

Demographic influences on employee perceptions of Robotic Process Automation at a South African telecommunications company

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- Robotic Process Automation
- Perceptions of RPA
- Fear of becoming unemployed
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ABSTRACT

This research report investigates the influence of employees' demographic characteristics on their perceptions of robotic process automation (RPA) in a South African telecommunications company. It uses an exploratory, non-experimental, quantitative research approach and presents and analyses primary data collected through an online survey instrument distributed to a cross-sectional, self-selection sample of employees. The research found that a large majority of employees perceived RPA to be beneficial to themselves and to the business and, were neither for nor against the implementation of RPA, but that they also believed that RPA was not flexible enough to be applied to every business task or process. It was also found that demographics have much less of an influence on employees' perceptions of RPA than might be expected.

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LIST OF ACRONYMS

Acronym	Description
Avg	Average
BOT	A Robotic Process Automation software robot
CFI	Comparative Fit Index
COE	Centre of Excellence
CSI	Corporate Social Investment
FTE	Full-time employee
GDP	Gross Domestic Product
IS	Information Systems
IT	Information Technology
Min	Minimum value
Max	Maximum value
OpCo	Operating company
Q	Research Instrument question
RI	Research Instrument
RMSEA	Root mean square error of approximation
ROI	Return on investment
RPA	Robotic Process Automation
SD	Standard Deviation
SEM	Structural Equation Modelling
SME	Subject matter expert

1 INTRODUCTION

In this chapter the purpose, background, context, and research problem and questions will be addressed.

1.1 Purpose of the study

The purpose of this quantitative perceptions study is to assess the demographic influences on employees' perceptions about Robotic Process Automation at a South African telecommunications company.

1.2 Context of the study

RPA is an emerging software technology (Siderska, 2020; Atencio et al., 2022), that is gaining in global popularity. RPA is considered one of the elements that support Industry 4.0 (Nilsson, 2014; Bahrin et al., 2016; Ribeiro et al., 2021), a name used interchangeably with the Fourth Industrial Revolution (4IR) (Marnewick A.L. & Marnewick C., 2020; Nhamo et al., 2020), however there is disagreement amongst academics as to whether they are equivalent (Marnewick A.L. & Marnewick C., 2020).

RPA differs from industrial automation accomplished through industrial robotics in that RPA is specifically accomplished through software robot automations that are created by RPA software developers. Industrial automation affects low-skilled workers doing repetitive, manual tasks, where RPA affects repetitive-work tasks conducted by both low-skilled workers as well as knowledge workers (Kelly, 2021).

It is claimed that if businesses, governments, and societies do not embrace Industry 4.0, especially in Africa, that they will become less relevant and competitive as global societies and industries evolve and progress due to programmes that implement Industry 4.0 technologies (Nhamo et al., 2020). Automating a business process or task using RPA is most suited to high volume, repetitive, rule-based tasks (AIIM, n.d.; Wewerka et al., 2020), that are often referred to as mundane tasks such as: a human manually capturing the data from an invoice into a billing system. Successful implementation of RPA is claimed to

offer an abundance of benefits to business, from business process efficiency gains, customer experience improvements, reduction in operating costs, improvement in employee welfare, an increase in accuracy, a reduction in human error, and a competitive advantage, amongst others (Syed et al., 2020; Ribeiro et al., 2021). In order to successfully implement RPA it is critical that employees willingly support and become involved in the programme (Wewerka et al., 2020), as it is crucial that the employees executing the business processes, referred to as a Subject Matter Expert (SME), provide accurate and comprehensive input (AIIM, n.d.; Dandekar et al., 1997), in to the development of the software robot, also referred to as a 'bot', so as to ensure that the bot performs all aspects of the automated process as least as well, if not better than a human would. The more clearly the business process is defined, the greater the chance of a successful automation project (Moffitt et al., 2018).

Scenarios relating to employment or unemployment due to technological advances have ranged from cautious (Brynjolfsson & McAfee, 2014), to potentially detrimental to humans (Brynjolfsson & McAfee, 2014; Huth, 2016; Ahmed, 2018). Brynjolfsson & McAfee (2014), suggest that reskilling those employees whose jobs are most vulnerable to automation will mitigate for the potential job losses that automation may expedite. A study conducted in Norway found that the fear of losing your job to automation could lead to stress and anxiety and be detrimental to productivity and innovation brought about by job dissatisfaction, and that lower-skilled workers who perform routine-based work have a greater fear of losing their jobs to automation (Schwabe & Castellacci, 2020). The fear may be misplaced as technological evolution, such as automation, can bring about positive disruption, new products, and enhance human capabilities (Bessen et al., 2020). Further in allaying fears Bessen et al. (2020), argue that it is tasks that are automated and not jobs. Although some headlines have alarmingly warned of job losses due to automation, Freeman et al. (2020), argue that these should be viewed with scepticism as job data does not reflect high levels of unemployment caused by automation. As tasks are automated, technology advancement creates the need for new tasks and even new occupations that require human labour (Acemoglu & Restrepo, 2019). In order for employees to mitigate against their skills becoming obsolete it is imperative that employees learn new skills (Bessen, J., 2016).

1.3 Research problem

RPA implementation has seen resistance from full-time employees (FTE), in part due to the threat that RPA is assumed to make towards FTEs losing their jobs to automation. This is referred to as the 'displacement effect' discussed by Acemoglu & Restrepo (2019), a scenario where capital replaces labour. To some extent this fear is validated by the FTE reduction benefit supposedly being pursued by some organisations for cost-cutting purposes. However, no published evidence of explicit FTE reduction targets through the implementation of RPA, has been found. Publications relating to job losses, due to the implementation of RPA, have discussed how the number of job roles that are automatable has been increasing over time but that the number of new job roles created by technology, such as RPA and other 4IR technologies, will far outweigh the number of jobs lost due to automation (Ratcheva et al., 2020). It is important to understand the perceptions of employees towards RPA, from leadership to low-level employees, in order to gauge how employees will interact and cooperate while implementing the technology (Cooper et al., 2020). In order to gain an in-depth understanding of employees' perceptions towards RPA and considering that this study is being conducted within South Africa with a history of past injustices towards specific demographic groups, as well as one of the highest unemployment rates in the world, it is important to this study to include participant demographics as a lens through which to view the results that would originate from this study. Gaining insights in to whether there are differences in perceptions that correlate to demographics would provide guidance on the future direction of messaging and the potential reskilling of employees that would allow them to remain relevant within the labour market. However, the demographics may or may not indicate a difference in perceptions for each demographic group which would enlighten and guide the results and recommendations of this study. Technology advances impact employees' careers which has implications on how employees and their careers should be managed (Baruch, 2004). It is hypothesised that employers who are actively exploring the implementation of RPA robots could result in the employees feeling undervalued and not well regarded by their employer (Brougham & Haar, 2018). This perception by the employees could lead to a higher employee turnover and loss of valuable employees as well as impact on employee morale and productivity (Brougham & Haar, 2018).

The research problem considers that employees' perceptions towards RPA within the South African context have not been sufficiently explored to the extent that the impact that RPA will have on employees, and by extension businesses, could begin to be understood.

1.4 Research questions

As previously discussed, considering the potential resistance from FTEs relating to the adoption of RPA that could be detrimental to the successful implementation of RPA and lead to the expected ROI not being realised, the following research question arises: (RQ1) what are employees' perceptions of Robotic Process Automation?

To gain an understanding as to whether the perceptions derived from RQ1 are influenced by the demographic characteristics of the questionnaire respondent, the following research question arises: (RQ2) do demographics have an influence on employees' perceptions about Robotic Process Automation?

These research questions will aid in providing both an overall insight into the perceptions of employees as well as potentially expose the role that demographics may play in relation to those perceptions.

1.5 Significance of the study

There is a general lack of academic literature that deals with the perceptions of employees relating to RPA. This is especially true for South Africa, a developing country that has high unemployment. The limited studies that have been conducted have all used samples from developed countries which raises the question of the applicability to South Africa of the conclusions of these studies. The academic literature available on the impact of RPA on employees has revealed a curious dichotomy of 'employees will lose their jobs due to RPA' argued by Frey & Osborne (2017), and 'RPA will augment employees' ability to do their work better' argued by Raj & Seamans (2019).

The research this study proposes is intended to contribute towards existing knowledge and provide a perspective from a developing country that could assist in narrowing this academic literature gap.

1.6 Delimitations of the study

1.6.1 *In scope*

This employee perceptions study specifically relates to the perceptions of RPA within a telecommunications company in South Africa. The study will attempt to include all business areas and job levels within the business. This study is aimed at eliciting input from permanent employees only.

1.6.2 *Out of scope*

This study will not include responses from the parent holding company, subsidiaries or associated operating companies. This study will not include responses from contracted or part-time employees. This study will not include any other software automation technology that is not already referred to as Robotic Process Automation by the industry or academics.

1.7 Definition of terms

In this section the list the major terms used within this proposal are indicated and defined using the most common and recently accepted definitions of these terms.

Term	Definition
Business objectives	“something that [a business would] plan to do or achieve...,” (<i>Cambridge University Press, n.d.</i>).
Cost reduction	“the process of reducing the amount of money that a company spends on wages, production, etc. in order to make it more profitable,” (<i>Cambridge University Press, n.d.</i>)
Customer experience	“... the subjective response customers have to direct or indirect contact with a company,” (Schwager & Meyer, 2007).

Term	Definition
Online survey	"An online survey is a questionnaire that the target audience can complete over the Internet," (<i>What Is an Online Survey?</i> , n.d.)
Operating companies	"a company that is owned by a larger company," (<i>Oxford English Dictionary</i> , n.d.).
Operational efficiency	"Operational efficiency is primarily a metric that measures the efficiency of profit earned as a function of operating costs," (Hayes, n.d.).
Perception	"an idea, a belief, or an image you have as a result of how you see or understand something," (<i>Cambridge University Press</i> , n.d.)
Permanent employee	"A permanent employee is a person employed for an undetermined period of time," (<i>Rights of Fixed Term, Part-Time and Other Employees</i> , n.d.)
Productivity leadership	Leadership as it relates to, "the rate at which a company or country makes goods, usually judged in connection with the number of people and the amount of materials necessary to produce the goods," (<i>Cambridge University Press</i> , n.d.).
Robotic Process Automation (RPA)	A non-invasive, autonomous software technology that uses pre-defined business rules to interact with digital software applications in a choreographed manner (Ribeiro et al., 2021; Syed et al., 2020; Wewerka & Reichert, 2020)
RPA capabilities	Relating to RPA and its, "the ability to do something," (<i>Cambridge University Press</i> , n.d.).
RPA Centre of Excellence	"This is a team that helps to manage the RPA system," (Taulli, n.d.).
RPA initiatives	Using RPA as part of, "a new plan or process to achieve something or solve a problem," (<i>Cambridge University Press</i> , n.d.).
Telecommunications	"the sending and receiving of messages by computer, telephone, radio, and television, or the business of doing this," (<i>Cambridge University Press</i> , n.d.)

Table 1: Definition of terms

1.8 Assumptions

It is assumed for the purposes of this study that Robotic Process Automation, as a concept, is sufficiently ubiquitous that participants have sufficient understanding of the technology in order to participate in this study.

1.9 Chapter Outline

In this section a diagrammatic representation of the chapters and sections used in this research is indicated.

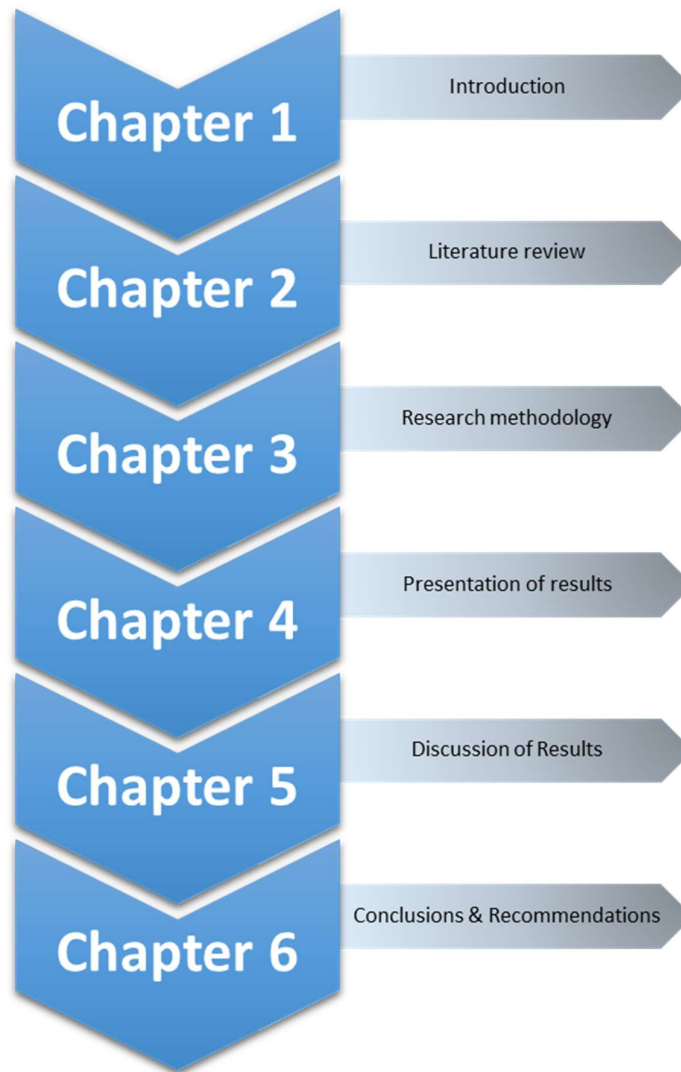


Figure 1: Chapter outline

2 LITERATURE REVIEW

2.1 Introduction

In this chapter the literature related to the research questions will be explored in order to discover what has been published with respect to perceptions relating to Robotic Process Automation (RPA). RPA will be described to provide context, the benefits of RPA and how RPA relates to the telecommunication industry will be addressed. The impact on jobs due to RPA is described from literature that is sourced from academia as well as from the industry.

2.2 Robotic Process Automation described

RPA is most commonly defined as a non-invasive, autonomous software technology that uses pre-defined business rules to interact with digital software applications in a choreographed manner (Wewerka & Reichert, 2020; Syed et al., 2020; Ribeiro et al., 2021). A basic description of what RPA is: RPA is software that can be trained to mimic the same steps and interactions a human would follow when interacting with a software application or across a suite of software applications, in order to perform a task or series of tasks (Leshob et al., 2018; Syed et al., 2020; Ribeiro et al., 2021; Hyun et al., 2021). The software robots, or 'bots' as they are often referred to, follow very specific, pre-defined programmatic steps to complete the tasks that they are programmed to conduct (J. Bessen et al., 2020; Eikebrokk & Olsen, 2020; Syed et al., 2020). The scheduling of when bots execute tasks is controlled by a separate software instance that acts as the orchestration, monitoring, and operational reporting component (*Robotic Process Automation Architecture: Reference Diagram - IBM Cloud Architecture Center*, n.d.). Bots are programmed through a low-code/no-code software application that require little to no software development experience (Eikebrokk & Olsen, 2020). This application allows software developers to drag-and-drop most of the code required to programme the bots and unless the software developer is programming a complex task that is not already catered for by the application, the software developer would not need to physically write any programming code (Willcocks et al., 2015). The ability to be able to programme an automation that accomplishes a task that would have previously required a human to perform,

without the need to physically write any code (no-code), reduces the requirement for experienced software developers to programme the automations (Willcocks et al., 2015). Automations that require a more complex solution that involve some code (low code) having to be written creates a need for the more experienced, or advanced software developers to be involved in some of the automation projects (Willcocks et al., 2015).

RPA is less suited for tasks or processes that require human judgement, tasks or processes that are required infrequently or, tasks or processes that utilise unstructured data (Moffitt et al., 2018).

2.3 The benefits of RPA

The business benefits of RPA are claimed to be numerous. A table has been provided below that indicates the category of benefit, and the description thereof, of the most commonly associated RPA business benefits.

Business Benefit category	Description
Accuracy/Quality	Fewer, if any data or calculation errors when compared to a human (Syed et al., 2020)
Cost reduction	Tasks take less time to complete and require fewer, if any humans to become involved in completing a task (Syed et al., 2020)
New revenue streams	Freeing employees from mundane tasks allows time for innovative thinking that could uncover new revenue streams (<i>The Future Of Work Is Still Being Written</i> , 2020)
Operational efficiency	Is achieved through the reduction of human involvement in completing tasks and the increased speed at which a bot is able to complete a task as compared to a human (Syed et al., 2020). Bots are able to work continuously and require no breaks.
Risk reduction	As bots are programmed to follow very specific steps that are constrained through very specific business rules, bots increase compliance which reduces risk (Syed et al., 2020). Due to the digital nature of the bots as well as the detailed

Business Benefit category	Description
	logging of what a bot is doing at each step of the programme, bots are highly auditable (Syed et al., 2020)

Table 2: Common RPA business benefits

2.4 RPA within the Telecommunications industry

Traditional revenue sources of telecommunication companies are becoming more commoditised as prices reduce and customers consume more services, which puts telecommunications companies in a position where they are forced to reduce operating costs as well as seek alternate revenue sources in order to survive and grow (UiPath & Virtusa, 2019; Graham & Chivandire, 2020). This scenario gives credibility to the need for telecommunications companies to cut costs and become as efficient as possible, which are benefits that RPA is argued to be able to deliver. Due to the potential of increased operational efficiency and cost reduction offered by RPA, it is no surprise that telecommunication companies are pursuing the utilisation of RPA within many areas of their business (Lacity et al., 2015; *RPA Telecom Industry | Telecom Automation*, n.d.; *Vodafone-Fy21-Press-Release.Pdf*, n.d.)

In 2019, Accenture stated that by the year 2025 the telecommunications industry in South Africa could unlock as much as R182 billion through the adoption of digital technologies and that telecommunications will provide the basis for a digital revolution in industries such as, "...healthcare, education, entertainment, logistics, e-commerce, and e-government..." (Sinclair & Barros, 2019). The report further argued that investing in technology and telecommunications would be a driver of growth that would result in an increase in the country's GDP (Sinclair & Barros, 2019). Telecommunication companies invest significant amounts of money into their networks every year, Muller (2021) argues, which is not only an investment in to major cities but also in less developed regions of the country (*Major Rural 4G Investment in South Africa*, 2020; *Vodacom Limpopo Region Network Investment of R170 Million and Pricing Transformation Strategy Are Yielding Positive Results*, 2020). These significant investments support and improve the country's GDP as well as create employment, amongst other benefits for the country.

Apart from the significant investment in to their telecommunication networks, the two largest telecommunication companies in South Africa practice corporate social responsibility through investments in to a myriad of social improvement initiatives (*The Vodacom Foundation*, n.d.; *Welcome to MTN | MTN Foundation*, n.d.). When considering that the money for these investments comes from the profits that these companies generate, it is fair to assume that should those profits decline that investment into social improvement initiatives would similarly decline, resulting in a negative impact on the country.

The implementation of RPA can assist an organisation in achieving operational efficiencies. This, together with cost reduction benefits would assist telecommunications companies in improving profits which would potentially enable them to establish, continue, or even broaden their Corporate Social Investment (CSI) initiatives, such as bridging the digital divide. The digital divide is a phrase describing the gap between the 'haves' and the 'have nots' in relation to access, affordability, and the utilisation of, digital technologies (Sinclair & Barros, 2019; Jacobs, 2021). Further, e-schooling, a phrase describing virtual education delivery, is made free to use through zero-rating the service to customers (*Vodacom E-School - Education | Vodacom*, n.d.). 'Zero-rating' is a term used to describe a subsidised digital service that is free-of-charge to the customer. The cost of the providing the zero-rated service is carried by the telecommunications company that provides the service.

2.5 The perceived impact on jobs due to RPA

2.5.1 Literature sourced from the industry

Several industry reports were found that provide insights in to perceptions and the impact on jobs in multiple international countries. Some of the reports include research data from South Africa. The reports are presented in chronological order according to the year in which they were published.

In 2016, the World Economic Forum released a report titled, 'The Future of Jobs' (WEF, 2016). This report has been superseded by a more recent report with the same title and is described below, however, the previous report is included here

as reference. The report addresses the results of a survey conducted amongst a little more than one-thousand and three-hundred participants, across multiple countries. Almost two-thirds of participants responded that they were pursuing a strategy of investing in re-skilling their current employees in preparation for Industry 4.0. The report states that two-thirds of job losses between the year 2015 and 2020, caused by Industry 4.0, would be from the Office and Administrative job family.

In 2018, PriceWaterhouseCoopers (PwC) released a thought-leadership document titled, 'Workforce of the future - The competing forces shaping 2030' (PricewaterhouseCoopers, 2018). The report addresses the results of a survey conducted amongst a little more than ten-thousand participants, across multiple countries. The report concludes that employers should focus on protecting the employees and not job roles, through re-skilling and encouraging agility in the workforce. Further, that leaders should have honest conversations about the future with their employees in order to address employees' fears. More than a third of participants responded that they are concerned that automation will put their jobs at risk. PwC indicated that such fear is detrimental to employee confidence as well as their willingness to innovate.

In 2019, Forrester Consulting released a report titled, 'The Impact Of RPA On Employee Experience' (*The Impact Of RPA On Employee Experience*, 2019). The report contains the results of a survey conducted amongst one-hundred participants who were employed at a managerial level or higher. The report found that poorly managed RPA initiatives resulted in an increase in employee fear in the workplace and that the method of mitigating the fear was through concerted employee engagement, honest communication, collaboration between the employees and the RPA team, and well-crafted change management programmes.

In 2020, Forrester Consulting released a report titled, 'The Future of Work is still being written', (*The Future Of Work Is Still Being Written*, 2020). The report contains the results of a survey conducted amongst two-hundred and seventy participants who were employed at a decision-maker level. The report states that automation technology will result in many job roles becoming redundant and

disappearing but, it will also lead to many more new job roles being created and some job roles being transformed.

In 2020, the World Economic Forum released a report titled, 'The Future of Jobs Report 2020' (WEF, 2020). The report garnered unique responses from two-hundred and ninety-one respondents, from global companies, that together comprise 80% of the global GDP. The responses were collected whilst the impact of the COVID-19 pandemic was gaining ground. Forty-three percent of responses indicated that they were intending to reduce their workforces due to technological integration brought about through automation. Eighty-four percent of participants responded that they are planning to rapidly digitalise their work processes.

In 2020, UiPath commissioned research that was published as a Whitepaper with the title, 'Throwing Away the Manual' (UiPath, 2020). The research garnered responses from one-thousand employees in the United Kingdom, from both the private as well as the public sectors. The research found that more than two-thirds of participants responded that they spend at least a third of any workweek doing manual, repetitive tasks that could have been accomplished through RPA. More than half of the participants responded that RPA had a positive impact on their job role. More than three-quarters responded that they do not fear losing their jobs to RPA but that they thought that the benefits and capabilities of RPA are still not properly understood. Two percent of participants responded that they do not do any manual, repetitive work that would suit RPA.

In 2022, PriceWaterhouseCoopers (PwC) released a report regarding a survey titled 'Global Workforce Hopes and Fears Survey 2022' (PricewaterhouseCoopers, 2022). The survey garnered fifty-two thousand one hundred and ninety-five responses from individuals who are active in the labour market across forty-four countries and territories, including one-thousand and forty-three respondents from South Africa. The report indicates that almost one-third of respondents indicated that they are concerned that their role will be replaced by technology. 38% of younger individuals agreed with this concern while only 19% of older employees agreed.

2.5.2 Academic Literature

Automating tasks that are usually done by humans does not necessarily lead to humans losing their jobs and automation can actually augment the work done by humans (Raj & Seamans, 2019). Technological advancement has historically brought about societal anxiety due to the fear of technology substituting labour, even though technology as a driver of innovation, can result in more jobs being created than what would be substituted (Mokyr et al., 2015). As much as 47% of jobs are at risk of being substituted by technology (Frey & Osborne, 2017). The most relevant jobs at risk of being substituted by technology, to this study, include, but is not limited to: employees who work in the customer service field, sales staff, and office/administration workers (Frey & Osborne, 2017). The risk of an employee being substituted by technology need not be a fait accompli if viewed as a reason for workers to reskill themselves to take advantage of the technological changes that allow them to pursue other careers (Krumboltz, 2009).

2.6 Unemployment in the South African Context

In South Africa, the national unemployment rate reported in the second quarter of 2022, for the working-age population who are actively seeking employment, was reported as 34,5% (*Quarterly Labour Force Survey (QES)*, 2022). If the number of people who are of working age, who are not actively seeking employment, is considered, the unemployment rate increases to over 40% of the working-age population (Naidoo, 2022). This is a disturbingly high unemployment rate considering that South Africa has the second highest GDP in Africa (*African Countries with the Highest Gross Domestic Product (GDP) in 2021, 2022*), and not only has the highest unemployment rate of countries in Africa (*Unemployment Rate in Africa as of 2022, by Country, 2022*), but also the highest unemployment rate in the world (*The 20 Countries with the Highest Unemployment Rate in 2021, 2022*). This is in stark contrast to Nigeria that currently has the largest economy in Africa (*African Countries with the Highest Gross Domestic Product (GDP) in 2021, 2022*), and has a population more than three times greater than South Africa (*African Countries with the Largest Population as of 2020, 2022*) but has an unemployment rate of less than 10% (*Nigeria: Unemployment Rate from 2002 to 2021, 2022*). The Nigerian economy is only marginally larger than that of South

Africa (*African Countries with the Highest Gross Domestic Product (GDP) in 2021, 2022*) which could be argued to indicate that the unemployment rate of a country is not directly proportional to the size of the country's economy. South Africa has a significantly high unemployment rate and any decisions or actions that could negatively influence this rate should be approached with caution.

2.7 Demographics in the South African Context

This section draws from academic literature in order to argue why the inclusion of demographics is important to this study.

Demographics is defined as the statistical characteristics that define a population ('Demographic', 2023). It is important to consider the demography of the participants of this study when considering the present economic and social challenges facing South Africa as well as the recent past injustices caused through racist policies that denied vast populations of particular ethnicity, access to opportunities and services that foster social wellbeing and economic growth. While ethnicity is one element of demography, this study avoids ethnicity and focuses on other demographics, such as age and education levels, in order to consider the consequences to unemployment rates that may result from automating job roles that could potentially render someone of working-age becoming unemployed.

The 'demographic dividend' is a term used to refer to an ideal balance between the number of people of working-age, that are employed, and the number of people that are unemployed and dependent on the State for social support (Cilliers, 2018). Cilliers (2018) argues that when this balance is reversed, an environment is fostered that creates instability and strife within a country due to a significant burden being placed on the State to provide social support to the country's population which reduces the amount of State money available to be used on social and economic improvement initiatives. Conversely, a period during which a healthy 'demographic dividend' is experienced, can bring about stability and economic growth. In order to achieve a period during which a country benefits from the 'demographic dividend' requires a significant portion of the working-age population actually being employed and for them to outnumber the proportion of people who are dependent on the State for social support. In the

South African context, where a high unemployment rate is experienced, and has been for many years, the 'demographic dividend' appears to be an extremely difficult goal to achieve. This goal seems even further out-of-reach when considering that unemployment amongst youth, even those who have graduated with tertiary qualifications, is concerning high (*South Africa's Youth Continues to Bear the Burden of Unemployment*, 2022).

2.8 Conclusion of Literature Review

From a South African perspective, the country faces significant economic and social wellbeing challenges that are being compounded by a high unemployment rate, especially amongst the youth, which could be exacerbated by the disruption that general adoption of RPA may cause.

Drawing from the literature available from international studies revealed that there are concerted efforts being undertaken through investments into reskilling employees to better prepare them for Industry 4.0, of which RPA plays an important role. Industry reports point to a significant risk of disruption to employment relating to employees conducting mundane, repetitive tasks, and that reskilling employees will aid in protecting them from unemployment as well as prepare them to pursue opportunities within new job roles that are being created by Industry 4.0. In many instances, industry reports indicate a significant fear amongst employees of becoming unemployed due to RPA and Industry 4.0 as a whole.

Developing a simple RPA bot to complete a task can be achieved by reskilled business employees due to its no-code/low-code nature which lowers the barrier of entry for employees interested in pursuing skills or a career change within the RPA developer field. The benefits of successfully adopting and implementing RPA within the business are many and can particularly aid telecommunication companies in increasing operating efficiency and reducing operating costs that could also improve the country's GDP growth.

2.9 ANALYTICAL FRAMEWORK

2.9.1 *Theoretical Framework*

The theoretical framework chosen to underpin this study is the Technology Acceptance Model 2 (TAM2), Venkatesh & Davis (2000), which is an extension of the Technology Acceptance Model (TAM), developed by Davis (1989), which itself was an adaption of the Theory of Reasoned Action (TRA) proposed by Ajzen & Fishbein (1980).

Davis (1989) argues that perceived usefulness and perceived ease of use are “fundamental determinants of user acceptance”. Perceived usefulness is described as the degree to which the use of technology may improve the user’s job performance, perceived ease of use is described as the degree to which the benefit(s) of utilising the technology exceed(s) the effort to use it, and both of these would inform the likelihood of a user adopting the technology being studied (Davis, 1989; Venkatesh, 2000; Venkatesh & Davis, 1996, 2000). The TAM model was extended to include further determinants, which resulted in the Technology Acceptance Model 2 (TAM2) being developed by Venkatesh & Davis (2000). An illustration of TAM2 and how TAM fits in to it, is included below.

While the determinants utilised in TAM are useful to this study, the model does not sufficiently include all determinants that would assist in adequately answering the research questions posed in this study. TAM2 was therefore chosen as it includes seven further determinants of which several aid this study. Those determinants that are not relevant to this study have been excluded. It should be noted that this study aims to determine perceptions relating to RPA and is not

intended to conclude on the likelihood of respondents adopting RPA as a technology.

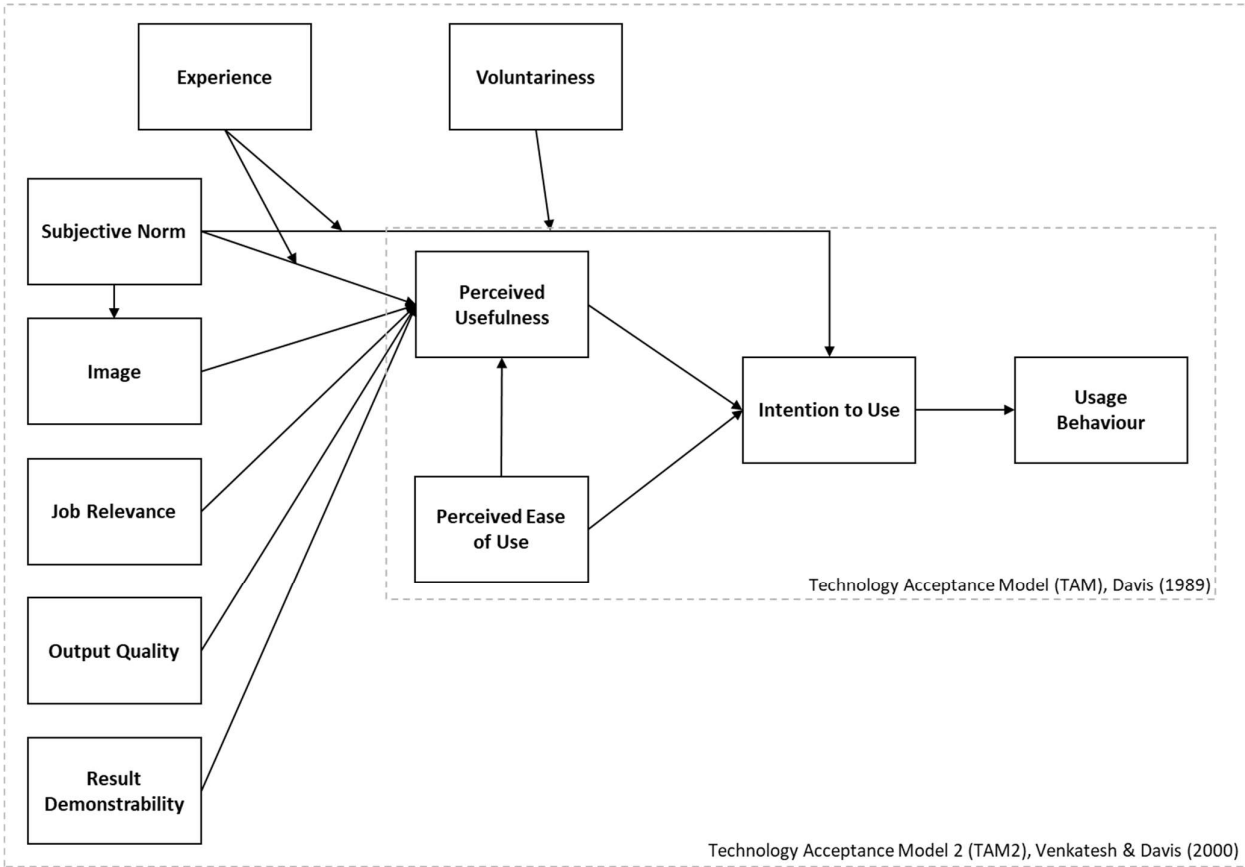


Figure 2: Technology Acceptance Model 2

2.9.2 Conceptual Framework

In this section the conceptual design of this research will be illustrated, the framework will be described, and the conceptual framework dimensions will be mapped with their variables and described.

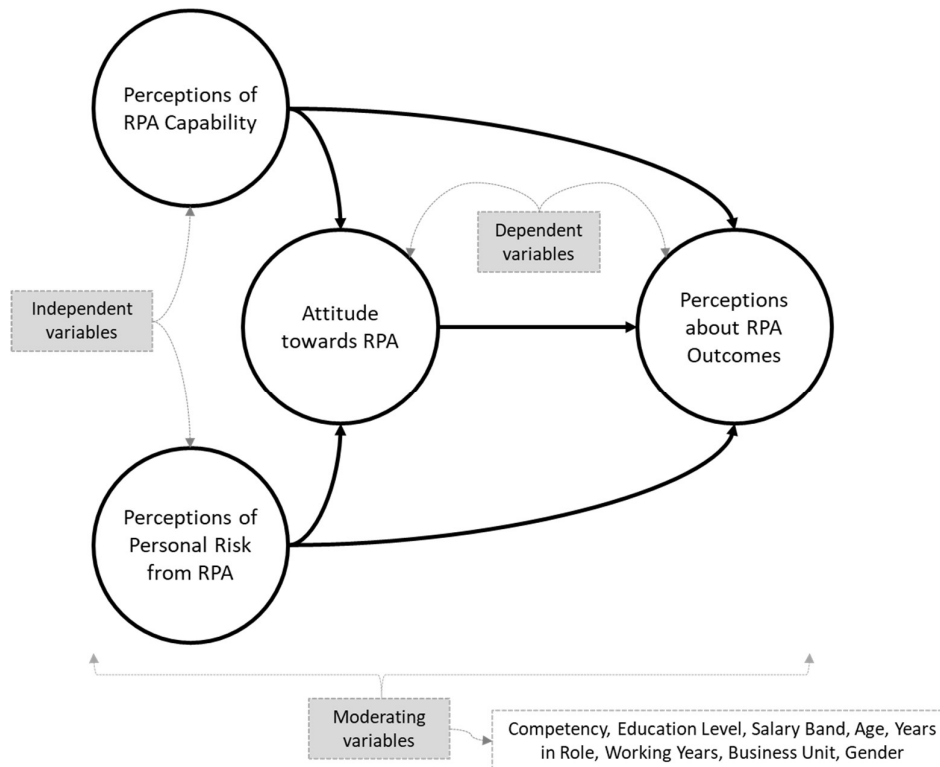


Figure 3: Conceptual framework

The following table maps the variable dimension to the variable name and provides a description of each variable.

Dimension	Variable	Description
Independent Variable	Capability	The perceived capabilities of RPA
Independent Variable	Personal Risk	The perceived personal risk of becoming unemployed due to RPA
Dependent Variable	Attitude	The perceptions of the respondent relating to RPA
Dependent Variable	Outcomes	The perceived outcomes expected with the implementation or adoption of RPA
Moderating Variable	Competency	The respondent's familiarity with RPA
Moderating Variable	Education Level	The respondent's highest formal qualification level
Moderating Variable	Salary Band	The respondent's current salary band (see Appendix D for examples)
Moderating Variable	Age	The respondent's current age
Moderating Variable	Years in Role	The length of time the respondent has been employed in their current role
Moderating Variable	Working Years	The total number of years since the respondent started working
Moderating Variable	Business Unit	Whether the respondent works in the Technology Division or not
Moderating Variable	Gender	The gender with which the respondent identifies the most

Table 3: Dimension, Variable, Description

The TAM model considers the perceptions of users and uses those perceptions to predict the potential intention of the user to adopt a particular technology. While this study does not intend to predict the adoption of technology, this study does rely on perceptions to gauge the likelihood of employees supporting the adoption of a technology that could lead to positive outcomes for the business and potentially for the employees as well. TAM2 extends the TAM model in order to consider further determinants that provide a broader understanding of users' intent to adopt a technology. Leveraging the extension of the model provides a basis for amending the determinants proffered by Venkatesh & Davis (2000) in order to gain a degree of understanding of users' perceived intent to support the adoption of the RPA technology within the business.

The conceptual design of this study zooms in on the essence of the major components of TAM2 which, in its simplest form, is that user perceptions influence outcomes and can be a predictor of user behaviour.

This study relies on the independent variables of 'Perceptions of RPA Capability' and 'Perceptions of Personal Risk from RPA', which are antecedents to the dependent variables of 'Attitude towards RPA' and 'Perceptions about RPA outcomes'. The moderating variables are: 'Competency/familiarity with RPA', 'Education Level', 'Salary Band', 'Age', 'Years in current Role', 'Working Years' (total number of years working), 'Business Unit (in which the respondent is employed)', and 'Gender' (most identified with).

The study will investigate the perceptions of employees as they relate to RPA and how those perceptions further relate to the business strategy of implementing RPA. It will also be investigated as to whether the moderating variables have an influence on the perceptions of employees.

3 RESEARCH METHODOLOGY

This chapter will begin by illustrating the research methodology utilised to support this study. This chapter also includes details on the research approach, research design, data collection method, the study sample and population, the research instrument, procedure for data collection, as well as how the collected data will be analysed and interpreted.

The methodology followed was to initially start with a research problem that would result in a set of two research questions. A literature review was conducted that guided the formulation of a set of survey questions. The survey questionnaire, as well as the survey invitation and survey information sheet was distributed to as many respondents as possible, within all levels of the business. The responses from the survey were then analysed and the findings documented and discussed.

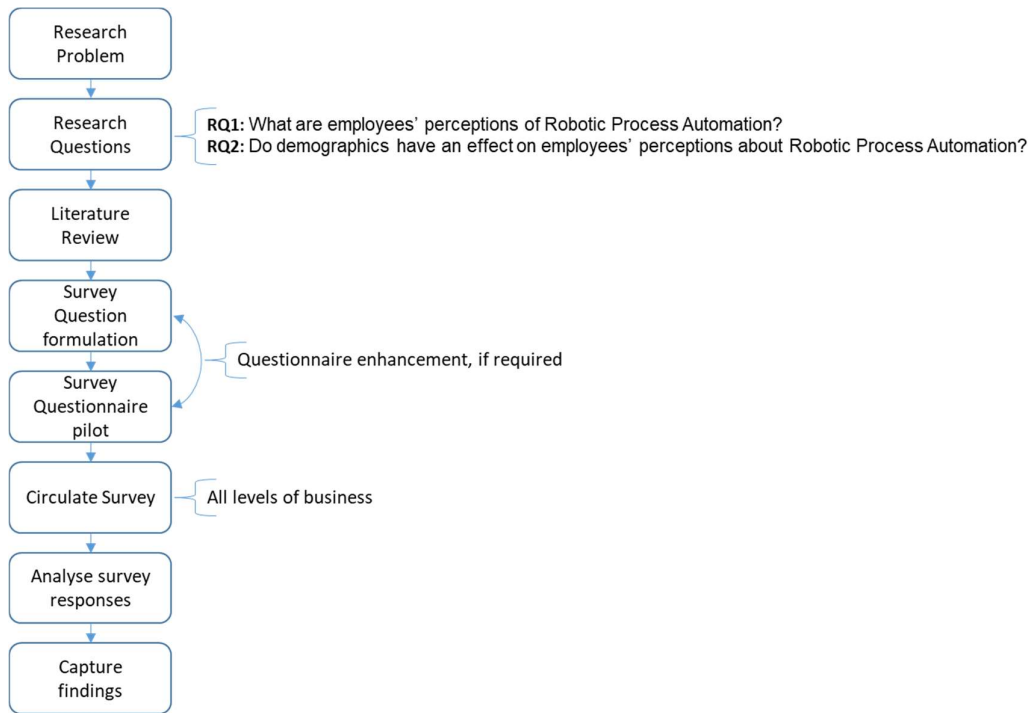


Figure 4: Research Methodology Outline

3.1 Research approach

This non-experimental, quantitative study uses a survey methodology approach to collect primary data and employs descriptive analytics to present the findings of the data collected.

Drawing from the literature review of this study, an impression is derived that there are mixed feelings amongst employees relating to RPA and goes as far as implying that RPA has created fear amongst employees of becoming unemployed due to RPA technology. This research study and research instrument has been crafted with care in an attempt to avoid exacerbating these fears or creating further anxiety amongst employees.

The research questions posed in this study were developed based on the literature review. A quantitative study employing survey methodology was chosen due to its convenience and efficiency in gathering the necessary data to be able to support answering the research questions. An existing survey instrument was found during the literature review that has been adapted to support this study. The survey invitation was drafted and is included as Appendix A. Once ethics clearance had been granted for this study, the survey invitation was then distributed, the number of responses were monitored, and due to an insufficient number of survey responses, reminders were sent to respondents requesting their participation in the study. The survey data was then downloaded to the researcher's password protected computer where it was analysed as described. The findings were then documented using descriptive analysis.

3.1.1 Research Approach Process Flow

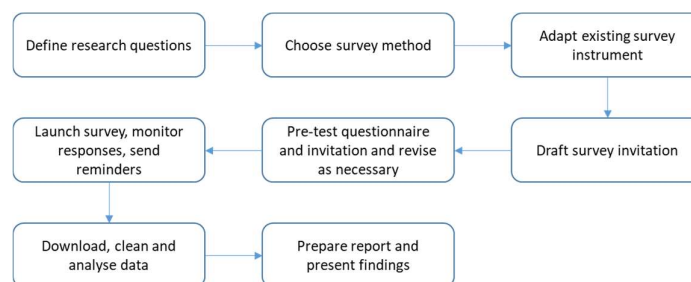


Figure 5: Adapted from Survey Research Process Flow, Sue & Ritter (2012)

3.2 Research design

The research design is comprised of a quantitative, non-experimental, cross-sectional study using survey methodology to collect primary data on respondents' perceptions relating to RPA.

A cross-sectional study using survey methodology was selected due to the efficiency of providing evidence that a research question is worthy of study and is most appropriate for exploratory research (Spector, 2019), such as that which is being conducted in this study.

3.3 Data Collection method

The overall study design adopted is the utilisation of a descriptive analytics, cross-sectional, online survey that was distributed to as many permanent full-time employees as possible in order to gather primary research data. The advantage of using this method of data collection is that the survey offers economy of design, rapid turnaround in data collection, and ease of distribution to potential respondents who can answer the survey questions in privacy and in their own time (Creswell & Creswell, 2017). A survey is also the most likely to succeed in reaching all areas and levels of the business as might otherwise be difficult or impossible to reach in order to conduct interviews for a qualitative study. As indicated in the literature review, RPA has a potential impact on all areas and levels of the business, and it is therefore important to the study to evaluate as many areas of the business as possible in order to gain insights on perceptions relating to RPA within the business.

The disadvantage of using a survey is that it limits respondents to specific answer choices for each question and, that the number of respondents would be unpredictable. By limiting responses to specific answer choices could mean that there are perceptions relating to RPA within the business that were unforeseen when the instrument was crafted, which will not be portrayed in the data collected from respondents.

The online survey is divided in to two sections of question-sets that includes an introduction. The online survey begins with a clear overview of what the survey

is about, how the data will be used, and provides assurance that the data collected is entirely anonymous. The first section of questions deals with general, non-personally identifying questions that gathered demographic information to allow for granular analysis of the data. The second section of questions are crafted to be able to assist in answering the research questions relating to this study.

The data collection method employed consists of a self-selection sampling, survey questionnaire that is comprised of two sets of questions and, answers that were provided through a Likert scale for each question that ranges from a scale of 1 to 7, where 1 is Strongly Disagree and 7 is Strongly Agree. The first section of questions gathered demographic information about the respondent and was comprised of closed-ended questions. The second section is comprised of closed-ended questions that had to be answered by selecting a value from a Likert scale.

3.4 Population and sample

The population to whom this study is most relevant are telecommunications companies. As the telecommunication industry is a mature, global industry, and telecommunication companies share many similarities relating to people, process, and technology, it is proposed that the population and sample of this study can be generalised within the telecommunications industry.

The two largest telecommunications companies in South Africa have embraced RPA as a technology (*Digital Society | Our Purpose | Vodacom Group*, 2021; 'Procurement Digitalization in a Post-Pandemic World', 2020), in order to assist the business in achieving the business objectives of reducing costs (*Our-Business.Pdf*, n.d.; 'Procurement Digitalization in a Post-Pandemic World', 2020), increasing operational efficiency, and improving customer experience (*Our-Strategy.Pdf*, n.d.; 'Procurement Digitalization in a Post-Pandemic World', 2020). RPA is considered an important element contributing to productivity leadership (*Vodafone-Fy21-Press-Release.Pdf*, n.d.).

The intention of this research is to gather responses from respondents in all levels of the business, across all salary bands, so as to provide results and analysis

from a cross-section of the business. The intension of this approach is to avoid gaining insights from only a sub-section of the business which may not reflect the overall perceptions of RPA within the business.

3.4.1 *Sample and sampling method*

A cross-sectional, self-selection sampling, survey methodology was employed for this research.

A cross-sectional study was chosen in order to gain insights across all levels of the business which should avoid gaining insights from only a sub-section of the business. This would provide overall insight in to the perceptions relating to RPA within the business.

Self-selection sampling using survey methodology was chosen for its convenience and efficiency. As many employees as possible, at all levels of the business will be targeted as potential survey respondents in order to gain overall insights in to the perceptions relating to RPA within the business.

The total population size for the business as of 2018 was 7554 permanent employees and no recent, publicly accessible data could be found to confirm the current number of permanent employees.

The sample size (survey responses) aimed for was to be 10 respondents per survey question, i.e., $10 * 16$ (the number of survey questions) = 160 survey responses. However, only 128 complete responses were received. A larger sample size would have provided a greater degree of accuracy and a lower margin of error.

3.4.2 *Demographic Profile of Respondents*

The following section describes the demographic profile of respondents and then presents the data in a set of summary tables that indicate the number of respondents in each demographic category and what percentage of the total number of respondents the number represents.

The average age of all respondents is 43 years old. The average number of years in their current role, at their current employer is 5 years. The average number of years since the respondents started working is 14 years. The majority of respondents have completed some form of tertiary education. The majority of respondents are male. The majority of respondents are not employed within the Technology Division. The majority of respondents are employed at Senior Specialist/middle-management or Executive Head of Division salary band level.

3.4.2.1 Years in current role

Most respondents (65%) have been in their current role for 5 years or less. 13% of respondents have been in their current role for 10 years or more. 5% of respondents indicated that they have been in their current role for 15 years or more which is a long time to remain in the same role at the same company. The average for all respondents is 5 years in their current role.

Standard Deviation	4.51
MEAN	5.38
Years in current role	Percent of Responses
20 or more	2%
15 to 19	3%
10 to 14	8%
5 to 9	22%
Less than 5	65%

Table 4: Years in current role result

3.4.2.2 Working Years

Roughly, one-third (34%) of respondents have 20 years or more working experience. Just slightly more than a quarter (27%) of respondents indicated that they have less than 10 years of working experience. Conversely, almost two-thirds of respondents indicated that they have 10-years or more working experience. The average for all respondents is 14-years of working experience.

Standard Deviation	7.28
MEAN	13.52
Years in current role	Percent of Responses
20 or more	34%
15 to 19	13%
10 to 14	16%
5 to 9	18%

3.4.2.3 Education Level

Of all respondents, 91% have some form of tertiary education which is to be expected from a large corporate business in the telecommunications industry. Interestingly, 18% of respondents have at least a Master's degree or higher which indicates a considerable proportion of respondents are highly educated.

Education Level	Count of Responses	Percent of Responses	Average Age
Did not complete high school	2	2%	57 years
Grade 12 (National Senior Certificate) and National (vocational) Certificate	9	7%	44 years
Higher Certificates and Advanced National (vocational) Certificate	5	4%	49 years
National Diploma and Advanced certificates	14	11%	45 years
Bachelor's degree, Advanced Diplomas, Post Graduate Certificate, and B-tech	35	27%	42 years
Honours degree, Post Graduate diploma, and Professional Qualifications	40	31%	43 years
Master's degree	22	17%	42 years
Doctor's degree	1	1%	50 years

Table 6: Education Level Result

3.4.2.4 Salary Band

Almost three-quarters (73%) of respondents indicated that they were on either Band G or Band F, Salary Band level. This indicates that most respondents are in either a senior specialist role or an executive head of division role. Comfortingly, just more than one-quarter (26%) of respondents indicated that they are employed in a junior position Band H. Two respondents indicated that they are employed at a Managing Executive level, Band E. This indicates that responses were received from most levels within the business and that the results do not pertain to a specific group of employees which would have skewed the results and prevented them from being generalised across the company.

Salary Band	Count of Responses	Percent of Responses	Average Age
Band H	33	26%	34 years
Band G	47	37%	43 years
Band F	46	36%	45 years
Band E	2	2%	55 years

Table 7: Salary Band Result

3.4.2.5 Business Unit

While the survey questionnaire asked the respondent to type the name of the business division within which they are employed, the responses were categorised in to either those respondents that are employed within the Technology Division, an actual division within the business and grouped as 'Technology' in the table below, and those respondents not employed within the Technology Division, grouped as 'Business' in the table below. This grouping is premised on the fact that the RPA team is situated within the Technology Division which would imply that those employed within this division would have better familiarity with RPA than those that are not. Further, it assists this research to be able to segment the responses in order gain an understanding as to whether perceptions relating to RPA are different between the two groups.

More than half of respondents (55%) indicated that they are employed in a business division other than the Technology Division. This result provides a healthy split of responses that is not skewed towards a technology intense business unit.

Business Unit	Count of Responses	Percent of Responses	Average Age
Business	70	55%	41 years
Technology	58	45%	46 years

Table 8: Business Unit Result

3.4.2.6 Age Groups

The highest proportion of responses were received from the age group of between 40 years and 59 years old, nearly two-thirds of responses (64%). The average age of respondents is 43 years old.

Standard Deviation	8.16
MEAN	43.44
Years in current role	Percent of Responses
20 or more	2%
15 to 19	23%
10 to 14	41%
5 to 9	29%
Less than 5	5%

Table 9: Age Group Result

3.4.2.7 Gender

Most respondents indicated their preferred gender as being 'Male' (59%). Encouragingly, 41% of respondents indicated their preferred gender as being female, which assists this research by ensuring that the results are not skewed towards a particular grouping of employees and perceptions.

Gender	Count of Responses	Percent of Responses	Average Age
Female	52	41%	43 years
Male	76	59%	44 years
Non-binary/Third Gender	0	0	-
Prefer not to say	0	0	-

Table 10: Gender Result

3.5 The research instrument

The questionnaire utilised for this research is adapted from one that was originally published by Oh et al. (2019) after which it was adapted and published by Abdullah & Fakieh (2020). Oh et al. (2019) investigated attitudes towards Artificial Intelligence by physicians in Korea and, Abdullah & Fakieh (2020) investigated perceptions of Artificial Intelligence by health care workers in Saudi Arabia.

Permission for repurposing the questionnaire was provided by Oh et al. (2019) which is included as Appendix E, no response to a request for approval to repurpose the questionnaire was received from Abdullah & Fakieh (2020).

The Oh et al. (2019) questionnaire was deemed appropriate for this research as it primarily gauges perceptions of participants towards a 4IR technology, namely Artificial Intelligence, which has the potential to displace labour, as has been claimed of RPA.

Changes to the Oh et al. (2019) questionnaire to suit this research was limited to replacing the term 'Artificial Intelligence' with the acronym 'RPA'.

The questionnaire starts with a validation question to ensure that respondents are permanently employed within South Africa by the business being studied. A negative answer to the validation question prevented the respondent from continuing to answer the rest of the survey questions.

The questionnaire is divided in to two, clear sections. The first section captures demographic information about the respondent and is comprised of 7 questions. The second section is comprised of 16 questions that relate to perceptions about RPA and each question had to be answered using a seven-point, ordinal, Likert scale (1=Strongly Disagree to 7=Strongly Agree).

The survey information letter and research instrument are included as appendixes B and C respectively.

The survey questions designed to answer the research questions are described below.

3.5.1 Demographic Questions

In this section the questions relating to the demographic profile of survey respondents are indicated. There are seven demographic questions.

Age: Age is captured by requesting that the respondent types in their year of birth in to a text field that only accepts integers. An example response is '1965'.

Qualification Level: Qualification Level is captured by requesting that the respondent selects their highest qualification level from a drop-down list of options that aligns with the Department of Education's list of possible education levels. These range from 'Did not complete high school' to 'Doctor's degree'. An example response is 'Post Graduate diploma'.

Salary Band: Salary Band is captured by requesting that the respondent selects their current salary band from a prepopulated list of options ranging from 'H-band', which is the lowest band, to 'Higher than E-band' which is the highest possible salary band level. An example response is 'G-band'.

Gender: Gender is captured by requesting that the respondent selects the gender with which the most identify, from a prepopulated list. In addition to male or female, respondents are able to select 'Non-binary / third gender' or 'Prefer not to say'. An example response is 'Female'.

Start Date: Start Date is captured by requesting that the respondent types in the year which they started working at their current company by typing in to a text field that only accepts integers. An example response is '2006'.

Role Start Date: Role Start Date is captured by requesting that the respondent types in the year which they started working in their current job role by typing in to a text field that only accepts integers. An example response is '2018'.

Business Unit: Business Unit is captured by requesting that the respondent types in the name of the Business Unit within which they are currently Employed. An example response is 'Technology'.

3.5.2 Perceptions Questions

Competency: Competency is measured using a single question measured on a 1 to 7-point Likert scale that ranges from 'Strongly Disagree' to 'Strongly Agree'. An example response is 'Agree'.

Capability: Capability is measured using 7 questions derived from Oh et al. (2019), that is measured on a 1 to 7-point Likert scale that ranges from 'Strongly Disagree' to 'Strongly Agree'. An example set of response is 'Agree', 'Disagree',

'Strongly Agree', 'Neither Disagree nor Agree', 'Agree', 'Disagree', 'Strongly Disagree'.

Personal Risk: Personal Risk is measured using a single question measured on a 1 to 7-point Likert scale that ranges from 'Strongly Disagree' to 'Strongly Agree'. An example response is 'Agree'.

Attitude: Attitude is measured using 4 questions derived from Oh et al. (2019), that is measured on a 1 to 7-point Likert scale that ranges from 'Strongly Disagree' to 'Strongly Agree'. An example set of response is 'Agree', 'Disagree', 'Strongly Agree', 'Neither Disagree nor Agree'.

Outcome: Outcome is measured using 3 questions derived from Oh et al. (2019), that is measured on a 1 to 7-point Likert scale that ranges from 'Strongly Disagree' to 'Strongly Agree'. An example set of response is 'Agree', 'Disagree', 'Strongly Agree'.

3.5.3 Tests of Factor Structure

Internal reliability was assessed using Cronbach alpha. The highest Cronbach alpha is .80 for the Attitude factor and the lowest is .62 for the Outcomes factor. While the Cronbach alpha value for the Outcomes factor of .62 falls below the .7 recommended by Taber (2018), and is also just below the recommended minimum of .65 by Lee. G., (2015), the Chi-Square of 23.56 and the $Pr > \text{Chi-Square}$ value of .07 assists in increasing the confidence of internal reliability of the construct.

3.6 Procedure for data collection

In order to gather the data for this research, the Learning and Development (L&D) team was approached and informed of the research to be conducted. The Ethics team was approached, and approval was granted for the research to be conducted within the business.

Once approval had been granted, the survey invitation was distributed amongst staff by way of an email invitation that included a website link to the survey information sheet and survey questionnaire.

3.7 Data analysis and interpretation

In this section the data analysis and interpretation of the data will be discussed.

Descriptive statistical analysis is used to document the research findings. The primary data collected was analysed using SAS, a statistical analysis suite developed by the SAS Institute, in order to determine standard deviation, frequencies, and percentages for each question. Cronbach alpha analysis was utilised to gauge the reliability of the path model. Structural Equation Modelling (SEM) was employed for path model analysis and to test for significant differences between the different demographic variables which assisted in determining the factors that contribute towards employees' perceptions relating to RPA.

3.8 Limitations of the study

In this section the limitations of the study will be indicated.

- Survey questionnaire responses may be more forthcoming from the more technology savvy employees, thereby potentially skewing the data away from the perceptions of less technology savvy employees.
- The survey responses will be collected from employees working at a technology company where employees may already be familiar with RPA as opposed to employees working in a non-technology company that may never have heard of RPA. This implies that the findings might not be generalisable to a broader context of employees in South Africa or elsewhere.

3.9 Study Reliability

In this section the reliability of the study will be discussed.

In order to enhance reliability of this study, the research instrument has been repurposed from a previously published study that dealt with attitudes/perceptions relating to Artificial Intelligence (AI). This study is related to

RPA so, the repurposed survey instrument questions have been adapted to specifically refer to RPA and any reference to AI has been removed.

As the survey respondents are anonymous and the scope of this research is limited to permanent employees of the business based in South Africa, it is not possible to verify whether non-permanent employees or, respondents from outside of South Africa have completed the survey.

Every question on the survey questionnaire was mandatory for the respondent to complete before they were permitted to submit the questionnaire. This was intended to ensure that the dataset will not include missing data. However, as discussed later, some data was received that included missing answers.

Although the questions on the survey instrument are written in simple language, they are also written only in English which may bring in to question the reliability of the results as survey responses were expected from some respondents whose first language is not English.

As RPA is only starting to become popular as a technology, the reliability of this study may be questionable once businesses and employees gain more insight in to the impact of RPA which may mean that they would answer the survey questionnaire differently if administered at a later date.

3.10 Ethical considerations

In this section the ethical considerations of this research are discussed.

The Risk Category applicable to this study is 'Low Risk'. It has been categorised as such as the primary data collected is purely the respondents' perceptions as well as minimal demographic information, however, due to the sensitivity that there is fear amongst employees of the potential to lose their jobs due to RPA, the questionnaire may cause some discomfort. All due care has been taken to limit any potential discomfort of respondents including ensuring that the responses received are entirely anonymous and indicating as much to respondents, the data gathered is securely stored on a password protected computer and is not shared with anyone other than the researcher.

Participation in the research is entirely voluntary and no incentives were offered to respondents for being involved in the research. Informed consent was obtained by first clearly indicating to the respondent as to what the research is about and that their participation is voluntary, and their responses are anonymous before requesting that the respondent indicates whether they give consent for their responses to be used for the research purposes indicated.

4 PRESENTATION OF RESULTS

4.1 Introduction

In this chapter the results of the survey questionnaire will be detailed by means of descriptive analysis.

A total of 136 respondents participated in the research by submitting answers to the survey questionnaire. For unknown reason(s) some of the submissions were incomplete even though every question in the survey was mandatory. Incomplete submissions do not meet the qualifying criteria. After removing the submissions that did not meet the qualifying criteria for the research, a total of 128 valid survey results remained and were analysed.

The results of the data are analysed using correlational analysis to determine the reliability of the construct and structural equation modelling path analysis to analyse the relationships between the main factors. SAS was used to construct the Structural Equation Model as well as perform the Cronbach alpha analysis.

4.2 Correlational Analysis

Pearson Correlation Coefficients, N = 128 Prob > r under H0: Rho=0											
	Mean	Standard Deviation	1	2	3	4	5	6	7	8	9
Outcomes	5.60	.94	(.61)								
Capability	5.80	.79	.61***	(.77)							
Attitude	5.90	1.09	.63***	.66***	(.80)						
Personal Risk	2.90	1.94	-.09	-.04	-.20**						
Education Level	4.91	1.64	.13	.08	.29***	-.20**					
Business Unit	.45	.50	-.06	-.08	.02	-.05	-.18**				
Age	5.38	1.00	.14	.17*	.05	-.07	-.08	.27***			
Salary Band	2.48	1.22	.11	.09	.27***	-.24***	.49***	-.010	.24***		
Gender	.41	.49	-.13	-.09	-.02	.13	-.06	-.18**	-.07	-.15*	
Competency	.59	.77	.06	.21**	.14	.08	.10	-.02	-.02	.08	.01

Note: *** = $p < .01$, ** = $p < .05$, * = $p < .10$ (Cronbach alphas shown in parentheses on the diagonal)

Table 11: Correlational Analysis result

As per the Correlational Analysis results table, the major factors of Capability ($r = .61$, $p < .01$) and Attitude ($r = .63$, $p < .01$) are positively correlated to Outcomes. However, Risk ($r = -.09$, $p > .30$) is negatively correlated to Outcomes.

Competency ($r = .06$, $p > .52$) is positively correlated to Outcomes but to an insignificant degree.

Relating to the demographic data: Age ($r = .14$, $p > .12$), Salary Band ($r = .11$, $p > .20$), and Education Level ($r = .13$, $p > .13$) are positively correlated to Outcomes but, , Business Unit ($r = -.06$, $p > .50$), and Gender ($r = -.13$, $p > .13$) are negatively correlated to Outcomes.

4.3 Structural Equation Model Path Analysis

The basis of the model is that Personal Risk and Capabilities are antecedents of Perception which is the main antecedent of Outcomes. The Competency factor as well as Demographics are predictor variables (PV). Each PV was removed from the model if the p-value in the Standardized Results for PATH List table indicated a value $> .05$ until all values were $< .05$. The Risk factor was left in the model as it produced unexpected results that will be discussed in Chapter 5. The final model is indicated, below in figure 6.

4.3.1 Fit Test

The Standardized RMR (SRMR) of .03 which meets the minimum cut-off of .08 recommended by Hu & Bentler (1999), an RMSEA of .07 that is close to the recommended value by Hu & Bentler (1999), Comparative Fit Index of .97 which exceeds the minimum of .93 recommended by Byrne (1994), and the Bentler-Bonett Non-normed Index of .90 support the assertion that the model displays acceptable fit statistics.

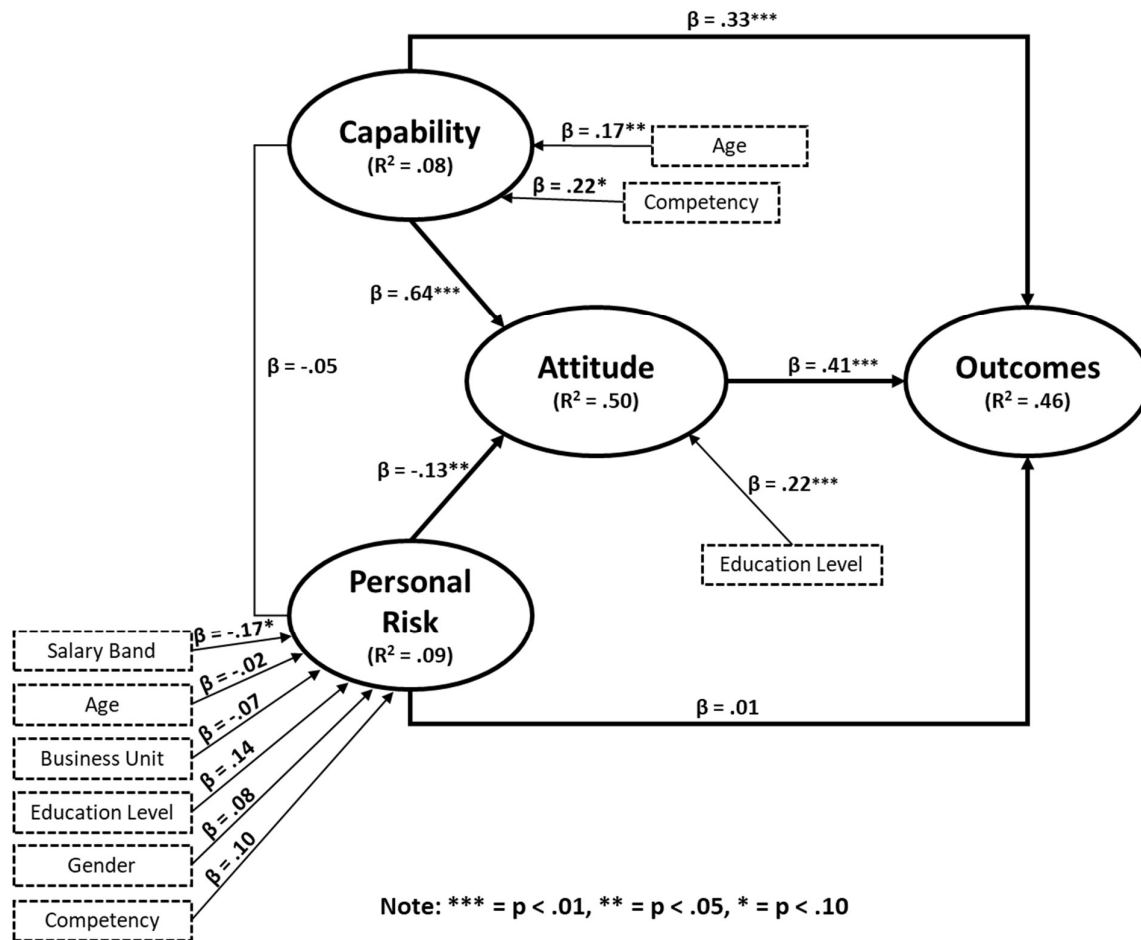


Figure 6: Structural Equation Model

4.3.2 Summary of the results

Capability ($\beta = .61$, $p < .01$) is demonstrated to be a strong predictor of Attitude ($R^2 = .50$) which in turn is a strong predictor of Outcomes ($R^2 = .46$). Capability ($\beta = .41$, $p < .01$) is also a strong predictor of Outcomes. Risk ($\beta = -.13$, $p < .05$) is negatively correlated and a weak predictor of Attitude as well as a weak predictor of Outcomes ($\beta = .01$, $p > .10$). The most significant demographics are Education Level ($\beta = .22$, $p < .01$) and Age ($\beta = .17$, $p < .05$) however, their correlations, as well as that of the other demographic variables of: Salary Band, Business Unit, and Gender, are minor. Competency ($\beta = .22$, $p < .10$) also shows a minor correlation to Capability and therefore to Outcomes.

Based on the Cronbach alpha and factor analysis results, the model is indicated as being a good fit. Most of the demographic variables as well as Competency prove to be poor predictors of Outcomes.

4.4 Research Instrument Results

In this section the results of the research instrument are narrated as well as presented in table format. Average ages have been rounded to the nearest decimal.

4.4.1 Competency

Of the Research Instrument responses received, 76% of respondents indicated that they 'Strongly Agree', 'Agree', or 'Somewhat Agree', that they are familiar with RPA. This demonstrates a substantial majority of respondents are familiar with RPA which serves to give weight to the confidence of the results of the other variables. 55% of these respondents are not employed in the Technology Division. 40% of responses were from respondents that indicated the gender with which they most identify, as 'Female', with an average age of 41 years old, 87% have completed some form of tertiary education, with an average duration of job experience of 12 years, 64% are not employed in the Technology Division, and, 60% indicated 'Male' as the gender with which they most identify, with an average age of 44 years old, 97% have completed some form of tertiary education, with an average duration of job experience of 15 years, 48% are not employed in the Technology Division. The responses indicated as 'Agree' have the highest individual percentage of 39%.

17% of respondents indicated that they either 'Strongly Disagree', 'Disagree', or 'Somewhat Disagree' that they are familiar with RPA. 7% indicated that they 'Strongly Disagree' that they are familiar with RPA. 50% of these respondents are not employed in the Technology Division. 36% of responses were from respondents that indicated the gender with which they most identify as 'Female', with an average age of 46 years old, 91% have completed some form of tertiary education, with an average duration of job experience of 11 years, 75% are not employed in the Technology Division, and 64% indicated 'Male', with an average

age of 42 years old, 100% have completed some form of tertiary education, with an average duration of job experience of 10 years, 36% are not employed in the Technology Division.

Curiously, 7% of respondents indicated that they 'Neither Disagree nor Agree' that they are familiar with RPA. All of these respondents are not employed in the Technology Division. 50% of responses were from respondents that indicated their gender as 'Female', with an average age of 54 years old, 100% have completed some form of tertiary education, with an average duration of job experience of 20 years, 0% are not employed in the Technology Division, and 50% indicated 'Male', with an average age of 42 years old, 66% have completed some form of tertiary education, with an average duration of job experience of 11 years, 0% are not employed in the Technology Division.

Familiar with RPA	Count of Responses	Percent of Responses	Grouped
Strongly Disagree	9	7%	17%
Somewhat Disagree	7	5%	
Disagree	6	5%	
Neither Disagree nor Agree	9	7%	
Somewhat Agree	24	19%	76%
Agree	50	39%	
Strongly Agree	23	18%	

Table 12: Competency Result

4.4.1.1 Competency Per Business Unit

Only 45% of respondents indicated that they are employed within the Technology Division, of which 76% indicated that they are familiar with RPA to some degree. Whereas 55% of respondents indicated that they are not employed in the Technology Division, 76% of respondents indicated that they are familiar with RPA to some degree.

Familiar with RPA							
Business Unit	Strongly Disagree	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree	Strongly Agree
Business	6 (9%)	2 (3%)	3 (4%)	6 (9%)	16 (23%)	27 (39%)	10 (14%)
Grouped	16%				76%		
Technology	3 (5%)	5 (9%)	3 (5%)	3 (5%)	8 (14%)	23 (40%)	13 (22%)
Grouped	19%				76%		

Table 13: Competency Result per Business Unit

4.4.2 Personal Risk

Of the Research Instrument responses received, 67% of respondents indicated that, to some extent, they disagree that RPA could replace their job. 53% of these respondents are not employed in the Technology Division. 36% of responses were from respondents that indicated the gender with which they most identify is 'Female', with an average age of 44 years old, 94% have completed some form of tertiary education, with an average duration of job experience of 13 years, 65% are not employed in the Technology Division, and 64% indicated 'Male' as the gender with which they most identify, have an average age of 42 years old, 93% have completed some form of tertiary education, with an average duration of job experience of 14 years, 47% are not employed in the Technology Division. 33% of these respondents strongly disagreed. 73% of these respondents agreed that they are familiar with RPA, 47% agreed that RPA capabilities are superior to human capabilities, 94% agreed that RPA could make them more productive, 95% agreed that RPA would free them from repetitive tasks, 92% agreed that they have high hopes for RPA within the business, 98% agreed that RPA could increase operational efficiency within the business, 95% agreed that RPA could reduce errors, 97% agreed that RPA could reduce costs within the business, 86% agreed that RPA could reduce risks, 92% agreed that RPA has no exhaustion or physical limitations, 85% agreed that RPA is not flexible enough to be applied to every business process, 93% agreed that RPA is crucial to the success of the business, 84% agreed that RPA makes them excited about the future way of

work, 94% disagreed that implementing RPA should be avoided, 74% agreed that the business strategy is to implement RPA throughout the business.

28% respondents indicated that they agree, to some extent, that RPA could replace their job. 58% of these respondents are not employed in the Technology Division. 50% of responses were from respondents that indicated their preferred gender as 'Female', with an average age of 41 years old, 78% have completed some form of tertiary education, with an average duration of job experience of 12 years, 72% are not employed in the Technology Division, and 50% indicated 'Male' as the gender with which the most identify, have an average age of 44 years old, 100% have completed some form of tertiary education, with an average duration of job experience of 14 years, 44% are not employed in the Technology Division.

78% of these respondents indicated that they are familiar with RPA, 61% agreed that RPA capabilities are superior to human capabilities, 89% agreed that RPA can make them more productive, 92% agreed that RPA would free them from repetitive work, 83% agreed that they have high hopes of RPA within the business, 97% agreed that RPA would improve operational efficiency, 92% agreed that RPA would reduce human errors, 89% agreed that RPA would reduce costs within the business, 89% agreed that RPA would reduce risks within the business, 89% agreed that RPA has not exhaustion or physical limitations, 72% agreed that RPA is not flexible enough to be applied to every business process and task, 75% agreed that RPA is crucial to the success of the business, 89% agreed that they are excited about the future way of work, 86% disagreed that implementing RPA should be avoided, 67% agreed that the strategy is to implement RPA throughout the business.

5% of respondents indicated that they 'Neither Disagree nor Agree' that RPA could replace their job. 50% of these respondents are not employed in the Technology Division. 50% of responses were from respondents that indicated their preferred gender as 'Female', with an average age of 40 years old, 66% have completed some form of tertiary education, with an average duration of job experience of 12 years, 66% are not employed in the Technology Division, and 50% indicated 'Male', with an average age of 43 years old, 100% have completed

some form of tertiary education, with an average duration of job experience of 12 years, 66% are not employed in the Technology Division.

RPA could replace your job	Count of Responses	Percent of Responses	Grouped
Strongly Disagree	42	33%	67%
Somewhat Disagree	31	24%	
Disagree	13	10%	
Neither Disagree nor Agree	6	5%	28%
Somewhat Agree	16	13%	
Agree	16	13%	
Strongly Agree	4	3%	

Table 14: Personal Risk Result

4.4.2.1 Personal Risk from a Business Unit perspective

26% of respondents within the Technology Division agree, to some extent, that RPA could replace their job, and 30% of respondents not within the Technology Division indicated the same response. Conversely, 66% of respondents within the Technology Division indicated that, to some extent, they disagreed that RPA could replace their job, and 69% of respondents not employed within the Technology Division indicated the same response.

RPA could replace your job							
Business Unit	Strongly Disagree	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree	Strongly Agree
Business	23 (33%)	14 (20%)	9 (13%)	3 (4%)	9 (13%)	10 (14%)	2 (3%)
Grouped	66%				30%		
Technology	19 (33%)	17 (29%)	4 (7%)	3 (5%)	7 (12%)	6 (10%)	2 (3%)
Grouped	69%				25%		

Table 15: Personal Risk Result per Business Unit

4.4.2.2 Personal Risk from an Age Group perspective

83% of respondents indicated that they disagree, to some extent, that RPA could replace their job. 100% of respondents aged 60 or older indicated that they disagree that RPA could replace their jobs. This is not unexpected considering that respondents in this age group are preparing to end their career and do not fear job loss as much as someone who is only starting their career. This assumption can be supported by the result that 35% of respondents within the 30 to 39 years old age group indicated that they agree, to some extent, that RPA could replace their jobs.

RPA could replace your job								
Shaded cells indicate that no response was received for the category.								
Age Group	Strongly Disagree	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree	Strongly Agree	Overall
60 or older	1 (33%)	1 (33%)	1 (33%)					2%
Grouped	100%							
50 to 59	9 (31%)	10 (34%)	2 (7%)		2 (7%)	6 (28%)		23%
Grouped	72%				28%			
40 to 49	19 (36%)	11 (21%)	6 (11%)	3 (6%)	8 (15%)	5 (9%)	1 (2%)	41%
Grouped	68%				26%			
30 to 39	10 (27%)	8 (22%)	3 (8%)	3 (8%)	6 (16%)	4 (11%)	3 (8%)	29%
Grouped	57%				35%			
20 to 29	3 (50%)	1 (17%)	1 (17%)			1 (1%)		5%
Grouped	83%				17%			

Table 16: Personal Risk by Age Group

4.4.2.3 Personal Risk from an Education Perspective

91% of all respondents have completed some form of tertiary education. Of these, more than two-thirds (68%) indicated that they disagree that RPA could replace their job. The average age of respondents that have completed some form of

tertiary education is 43 years-old, and have, on average, 13 years of work experience, and have been, on average, 5 years in their current role. Only 45% of these respondents are employed within the Technology Division, and 55% are not.

RPA could replace your job								
Completed Tertiary Education	Strongly Disagree	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree	Strongly Agree	Overall
Shaded cells indicate that no response was received for the category.								
Yes	40 (34%)	28 (24%)	12 (10%)	5 (4%)	15 (13%)	13 (11%)	4 (3%)	91%
Grouped	68%				27%			
No	2 (18%)	3 (27%)	1 (9%)	1 (9%)	1 (9%)	3 (27%)		9%
Grouped	55%				36%			

Table 17: Personal Risk Result by Tertiary Education

4.4.3 Capability

Capability is the measure of the respondents' perception of the usefulness of RPA as it pertains to the respondent as well as to the business. The Research Instrument questions 2, 4, 5, 8, 9, 10, and 11 address the Capability variable.

Question 2: 51% of respondents agreed, to some extent, that RPA capabilities are superior to human capabilities. 89% of these respondents have completed some form of tertiary education. 62% of these respondents are not employed within the Technology division, and 42% indicated that the gender with which they most identify is female. The average age of these respondents is 42 years old.

20% of respondents indicated that they neither disagree nor agree that RPA capabilities are superior to human capabilities. Of these respondents 92% have completed some form of tertiary education, 62% are not employed within the Technology division, and 27% indicated that the gender with which they most identify is female. The average age of these respondents is 45 years old.

29% of respondents indicated that they disagree, to some extent, that RPA capabilities are superior to human capabilities, 95% have completed some form

of tertiary education, 38% are not employed within the Technology division, and 46% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

Question 4: 92% of respondents indicated that they agree, to some extent, that RPA can help them become more productive. 91% of these respondents have completed some form of tertiary education, 57% are not employed within the Technology division, and 42% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

1% of respondents indicated that they neither disagree nor agree that RPA can help them become more productive. Of these respondents, 100% have completed some form of tertiary education, all were employed within the Technology division, and all indicated that the gender with which they most identify is female.

7% of respondents indicated that they disagree, to some extent, that RPA could help them become more productive. Of these respondents, all have completed some form of tertiary education, 33% are not employed within the Technology division, and 22% indicated that the gender with which they most identify is female. The average age of these respondents is 36 years old.

Question 5: 95% of respondents indicated that they agree, to some extent, that RPA will free them from mundane, repetitive tasks. Of these respondents, 95% have completed some form of tertiary education, 55% are not employed within the Technology division, and 41% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

2% indicated that they neither disagree nor agree that RPA will free them from mundane, repetitive tasks. Of these respondents, 66% completed some form of tertiary education, 66% are not employed within the Technology division, and 66% indicated that the gender with which they most identify is female. The average age of these respondents is 45 years old.

3% indicated that they disagree, to some extent, that RPA will free them from mundane, repetitive tasks. Of these respondents, all have completed some form of tertiary education, 50% are not employed within the Technology division, and

all indicated that the gender with which they most identify is male. The average age of these respondents is 38 years old.

Question 8: 94% of respondents indicated that they agree, to some extent, that RPA can help reduce human errors. Of these respondents, 92% have completed some form of tertiary education, 56% are not employed within the Technology division, and 40% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

4% of respondents neither disagree nor agree that RPA can help reduce human errors. Of these respondents, 20% have completed some form of tertiary education, 40% are not employed within the Technology division, and 66% indicated that the gender with which they most identify is female. The average age of these respondents is 48 years old.

2% of respondents indicated that they disagree, to some extent, that RPA can help reduce human errors. Of these respondents, all have completed some form of tertiary education, 33% are not employed within the Technology division, and 33% indicated that the gender with which they most identify is female. The average age of these respondents is 41 years old.

Question 9: 93% of respondents agree, to some extent, that RPA can reduce processing costs within the business. Of these respondents, 92% have completed some form of tertiary education, 55% are not employed within the Technology division, and 39% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

5% of respondents indicated that they neither disagree nor agree that RPA can reduce processing costs within the business. Of these respondents, 29% have completed some form of tertiary education, 57% are not employed within the Technology division, and 86% indicated that the gender with which they most identify is female. The average age of these respondents is 41 years old.

2% of respondents indicated that they disagree, to some extent, that RPA can reduce processing costs within the business. Of these respondents, all have completed some form of tertiary education, 50% are not employed within the

Technology division, and all indicated that the gender with which they most identify is male. The average age of these respondents is 40 years old.

Question 10: 86% of respondents indicated that they agree, to some extent, that RPA can reduce risks within the business. Of these respondents, 92% have completed some form of tertiary education, 56% are not employed within the Technology division, and 40% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

9% of respondents indicated that they neither disagree nor agree that RPA can reduce risks within the business. Of these respondents, 91% have completed some form of tertiary education, 45% are not employed within the Technology division, and 36% indicated that the gender with which the most identify is female. The average age of these respondents is 44 years old.

5% of respondents indicated that they disagree, to some extent, that RPA can reduce risks within the business. Of these respondents, 86% have completed some form of tertiary education, 43% are not employed within the Technology division, and 57% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

Question 11: 91% of respondents indicated that they agree, to some extent, that RPA has no emotional exhaustion or physical limitation. Of these respondents, 91% have completed some form of tertiary education, 55% are not employed within the Technology division, and 40% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

5% of respondents indicated that they neither disagree nor agree that RPA has no emotional exhaustion or physical limitation. Of these respondents, 17% have completed some form of tertiary education, 67% are not employed within the Technology division, and 67% indicated that the gender with which they most identify is female. The average age of these respondents is 38 years old.

4% of respondents indicated that they disagree, to some extent, that RPA has no emotional exhaustion or physical limitation. Of these respondents, all have completed some form of tertiary education, 40% are not employed within the

Technology division, and 20% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

Capability														
For each question the number of responses, per category is indicated, as well as the average age of the respondents for the category. The percentage of the grouped responses per question is indicated in the succeeding row, as well as the percentage of respondents where: E = Completed Tertiary Education, B = Not employed within the Technology Division, F = Females. Shaded cells indicate that no response was received for the category.														
RI Question	Strongly Disagree	Average Age	Disagree	Average Age	Somewhat Disagree	Average Age	Neither Disagree nor Agree	Average Age	Somewhat Agree	Average Age	Agree	Average Age	Strongly Agree	Average Age
Q2	4 (3%)	44 years	21 (16%)	44 years	12 (9%)	45 years	26 (20%)	45 years	31 (24%)	42 years	27 (21%)	41 years	7 (5%)	44 years
Grouped	29% [E:95%, B:38%, F:46%]						20% [E:92%, B:62%, F:27%]		51% [E:89%, B:62%, F:42%]					
Q4	2 (2%)	34 years	4 (3%)	39 years	3 (2%)	35 years	1 (1%)	44 years	13 (10%)	40 years	44 (34%)	44 years	61 (48%)	44 years
Grouped	7% [E:100%, B:33%, F:22%]						1% [E:100%, B:0%, F:100%]		92% [E:91%, B:57%, F:42%]					
Q5	2 (2%)	36 years	2 (2%)	40 years			3 (2%)	45 years	10 (8%)	44 years	43 (34%)	43 years	68 (53%)	44 years
Grouped	3% [E:100%, B:50%, F:0%]						2% [E:66%, B:66%, F:66%]		95% [E:92%, B:55%, F:41%]					
Q8			2 (2%)	39 years	1 (1%)	42 years	5 (4%)	48 years	18 (14%)	42 years	39 (30%)	43 years	63 (49%)	44 years
Grouped	2% [E:100%, B:33%, F:33%]						4% [E:20%, B:40%, F:60%]		94% [E:92%, B:56%, F:40%]					
Q9			1 (1%)	29 years	1 (1%)	50 years	7 (5%)	41 years	17 (13%)	39 years	60 (47%)	44 years	42 (33%)	45 years
Grouped	2% [E:100%, B:50%, F:0%]						5% [E:29%, B:57%, F:86%]		93% [E:92%, B:55%, F:39%]					
Q10	1 (1%)	55 years	4 (3%)	40 years	2 (2%)	37 years	11 (9%)	44 years	29 (23%)	41 years	50 (39%)	44 years	31 (24%)	45 years
Grouped	5% [E:86%, B:43%, F:57%]						9% [E:91%, B:45%, F:36%]		86% [E:92%, B:56%, F:40%]					
Q11	3 (2%)	39 years	2 (2%)	49 years			6 (5%)	38 years	15 (12%)	42 years	40 (31%)	43 years	62 (48%)	44 years
Grouped	4% [E:100%, B:40%, F:20%]						5% [E:17%, B:67%, F:67%]		91% [E:91%, B:55%, F:40%]					
Average Age		42 years		40 years		42 years		44 years		41 years		43 years		44 years

Table 18: Capability Result per RI Question

4.4.4 Attitude

Attitude is the measure of the respondents' attitude towards RPA, as it pertains to themselves as well as to the business. The Research Instrument questions 6, 12, 14, and 15 address the Attitude variable.

Question 6: 90% of respondents indicated that they agree, to some extent, that they have high hopes about RPA within the business. Of these respondents, 91% have completed some form of tertiary education, 54% are not employed within the Technology division, and 39% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

5% of respondents indicated that they neither disagree nor agree that they have high hopes about RPA within the business. Of these respondents, all had completed some form of tertiary education, 57% are not employed within the Technology division, and 57% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

5% of respondents indicated that they disagree, to some extent, that they have high hopes about RPA within the business. Of these respondents, 86% have completed some form of tertiary education, 57% are not employed within the Technology division, and 43% indicated that the gender with which they most identify is female. The average age of these respondents is 39 years old.

Question 12: 81% of respondents indicated that they agree, to some extent, that RPA is not flexible enough to be applied to every business task or process. Of these respondents, 92% have completed some form of tertiary education, 57% are not employed within the Technology division, and 43% indicated that the gender with which they most identify is female.

9% of respondents indicated that they neither disagree nor agree that RPA is not flexible enough to be applied to every business task or process. Of these respondents, 82% have completed some form of tertiary education, 64% are not employed within the Technology division, and 36% indicated that the gender with

which they most identify is female. The average age of these respondents is 44 years old.

10% of respondents indicated that they disagree, to some extent, that RPA is not flexible enough to be applied to every business task or process. Of these respondents, 92% have completed some form of tertiary education, 31% are not employed within the Technology division, and 23% indicated that the gender with which they most identify is female. The average age of these respondents is 45 years old.

Question 14: 86% of respondents indicated that they agree, to some extent, that RPA makes them excited about the future way of work. Of these respondents, 91% have completed some form of tertiary education, 53% are not employed within the Technology division, and 42% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

10% of respondents indicated that they neither disagree nor agree that RPA makes them excited about the future way of work. Of these respondents, 92% have completed some form of tertiary education, 69% are not completed within the Technology division, and 38% indicated that the gender with which the most identify is female. The average age of these respondents is 47 years old.

4% of respondents indicated that the disagree, to some extent, that RPA makes them excited about the future way of work. Of these respondents, all have completed some form of tertiary education, 60% are not employed within the Technology division, and 20% indicated that the gender with which they most identify is female. The average age of these respondents is 39 years old.

Question 15: 6% of respondents indicated that they agree, to some extent, that implementing RPA in the business should be avoided. Of these respondents, 75% have completed some form of tertiary education, 63% are not employed within the business, and 25% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

5% of respondents indicated that they neither disagree nor agree that implementing RPA in the business should be avoided. Of these respondents, 86% have completed some form of tertiary education, 57% are not employed within the Technology division, and 57% indicated that the gender with which they most identify is female. The average age of these respondents is 42 years old.

89% of respondents indicated that they disagree, to some extent, that implementing RPA in the business should be avoided. Of these respondents, 93% have completed some form of tertiary education, 54% are not employed within the Technology division, and 41% indicated that the gender with which they most identify is female.

Attitude														
For each question the number of responses, per category is indicated, as well as the average age of the respondents for the category. The percentage of the grouped responses per question is indicated in the succeeding row, as well as the percentage of respondents where: E = Completed Tertiary Education, B = Not employed within the Technology Division, F = Females														
RI Question	Strongly Disagree	Average Age	Disagree	Average Age	Somewhat Disagree	Average Age	Neither Disagree nor Agree	Average Age	Somewhat Agree	Average Age	Agree	Average Age	Strongly Agree	Average Age
Q6	2 (2%)	38 years	2 (2%)	39 years	3 (2%)	39 years	7 (5%)	44 years	25 (20%)	46 years	41 (32%)	44 years	48 (38%)	42 years
Grouped	5% [E:86%, B:57%, F:43%]						5% [E:100%, B:57%, F:57%]		90% [E:91%, B:54%, F:39%]					
Q12	1 (1%)	50 years	8 (6%)	38 years	4 (3%)	47 years	11 (9%)	44 years	25 (20%)	43 years	53 (41%)	45 years	26 (20%)	42 years
Grouped	10% [E:92%, B:31%, F:23%]						9% [E:82%, B:64%, F:36%]		81% [E:92%, B:57%, F:43%]					
Q14	2 (2%)	40 years	2 (2%)	37 years	1 (1%)	40 years	13 (10%)	47 years	24 (19%)	46 years	50 (39%)	43 years	36 (28%)	44 years
Grouped	4% [E:100%, B:60%, F:20%]						10% [E:92%, B:69%, F:38%]		86% [E:91%, B:53%, F:42%]					
Q15	63 (49%)	45 Years	47 (37%)	42 years	3 (2%)	38 years	7 (5%)	42 years	3 (2%)	44 years	2 (2%)	40 years	3 (2%)	46 years
Grouped	89% [E:93%, B:54%, F:41%]						5% [E:86%, B:57%, F:57%]		6% [E:75%, B:63%, F:25%]					
Average Age		43 years		39 years		41 years		44 years		45 years		37 years		44 years

Table 19: Attitude Result per RI Question

4.4.5 Outcomes

Outcomes is the measure of the respondents' perception regarding the outcomes that can be achieved through implementation of RPA, as it pertains to the business. The Research Instrument questions 7, 13, and 16 address the Outcomes variable.

Question 7: 97% of respondents indicated that they agree, to some extent, that RPA can improve operational efficiency within the business. Of these respondents, 91% have completed some form of tertiary education, 56% are not employed within the Technology division, and 40% indicated that the gender with which they most identify is female. The average age of these respondents is 45 years old.

1% of respondents indicated that they neither disagree nor agree that RPA can improve operational efficiency within the business. Of these respondents, all have completed some form of tertiary education, all were employed within the Technology division, and all indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

2% indicated that they disagree, to some extent, that RPA can improve operational efficiency within the business. Of these respondents, all have completed some form of tertiary education, 33% were not employed within the Technology division, and 33% indicated that the gender with which they most identify is female. The average age of these respondents is 32 years old.

Question 13: 86% of respondents indicated that they agree, to some extent, that RPA is crucial to the success of the business. Of these respondents, 93% have completed some form of tertiary education, 56% are not employed within the Technology division, and 39% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

7% of respondents indicated that they neither disagree nor agree that RPA is crucial to the success of the business. Of these respondents, 67% have

completed some form of tertiary education, 56% were employed within the Technology division, and 67% indicated that the gender with which they most identify is female. The average age of these respondents is 42 years old.

7% indicated that they disagree, to some extent, that RPA is crucial to the success of the business. Of these respondents, all have completed some form of tertiary education, 33% were not employed within the Technology division, and 33% indicated that the gender with which they most identify is female. The average age of these respondents is 39 years old.

Question 16: 72% of respondents indicated that they agree, to some extent, that the business strategy is to implement RPA throughout the business. Of these respondents, 91% have completed some form of tertiary education, 54% are not employed within the Technology division, and 36% indicated that the gender with which they most identify is female. The average age of these respondents is 43 years old.

15% of respondents indicated that they neither disagree nor agree that the business strategy is to implement RPA throughout the business. Of these respondents, 89% have completed some form of tertiary education, 68% were employed within the Technology division, and 58% indicated that the gender with which they most identify is female. The average age of these respondents is 42 years old.

13% indicated that they disagree, to some extent, that the business strategy is to implement RPA throughout the business. Of these respondents, 94% have completed some form of tertiary education, 41% were not employed within the Technology division, and 47% indicated that the gender with which they most identify is female. The average age of these respondents is 44 years old.

Outcomes														
For each question the number of responses, per category is indicated, as well as the average age of the respondents for the category. The percentage of the grouped responses per question is indicated in the succeeding row, as well as the percentage of respondents where: E = Completed Tertiary Education, B = Not employed within the Technology Division, F = Females														
RI Question	Strongly Disagree	Average Age	Disagree	Average Age	Somewhat Disagree	Average Age	Neither Disagree nor Agree	Average Age	Somewhat Agree	Average Age	Agree	Average Age	Strongly Agree	Average Age
Q7	1 (1%)	25 years	1 (1%)	29 years	1 (1%)	42 years	1 (1%)	44 years	8 (6%)	49 years	48 (38%)	42 years	68 (53%)	44 years
Grouped	2% [E:100%, B:33%, F:33%]						1% [E:100%, B:0%, F:100%]		97% [E:91%, B:56%, F:40%]					
Q13	2 (2%)	43 years	3 (2%)	37 years	4 (3%)	38 years	9 (7%)	42 years	41 (32%)	43 years	47 (37%)	44 years	22 (17%)	45 years
Grouped	7% [E:100%, B:33%, F:33%]						7% [E:67%, B:56%, F:67%]		86% [E:93%, B:56%, F:39%]					
Q16	5 (4%)	45 years	9 (7%)	45 years	3 (2%)	41 years	19 (15%)	42 years	34 (27%)	42 years	44 (34%)	45 years	14 (11%)	43 years
Grouped	13% [E:94%, B:41%, F:47%]						15% [E:89%, B:68%, F:58%]		72% [E:91%, B:54%, F:36%]					
Average Age		38 Years		37 years		40 years		43 years		45 years		44 years		44 years

Table 20: Outcomes Result per RI Question

5 DISCUSSION OF THE RESULTS

5.1 Introduction

In this chapter the results of the research and how they relate to the literature review in chapter 2, will be discussed. This section will start with discussing the individual variables of the model before contrasting the research results against the literature review and how the results assist in answering the research questions posed. All percentages are rounded to have no decimal value.

5.2 Competency

In this section the results of the Competency variable are discussed.

Competency is a consideration as to what extent the respondent perceives themselves as being sufficiently familiar with RPA in order to be able to engage with RPA as a topic of discussion. Competency is an exogenous variable explicitly measured in Question 1 of the Research Instrument.

The insights provided by the results for Competency is that the majority of respondents are familiar with RPA. This implies that RPA is becoming a common term within the business which is supported by Siderska (2020) who argues that RPA is gaining global popularity. This may be due to intentional programmes instituted by the organisation to automate many of the mundane, high-volume, repetitive tasks that employees were previously required to complete, or, that the marketing campaigns and media attention relating to 4IR have been successfully sensitising people to the existence of RPA and how it can assist organisations in various ways.

17% of respondents indicated that they either 'Strongly Disagree', 'Agree', 'Somewhat Disagree' that they are familiar with RPA, which could indicate that there are areas within the business that have not as yet been explored for

automation use cases. Exploration of RPA uses cases would have resulted in those areas being exposed to RPA to varying degrees. Perhaps the tasks within these areas have not as yet been digitised and can therefore not be automated, or perhaps the tasks performed within these business areas are too complex or sporadic to be suitable candidates for automation. Further, it is plausible that the messaging regarding RPA as an automation technology available within the business is not reaching all business areas. This could be due to the business focusing on the perceived highest business value processes to automate which could result in missing lower value processes which may in some instances be easier to automate. This could indicate a blind spot as far as identifying RPA uses cases is concerned.

If the 17% that disagreed and the 7% that neither disagreed nor agreed that they are familiar with RPA, are combined, it indicates that almost a quarter of respondents are not entirely comfortable indicating that they are familiar with RPA. This indicates that there is opportunity to further educate, socialise, and explore automation within the business.

In Limitations of the Study section (3.8), it was indicated that the data may be skewed towards more technology savvy employees which would, by nature of the business, be expected to mainly include those employees working in the Technology Division. By extension, it is plausible to expect that employees not working in the Technology Division would have less familiarity with RPA. As the Competency Results per Business Unit table indicates, this is not the case.

It is curious that 19% of respondents that indicated that they are employed within the Technology Division indicated that they disagree that they are familiar with RPA to some degree. It is unclear why or how those respondents are not familiar with RPA considering that the Technology Division within the business has a RPA team currently comprised of more than two dozen members. Surprisingly, 76% of respondents that indicated that they are not employed within the Technology Division indicated that they are familiar with RPA to some degree. Of these, only 16% indicated that they are not familiar with RPA to some degree. 5% of those

within the Technology Division and 9% of those not within that division indicated that they neither disagree nor agree that they are familiar with RPA. These results again indicate potential to further familiarise employees with the technology.

5.3 Personal Risk

In this section the results relating to Personal Risk are discussed.

Personal Risk is a consideration as to whether the respondent thinks that RPA may replace their job, potentially implying that the respondent may lose their job. Personal Risk is an exogenous variable explicitly measured in Question 3 of the Research Instrument.

These results indicate that two-thirds of respondents are confident that RPA does not pose a risk to their jobs which is a result echoed by the PricewaterhouseCoopers (2018) survey result that found that a-third of respondents feared that automation would potentially pose a risk to their jobs as well as the UiPath (2020) result that indicated that more than three-quarters of respondents did not fear losing their jobs due to automation. Perhaps this confidence is justified but it is unlikely that 67% of respondents of this study do not conduct at least some automatable tasks as part of their jobs which is a result that is nearly the same as the result of the UiPath (2020) report that found that more than two thirds of respondents spend a portion of their work week conducting tasks that are potentially automatable. However, those tasks that may be automatable most likely constitute a small portion of the multiple tasks that make up the jobs that they perform on a regular basis which could explain this level of confidence.

The results of those respondents who indicated that to some degree that RPA may replace their jobs may imply that more than a quarter of respondents may be experiencing varying degrees of anxiety, as highlighted by Schwabe & Castellacci (2020), that they may become unemployed due to their job being automated. This is not an unsupported fear considering that 43% of respondents

of the WEF (2020) survey indicated intention to reduce their workforces based on the benefits of automation. It is therefore plausible that these respondents consider RPA a threat which may have implications for their willingness to cooperate with the RPA team, which could potentially be detrimental to gathering accurate and complete analysis of tasks and processes as argued by Dandekar et al. (1997), should their business area or team be analysed for RPA use cases. 3% of these indicated that they strongly agree that RPA could replace their job. It would be remiss not to take this result in to consideration and at least attempt to assist respondents who are potentially fearful of RPA by upskilling them, as proposed by Bessen (2016), in order for them to remain relevant, productive, and employable within the business, a view supported by Brynjolfsson & McAfee (2014). This result could also be due to ignorance of RPA on the part of the respondent, an irrational fear of automation, or that some of the respondents have a rational fear of RPA replacing their job as they are still conducting mundane, high-volume, repetitive work that could potentially be automated, or that the 'displacement effect' argued by Acemoglu & Restrepo (2019) could be playing a role in the genesis of their fear. Regardless, these results indicate a potential fear that could be destructive to both employees and the business. The results from this group of respondents is surprising in that, although they agree that their jobs can be automated by RPA, they are also largely in favour of utilising RPA and are positive about the benefits that it may bring to themselves as well as to the business which is a view supported by Bessen et al. (2020) who argues that automation can result in positive disruption, new products, and enhance human capabilities. This could indicate that while these respondents' jobs may be automated with RPA, that these respondents are not fearful of what that may mean for them and their continued employment.

Personal Risk from a Business Unit perspective

From a Business Unit perspective these results are interesting in that more than two-thirds of respondents within the Technology Division and two-thirds of respondents not within the Technology Division appear confident that RPA could not replace their job. A-third (33%) of respondents in both business areas strongly

disagreed that RPA could replace their jobs. These results are a potential indicator that further research needs to be conducted to determine the reasoning behind these responses which may indeed turn out to be supported.

Personal Risk from an Age Group perspective

None of the oldest respondents (60 or older) indicated any potential that RPA could replace their jobs. This is not an unexpected result considering that those in this age group are very near retirement age and may experience no fear of losing their jobs. It is plausible that those in this age group are apathetic in this regard. This age group only makes up 2% of respondents.

The next age group of respondents that are most confident that RPA could not replace their jobs are those aged between 20 and 29 years old. 83% of these respondents indicated, to some extent, that they disagreed that RPA could replace their job. This result may be due to younger employees being employed in to new job roles that have been created which may not require employees to conduct repetitive, high-volume tasks. This result may also be the result of naivety or the optimism of youth. However, this does not explain the result entirely as 17% of respondents in this age group indicated that they 'Agree' that RPA could replace their job, which indicates that employees are, to some extent, still being employed to perform tasks that are potentially automatable. This age group only makes up 5% of respondents.

Perhaps the most telling age group are those aged between 40 and 49 years old which is comprised of 41% of all respondents. 68% of these respondents disagreed, to some extent, that RPA could replace their job. 36% of them strongly disagreed. This result is perhaps due to this age group having had substantial work experience that has enabled them to progress in their careers sufficiently where they no longer perform mainly automatable tasks. 92% of respondents in this age group have completed some form of tertiary education which may indicate that they are currently employed as knowledge workers whose main tasks are not necessarily repetitive, at least not to the point that they are

automatable. However, 26% of respondents in this age group did agree that RPA could replace their job which indicates that age is not necessarily a conclusive indicator of those employees that are least likely to lose their jobs due to RPA. 6% of respondents in this age group neither disagreed nor agreed that RPA could replace their job.

Respondents in the age group between 30 and 39 years old did not indicate responses that were as conclusively on one side of the spectrum as were evident in the other age groups. Just more than half (57%) of respondents in this age group disagreed that RPA could replace their job. 27% strongly disagreed. However, 35% agreed that RPA could replace their job with 8% strongly agreeing. 92% of respondents in this age group have completed some form of tertiary education which indicates that there may be something else at play that would require further research to uncover, for example, perhaps respondents in this age group fear the most about their future. This age group is comprised of 29% of respondents.

Personal Risk from an Education perspective

Education is considered to be those respondents that indicated that they had completed some form of tertiary education post completing 'Grade 12 (National Senior Certificate) and National (vocational) Certificate'. These responses are grouped as 'Yes' in the table below. All other responses are indicated as 'No' in the table below and is to be interpreted as those respondents who have not completed any tertiary education programmes.

These results could indicate that age, job experience, role duration, and education level, play a role in respondents' perceptions of the risk that RPA poses to their job. This is however not supported by the results of the Structural Path Model that indicated that these factors play a small, almost insignificant role in influencing perceptions as well as outcomes.

Of those that have completed some form of tertiary education, more than a quarter (27%) responded that they agree that RPA could replace their job. This

result could indicate that there are educated employees performing tasks that are automatable. Further research would be required to confirm the validity of this statement.

9% of respondents have not completed some form of tertiary education. Of these, more than half (55%) disagreed that RPA could replace their job, with 18% strongly disagreeing. This result could indicate that education level may not be a useful predictor of whether someone is performing automatable tasks or not. 36% of these respondents indicated that they agree that RPA could replace their job and 9% neither disagreed nor agreed.

5.4 Discussion relating to Research Questions

In this section, each variable, and its related Research Instrument (RI) questions are first analysed before providing an overall view of the results.

For each variable the RI results are grouped. The grouping used is as follows: responses indicated as either 'Strongly Agree', 'Agree', or 'Somewhat Agree', are grouped as 'Agree', responses indicated as either 'Strongly Disagree', 'Disagree', or 'Somewhat Disagree', are grouped as 'Disagree', and the remaining response is 'Neither Disagree nor Agree'. The values for responses are indicated as a percentage of all responses. At the end of each section, a detailed tabular view of the results is presented.

5.4.1 Discussion relating to Research Question 1

Research Question 1 (RQ1) asks 'What are employee's perceptions of Robotic Process Automation?'.

5.4.1.1 The Capability variable

Questions Q2, Q4, Q5, Q8, Q9, Q10, Q11, of the Research Instrument seek to provide answers that inform the Capability variable.

Relating to Q2: when averaging the ungrouped responses, the results show that on average the respondents lean closer to 'Neither Disagree nor Agree' than 'Somewhat Agree' that 'RPA capabilities are superior to human capabilities. This almost neutral result for Q2 is an outlier in the Capability set of results considering that the other questions had strong leanings that eliminate any ambiguity. However, when viewing the detailed results, it can be seen that just slightly more than half (51%) of respondents indicated that, to some extent, they believe that RPA capabilities are superior to human capabilities. This is not an unexpected result considering that RPA is a rules-based technology (AIIM, n.d.; Wewerka et al., 2020), that has no subjective reasoning, unlike human beings. When an automated process encounters a scenario it has not been programmed to handle the automation will fail, unlike humans who would most likely find a way or already know a way to handle the new scenario.

Relating to Q4: when averaging the ungrouped responses, the results show that on average the respondents 'Agree' that 'RPA can help me become more productive'. The detailed results indicate that most respondents (92%) agreed, to some extent, that RPA can help them be more productive which is a result echoed by the UiPath (2020) survey where more than half of respondents agreed that RPA has had a positive impact on their productivity. Interestingly, 48% of respondents strongly agreed, which is a convincing result. This result aligns with the expectations of the extent to which RPA can increase efficiency (Syed et al., 2020; Ribeiro et al., 2021), allowing more to be accomplished in less time. The 7% of respondents that disagreed to some extent, have all completed some form of tertiary education, most indicated they most identified with the 'Male' gender, and two-thirds are employed within the Technology Division.

Relating to Q5: when averaging the ungrouped responses, the results show that on average the respondents indicated a strong 'Agree' that 'RPA will free me from mundane, repetitive tasks'. The detailed results indicate that a significant majority of respondents (95%) agreed that RPA would free them from mundane, repetitive tasks. 53% of these respondents strongly agreed. This result supports the

assertion that repetitive tasks are best suited for automation using RPA (Syed et al., 2020; Ribeiro et al., 2021).

Relating to Q8: when averaging the ungrouped responses, the results show that on average the respondents indicated a strong 'Agree' that 'RPA can help reduce human errors'. The detailed results indicate that most respondents (94%) agreed that RPA can help with reducing human errors. 49% of these respondents strongly agreed. This result supports the consideration that RPA does not tire or make mistakes (Syed et al., 2020; Ribeiro et al., 2021). Of the 3% that did not agree, all had completed some form of tertiary education, all identified as males, and half were employed in the Technology Division.

Relating to Q9: when averaging the ungrouped responses, the results show that on average the respondents firmly 'Agree' that 'RPA can reduce processing costs within the business'. The detailed results indicate that most respondents (93%) agreed that RPA can reduce processing costs within the business. 33% of these respondents strongly agree, and 47% of these respondents agreed. This result supports the reality that the cost of running an automation is less than what it would cost to pay a human to perform the same task (Syed et al., 2020; Ribeiro et al., 2021). Of the 2% that disagreed to some extent, all had completed some form of tertiary education, all identified as male, and 50% were employed within the Technology Division.

Relating to Q10: when averaging the ungrouped responses, the results show that on average the respondents indicated more than 'Somewhat Agree' but not quite a firm 'Agree' that 'RPA can reduce risks within the business'. The detailed result indicates that most respondents (86%) agreed to some extent, that RPA can reduce risks within the business. 24% strongly agreed, 39% agreed, and 23% somewhat agreed. This result is contentious considering that by its nature RPA has no bearing on risk, it is the manner in which RPA is implemented and utilised that would have an effect on risk within the business. A poor RPA implementation could in fact greatly increase risk within the business. Conversely, a good,

security and accuracy focused implementation of RPA would reduce risk within the business.

Relating to Q11: when averaging the ungrouped responses, the results show that on average the respondents indicated a firm 'Agree' that 'RPA has no emotional exhaustion or physical limitation'. The detailed result indicates that most respondents (91%) agreed to some extent, that RPA has no emotional exhaustion of physical limitations. 48% strongly agreed, and 31% agreed. This result could be claimed to be contentious, at least on the latter part of the question. RPA does indeed have no emotions of any kind, but it could have physical limitations of various kinds considering that RPA relies extensively on the hardware on which it operates, running efficiently and without errors. While RPA may not have physical limitations it is highly dependent on any physical limitations of the components of its ecosystem. Of the 4% that disagreed to some extent, all had completed some form of tertiary education, and most identified as males and were employed within the Technology Division.

5.4.1.2 The Attitude variable

Questions Q6, Q12, Q14, Q15, of the Research Instrument seek to provide answers that inform the Attitude variable.

Relating to Q6: when averaging the ungrouped responses, the results show that on average the respondents indicated a near firm 'Agree' that 'I have high hopes about RPA within the business'. The detailed results show that most respondents (90%) indicated that they have high hopes for RPA within the business. 38% strongly agreed, and 32% agreed. 2% strongly disagreed. This is an interesting result and indicates wide support for the utilisation of RPA within the business. As this question is intended to garner the perception of RPA from the respondent it is rational to consider that this result may vary greatly, even from the same respondent, should they experience any negative outcomes or experience of RPA. It is plausible to think that the failure of even a single RPA automation upon which the respondent relies, may result in the respondent indicating a negative response to this question. 5% indicated that they neither disagree nor agree, and all have completed some form of tertiary education.

Relating to Q12: when averaging the ungrouped responses, the results show that on average the respondents indicated more than 'Somewhat Agree' but not quite a firm 'Agree' that 'RPA is not flexible enough to be applied to every business task or process'. The detailed results indicate that most respondents (81%) agreed that RPA is not flexible enough to be applied to every business task or process. 20% strongly agreed, 41% agreed, and 20% somewhat agreed. This is not an unexpected result considering that RPA in its current form is best suited for high-volume, repetitive tasks, and not all business tasks or processes fit this description.

Relating to Q14: when averaging the ungrouped responses, the results show that on average the respondents indicated a near firm 'Agree' that 'RPA makes me excited about the future way of work'. The detailed results indicate that most respondents (86%) agreed that RPA makes them excited about the future way of

work. 28% strongly agreed, 39% agreed, and 19% somewhat agreed. This is an encouraging result when considering that a technology has the ability to make someone excited about the future way of work. Perhaps this result is an indication that the daily tasks that respondents are required to perform in their job cause the respondents frustration and the idea that a technology could alleviate the frustration by taking over the tasks provides a basis for hope which would therefore explain this result. Of the 4% that disagreed, 2% strongly disagreed, 2% disagreed, and all have completed some form of tertiary education.

Relating to Q15: when averaging the ungrouped responses, the results show that on average the respondents indicated a near firm 'Disagree' that 'Implementing RPA within the business should be avoided'. The detailed results indicate that most respondents (89%) indicated that they disagreed. 49% strongly disagreed, and 37% disagreed. This is a curious result when taking in to account the result of Q14. It would not be possible for RPA to make respondents excited about the future way of work unless there was support for the implementation of RPA within the business. 6% of respondents agreed that implementing RPA within the business should be avoided which raises the question as to why respondents would have answered in this way. It could be speculated that these respondents fear RPA would replace their job however, only 63% of respondents who agree also indicated the RPA could replace their job. It is possible that these respondents fear the loss of jobs in-general but further research would be required to delve in to the details of why respondents provided the answer to this question as they did.

5.4.1.3 The Outcomes variable

Questions Q7, Q13, Q16, of the Research Instrument seek to provide answers that inform the Outcomes variable.

Relating to Q7: when averaging the ungrouped responses, the results show that on average the respondents indicated a firm 'Agree' that 'RPA can improve operational efficiency within the business'. The detailed results indicate that the vast majority (97%) of respondents agreed that RPA can improve operational efficiency within the business. 53% strongly agree, and 38% agree. This is an expected result especially when considering that most businesses are striving to find efficiencies in order to 'do more with less' which would result in either stabilising or reducing operational costs. Of the 2% that disagreed, all have completed some form of tertiary education, two-thirds are employed within the Technology Division, and two-thirds identify as males.

Relating to Q13: when averaging the ungrouped responses, the results show that on average the respondents indicated a near firm 'Somewhat Agree' that 'RPA is crucial to the success of the business'. The detailed results indicate that the majority (86%) of respondents agreed that RPA is crucial to the success of the business. 37% agreed, and 32% somewhat agreed. Of the 7% of respondents that disagreed, all have completed some form of tertiary education, two-thirds are employed within the Technology Division, and two-thirds identify as males. The remaining 7% answered that they neither agreed nor disagreed that RPA is crucial to the success of the business. Further research would be needed to determine why 14% of respondents either disagreed or are neutral with relation to RPA being crucial to the success of the business.

Relating to Q16: when averaging the ungrouped responses, the results show that on average the respondents indicated that they 'Somewhat Agree' that 'The business strategy is to implement RPA throughout the business'. The detailed results indicate that the majority (72%) of respondents agreed that the business strategy is to implement RPA throughout the business. 11% strongly agreed, 34%

agreed, and 27% somewhat agreed. 13% disagreed, and 15% neither disagreed nor agreed (a combined total of 28%) which may imply some degree of mixed messaging with the business as to the RPA strategy. Further research would be needed to uncover the respondents' reasons for answering as they did.

5.4.1.4 RQ1 Overall

The perceptions of the majority of respondents indicate a support from a capability, perceptions, and outcomes point-of-view, of the many potential benefits that RPA can offer to the business. These perceptions echo the claims made by the RPA industry which is also echoed in academic literature. Almost a third of respondents indicated a degree of fear that RPA could replace their job, which is a significant proportion and requires further research to determine whether this fear is warranted, or that it is perhaps an irrational perception born out of ignorance of the technology.

5.4.2 Discussion relating to Research Question 2

Research Question 2 (RQ2) asks 'Do demographics have an influence on employees' perceptions about Robotic Process Automation?'

As can be seen from the Structural Equation Model Path Analysis, demographics appear to play a small, almost insignificant role relating to the perceptions of employees. Only two of the demographic results indicated some degree of influence on perceptions, those being: Age, and Education. It could therefore be reasoned, from a demographics perspective, that perceptions are influenced mainly by how old and how educated the respondent happens to be. Although Competency is not technically a demographic, it also appears to have little influence on perceptions and even then, it only has a minor measurable effect on Capability. Although Personal Risk is not a demographic, the unexpected result that it has almost no influence on Perceptions is quite curious but would require further research to uncover the reasons behind this result.

5.4.2.1 RQ2 Overall

Some demographic variables do indicate some degree of influence on employees' perceptions of RPA; however, the influence appears to be almost insignificant. It would be tempting to generalise this result as being pertinent to all areas of the business and at all levels but, as further research would be required to confirm a plausible generalisation, it would be inaccurate to do so here.

The Overall Results figure below paints an interesting picture when taking the following demographics in to account: Gender, Business Unit, Completed tertiary education or not, Work Experience, and a grouping of Agree or Disagree.

There is little difference between the female and male respondents overall responses of either agreeing or disagreeing with the RI questions posed. Those respondents with more than 10 years of work experience and have completed some form of tertiary education, overwhelmingly selected either strongly agree, agree, or somewhat agree to the RI questions. Conversely, those with less than or equal to, 10 years of work experience answered that they either strongly disagree, disagree, or somewhat disagree with the RI questions. However, there is a clear indication that those respondents that are employed in the Technology Division, who have completed some form of tertiary education, identify as male, and have more than 10 years work experience responded that they agree more than the other combinations of the demographics.

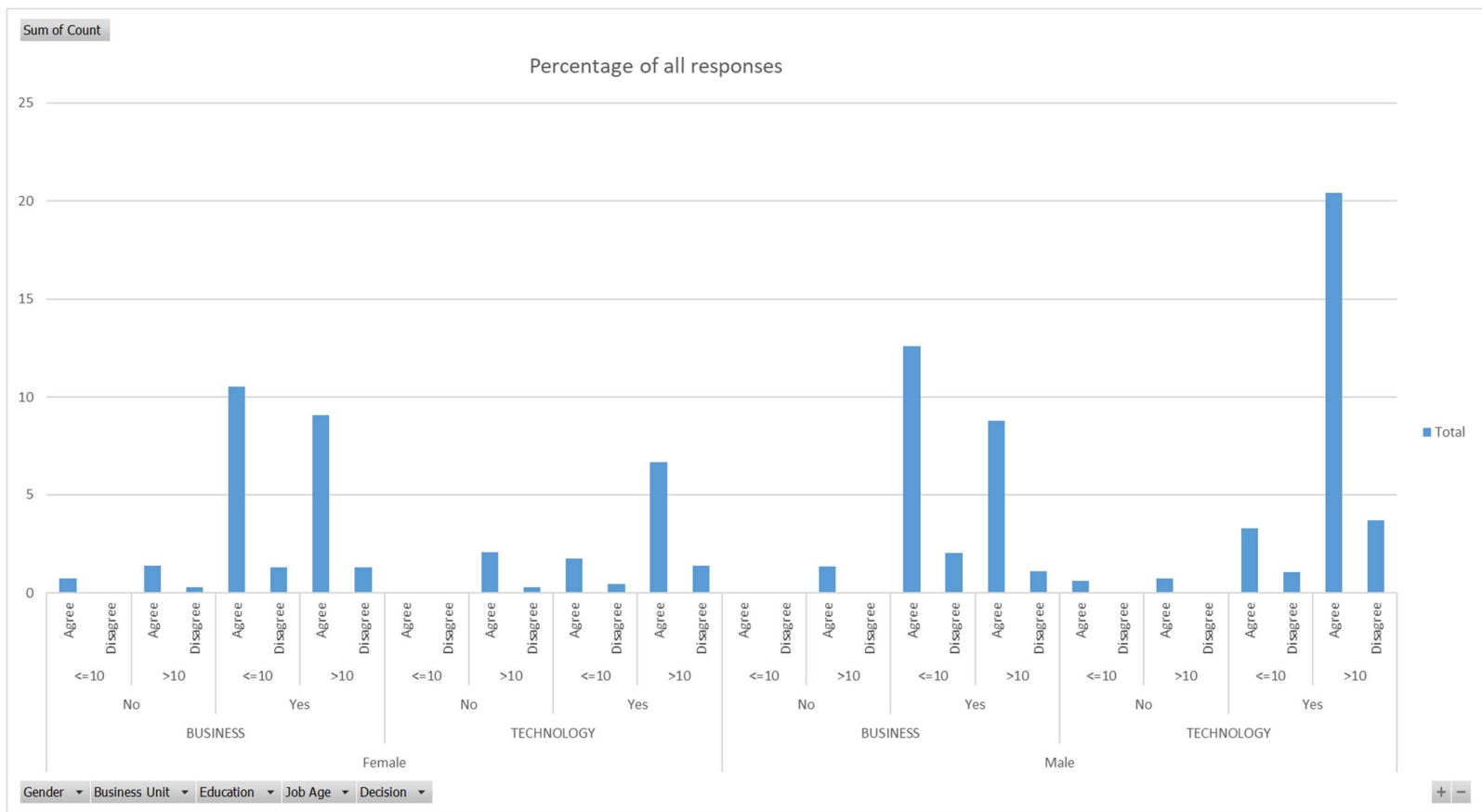


Figure 7: Overall Results

5.5 Conclusion

Employees of all ages, education levels, salary bands, age groups, and genders, are significantly in support of RPA and their responses captured through the research instrument confirm their perceptions agree with the benefits and outcomes claimed of RPA. This indicates that demographics play a less significant role in employees' perceptions relating to RPA than what would have been expected, especially considering the context of South Africa where unemployment is high and which has a difficult history of legislated exclusion of a large portion of the population, based on demographics.

The structural equation path model discussed earlier provides credibility to the claim that perceptions relating to RPA are influenced by the perception of capability of RPA, which in turn has a significant influence on the outcomes of RPA within the business.

A noticeable proportion of respondents indicated that RPA could replace their job which provides impetus to the idea of implementing programmes within the business that would alleviate any anxiety that these respondents are experiencing in order to ensure that these respondents do not become disengaged, unproductive employees, or perhaps worse, unemployed.

6 CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

In this chapter the conclusions of the research questions will be considered in answering each research question. Recommendations relating to these answers will then be discussed before suggestions are provided for areas of future research.

6.2 Conclusions regarding research question 1

Research Question 1 asked: 'What are employees' perceptions of Robotic Process Automation?'.

The results from the employees that responded to the survey questionnaire indicate that there is practically an equal split between those that believe RPA capabilities are superior to human capabilities, and those that do not believe so or neither disagree nor agree. In general, relating to the capabilities of RPA, a large majority of respondents indicated that they believe that RPA can greatly assist them as well as the business by increasing efficiencies, reduce human errors, reduce processing costs, reduce risks, and would free employees from having to manually process mundane, repetitive tasks. Employees indicated that they have high hopes for RPA within the business, that RPA is critical to the success of the business, and that RPA makes them excited about the future way of work. However, a significant majority believe that the technology is not flexible enough to be applied to every business task or process but that they are neither for nor against the business implementing RPA.

6.3 Conclusions regarding research question 2

Research Question 2 asked: 'Do demographics have an influence on employees' perceptions about Robotic Process Automation?'

The outcome of the research indicates that demographics play much less of an influence on employees' perceptions of RPA than may have been expected. To a small degree, the older the respondent and the more educated they are, the greater the respondent views the likelihood of a successful RPA implementation within the business.

6.4 Recommendations

In order to best support positive outcomes to the business and employees alike, through the implementation of RPA, it becomes apparent that it would be prudent to include employees as part of the implementation, especially considering that the results of this research indicate that to a great extent, employees are in support and have high hopes for the benefits that RPA could potentially deliver both to the business as well as to the employees. This consideration is supported by Wewerka et al. (2020), who argues that a successful implementation of RPA is critically dependent on including employees in the implementation programme.

The argument put forward by Bessen, J. (2016) proposes a duty on employees to actively pursue reskilling themselves in order to remain employable, especially those employees that currently perform jobs, or even tasks, that are deemed to be conducive to automation. However, Brynjolfsson & McAfee (2014) argue that the reskilling of employees in order to keep their skills relevant is a dual responsibility of both the employee as well as the employer. It is an argument that proposes that it is the best outcome for both the business as well as employees as the business would gain new skills that could bolster efficiency and competitiveness, and potentially reduce costs, and employees can remain employed as their new skills would still be relevant to the business.

As more than a third of employees that are between 30 and 39 years old indicated that they agree to varying extents that RPA could replace their jobs, it would be prudent for the business to actively engage with employees in this age group, but perhaps not exclusively with employees only in this age group, to ensure that those employees who will grow in to more senior roles in the business develop the skills that will ensure their employment longevity and ensure business

continuity by the business avoiding having to hire new employees with relevant skills which presents a risk and additional cost to the business.

More than a quarter of respondents that indicated that they have completed some form of tertiary education also indicated that their jobs could be replaced by RPA. This could well imply that the tertiary education that those employees completed is perhaps no longer relevant to the current labour market and that they should therefore pursue additional education paths in order to remain employable. The more than a third of employees that have not completed some form of tertiary education and also indicated that they believe that RPA could replace their job should be encouraged to pursue tertiary education or complete short courses that would provide them with skills that could potentially be used elsewhere within the business and avoid them from becoming unemployed.

As RPA is becoming a ubiquitous technology, even to the extent that anyone can download a trial or free version of the software, it would be sensible for those employees that indicated that they are not familiar with RPA to actively explore the technology in order to gain an understanding of its capabilities and shortcomings which would place the employees on a stronger footing as far as knowledge of the subject is concerned.

6.5 Suggestions for further research

Further research would potentially determine why there appears to be a general decline in the fear of automation which historically accompanied industrial revolutions. Perhaps RPA, a claimed component of the Fourth Industrial Revolution, is no longer considered as being part of an industrial revolution, or there may be other factors at play which could be uncovered through further research. It would also be enlightening to conduct further research in to why the respondents that indicated that their job was not at risk of being replaced by RPA also by and large indicated that they are against the business implementing RPA. As to what factors are at play in influencing these results would require further research.

Further research would potentially uncover the reasons as to why respondents either disagreed or are neutral with relation to RPA contributing to the success of the business. This could be due to the increased public awareness of Artificial Intelligence leading respondents to consider RPA of less importance to the success of the business. Further research could potentially provide insight.

As the scope of this research was limited to a telecommunications company in South Africa, the question arises as to what degree the results of this research could be replicated in other companies and other industries. It is possible that this company, or telecommunications companies in general, are an outlier when taking all industries and companies in to account, especially considering that telecommunications companies require the utilisation of extensive, complex, and often cutting-edge technologies that are regularly upgraded, in order to remain competitive.

While the results of this quantitative study have been enlightening and have provided answers to the stated research questions, following this research up with a qualitative study may provide deeper insights as to why respondents answered questions as they did.

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APPENDIX (A): The Participant survey invitation sheet

Dear colleague,

The time available to us to complete our work is often limited due to the number of mundane, repetitive tasks that form part of our daily business-as-usual. In order to reduce the impact on your time due to these sorts of tasks the business is proposing automating as much as possible using Robotic Process Automation (RPA). In light of this I am conducting research in order to gain an understanding of what employees perceptions are about RPA. The research I am conducting forms part of the Master of Management in the field of Digital Business degree towards which I am studying.

To shed some light on employee's perceptions, I invite you to answer 25 simple survey questions by clicking on the hyperlink below. Your responses are completely anonymous and will only be seen by myself as the researcher. Your responses will be stored on a password-protected computer and will be permanently deleted after 1 year.

Please note that this survey is only open to permanent, full-time Vodacom employees based within South Africa.

Please share this survey link with any of your colleagues that are permanent Vodacom employees based in South Africa.

Your participation in this survey would be greatly appreciated,

Shaun

To take the survey please click on this link

https://wits.eu.qualtrics.com/jfe/form/SV_bfs7KDBpAjGbm9E

APPENDIX (B): The Participant information sheet

Dear survey participant

Thank you for taking the time to voluntarily complete the questionnaire that follows

Anonymous and safe: Please be reassured that your responses are entirely anonymous which means that there is no way for the researcher to be able to link your responses to you. The responses gathered from this survey will be stored on a password-protected computer and the data will not be shared with anyone other than the person conducting the research. The data will be permanently deleted after 1 year.

What is RPA? Robotic Process Automation, or RPA for short, is a technology that is used to automate tasks and processes through the use of software robots. It is a technology that forms part of Industry 4.0, otherwise known as the Fourth Industrial Revolution.

Please note: This study is intended to gather perceptions relating to RPA from permanent, full-time Vodacom employees based within South Africa. If you are not a permanent, full-time Vodacom employee based in South Africa please do not complete this survey questionnaire.

The survey: There are 25 questions in this survey and all have to be answered in order to submit your responses. The first question requests that you consent to your responses being used for research purposes. The second questions is for validation purposes. The next section asks you 7 demographic questions that will assist in determining whether demographics have an influence on employees' perceptions. These questions are answered by selecting the relevant value from the options provided. The last section is comprised of 16 questions relating to your perceptions about RPA. These questions are answered by selecting one option from the scale of: strongly disagree, disagree, somewhat disagree, neither disagree nor agree, somewhat agree, agree, strongly agree.

If you have any questions regarding this research or questionnaire please feel free to contact the researcher via the following email address 2368824@students.wits.ac.za

Thank you for your participation

APPENDIX (C): The Research Instrument

Demographic influences on employee perceptions of Robotic Process Automation (RPA) at a South African telecommunications company	
Survey Questionnaire	
Informed consent question	Answer Options – drop-down list
Do you give consent that the information that you provide may be used for research purposes?	- Yes - No (You will not be able to continue to answer this survey)
Validation question	Answer Options - drop-down list
Are you a permanent Vodacom employee based in South Africa?	- Yes - No (Please note that this survey is only for permanent Vodacom employees based in South Africa)
Demographic questions	Answer Options
Question 1: In what year were you born?	Free text, integers only
Question 2: What is your highest qualification level?	Dropdown list
	- Grade 12 (National Senior Certificate) and National (vocational) Certificate
	- Higher Certificates and Advanced National (vocational) Certificate

	- National Diploma and Advanced certificates
	- Bachelor's degree, Advanced Diplomas, Post Graduate Certificate, and B-tech
	- Honours degree, Post Graduate diploma, and Professional Qualifications
	- Master's degree
	- Doctor's degree
Question 3: What is your employee salary band?	Dropdown list
	- Band H
	- Band G
	- Band F
	- Band E
	- Higher than Band E
Question 4: With which gender do you identify the most?	Dropdown list
	- Female
	- Male
	- Other
	- Prefer not to say

Question 5: In what year did you start working at Vodacom?	Free text, integers only
Question 6: In what year did you start in your current job role	Free text, integers only
Question 7: In which Business Division do you currently work?	Free text, alphanumeric
Survey Questions	Answer Options - Likert scale
Question 1: Do you agree that you have good familiarity with RPA?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 2: RPA capabilities are superior to human capabilities?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 3: Do you agree that RPA could replace your job?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 4: RPA can help me become more productive?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 5: RPA will free me from mundane, repetitive tasks?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree

Question 6: I have high hopes about RPA within the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 7: RPA can improve operational efficiency within the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 8: RPA can help reduce human errors?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 9: RPA can reduce processing costs within the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 10: RPA can reduce risks within the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 11: RPA has no emotional exhaustion or physical limitation?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 12: RPA is not flexible enough to be applied to every business task or process?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 13: RPA is crucial to the success of the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree

Question 14: RPA makes me excited about the future way of work?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 15: Implementing RPA in the business should be avoided?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree
Question 16: The business' strategy is to implement RPA throughout the business?	1=strongly disagree 2=somewhat agree 3=disagree 4=Neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree

APPENDIX (D): Salary Band examples

Salary Band	Job Role examples
H-band	Specialist
G-band	Senior Specialist or Principal Specialist
F-band	Executive Head of Division
E-band	Managing Executive of Division
Higher than E-band	Chief of Division or Chief Executive Officer

APPENDIX (E): Survey questionnaire repurposing approval

From: Ksoonhyo <ksoonhyo@gmail.com>
Sent: Tuesday, 03 August 2021 9:51 AM
To: Robertson, Shaun, Vodacom <Shaun.Robertson@vodacom.co.za>
Cc: 오승희 <cucumber5210@hanmail.net>
Subject: Re: Permission requested to use your survey instrument

Sure go ahead
Good luck

Kwon, Soon Hyo

On Aug 3, 2021 at 4:44 PM, <[Vodacom Robertson](mailto:Shaun.Robertson@vodacom.co.za)> wrote:

Good morning, Dr. Kwon,

I am currently studying towards a Master Degree in Management in the field of Digital Business with the Witwatersrand University Business School, under the supervision of Professor Leona Craffert. The title of my research is 'A perceptions study relating to Robotics Process Automation (RPA) at the largest telecommunication company in South Africa'.

I came across your article titled, 'Physician Confidence in Artificial Intelligence: An Online Mobile Survey', in the Journal of Medical Internet Research by way of another article titled, 'Health Care Employees' Perceptions of the Use of Artificial Intelligence Applications: Survey Study'. I found your article informative and valuable to my research. I humbly request your permission to reuse your survey instrument for my research. It would need to be adapted in order for it to relate to robotics process automation but due credit and citation would be attributed to yourself.

Kind regards,
Shaun