the minimum acceptable threshold. Additionally, when evaluating the Bartlett's Test, the factor analysis is significant as the p-value is below the 0.05 threshold. These findings suggest that the sampling results are adequate to run factor analysis.

Once EFA was run and adequacy was established the next step was to determine how many factors were prevalent. This process is referred to as factor extraction and the results can be seen in table 5.12. The extraction method entails determining the smallest number of factors that can adequately explain a set of variables' interrelationships (Pallant, 2020). According to Kaiser's criterion, any component with an eigenvalue of 1 or more is a good candidate for analysis (Pallant, 2020). This was accomplished by examining the Total Variance Explained (TVE) table. A table with the TVE values is shown below.

Table 5.12 Total Variance Explained

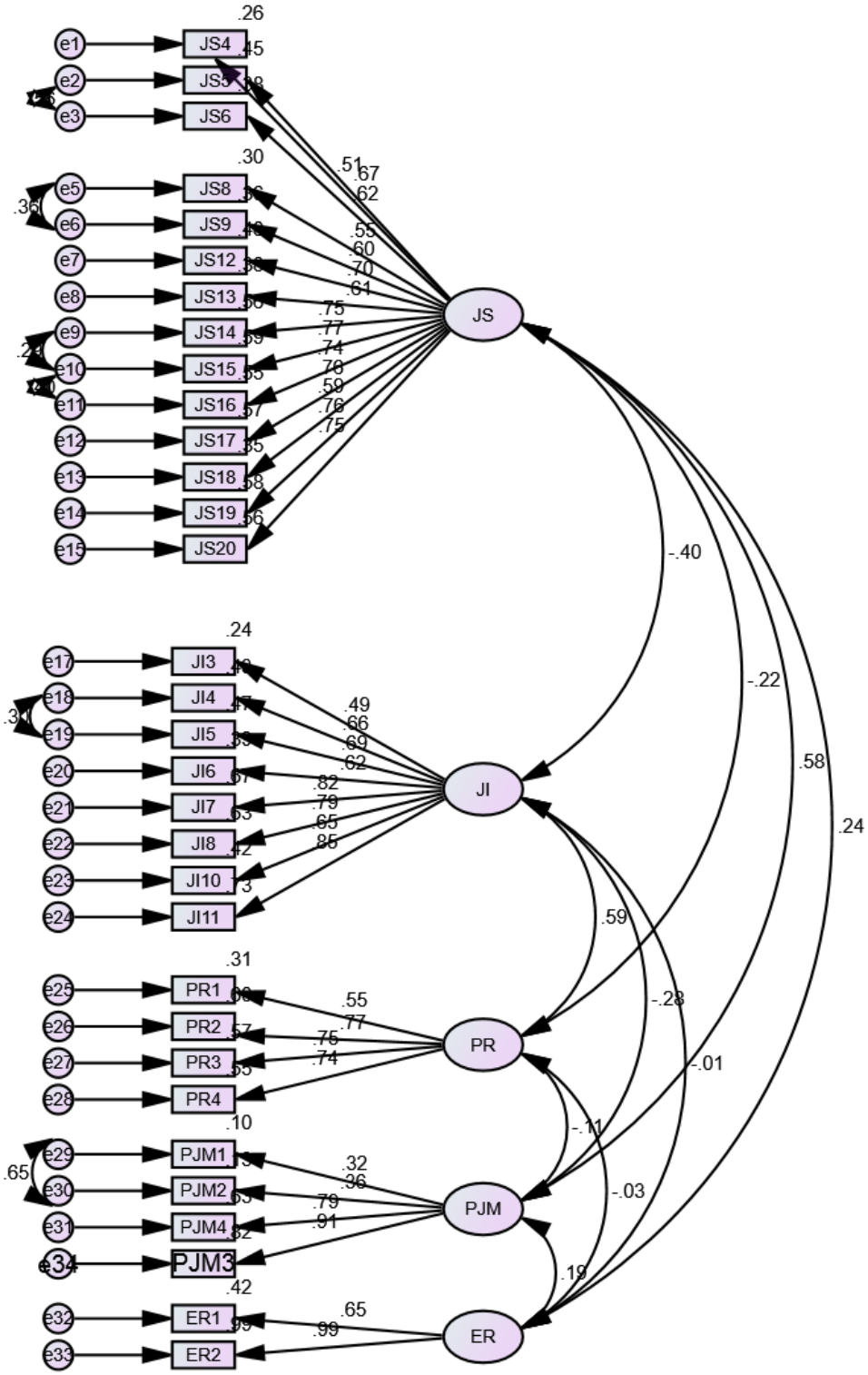
Total Variance Explained							
Factor	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**SS**
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	9.715	29.439	29.439	9.227	27.960	27.960	8.187
2	3.993	12.099	41.539	3.541	10.730	38.690	6.265
3	1.892	5.734	47.273	1.462	4.432	43.122	3.938
4	1.643	4.978	52.251	1.200	3.636	46.758	4.209
5	1.432	4.339	56.589	1.008	3.054	49.813	2.029

SS: Rotation sum of squared loadings
Extraction Method: Principal Axis Factoring.

Interpreting these results shows that the five factors explained ~ 50% of the included items' variance, which was considered adequate. In simpler terms these results suggest that 49.813% of the variance in this study can be explained by these five factors.

5.2 Confirmatory Factor Analysis

Figure 5.10 Final factor structure for the included latent variables



5.2.1 Factor Loadings

Initially, item JS7 was removed due to poor loading (< 0.4). All the remaining loadings were > 0.5 except PJM1 and PJM 2. However, these items were kept in the model as the CR of the scale was adequate and removing these two items would reduce the number of items in the factor to two. The AVE was also close to 0.5. The errors terms of the following items were allowed to co-vary to improve model fit: PJM1/PJM2, JI4/JI5, JS14/JS15, JS15/JS16, JS8/JS9, and JS5/JS6.

Table 5.13 Validity and reliability of the included latent factors

	CR	AVE	JS	JI	PR	PJM	ER
JS	0.920	0.454	**0.674**				
JI	0.885	0.497	-0.396***	**0.705**			
PR	0.800	0.504	-0.223**	0.592***	**0.710**		
PJM	0.710	0.421	0.582***	-0.279**	-0.106	**0.649**	
ER	0.820	0.704	0.245**	-0.010	-0.033	0.190*	**0.839**

AVE: Average variance extracted, CR: Composite reliability

* P < 0.05, ** P < 0.01, *** P < 0.0001

Numbers on the diagonals represent the $\sqrt{AVE}$, and the numbers below represent the correlation between the corresponding latent factors

Results showed that composite reliability was > 0.7 for all constructs. The AVE was greater than or equal to 0.5 for factors JI, PR, and ER. The AVE was < 0.5 for two factors (JS and PJM). However, the CR was acceptable for these two factors. Thus, this was deemed acceptable. A statistically significant positive correlation was observed between JI and PR (r = 0.592, P < 0.001), between PJM and ER (r = 0.19, P < 0.05), and between JS and ER (r = 0.245, P < 0.01). No association was observed between JI and ER (r = -0.01, P > 0.05). A statistically significant negative correlation was observed between JS and JI (r = -0.396, P < 0.001) and between JS and PJM (r = 0.582, P < 0.001). The √AVE for all factors was greater than its correlation with any other factor, which was considered a good measure of discriminant validity.

Table 5.14 Model fit indices

Measure	*Value*	*Acceptable value*
CFI	0.916	.9
TLI	0.907	≥ 0.9
RMSEA	0.055	< .06
RMSEA upper 90% CI	0.06	< .08
P close	0.084	> 0.05
Chi-square (X2)	844.105	
P	< .001	> .05
Degrees of freedom (df	448	
Cmin (X2/df)	1.884	< 3

The results showed that the proposed CFA model fits the data, as shown by the various fit measures illustrated in table 5.14. The chi-square statistic ($\chi 2$) was statistically significant at the 0.01 significance level [$\chi 2$ (448) = 884.105, P < 0.001]. Both CFI and TLI were > 0.9, which indicates a good model fit. The RMSEA was < 0.06, which indicates a good model fit, and the 95% confidence interval for the RMSEA was also < 0.08, which indicates excellent fit. The Cmin was less than five, which indicates that the model is a good fit for the data (P. J. Hu et al., 1999; Kaplan & Haenlein, 2019).

Table 5.15 Descriptive Statistics of the Theoretical Construct Variables

Construct Variables	Mean	Std. Deviation	Analysis N
PR1	3.58	1.170	296
PR2	3.81	1.042	296
PR3	3.8	1.118	296
PR4	3.8	1.107	296
JI3	4.38	0.851	296
JI4	4.18	1.107	296
JI5	4.35	1.060	296
JI6	3.68	1.414	296
JI7	4.08	1.209	296
JI8	4.26	1.082	296
JI10	3.84	1.360	296

Construct Variables	Mean	Std. Deviation	Analysis N
JI11	4.23	1.120	296
JS4	1.8	0.819	296
JS5	2.11	0.963	296
JS6	2.18	0.934	296
JS7	2	0.993	296
JS8	1.9	0.825	296
JS9	1.8	0.774	296
JS12	2.22	0.911	296
JS13	2.71	1.115	296
JS14	2.22	1.024	296
JS15	1.99	0.871	296
JS16	1.91	0.827	296
JS17	2.05	0.897	296
JS18	1.94	0.855	296
JS19	2.14	0.932	296
JS20	1.89	0.830	296
PJM1	2.24	0.964	296
PJM2	2.47	1.061	296
PJM3	3.05	1.129	296
PJM4	2.71	1.098	296
ER1	1.94	0.995	296
ER2	1.8	0.887	296

5.3 Validity and Reliability

This section summarizes the findings of the data validity and reliability tests conducted prior to their use in hypothesis testing.

5.3.1 Validity

In research, it is critical to test data for reliability and validity. It demonstrates that data accurately reflect reality (validity). Additionally, it demonstrates that the results are

replicable (reliability). According to Webber (2004) positivist researchers believe in gathering data that is an accurate representation of reality.

Positivists believe that if the researcher's findings can be duplicated by another researcher or by themselves, the research is trustworthy. If there are biases present, or if a different context is chosen, or if measurement mistakes occur, this results in discrepancies, resulting in untrustworthy research (Webber, 2004). To establish validity in the positivist paradigm, four criteria are used: external validity objectivity, internal validity, and reliability (Kivunja & Ahmed 2017, p.33).

To determine internal validity for this study, the author conducted face validity by having an expert in the information technology sector and the supervisor read through the questions to ensure they are not confusing, leading, or double-barreled. Once the author received feedback on the initial test, she undertook a pilot test on a subset of the intended demographic. This is referred to as test-retest reliability, and it is determined by delivering the instrument twice to the same population sample.

5.3.2 Reliability

The reliability of the factor analysis was assessed in the following section. Internal consistency is a metric of trustworthiness. This has to do with how closely the items on the same scale measure the same thing. The Cronbach's Coefficient Alpha is the most used method of determining reliability, with a recommended minimum value of 0.7 (Pallant, 2020). The five factors were then tested for reliability using the Cronbach Alpha as a criterion; the alpha was significant at 0.79 for Perceived RAIA, 0.88 for job insecurity, 0.91 for Job Satisfaction, 0.74 for Perceived Job Mobility and 0.78 for Expected Retraining. The results are shown in the table 5.16 below and these results confirm that the constructs used in this study were reliable.

Table 2.16 Reliability Check of FA

Construct	Cronbach's Alpha	Construct	Mean	Std. Deviation	N
Perceived RAIA	0.792	PR1	3.58	1.170	296
		PR2	3.81	1.042	296
		PR3	3.8	1.118	296

Construct	Cronbach's Alpha	Construct	Mean	Std. Deviation	N
		PR4	3.8	1.107	296
Job Insecurity	0.883	JI3	4.38	0.851	296
		JI4	4.18	1.107	296
		JI5	4.35	1.060	296
		JI6	3.68	1.414	296
		JI7	4.08	1.209	296
		JI8	4.26	1.082	296
		JI10	3.84	1.360	296
		JI11	4.23	1.120	296
Job Satisfaction	0.916	JS4	1.8	0.819	296
		JS5	2.11	0.963	296
		JS6	2.18	0.934	296
		JS7	2	0.993	296
		JS8	1.9	0.825	296
		JS9	1.8	0.774	296
		JS12	2.22	0.911	296
		JS13	2.71	1.115	296
		JS14	2.22	1.024	296
		JS15	1.99	0.871	296
		JS16	1.91	0.827	296
		JS17	2.05	0.897	296
		JS18	1.94	0.855	296
		JS19	2.14	0.932	296
		JS20	1.89	0.830	296
Perceived Job Mobility	0.742	PJM1	2.24	0.964	296
		PJM2	2.47	1.061	296
		PJM3	3.05	1.129	296
		PJM4	2.71	1.098	296
Expected Retraining	0.78	ER1	1.94	0.995	296
		ER2	1.8	0.887	296

5.4 Structural Equation Modelling

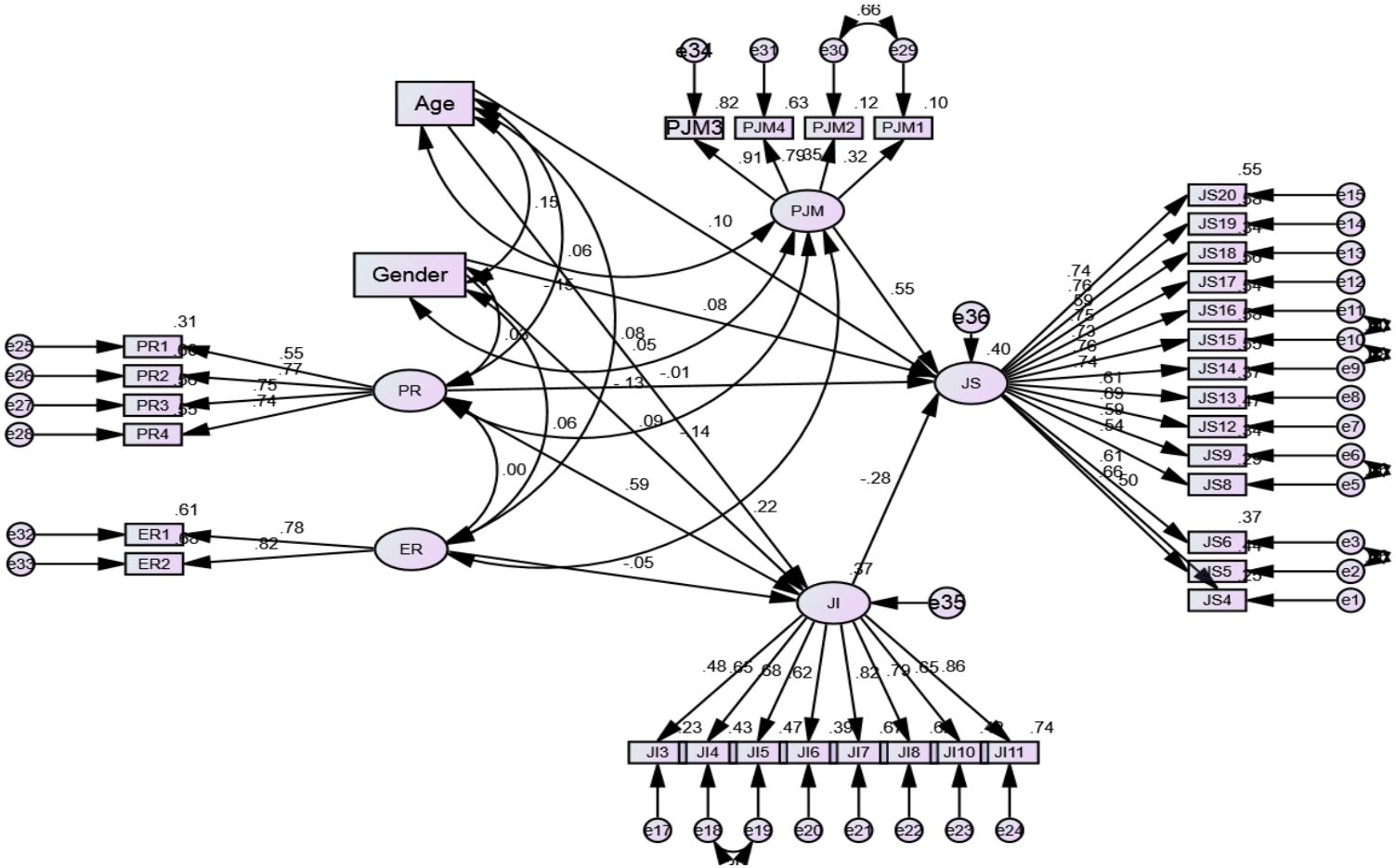
Structural Equation Modelling (hereafter referred to as SEM) is a method for representing, estimating, and testing a network of relationships between variables (measured variables and latent constructs). SEM is a multivariate technique that incorporates measurable variables and latent constructs and clearly specifies measurement error, and it necessitates the specification of a model based on theory and research. Relationships between variables can be specified using a model (diagram) as depicted in figure 5.11 (Fan et al., 2016).

The use of the SEM approach begins with the definition of a model to be estimated. As a result, the key objectives are to determine the goodness of fit and estimate the parameters of the postulated model(s). The X2 goodness-of-fit statistics and fit indices are the two most used methods for assessing model fit (Hu & Bentler, 1999).

Absolute and incremental fit indexes are the two types of fit indexes used to measure the Fit. The absolute fit index measures how well an a priori model matches the sample data. Although no reference model is utilized to determine the level of improvement in model fit, an implicit or explicit comparison to a saturated model that accurately reproduces the sample covariance matrix may be made. The Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit Index (AGFI), a cross-validation index, the root mean squared residual (SRMR), and the root mean square error of approximation are all examples of absolute fit indexes (RMSEA)(Fan et al., 2016; Hu & Bentler, 1999).

The next section provides an illustration of SEM (figure 5.11) followed by the results obtained from the conducted path analysis and finally the section discusses the results from the conducted Fit Analysis. A good-fitting model is one that is sufficiently consistent with the data (Fan et al., 2016).

Figure 5.11 Structural Equation Modelling



The perceptions of RAIA technology captures the extent to which South African IT professionals perceive the likelihood of RAIA technologies affecting their future employment. Going back to a study conducted by Brougham and Haar (2018, p.241) STARA awareness (which is another acronym that denotes the latest technologies) is defined as "the extent to which employees viewed the likelihood of technologies such as Smart Technology, Artificial Intelligence, Robotics and Algorithms (STARA) impacting on their future career prospects".

This research uses the same definition to define the perception of RAIA technologies and tries to understand whether an IT professional's awareness of has an influence on their job insecurity levels and are therefore threatened by such technologies. This study hypothesised that:

H_1 ***"Perception of RAIA technology will be positively correlated to job insecurity such that the higher the Perceptions of RAIA the higher job insecurity will be and the lower the Perceived RAIA the lower the job insecurity level".***

The results as shown in table 5.17 showed that there was a statistically significantly positive association between the perception of RAIA (PR) and job insecurity (JI) as indicated by the regression coefficient (B = 0.375, P < 0.001). These results indicate that one SD increase in PR is associated with 0.375 SD increase in job insecurity. Therefore, these results confirm the hypothesis and therefore H1 is accepted.

Table 5.17 Standardized regression coefficients for path analysis

			Estimate	S.E.	Z statistic	P
JI	<---	PR	.375	.065	5.732	< 0.001
JI	<---	ER	-.026	.032	-.816	.415
JI	<---	Age2	.036	.040	.922	.357
JI	<---	Gender	.077	.045	1.699	.089
JS	<---	JI	-.275	.083	-3.324	< 0.001
JS	<---	PJM	.740	.175	4.238	< 0.001
JS	<---	PR	-.006	.047	-.133	.894
JS	<---	Gender	.065	.044	1.497	.134
JS	<---	Age2	.071	.039	1.830	.067

			Estimate	S.E.	Z statistic	P
The model was adjusted for age and gender DV: Dependent variable IV: Independent variable						

According to Lingmont and Alexiou (2020) employees who undergoing training to upskill when a new technology is introduced tend to be far more prepared for changes in their occupations or duties, and they also exhibit significantly decreased levels of job insecurity than employees who have not been retrained. Based on their research this study hypothesised that:

H2 "Employees with higher expectations of retraining have significantly lower levels of perceived job insecurity"

The results from the study show that there is no association observed between the expectation of retraining and Job Insecurity (B = -0.026, P = 0.415). These results can be seen in row two in table 5.17. This therefore means that the hypothesis cannot be confirmed and has therefore been rejected.

In chapter two of this study, it was highlighted that research conducted by to Naidoo (2018), found that there are limited skilled IT professionals in South Africa and yet the demand is high which has resulted in voluntary job-hoping meaning that South African IT professionals can easily locate new positions. Based on Naidoo's study this study hypothesised that:

H3 "Job mobility will be positively correlated to job satisfaction such that the higher the perceived job mobility the higher the job satisfaction level"

The results showed that Perceived Job Mobility (PJM) was positively associated with job satisfaction (B = 0.74, P < 0.001), this can be seen in table 5.17 in row six. These results show that one SD increase in the perceived job mobility is associated with 0.74 SD increase in job satisfaction. These results prove the hypothesis and therefore the hypothesis is accepted.

In a study conducted by Lingmont and Alexiou (2020, p.2) it was stated that “changes anticipated in an organization and perceived role ambiguity” are positively correlated to job insecurity and the changes they refer to include changes in technology which result to anticipated threat. This study further states that the prospects of technologies such as RAIA cause employees to have less job satisfaction. This study therefore hypothesised that:

H9. “Job insecurity will be negatively correlated to job satisfaction and mediate the effects of the perceptions of RAIA technologies”

H10. “Perceived Job Insecurity is negatively correlated to job satisfaction, where job satisfaction increases with a decrease in job insecurity”

The results showed that a statistically significant negative association was observed between job insecurity and job satisfaction (B = -0.275, P < 0.001). These results indicate that one SD increase in JI is associated with 0.275 SD decrease in JS, as illustrated in table 5.17 row five. These results therefore support the first part of the hypothesis which states that Job Insecurity will be negatively correlated to Job Satisfaction. H10 is discussed under the mediation analysis section.

5.4.1 Mediation Analysis

Descriptive statistics and exploratory factor analysis were performed using SPSS v 26. Confirmatory factor analysis and structural equation modelling were performed using AMOS v 26. Maximum likelihood estimation was used in AMOS. Bootstrapping using 1000 bootstrapped samples was used for mediation testing. The bootstrapped 95% bias-corrected confidence intervals and p-values were used to test the indirect effect

Table 5.18 Mediation analysis results

DV	Mediator	IV	Direct effect		Indirect effect		Total effect	
			Estimate [SE]	P	Estimate [SE]	P	Estimate [SE]	P
JS	JI	PR	-0.01 [0.114]	0.904	-0.164 [0.075]	0.017	0.174 [0.067]	0.015

Standard errors and p values were derived using bootstrapping (1000 samples)
Indirect effect indicates the effect mediated by the included mediator
Total effect represents the sum of direct and indirect effects

There was a statistically significant negative total effect for PR and JS (B = -0.174, P = 0.015). Results suggest that the effect of PR on JS is a **totally indirect effect** as evident by the non-statistically significant direct effect (B = -0.01, P = 0.894). However, the indirect effect of PR on JS was statistically significant (B = -0.164, P = 0.017). These results support the hypothesis that the effect of PR on JS is mediated by JI.

Table 5.19 Model fit indices

Measure	*Value*	*Acceptable value*
CFI	0.911	.9
TLI	0.9	≥ 0.9
RMSEA	0.054	< .06
RMSEA upper 90% CI	0.059	< .08
P close	0.14	> 0.05
Chi-square (X2)	929.8	
P	< .001	> .05
Degrees of freedom (df	504	
Cmin (X2/df)	1.845	< 3

According to research the RMSEA is an absolute fit indicator that measures how close a hypothesized model is to being perfect. CFI and TLI, on the other hand, are incremental fit indices that compare a postulated model's fit to that of a baseline model. RMSEA values less than 0.05 are considered good, values between 0.05 and 0.08 are considered acceptable, values between 0.08 and 0.1 are considered marginal, and values greater than 0.1 are considered poor (Fan et al., 2016).

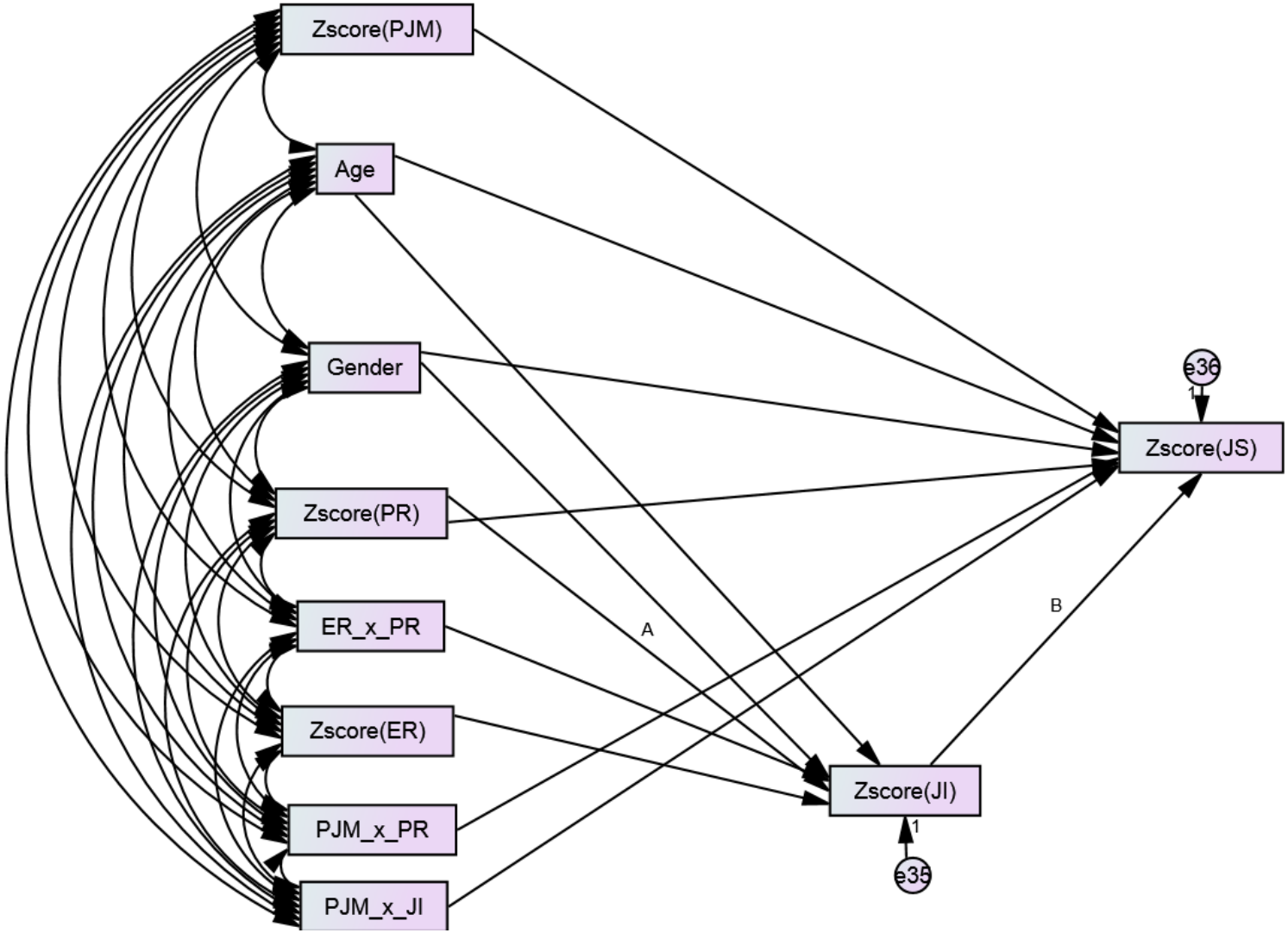
The results showed that the proposed CFA model fits the data, as shown by the various fit measures (table 5.19). The chi-square statistic ($\chi 2$) was statistically significant at the 0.01 significance level [$\chi 2$ (504) = 929.8, P < 0.001]. Both CFI and TLI were > 0.9, which indicates a good model fit. The RMSEA was < 0.06, which indicates a good model fit, and the 95% confidence interval for the RMSEA was also

< 0.08, which indicates excellent fit. The Cmin was less than five, which indicates that the model is a good fit for the data (P. J. Hu et al., 1999; Kaplan & Haenlein, 2019).

5.4.2 Moderation Testing

Factor scores were imputed for moderation analysis, and this was achieved using regression weights in an IBM Software called AMOS. Imputed scores were used for moderation analysis and factor scores were standardized to reduce multicollinearity between the interaction terms and the independent variables. Interaction terms were constructed by multiplying the standardized factor scores. Figure 5.11 below is a path diagram of moderation analysis which illustrates the relationship between the dependent variable (Job Satisfaction) and independent variables. The diagram shows both the direct and indirect.

Figure 5.11 Moderation analysis results



H6a "Perceived Job Mobility will a) interact with the Perception of RAIA technology"

H6b "Perceived Job Mobility will a) interact with the Perception of RAIA technology and b) job insecurity towards job satisfaction, with higher job satisfaction occurring for those with higher perceived employability"

Table 5.20 Moderation analysis results

			Estimate	S.E.	C.R.	P	
JI	<---	ER_x_PR	-.059	.036	-1.635	.102	
JS	<---	PJM_x_PR	-.031	.052	-.591	.554	5a
JS	<---	PJM_x_JI	-.048	.051	-.947	.343	5b

The imputed factor scores were used to construct the interaction terms as seen in figure 5.11. The interaction terms were included in the model along with the independent variables and moderation analysis was performed. Statistical analysis showed that the expected retention did not moderate the association between the perception of RAIA and job insecurity (B = -0.059, P = 0.102) as illustrated in table 5.20. The interaction between perceived job mobility and the perception of RAIA did not affect job satisfaction (B = -0.031, P = 0.554) which indicates that the perceived job mobility does not moderate the association between the perception of RAIA and job satisfaction.

This therefore means that hypothesis H6a which states that "*Perceived Job Mobility will a) interact with the Perception of RAIA technology*" was rejected

The interaction between perceived job mobility and job insecurity did not affect job satisfaction (B = -0.048, P = 0.343) which indicates that the perceived job mobility does not moderate the association between the job insecurity and job satisfaction. The results are shown in table 5.20.

This therefore means that H6b which states that:

> *"Perceived Job Mobility will a) interact with the Perception of RAIA technology and b) job insecurity towards job satisfaction, with higher job satisfaction occurring for those with higher perceived employability"* was rejected.

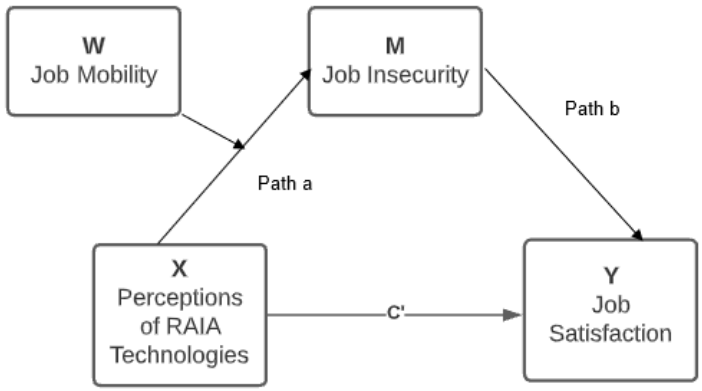
5.4.3 Moderated Mediation Analysis

According to Naidoo (2018) findings, there is a scarcity of skilled IT professionals, which indicates that those who do exist will quickly find other jobs if their current employment situation changes. However, because the world of technology is rapidly evolving, the abilities held by existing IT professionals may become obsolete, affecting their employability status. Therefore, this study hypothesizes that:

H4 ***"The indirect effects of the perceptions of RAIA technologies on job satisfaction via job insecurity will be moderated by perceived job mobility, such that the indirect relationship becomes stronger as job mobility strengthens (moderated mediation)"***

To test this hypothesis a moderated mediation analysis was conducted (figure 5.12). This model involves testing for the indirect effect of x (the independent variable i.e., Perceived RAIA Technologies) on Y (the dependent variable i.e., Job satisfaction) via the proposed mediator M (Job Insecurity), with the indirect effect being moderated by W (Job Mobility). In this model there is first- stage moderation as W is moderated by path a. In a second stage moderation, the moderation would be on path b.

Figure 5.12 Moderated mediation analysis



The imputed factor scores were used to test moderated mediation. Moderated mediation was tested using Hayes Process tool in SPSS. Job satisfaction was included as the outcome come (Y). PR was included as the independent variable (X). Job insecurity was included as the mediator and the perceived job mobility was included as the moderator. Standard errors and 95% confidence intervals were constructed using 5000 bootstrapped samples.

Table 5.21 Moderated mediation analysis results

DV	Mediator	Moderator	IV	Estimate	S.E.	95% CI	P	
JS	JI	PJM	PR	-.0156	.0697	-.173; 0.09	> 0.05	H6

The index of moderated mediation was not statistically significant (B = -0.0156, P > 0.05). Thus, PJM does not moderate the mediating effect of JI on the association between PR and JS i.e., the strength of mediating effect of JI does not vary at different levels of PJM. Therefore, hypothesis H4 is rejected.

5.4.4 Correlation Between Variables

Studies have shown that individuals with higher levels of education tend to exhibit lower levels of job insecurity as these individuals believe that they have more control over their future employment. Based on these findings this study hypothesized that:

H5 ***"A negative relationship will be observed between an IT employee's education level and job insecurity such that IT employees with less education will report greater job insecurity than those with higher education level"***

Linear regression analysis was used to assess the effect of education on job insecurity after adjusting for age, gender, PR, and ER. Analysis showed that education level was not associated with job insecurity (B = 0.008, P = 0.562), therefore the proposed hypothesis is rejected.

Table 5.22 Association between education and job insecurity

Model		Unstandardized Coefficients		Std. B	t	P
		B	Std. Error			
1	(Constant)	.482	.101		4.783	.000
	Age	.025	.032	.035	.789	.431
	Gender	.060	.035	.075	1.708	.089
	Education level	.008	.015	.026	.580	.562
	PR	.337	.023	.656	14.908	.000
	ER	.007	.027	.011	.244	.807

a. Dependent Variable: JI

t: T-statistic

Std. B: Standardized coefficient

B: Unstandardized regression coefficient

Studies have found that perceived control is a predictor of job insecurity(Keim et al., 2014). Control in this instance refers to the extent in which an individual's career is determined by his/her own actions. This study therefore hypothesised that:

H8 "A negative relationship will be observed between employees perceived control and job insecurity such that employees expressing an internal control will report

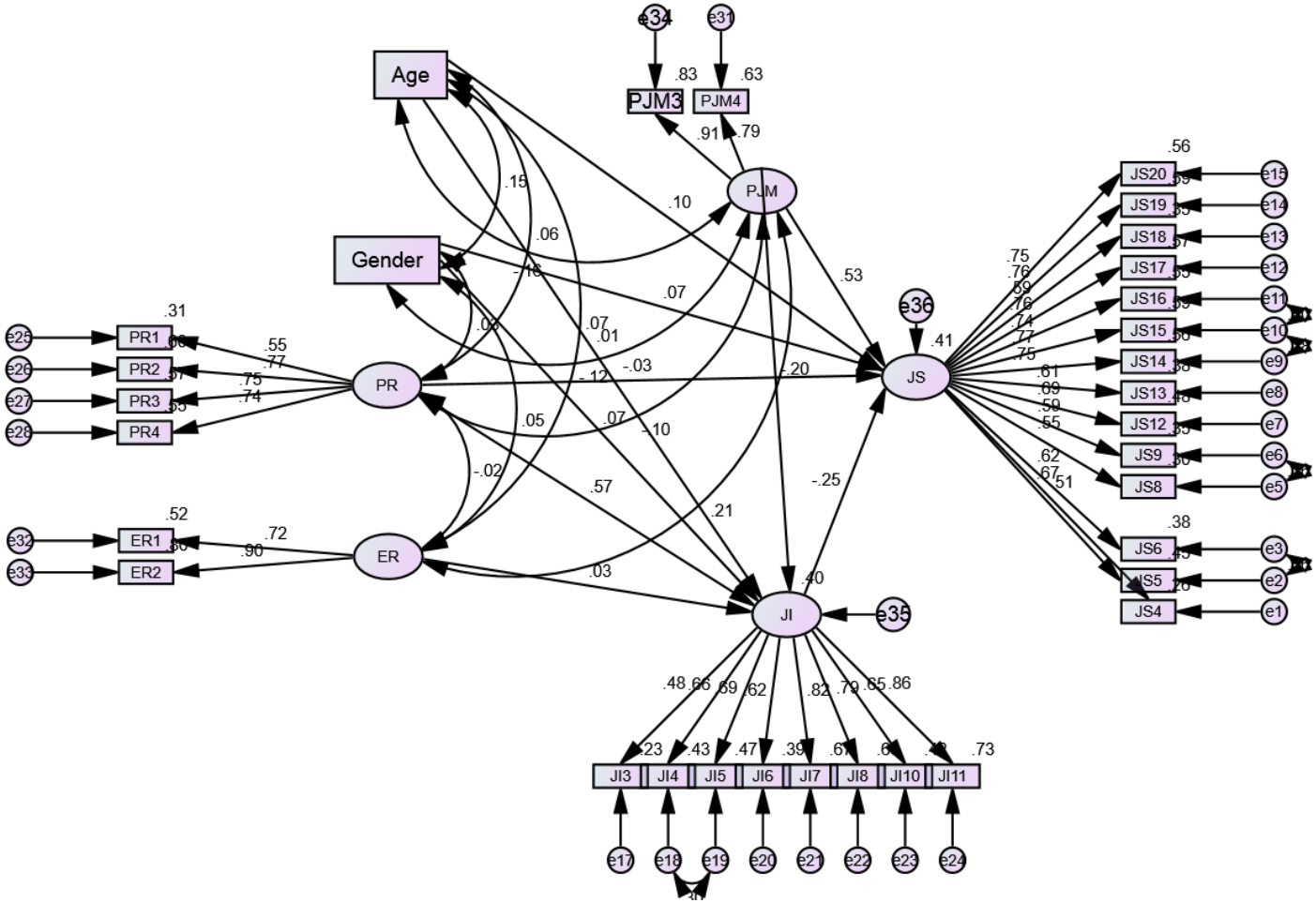
less job insecurity compared to those employees expressing external locus of control”

Table 5.23 Association between perceived control and job insecurity

			Estimate	SE	Z	P
JI	<---	Perceived control	-.081	.026	-3.164	**.002**

Structural equation modelling (Figure 5) was repeated after excluding items PJM1 and PJM2. Analysis showed that the perceived control was negatively associated with job insecurity (B = -0.081, P = 0.002).

Figure 5.13 Structural model after including only items related to perceived control



5.4.5 *Multiple Regression*

For any regression model, linearity needs to be proven. A linearity test was conducted through a curve fit analysis and linearity for all constructs was established. For a regression model to meet the criteria of linearity, all F values should be within the same range. The following table shows the F values for the constructs.

Table 5.24 Model Summary and Parameter Estimates

Model Summary and Parameter Estimates								
Dependent Variable	**Job Satisfaction**							
	Model Summary						**Parameter Estimates**	
Independent Variable	**Equation**	**R Square**	**F**	**df1**	**df2**	**Sig.**	**Constant**	**b1**
JI	Linear	0.184	66.367	1	294	0.000	1.992	-0.437
PR	Linear	0.065	20.4	1	294	0.000	1.688	-0.133
PJM	Linear	0.049	203.821	1	294	0.000	0.448	0.883
ER	Linear	0.066	20.705	1	294	0.000	1.008	0.160

5.5 Conclusion of the results

Based on the perceptions of IT professionals in South Africa, this chapter gave an analysis of the data and discussion of the findings. IT professionals' impressions of RAIA technology, job insecurity, job satisfaction, perceived job mobility, and expected retraining were all measured using descriptive statistics. Furthermore, SPSS version 26 was used to examine the statistical significance of eight (8) hypotheses. This proved to be an excellent tool for gauging respondents' perceptions of RAIA technologies and the effects thereof on job insecurity and job satisfaction. The discussion and recommendations based on empirical data are presented in the

following chapter. However, these findings can only be applied to IT professionals in South Africa.

CHAPTER SIX

6. DISCUSSION AND CONCLUSION

6.1 Introduction

The interpretations, comments, and analyses of the research findings were reported in the previous chapter. This chapter summarizes the findings and gives recommendations based on the empirical analysis, as well as suggesting research directions for the future. The recommendations are limited to South African IT professionals because this study focused on South African professionals who considered themselves to be part of the defined group of IT professionals investigated in this study. They might, however, be beneficial to other researchers working in related disciplines. The major goal of this study was to understand an IT professionals' perceptions of RAIA technology and the effects thereof on job insecurity and job satisfaction. The study's conclusions are in line with the research objectives and respond to the study's major goal.

6.1.1 Research Question One and Three

R1: To what extent do IT professionals Perceptions of RAIA technologies influence Job Satisfaction and Job Insecurity in the South African IT sector?

R3: To what extent does job insecurity mediate the effects of the Perception of RAIA technology on job satisfaction?

According to Lingmont and Alexiou, (2020) increased perceptions of job insecurity influence an employees' well-being, performance, and job satisfaction. This studies aim was to investigate the extent in which RAIA technology affects IT professionals job insecurity levels and job satisfaction, the reason for this is that even though technology is on the rise especially in the automation space the literature on such technologies is still limited(Brougham & Haar, 2018; Lingmont & Alexiou, 2020). As a result, this study researched the question "To what extent do IT professionals Perceptions of RAIA technologies influence Job Satisfaction and Job Insecurity in the

South African IT sector?" To answer this research, question the researcher conducted mediation analysis where the dependent variable was Job Satisfaction, and the independent variable was perceived RAIA technology with Job Insecurity as the mediator.

The data collected during this study found that there were several statistically significant correlations. Among these was the total effect for Perceived RAIA Technology and Job Satisfaction, where the results showed that there was a statistically significant negative total effect between Perceived RAIA technology and Job Satisfaction. In addition, the indirect effect of Perceived RAIA Technology on Job Satisfaction was statistically significant (B = -0.164, P = 0.017). These results support the hypothesis that the effect of Perceived RAIA Technology on Job Satisfaction is mediated by Job Insecurity and therefore the results show that the extent in which IT professionals Perceptions of RAIA technologies influence Job Satisfaction and Job Insecurity in the South African IT sector is significant.

6.1.2 Research Question Two

To what extent does job insecurity affect job satisfaction?

Job satisfaction is a crucial phenomenon in modern day organizations mainly because of its diverse effect on organizational effectiveness and employee well-being. This study places a lens on the effects of job insecurity on job satisfaction. Research has shown job insecurity to be negatively correlated to job satisfaction (Yaşlıoğlu et al., 2013). This study's results corroborate these findings. To investigate this phenomenon this study attempted to answer the following research question: "To what extent does job insecurity affect job satisfaction?". To answer this question the researcher analyzed data using path coefficients.

The results showed a statistically significant negative association between job insecurity and job satisfaction (B = -0.275, P < 0.001). These results indicate that one SD increase in JI is associated with 0.275 SD decrease in Job Satisfaction. These

results are supported by a study conducted by Keim et al. (2014) who also reported that job insecurity was negatively correlated to outcomes such as job satisfaction.

6.2 Conclusion

The researcher provided an overview of perceived RAIA technology and its influence on job insecurity and the resulting effect on job satisfaction. The theoretical framework was built by reviewing various literature. Based on the observed literature and objectives of this study the study was directed towards a quantitative research design and to answer the research questions a closed- ended questionnaire was developed to collect primary data. A survey was used as it allowed the researcher to reach a wider audience in a short period of time which resulted in the researcher reaching more than 300 participants. The data was analysed using SPSS version 26 for windows. The descriptive statistics were analysed by the researcher and hypotheses were tested, presented, and discussed.

7. CONCLUSIONS

7.1 Overview of the Study

The purpose of this research is to close the gap by determining how RAIA technologies contribute to subjective job insecurity and how the interaction between these two factors influences job satisfaction. The findings from the study showed that the Perception of RAIA Technologies is positively correlated to Job Insecurity which showed that a positive increase in the Perception of RAIA resulted in an increase in Job Insecurity. Surprisingly the results also showed that there was no association between Expected Retraining and Job Insecurity. These findings contradict the findings of Lingmont and Alexiou (2020) who had found that when empolyees undergo training they tend to be prepared for changes in their work environent and therefore exhibit significantly decreased levels of job insecurity than employees who have not been retrained and based on their research this study had hypothesised that “Employees with higher expectations of retraining have significantly lower levels of perceived job insecurity”. This hypothesis was therefore rejected.

The study also proved that Job Mobility was indeed associated with Job Insecurity. The results showed that there was a positive correlation between Job Mobility and Job Satisfaction meaning that when IT professionals believe that they they can be easily employed they then exhibit lower levels of job insecurity.

The studies main goal was to identify if RAIA Technology has an effect on Job Satisfaction and this was tested through mediation analysis where Job Insecurity was the mediator. The results proved this study’s hypotheses that the effect of Perceived RAIA Technology on Job Satisfaction is mediated by Job Insecurity.

This chapter concludes the research by providing future recommendations to future reasearchers who might find this topic interesting.

7.2 Recommendations and Directions for future research

a) **Unemployment Rate:** According to a study done by Bustillo and Pedraza (2010), the perception of job insecurity is positively connected with a country's level of

unemployment. Additionally, research indicates that public sector employees face less job insecurity than private sector employees, as public sector employment is regarded to be more stable. Abdullah and Muhammad (2012) add to this conclusion by arguing that jobs are more secure in the public sector due to legislative limits. As a result, retrenchment in the public sector is far more difficult than in the private sector. Additionally, they discovered that layoffs increase anxiety and a sense of job uncertainty.

Earlier in the study, it was highlighted that South Africa's unemployment rate sits at 30.1%, which, based on Bustillo and Pedraza (2010), employees would experience higher levels of anxiety. However, Naidoo's (2018) study shows an increased demand for IT professionals in the South African labour market and that IT professionals often easily find new employment. This finding by Naidoo shows that a high unemployment rate does not always mean that employees will struggle with finding new employment, meaning that job insecurity levels will also be dependent on the industry and how that specific industry is performing. Due to time constraints and taking into consideration that the world was faced with a pandemic that led to retrenchments this study did not investigate this aspect. It would be interesting to see how a country's unemployment rate contributes to an IT professionals job insecurity. It is therefore imperative that future research investigates this relationship.

b) Perceived Threat of Loss: This element of job insecurity is related to an employee's perception of a situation that has some probability of violating his or her desired continuity. According to (Greenhalgh and Rosenblatt, 2010), the primary source of perceived threat stems from rumors within organizations. The perceived threat can also stem from professional obsolescence, which is defined as possessing devalued IT skills, resulting in negative implications such as lower employability and compensation (Setor, Joseph and Srivastava, 2015).

Research states that professional obsolescence is recognized as one of the biggest threats confronting IT employees. It is believed that when one holds

obsolete skills, they are at a higher risk of losing their job (Setor et al., 2015). This study failed to explore the participants skills level, it only looked at educational level which does not necessary inform the researcher on the skills that the respondents hold with regards to their subject matter. For instance, in the enterprise resource management software space were there any participants who were certified in SAP, SAGE X3, ORACLE or in the Robotics and Automation space were there any participants certified in UiPath? The researcher does not have answers to these as there was an oversight when building the data collection instrument. These questions are important as they can influence an individual's level of security. It is therefore essential for the researcher to explore the skills within this space.

c) Job features at risk: In their study, Greenhalgh and Rosenblatt (1984) found that employees were worried about changes that could result in losing aspects of the job they are used to. The example that they provide is that say for instance that a new undesirable manager is appointed, or an employee turned friend leaves the organization, or when one is assigned undesirable tasks, this could leave the employee feeling a significant degree of job insecurity.

RAIA technologies change the way people usually perform their tasks and based on the above; it could result in employees fearing that they will lose aspects of the job they wish to continue with. Future research should explore this aspect, this study did not ask participants on whether they have in fact experienced the effects of RAIA Technology and how they felt about that. The research was based solely on the assumption that participants understand and know what RAIA technology is, and it focused on perception as opposed to real experience. It would be worthwhile finding out how IT professionals who have had some of their tasks automated feel and whether they are still confident that they are 'irreplaceable'.

***d)* Economic Insecurity**: This construct denotes the anticipated pay-cut or shrinkage of expected future salary increases. It is defined as the perceived inability to meet current financial obligations should the income from the current job be taken away from the employee (Greenhalgh and Rosenblatt, 1984). There are contradictory findings on the effects of economic insecurity on job insecurity and job satisfaction

(Naidoo, 2018). For instance, a study by (Thatcher et al., 2006) found that there is a positive relationship between salary satisfaction and job satisfaction. However, another study found that salary satisfaction played an insignificant role in determining an IT professionals job satisfaction level (Kim, 2009). Another study found that IT professionals in South Africa are attracted to organizations that pay more (Naidoo, 2018). Considering that some companies imposed salary cuts during the pandemic it would have been a great opprotunity to identify IT professionals who underwent salary cuts and observe the mediating role of economic insecurity.

e) **Entrepreneurs**: During the data collection process the researcher received private notes from a number of participants voicing out that the study was geared towards IT professionals who were working for someone else and it neglected those who were self-employed or owned their own organizations. This was an interesting realization, and these participants were indeed correct. The study did not consider individuals who were freelancers, independent contractors, entrepreneurs, or owners of large IT organizations. Future research should explore this aspect as a unit of analysis.

7.3 Conclusion

The world is in a period were technology changes at exponential rates and drives the way in which we work and has the potential to automate some of the tasks performed by individuals in their day-to-day work lives. This study has identified three main constructs that either directly or indirectly affect job satisfaction, namely: Perceived RAIA Technology, Job Insecurity, Job Mobility and Expected Retraining. This study developed a framework and a set of hypotheses to examine the effects of these constructs on Job Satisfaction.

This study has contributed to our understanding of IT professionals' perceptions of RAIA technologies and how those perceptions contribute to job insecurity and job satisfaction

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9. Research Planning

9.1 Timetable

	September	October	November	December	January	February
Finalise proposal						
Gain approval						
Gather data						
Do data analysis						
Write report						
Finalise report						

10. Appendix A – Cover Letter Shared Online

Dear Sir/Madam

My name is Palesa Mashego, and I am a Masters student in the School of Economic and Business Sciences at the University of the Witwatersrand, Johannesburg. The title of my research is **IT Professional's Perceptions of Robotics, Artificial Intelligence and Automation (RAIA) as a source of Job Satisfaction and Job Insecurity in the IT sector.** Specifically, I am interested in understanding how IT professionals perceive RAIA technology and whether or not their perceptions lead to job insecurity and the effect thereof on job satisfaction.

As an IT professional based in South Africa, you are invited to participate in my research by completing the attached questionnaire. The purpose of the questionnaire is to investigate how your perceptions affect your job insecurity and job satisfaction levels.

The questionnaire is broken down into six parts, where each part assists in answering specific research questions. There are 46 questions in total, and the questionnaire should take about 15 minutes to complete.

Participation will bear no risk to you, and no harm will come to you if you do participate. Participation in the research is purely voluntary. Nobody will force you to complete the questionnaire. Your responses will be taken to be both confidential and anonymous. In order to ensure your confidentiality and anonymity, you will not be required to give your name or your business's name at any stage.

This study is for academic purposes only. The results of the survey will only be reported in my dissertation, and your responses will not be shared with anyone else. If you would like a summary of my findings, you may request in writing, and I will share the results. I will keep the questionnaires for two years to facilitate further research. There will be no penalty or consequence if you do not complete the questionnaire. I would, however, really appreciate it if you took part in the study.

If you have any questions regarding the study, please feel free to contact me at 2324639@students.wits.co.za

Yours Sincerely

Palesa Mashego

11. Appendix B – Electronic Consent

ELECTRONIC CONSENT TO PARTICIPATE IN MASTERS RESEARCH

IT Employee's Perceptions of the implementation of Robotics, Artificial Intelligence and Automation as a source of Job Satisfaction and Job Insecurity in the IT Industry

You are invited to participate in a web-based online survey on ***IT Employee's Perceptions of the implementation of Robotics, Artificial Intelligence and Automation as a source of Job Satisfaction and Job Insecurity in the IT Industry***. This is a research project being conducted by Palesa Mashego, a student at the School of Economic and Business Sciences at the University of the Witwatersrand, Johannesburg. It should take approximately 10 minutes to complete.

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about IT professionals perceptions of RAIA technology on job insecurity and job satisfaction.

Your survey answers will be sent to a link at SurveyMonkey.com where data will be stored in a password protected electronic format. Survey Monkey does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

If you have any questions relating to the consent form, please contact the principal researcher, Palesa Mashego, on 0718738958. I have read and understood the contents of the participant information sheet attached to the questionnaire.

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that

- You have read the above information
- You voluntarily agree to participate
- You are 18 years of age or older

❑ Agree

❑ Disagree

12. Ethical Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

SCHOOL OF BUSINESS SCIENCES ETHICS COMMITTEE
CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: CBUSE1906**
PROJECT TITLE	IT Professional's Perceptions of Robotics, Artificial Intelligence and Automation (RAIA) as a source of Job Satisfaction and Job Insecurity in the IT sector
INVESTIGATOR	Mashego Palesa Precious
SCHOOL/DEPARTMENT OF INVESTIGATOR	School of Business Sciences
DATE CONSIDERED	17 August 2021
DECISION OF THE COMMITTEE	Approved unconditionally
RISK LEVEL	Low Risk
EXPIRY DATE	31 December 2023

ISSUE DATE OF CERTIFICATE 24 August 2021 **CHAIRPERSON** _____
(Neetu Ramsaroop)

cc: Supervisor: Ms Neetu Ramsaroop

DECLARATION OF INVESTIGATOR

To be completed in duplicate and **ONE COPY** returned to the Chairperson of the School/Department ethics committee.

I fully understand the conditions under which I am are authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

_____ 24 /08 /2021
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

13. Appendix C – Questionnaire

Part 1: Demographics and Personal Information — This section will assist in comprehending the participants' demographic mix. Kindly respond to the following questions by selecting the appropriate option.

1. **Your Gender (Select One √):** Female □□Male □□

2. **Age:** In which age range do you fall? Please use the generational table below as a guide.

- ○ Boomers
- ○ Generation X
- ○ Milennials
- ◉ Postmilennials

Grouping	Year	Age Range
Boomers	1946 - 1964	56 -74
Generation X	1965 -1980	40 - 55
Millennials	1981 - 1996	24 - 39
Postmilennials	1997 - 2002	18 - 23

3. **Educational level:** please select your highest level of education by selecting one of the below options

#	Items	1	2	3	4	5	6	7	8
		No formal schooling	Primary School	High School	Diploma	Undergraduate Degree	Postgraduate Honours	Postgraduate Masters	PhD
1	What is your highest educational attainment?								

Part 2: The perception of RAIA Technology. This section will help us understand how you perceive the RAIA technology. Please respond to the below items by selecting the appropriate rating

#	Items	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	"I think my job could be replaced by RAIA"					
2	"I am personally worried that what I do now in my job, will be able to be replaced RAIA"					
3	"I am personally worried about my future in my organisation due to RAIA replacing employees"					
4	"I am personally worried about my future in my industry due to RAIA replacing employees"					

Part 3: Job Insecurity. This section will help understand the employee's perception of their job insecurity levels. Please respond to the below questions by selecting the appropriate rating

#	Items	1 Strongly Disagree	2 Somewhat disagree	3 Partly Agree	4 Somewhat Agree	5 Strongly Agree
1	"I think that I will be able to continue working here."					
2	"There is only a small chance that I will become Unemployed."					
3	"I am certain/sure of my job environment."					
4	"I am very sure that I will be able to keep my job."					
5	"It makes me anxious that I might become unemployed"					
6	"I feel uncertain about the future of my job."					
7	"I worry about the continuation of my career."					
8	"I fear that I might lose my job."					
9	"I fear that I might get fired."					
10	"There is a possibility that I might lose my job in the near future."					
11	"I think that I might be dismissed in the future"					

Part 4: Job Satisfaction. This section will assist in comprehending the employee's perception of his or her level of job satisfaction. Kindly respond to the questions below by selecting the most relevant rating.

#	Items	1 Very Dissatisfied	2 Dissatisfied	3 Somewhat Satisfied	4 Satisfied	5 Very Satisfied
1	"Being able to keep busy all the time."					
2	"The chance to work alone on the job."					
3	"The chance to do different things from time to time."					
4	"The chance to be "somebody" in the community."					
5	"The way my boss handles his/her workers."					
6	"The competence of my supervisor in making decisions."					
7	"Being able to do things that don't go against my conscience."					
8	"The way my job provides for steady employment."					
9	"The chance to do things for other people."					
10	"The chance to tell people what to do."					
11	"The chance to do something that makes use of my abilities."					
12	"The way company policies are put into practice."					
13	"My pay and the amount of work I do."					
14	"The chances for advancement in this job."					
15	"The freedom to use my own judgment."					
16	"The chance to try my own methods of doing the job."					
17	"The working conditions."					
18	"The way my co-workers get along with each other"					
19	"The praise I get for doing a good job."					
20	"The feeling of accomplishment I get from the job."					

Part 5: Perceived Job Mobility. This section will assist in comprehending employees' perceptions on their perceived job mobility/employability. Kindly respond to the questions below by picking the relevant rating.

#	Items	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1	"If I were to quit my job, I could find another job that is just as good."					
2	"I would have no problem finding an acceptable job if I quit."					
3	"I have enough power in this organization to control events that might affect my job."					
4	"I have enough power in this organization to control events that might affect my job."					
5	"I understand this organization well enough to be able to control things that affect me."					

Part 6: Expected Retraining. This part will assist in comprehending employee attitudes toward retraining.

#	Items	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1	"If some tasks I perform now for my job will be replaced RAIA technologies, I expect my organization to provide opportunities for me to adapt to the new job description "					
2	"When my organization replaces employees with RAIA technologies, I expect my organization to have career development programs that help employees develop specialized functional skills and expertise for new jobs"					