UNIVERSITY OF KWAZULU-NATAL

Understanding the Causes for a Low Success Rate of Technology-Prompted Change: A Case Study of Toyota South Africa

By

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Declaration

I, **Suven Mohanlal Ramsunder,** declare that

(i) The research reported in this dissertation, except where otherwise indicated, is my original research.

(ii) This dissertation has not been submitted for any degree or examination at any other university.

(iii) This dissertation does not contain any other person's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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Date:

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Abstract

Technological advancements are inevitable if a business wants to remain competitive, however, in addition to the multiple benefits there are also numerous difficulties associated with the implementation of new technology and automation. This study delves into the perspective of the semi to low-skilled workers, with the viewpoints of management being investigated to draw a comparison.

The research was carried out at Toyota South Africa Manufacturing in Durban, with the respondents comprising of 315 semi to low-skilled workers, and six managers. The semi to low-skilled workers were issued questionnaires, while the managers were interviewed, hence a mixed methodology was used. The literature review provides the basis of the study, which outlines the factors affecting resistance to change. Firstly, the acceptance of technology was assessed to ensure that the respondents were indeed receptive to new technology. Once this was established, the next step was to look at the factors affecting the resistance to change, such as, fear, trust, job wellbeing and self-acceptance. The status quo bias was adopted to bring these factors together to show that, even though the respondents were open to using new technology, if it was not administered correctly the initiatives would fail.

The study not only developed a framework that could be incorporated when applying new technology, it also found certain improvements that could be incorporated. Amongst other recommendations, this study put forth the notion that the semi to low-skilled workers should be incorporated into the change process from the inception of the technological advancement processes, with diverse forms of communication being used so as to ensure that the different groups that exist within the company would have a proper understanding of the processes. It also highlighted the perceptions that management had of the employees and the actual insight of the workers.

The study concludes with limitations of the study and future research that could be done to enhance the findings.

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CHAPTER ONE

Overview of Research

1.1. Introduction

Despite the emerging interest in the field of automation and the affordable technology available, there has been little implementation of it. This could be warranted by the initial fear of the changes that it could bring about, with regards to the employees. It was for this reason that an in-depth study was undertaken to understand the semi-skilled employees' perception of automation in the plant. This chapter outlines the background of the study, an understanding of the research problem, as well as an account of the research questions and objectives. The aim of the study will also be clearly stated, followed by an indication of how the research was designed.

1.2. Background of the Study

There have been many advancements in the technological sphere, which have had a direct impact on the world of business. It has made many rudimentary tasks redundant and communication with people anywhere in the world seamlessly effortless. Employees no longer need to have intensely physical jobs; instead there are robotics or production lines that allow for these tasks to be done without menial labour. Although these new technologies propose multiple benefits and opportunities, they have a common thread that unites them all, which is an increase in productivity and efficiency.

It cannot be disputed that technology exists in every part of an average person's daily life, whether it is sending emails, streaming a movie, or using their vehicle to get from one point to another. Technology has enhanced peoples' lifestyles in more ways than can be counted. It can be said that the world is now smaller because of the implementation of technology. It is for these reasons people find it difficult to function without technology. Technological innovations are imperative to a nation's competitiveness and economic growth. With the world growing smaller (in a communication and technological sense), there are many companies and organisations that can now be classified as global competitors, so the introduction of technological advancements in the workplace is unavoidable if companies and organisations wish to remain as such.

Jobs no longer require several people assigned to tightening bolts or fitting certain parts on to merchandise on a production line. The criteria for these positions changed and they have become available to people who are higher skilled and more adaptive to working with the new technology implemented to make these roles easier and faster. In the industrial environment, therefore, most workers now need to be technologically knowledgeable; even secretaries are required to know how to work with technology as they may need to use new programs and communication devices as part of their daily function.

Conversely, technology can also be blamed for the deskilling of certain jobs. Before the implementation of automation, people were responsible for knowing the whereabouts of products, were required to mentally calculate the output and throughput scores daily and had to be able to generate reports and present them. Furthermore, they needed to be vigilant and aware of their surrounds to be able to pick up faults, defects and errors that could occur in an industrial environment. Now there are computer aided programs that allow for stock keeping, electronic devices that perform mathematical equations for the user and cameras or visual programs that monitors plants and equipment. From this information, reports are generated autonomously and sent to the relevant personnel. The argument is that people are getting lazy and relying on technology to get their information for them, without using their own mental capacity.

Technology has a direct impact on reducing the roles of humans in a working structure (International Focus, 2012), however, this also means that employees have new routes to improve upon their own wellbeing and align themselves for better positions. It is the fear of change that seems to hold people back from accomplishing success. The problem is that, if they are not willing to change and learn the new technology, they will be left behind (Fox & Felkey, 2008). It is this fact that has kept the fires burning for innovation and ensured constant effort for change. Looking back at the blacksmiths and wagon wheel makers as an example of this, these artisans delivered a service that was vital for the needs of their times. Over time, however they found that their jobs became redundant due to the lack of demand for their products as a result of cheaper and/or better alternatives. As these trades declined, it forced the next generation to immerse themselves in the newer way of life and embrace technology to survive, thereby improving the quality of life of each generation that passed.

As mentioned, the implementation of new technology is inevitable, especially looking at the endless possibilities it provides organisations and the opportunities it affords the youth of the future. It can be understood that there will be intense resistance towards this change in work ethic, as well as resistance to taking the first steps in the technological advancement. It is for this reason that a well-designed framework should be utilised to introduce the implementation of new technology, for the best chance of success. The absence of a structured process for introducing new technology into an industrial environment could be accounted as being the biggest contributing factor to failure faced by organisations trying to improve their infrastructure and processes. Such models and guidelines allow for proper and functional involvement of the relevant personnel, to define and execute the correct governance mechanisms that ensure the implementation process is should be properly executed.

1.3. Motivation and Contribution of the Study

This study was commenced to offer essential research to bridge the gaps of change management with regards to technological advancement in third world countries. Additionally, it was to satisfy the researcher's personal inquisitiveness of how to improve employees' workplace experience with automation. The research endeavours to promote the use of technology in the workplace and motivate employees to enhance their skills.

It is the aspiration that this study will contribute to the process of technological change management in the new era, as well as add an additional perspective to the existing knowledge base. Since this was a case study of Toyota South Africa Manufacturing, the results would have a direct benefit to them. Other automotive manufacturing industries could also benefit from the findings, especially by using the framework developed on page 174.

Some of the other end users that would benefit from the study are students and instructors in strategic management, and corporate strategists when creating future plans for enhancing the output of their businesses with newer technology. By understanding the needs of the people (semi-skilled workers), strategies can be implemented to persuade their judgment and increase the competitive advantage of the company. Although the scope of the research is relatively small, it is anticipated

that it could be used as the basis for further investigations in the field of change management.

1.4. The Overview of the Study

1.4.1. The Research Problem

The employer's intention to use automation to facilitate the increase in production volumes can be perceived by employees as a difficult transition. Although the changes being made are to enable a more efficient production output with the workforce, there seems to be a lack of balance between the employer's intention and the employees' perceptions, thus leading to a low success rate of technology-prompted change. Such imbalance at times leads to 'go slows' and even strikes. This could cause loss of income to both parties, forcing the employer to cut costs to allow for the company to stay functional, thereby leading to a cut in head count.

1.4.2. The Objectives of the Study

- To determine the level of acceptance of new technology by Toyota South Africa Manufacturing employees.
- To determine the aspects that intensify the employees' resistance to change.
- To investigate the role communication can play to enhance the acceptance of automation.
- To develop an automation/technology acceptance framework that could be applied in developing countries.

1.4.3. The Research Questions

- What is the level of acceptance of new technology by Toyota South Africa Manufacturing employees?
- What aspects intensify the employees' resistance to change?
- What role can communication play to enhance the acceptance of automation?
- What automation/technology acceptance framework could be applied in developing countries?

1.4.4. Limitations of the Study

Firstly, both phases of the study, qualitative and quantitative, carry with them limitations in terms of socially desirable responses and biasness. The study will not be able to identify any inconsistencies between the individuals' perceptions and their

behaviour, as the ambition of the research was to gather attitudinal data, and not observe the actual behaviour of the participants.

The population chosen for the study was limited to the single most affected area in the plant. In an ideal, situation it would be possible to have a census of all people affected by the technology implementation. It was, however, sufficient to generalise the findings.

It is also important to state that the information provided by the participants was gathered at the time of the study and can thus be seen as a snapshot of peoples' feelings, attitudes and behaviours at that given time.

The researcher was familiar with the industry, technology and the people participating and was therefore able to relate easily to the subject matters discussed. This brings about both benefits and shortcomings, it could be said that the researcher was able to create a sense of rapport and credibility with the participants, but it also meant that the researcher's prior knowledge could impact the final outcomes.

Lastly, it is important to mention that the organisation used for the case study has a predominately male work force. It is thus appropriate to make mention of the fact generalising the outcomes to a heavy female population may not be appropriate.

1.5. Research Design

Research design is more like the road map that indicates how the research was conducted. This brief explanation of what research design entails is to show that it incorporates multiple components, as indicated below.

1.5.1. Research Methodology

Authors such as Cresswell (2014), Mouton (2006), and Bryman and Bell (2007) identify three types of research methodologies, namely qualitative, quantitative and mixed research methodology. The authors argue that qualitative research methodology is more relevant when the sample size is small, while quantitative methodology, on the other hand, is more relevant in cases where the sample size is large. They argue further that in some cases, both methods can be combined. For this study, the researcher chose the mixed method, whereby quantitative research methodology was used for the large sample size comprising of the general workers,

and qualitative research methodology was used for the small sample comprising of five supervisors and five managers.

1.5.2. Research Model

There are a number of models that talk about automation, but of particular interest to the researcher is the dual factor model. This model is briefly discussed in an in-depth analysis in the following chapter. This was the model used as the theoretical foundation of the quantitative study, and will allow for the integration of the Technology Acceptance Model (TAM) and Status-Quo Bias (SQB) theories to explain the employees' acceptance and resistance prior to automating systems. As a result, it is proposed that a person's intention to accept the new technology is based on two opposing forces, namely, inhibiting and enabling perceptions.

1.5.3. Location of the Study

The study was conducted in KwaZulu-Natal in Durban, within Toyota South Africa Manufacturing. This is the largest manufacturing company in South Africa, with a market share of 19.8 per cent in 2014, as stated in the South Africa Automotive Export Manual (2015). To enable the large throughput required, the company is heavily dependent on automation to ensure that their targets are met successfully. The production environment has changed and adapted with new technology to assist with the higher volumes required. It is for these reasons that Toyota South Africa Manufacturing was chosen, however, the study was conducted so that the findings could be generalized for any third world country with an emerging technological market.

1.5.4. Population of the Study

Toyota South Africa Manufacturing has a large number of employees. As a result, the researcher had to decide which production line would be chosen for the purposes of the study, and the Integrated Motor Vehicle (IMV) line in the Assembly plant was chosen. This is the line that produces the Hilux and Fortuner models. These models are constantly upgraded, which necessitates improved build quality and new automation implementation. The workers in this assembly line are estimated to be approximately 600 in number. This population was chosen because it is the most affected by the introduction of automation.

1.5.5. Sample of the Study and Sampling Strategy

In terms of the statistical table that the researcher consulted when estimating the sample, a total of 315 employees provided a good sample, since this number gave a 99 percent confidence limit, implying that there was only a 5 per cent margin of error (Sekaran, 2003). The sampling technique chosen was the simple random sampling technique. This made it possible for each and every member to have an equal chance in participating.

1.5.6. Data Collection Instruments

A structured questionnaire was the research instrument chosen, which incorporated three major sections. These sections were the demographics of the participants, the Technology Acceptance Model, and the Status-Quo Bias. A five-point Likert scale was used, that ranged from 'Strongly Disagree' to 'Strongly Agree'. This enabled the researcher to analyse and measure the influencing factors that could persuade the adoption of automation in the plant, and to determine the major contributors to resistance to change.

1.5.7. Administration of the Research Instruments

The questionnaires were self-administered and completed by the participants in their own time.

1.6. Chapter Outline

Chapter One: Overview of Research

This chapter provides an overview of the entire dissertation

Chapter Two: History of Toyota

This chapter provides a brief background of Toyota South Africa Manufacturing to enable an overview of the location that the case study was based on.

Chapter Three: Literature Review

The literature review provides the background of the issue at hand. Journal articles constitute the predominant source of information and newspaper articles was cited in certain instances.

Chapter Four: Research Methodology

This chapter presents the methods used to collect and analyse the data. In other words it shows how the entire research project was planned and executed.

Chapter Five: Results

Chapter five presents the collected data and provides a brief analysis of the results.

Chapter Six: Findings

This chapter discussed the research findings in detail, and the topic in general.

Chapter Seven: Recommendations and Conclusions

It is in this chapter that the researcher provides answers to the research questions. The chapter also provides recommendations and then concludes the dissertation report.

1.7. Conclusion

The first chapter of this study provides an overview of the study, and the contribution. The research methodology, research questions and a breakdown of the structure of the dissertation are also provided. The following two chapters provide information on the location of the study, thereafter focusing on the literature that was used to back the arguments laid out in the research.

CHAPTER TWO

The History of Toyota South Africa

2.1. Introduction

Toyota has earned its name in the hearts of many South Africans as the brand of cars and trucks that can be trusted, are reliable, and safe to utilise at any time. This could be attributed to the fact that Toyota South Africa has come a long way in the past 55 years. It was in 1961 that an industrial entrepreneur by the name of Dr. Albert Wessels travelled from South Africa to Japan, to embark on a journey that would start a revolution. Dr. Wessels was a pioneer who returned with a permit to import the first ten vehicles that bore the name of a thriving family business in Japan, and which would thereafter grow to become one of the greatest in motoring history, namely Toyota (Kirby, 2015).

2.2. The Conception of a Giant

Dr Wessels had grown up on farm, so he was drawn towards a stock looking, hardworking pickup truck as the first Toyota to reach South African soil. He had an inkling that the tough, trust-worthy and affordable vehicle would strike a chord with those who worked in rugged terrain. According to Toyota South Africa Motors (2010), this hunch paid off as the ‘Toyota Stout’ was an instant hit, and in its tracks followed generations of other passenger and commercial vehicles.

In 1962, assembly of the Stout commenced at Motor Assemblies, which is now known as the Toyota South Africa Manufacturing Division in Prospecton Durban (Toyota Motor Corporation, 2012). This was a massive plant that grew in size over the years. An overview can be seen in the figure that follows. Toyota’s range of vehicles swiftly became South African favourites, supremely dependable, and ideally suited to purpose.

It took Toyota less than a decade from the first Toyota Stout arriving in the country for the brand to make its mark as the greatest and most celebrated South African motoring giant. By 1968, Toyota had become the largest producer of commercial vehicles in the country, and the following year saw the advent of a passenger vehicle that became the top selling sedan of all time, the ‘Toyota Corolla’ (UK Essays, 2013).

Figure 2.1 Overview of the Toyota Prospecton Plant in Durban South Africa
Toyota South Africa Motors, 2010. Sustainability Report 2010, Durban: s.n

By 1971, Toyota was able to sell 100 000 vehicles in the first decade of its conception in South Africa. The real mile-stone achieved by Toyota South Africa came in 1980, when just on the eve of its 20th anniversary, Toyota South Africa took the number one spot for total vehicle sales across the country (Toyota Motor Corporation, 2012). An article published by Superbrands (n.d.: 2), stated that “In 1983 the Corolla broke all existing records in South Africa for endurance and distance for standard cars.”

In all the years since then, that spot has yet been relinquished, milestone after milestone, achievement after achievement, and conquest after conquest. Toyota has firmly entrenched itself as an icon integral to our way of life, even as that way of life began changing. Amidst the onrush of social and political transition, one thing did not change; one tradition long established continued to stand firm as millions of South Africans continued to place their trust in the stable of brands that included such legends as the Conquest, the Corolla, the Camry, the Hilux, the Stallion and the Dyna and Hino truck range. Toyota South Africa has managed to live up to their slogan: ‘*Everything keeps going right*’, asserts Shuttleworth (2009). Just as Toyota itself shifted from the textile to transport industry, and Dr. Albert Wessels had seized an opportunity to expand the boundaries of the South African business world, Toyota South Africa also needed to change, and adapt to the new times (Toyota Motor

Corporation, 2012). Upon celebrating an unprecedented 20 years as overall market leader, the Toyota Motor Corporation of Japan reaffirmed its commitment by extending its ownership of its South African subsidiary to 75 per cent (Toyota South Africa Motors, 2013). Thus, adds the Toyota South Africa Motors (2013) report, Toyota South Africa, a motoring giant that had its humble beginnings as an importer of the first ten vehicles all those years ago, stood ready to join the global Toyota supply network and live up to its new slogan, to 'lead the way'.

In 2006 Toyota became the first South African motor manufacturer to break through the 150 000 sales barrier, with almost half of those vehicles destined for export. The introduction of the new Corolla, which soon became the number one selling car worldwide, saw Toyota South Africa pushing ahead with plans to increase capacity at its Prospection plant to 220 000 units per year; meanwhile sales of the legendary Hilux reached record highs in South Africa. Toyota was able to attain the awards for best light commercial vehicle, best medium commercial vehicle and environmental excellence at the prestigious Focus awards, attest Toyota South Africa Motors (2013).

In 2008, Toyota Japan acquired the remaining 25 per cent share in Toyota South Africa, making it a 100 percent Japanese owned Toyota subsidiary (Fin24, 2008). In the same year Toyota exported 147 000 vehicles, earning a new accolade as Topco exporter of the year.

From 1980 until 2013, Toyota South Africa Motors maintained its position as the overall market leader in South Africa, for 33 consecutive years. In 2014, Toyota South Africa Motors obtained an overall market share of 19,8 per cent, trailed by the Volkswagen Group of South Africa, and thereafter the Ford Motor Company of Southern Africa. The pie chart shown in Figure 2.2 displays the top ten equipment manufacturer (OEMs)/Importers in the country in 2014 (Council, 2015).

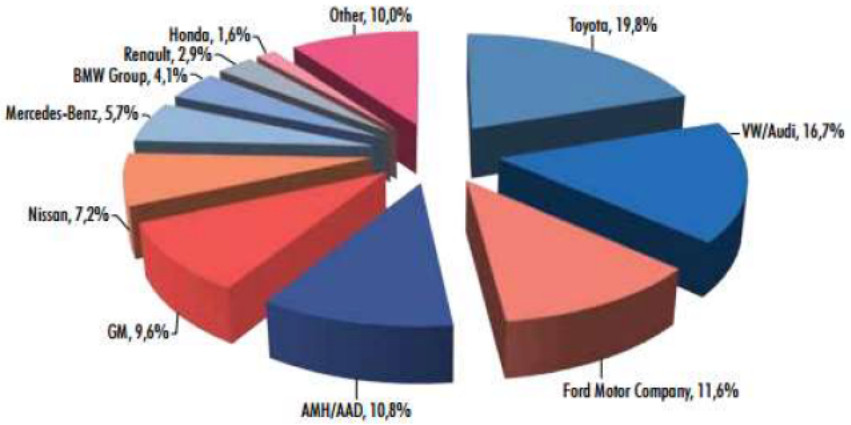

Figure 2.2 Top 10 OEM overall market share for 2014

Council, A. I. E., 2015. South Africa Automotive Export Manual 2015, South Africa: Automotive Industry Export Council.

Upon closer inspection, it can be seen that the sales obtained to uphold the market share were mainly from the commercial market. The statistics of the commercial vehicles, such as the Hilux and Fortuner are shown in Figure 2.3, which shows that Toyota had far more vehicles being sold, close to 50 000 units, compared to that of any other manufacturer. Unfortunately, Figure 2.4 reveals a decline in the sales of the passenger vehicles, namely the Corolla, with approximately 58 000 units being sold in comparison to Volkswagen South Africa selling almost 85 000 units according to the South African Automotive Benchmarking Club (2015).

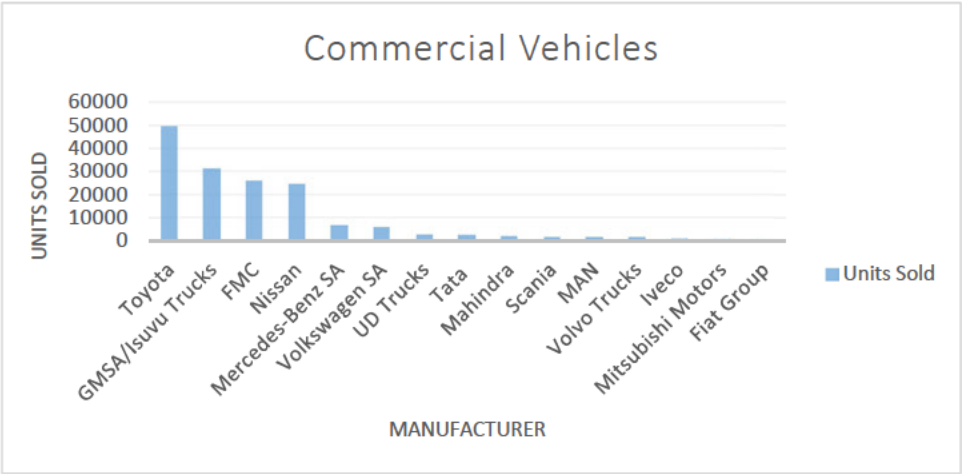

Figure 2.3 Commercial vehicles sold in 2014

South African Automotive Benchmarking Club, 2015. State of the Automotive Industry in South Africa, Pretoria: South African Automotive Benchmarking Club.

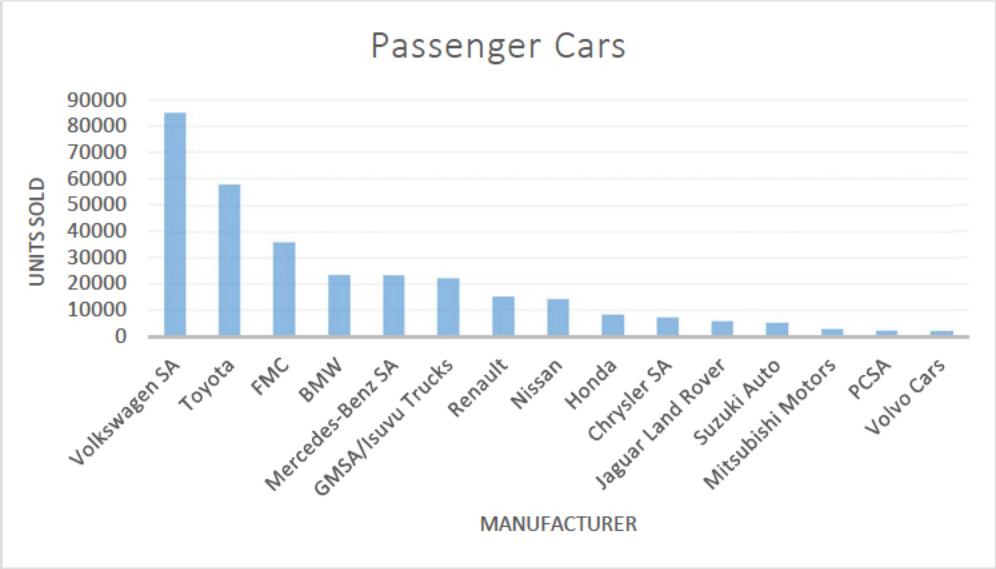

Figure 2.4 Passenger vehicles sold in 2014

South African Automotive Benchmarking Club, 2015. *State of the Automotive Industry in South Africa,* Pretoria: South African Automotive Benchmarking Club.

2.3. Conclusion

Through continuous improvement, relentless innovation, and respect for all people, as is the 'Toyota way', Toyota South Africa has kept the company thriving; but in this time of economic turmoil and an unpredictable workforce, continuous improvement is needed now more than ever. To incorporate newest technology and ensure a high throughput is a way that Toyota would be able to accomplish this undertaking. With the growth of the company, technological change is imminent, which implies that the way people do their jobs would change.

CHAPTER THREE

Literature Review

3.1. Introduction

This section looks at the theory behind the concepts of the implementation of new technology in the workplace. It provides a brief history of the conceptualisation and the advancements made in the field; as well as the ideologies involved in the implementation of technology such as employment security and the resistive factors that face organisations. An overview of ways to overcome resistance to technology will also be provided. The aim in this chapter is to fairly assess arguments, analyses and past examinations of economic literature on the relationship between productivity and technology, as well those on the logic that higher productivity leads to additional jobs. The idea of higher productivity leading to additional jobs speaks to the competitiveness of companies in the global sphere with technological advancements and factors that could be affecting the profitability and improvements of people and companies.

It would be apt to first explain the terminology that was used in the research. The term 'technology' is defined by the Oxford Dictionary (Stevenson, 2010: 1826) is:
"The application of scientific knowledge for practical purposes, especially in industry". In stating that, for the purpose of this study, 'technology' shall be used as a collective term for equipment and software.

'Automation', as per the Oxford Dictionary (Stevenson, 2010: 108), is defined as:
"The use or introduction of automatic equipment in a manufacturing or other process or facility". With this explanation in mind, 'automation' will mean the use of technology to automate processes.

3.2. Technology and Automation

3.2.1. History of Automation

Technology has come a long way, from the Stone Age until the technological era known today. The first known technological advancements dated back to Palaeolithic, times when people were still hunters and gatherers. They developed tools from stone that aided in their activities such as making fire and clothing, and could be used as

weapons. Fire may not be thought of as technology, Marangoni et al. (2014) explain that at that time, in order to have been able to have controlled fire, the people would have used tools and friction to start it.

These tools gave way to agricultural advancements, which many believe is the basis of civilisation today. It was the time that man started to melt copper and bronze to create items used in the fields to aid with sowing seeds and harvesting crops.

In the year 4000 BC the wheel was created. The wheel had to fit within a hole, and have an axel turn it without any friction. The first use of the wheel was found to be for pottery (Gambino, 2009).

In medieval times, the concept of watermarks and a dry compass emerged. Serra (2015) adds that it was the time of weaponry and the beginning of military warfare, with the invention of cannons and cross bows.

The Egyptians used many technological advancements in the building of the pyramids, such as pulley systems and using logs to move big items which were rolled to their destinations. This enabled fewer people to move the item with less work effort (Ivan, 2016).

McNeese (1999) reported that the renaissance saw a movable, cast-metal type printing press being invented, that increased the number of books printed and alleviated the practice whereby one person attempted to write down multiple copies of a book.

Then came the industrial revolution, which broke boundaries and took a giant leap of technology. Huge strides were made in the manufacturing and mining sectors. This was the era that started the technological age and saw the production of machinery that was more productive than people, and was available at a cheaper cost (Hackett, 1999). This phase gave rise to the Luddites that apposed the drastic changes to the workplace (Bennett, 2012).

The 19th Century brought with it the beginning of automation. Transportation, communication and manufacturing were starting to evolve with the new technological advances and enhancements. It brought about the invention of the incandescent light bulb, which in turn enabled factories to operate for 24 hours a day by having two or

three shifts. This, according to the Citi Group (2015), ultimately increased the employment rate. There was mass production of the sewing machine and agricultural equipment, which meant a better production rate (Thomson, 2010). Towards the end of the 19th century, leaps in advancements in the chemical and electrical spheres were seen, and this is commonly referred to as the second industrial revolution.

The 20th century brought with it improved methods of communication, such as radio and telephone, and transportation enabled the teaching of systems and understanding of methods much easier, assert Huberman et al. (2014). Technological advancements were being made in offices and factories, and these improvements aided in the transformation of manual and clerical labour. The advent and implementation of these devices reduced the time and labour needed to produce more precise outputs. The fear of unemployment grew with the advent of all of this technology, but declined as the years went by, explained Hackett (1999). It was around this point, in 1908, that Henry Ford brought the car to the average man. He developed a system that enabled vehicles to be built quicker and cheaper. He improved the assembly line concept, which aided in bringing costs considerably lower and cut down build time by approximately 45 per cent. This, according to the Eye Witness to History (2005), was the starting point for industries to grow and create more efficient plants. Witness to History, to show you what I mean: This, according to the Eye Witness to History (2005), was the starting point for industries to grow and create more efficient plants, however, many economists were in an uproar, with negative views of the future with regards the effects of automation and technology. As the age of capitalism grew to a close in the 1970s, the unemployment rate spiked again (Solow, 2002). This demonstrated very clearly that although unemployment was linked to automation and technological progress, these were not solely responsible and there was, in fact, a very strong relationship between the political sphere and unemployment rates (Azeng & Yogo, 2013).

It is during this time that many technological advancements were born, and they were perfected over the years to come. Examples of this include communication protocols and space initiatives. Industrial automation was present at this time, however most control systems were hardwired and used primitive instruments such as relay logic and pneumatic controllers. This technology was cumbersome and expensive, not to mention extremely difficult to maintain and find the source of faults when problems

were encountered with it. Modifications were labour intensive and caused many hours of down time, with no productivity. The pneumatic controllers required constant maintenance in order to be within specification. However, with these factors taken into consideration, it was still an improvement on a completely labour intensive processes, and it allowed for more skilled personal to be hired at a better rate of pay.

By the time the 21st century rolled around, the automation age was underway. Programmable Logic Controllers (PLC) had replaced relay logic to enable easy programming of systems to carry out routine tasks (Segovia & Theorin, 2012). This, however, negated workers from this tedious manual labour. Machinery was now able to efficiently carry out tasks that were being done by multiple people; especially in harmful environments, such as paint booths, where the fumes could effect a person's health, causing sickness or even death. Technology was able to make the world a smaller place with the Internet and video calling (Mehta & Dixit, 2015), with the growing capabilities of the World Wide Web. This meant that information was readily available and it filtered down to the factory level. An organisation could now encompass all their units; finance, human resources, manufacturing and the warehouses together as a cohesive unit and maintain an efficient course to success (BSR, 2015). The reporting structures and information feedback no longer relied on the competence of people, but rather on automated software that used plant-level automation and tracking software to create reports and relay the information of the business. The BSR (2015) expanded further to state that the 21st century opened the door for an amalgamated business society, where individual business units no longer operated in silos. This advancement aided in building up organisations, and their growth meant more people being employed.

Automation and technology have become something of a norm these days, with every manufacturing industry incorporating hi-tech control systems and automation. It would be strange to walk through a manufacturing plant and not see any of these robots or automation devices, asserts Westlake (2014). The advent of smart devices has also impacted dramatically on the world, and almost every person has one. It is contradictory to oppose automation and technology on the basis that it denies jobs, but carry around a device that incorporates the latest technology to enable on to communication and the gathering of information. The smart phone has more processing power, memory and functionality than that of the first computer invented

by Charles Babbage. What took up multiple rooms to get easy, logical functionality now resides in the palm of the hand and allows for easy connectivity to the internet. It then follows logically that the automated factory systems can be accessed from smart phones, and Marsan (2015) points out that it is thus possible to control functions, tasks and operations from anywhere, without actually physically being on the plant.

3.2.2. The Ideology of an Automated Plant

Pollock did a study in 1957 that explained the structure and future development of factory automation (Pollock, 1957). These ideals are still being utilised today, and are the future ideals that the world is currently striving to. The Figure 3.1 below explains what was built upon those many years ago.

The diagram that follows is a simplified depiction of the different stages of automation in a manufacturing environment, moving from a manual plant, to a fully automated plant. Although there is not much explanation needed for the figure, it is important to note some of the terminology used:

- ‘Automatic’ implies that humans control these machines that perform certain actions.
- ‘Completely automatic’ implies that quality control and supervision of the machines is done by machines, allowing human interaction to be at a minimal to oversee a certain process.
- ‘Automatic unit’ includes machines that are networked with multiple other machines, to create a cohesive workflow that manipulates and creates different processes simultaneously, which can be controlled from a singular point.
- ‘Automatic plant’ refers to the interconnectivity of the automatic units to create a fully automated factory.
- ‘Automatic factory’ is the combination of the automation that allows for a fully autonomous plant that does not need any human interaction to create high quality products, with a minimal defective rate.

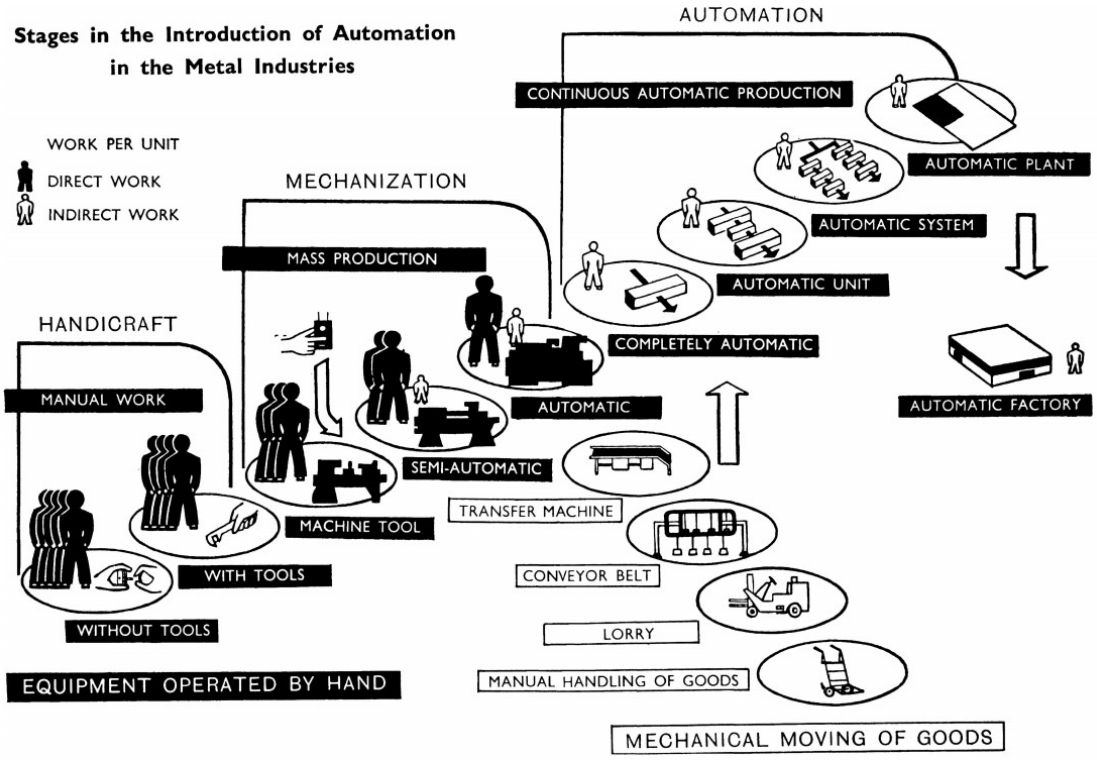

Figure 3.1 Stages in the Introduction of Automation in the Metal Industry

Adapted from Pollock, F., 1957. *Automation: A Study of its Economic and Social Consequences.* Translated

This is the goal that many factories strive to achieve, however, there have been many outcries and controversies around the belief that heading in this direction would leave many unemployed people in its wake, and many more without a future after the inception.

Many places still rely on labour, rather than automating systems, for multiple reasons. A spike was recently seen in the number of companies trying to upgrade facilities or become more automated when the labour markets were in turmoil. This further aggravated the employees and shone the light on automation as the biggest contributor to unemployment (Noble, 2011). This is an issue that has raged on for centuries, and continues today.

3.2.3. Levels of Technology

In industry there are different levels of automation that exist. These were explained by Omar and Taleb (2014) as sensors and actuators that interact directly with the process machinery (level 0); automatic control (Level 1); supervisory control (Level 2);

production control which is responsible for inventory, quality, production, maintenance, etc. (Level 3); and the enterprise which is mainly concerned with managerial functions such as marketing, sales, etc. (Level 4). Figure 3.2 illustrates these levels, which form a pyramidal shape. Omar and Taleb (2014) explain that this shape is due to the relationship that each level has on the preceding phase.

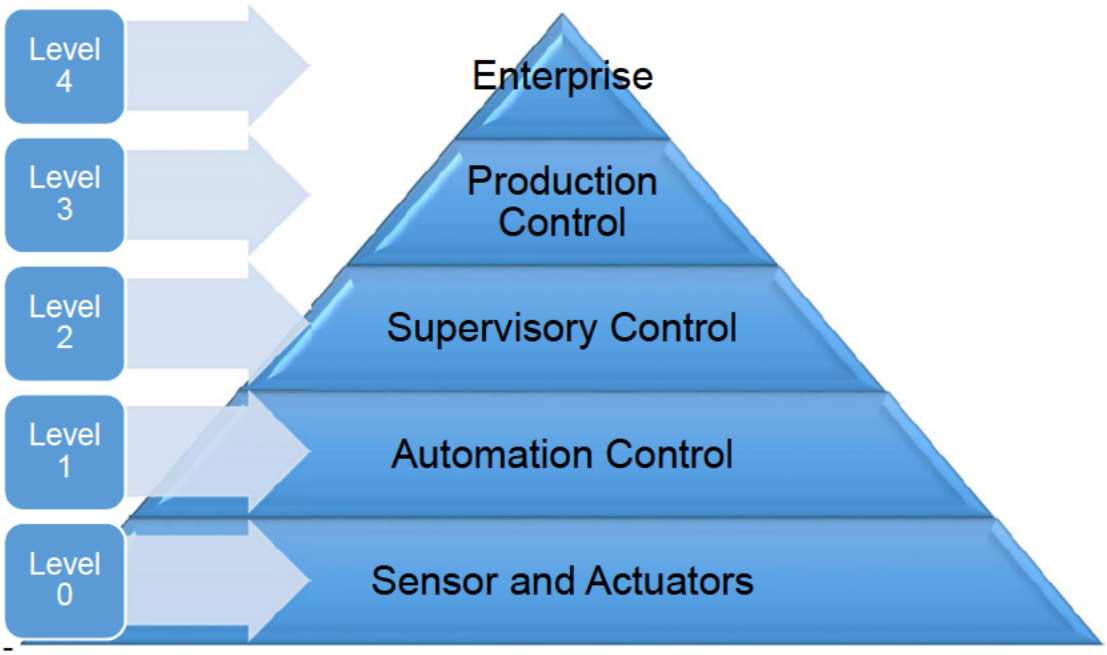

Figure 3.2 Levels of Automation

Adapted from Omer, C. & Taleb, M., 2014. Architecture of Industrial Automation Systems. *European Scientific Journal,* 10(3), pp. 273-283

Understanding this relationship enables the conceptualisation of the entirety of automation, as well as the different roles automation has in an organisation. It is not merely an installation of robotics and complicated conveyor systems, but rather a number of intricately woven factors that allow autonomous ability to thrive. It can be argued that this sort of activity could be costly and complicated to implement, however, these factors can be negated if the automation is planned and implemented correctly within each level.

The system can simply be explained as such; if a sensor was to measure a singular process variable in a machine, this information would be transferred to a controller, who reacts to the change of information accordingly. The controller could be a man or

a machine, and it is at this level that the true automation begins. Currently, there are many of these mundane tasks that are carried out by people, and the reaction required could be something as simple as tightening a bolt. It is at this level, Level 1, that many unskilled and semi-skilled workers are hired to carry out these operations. By adopting an automated structure at this level, it would not only increase the productivity, but also decrease the error margin. This study explores the implementation of technology at this level, as it is from this point that a company can implement its holistic approach to automation and control the quality of every process'.

The next levels are able to build from the information and productivity gained from this level. Typically, there would be programmable logic controllers (PLCs) at level 1 to interpret the information from the sensors, Level 0. A PLC is used for the control and operation of processes in the manufacturing and machine environment (Chitra & Raghavan, 2014), and is able to store information executable instructions, complete arithmetic logic and handle data, among others. It is a versatile device that enables machinery to run autonomously or with the aid of an operator. As the signal on the sensor changes (digital or analog) the PLC changes out tasks accordingly. Figure 3.3 shows how a PLC controls a simple bottle filling process.

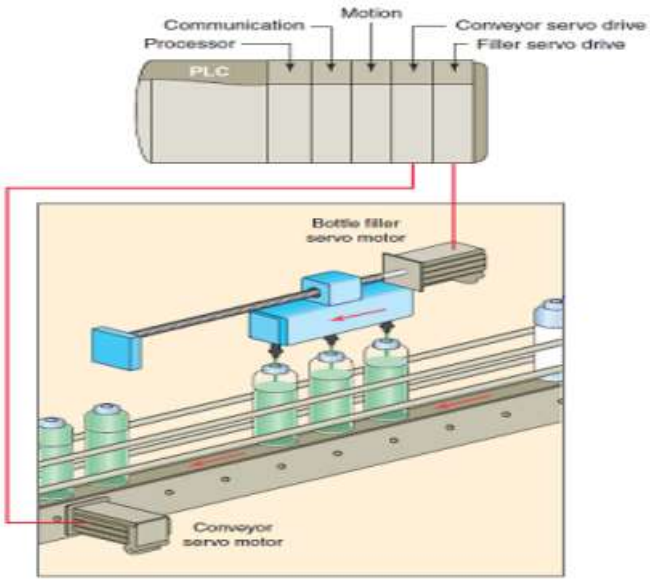

Figure 3.3 Example a PLC implementation

Chitra, S. & Raghavan, V., 2014. Conveyor Control Using Programmable Logic Controller. *International Journal of Advancements in Research & Technolog,* 3(8), pp. 25-31

The PLC here has been programmed with motion instructions that allow for movement of the conveyor and the bottle filler servo motor. These need to work together to ensure that there are no spillages. When a signal for a movement is received, the motion is calculated to reach the desired position of the servo motor by taking the torque and velocity of the conveyor, as well as the current position of the bottle filler into account. This is but a simple example that shows the versatility of the PLC and its ability to produce products at a faster pace, with the least amount of wastage. The PLC is also used to control machinery which piece together vehicles, robots that spray the entire vehicles, and in the water treatment plants to ensure that the chemical processes are constant and correct.

The next level, Supervisory Control, gets its information from these PLCs and similar devices. From this level onwards, there is no hardware that's utilised, but rather software that integrates with all facets of the organisation to ensure that no area operates as a silo, but rather as a singular unit to progress. The software used is known as the supervisory control and data acquisition (SCADA) system. The initial systems used a series of lights and sounds to alert an operator, who would then carry out a manual process to record the events and take further action, if need be (Bagri, et al., 2014). This way of operating is still used in certain plants today.

This system contains two elements; specifically, the system, processes, and/or machinery that need to be controlled, as well as the interconnecting devices which form an interface for a user to view and control these processes. The SCADA system consolidates the control for various process outputs and inputs by integrating Human Machine Interface (HMI) software. This allows for the visualization of the process that occurs in the plant, and for certain changes to be made with ease. The system collects pertinent information and thereafter transfers the data to a central database while notifying the operator station about the event. In the background, the system creates graphs, statistics, and real time trends to give the operator a complete visual of the process, so that appropriate changes can be verified (Unnikrishnan & Sridhar, 2014). An overview of the SCADA system can be viewed in Figure 3.4 that follows. It shows a central SCADA master that consolidates the information from PLCs and other devices, as well as a HMI, which is the operator workstation. From this workstation, it is possible to change the speed set point of a conveyor, whether it is to increase the speed or decrease it. The SCADA will acknowledge the change and filter it down to

the relevant PLC; thereafter it monitors that the operation proceeds with normal functionality at the adjusted speed. There are also alarms and trends that are recorded so that preventative maintenance is possible, with less reactive maintenance. By doing this, it cuts down the need for extra working hours and increases production uptime.

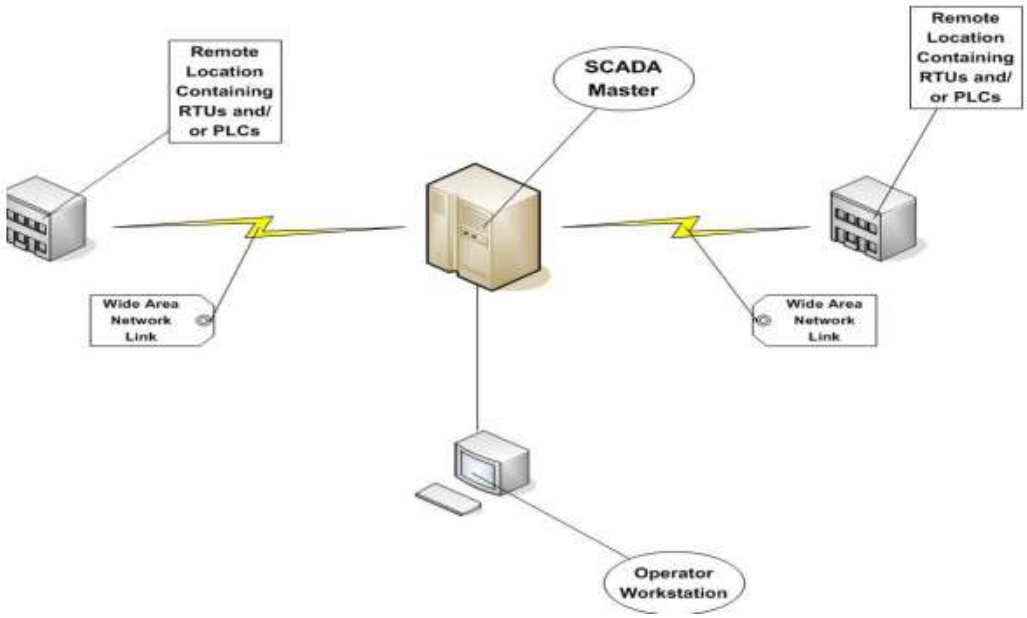

Figure 3.4 Example of a SCADA Implementation

Bagri, A., Netto, R. & Jhaver, D., 2014. Supervisory Control and Data Acquisition. *International Journal of Computer Applications ,* 102(10), pp. 1-5.

The next level, Production Control, integrates the shop floor with the decision makers. This means that there needs to be a continuous monitoring system for the product, from conceptualisation to completion, whilst recording vital information such as traceability, genealogy, work in progress, performance management, material management and more. Thereafter it is essential to get this information in the hands of decision makers, so that they can take the correct actions to enhance manufacturing processes, reduce risk, lower costs and increase yield. This enables connections between complex data flows and systems to provide better efficiency throughout the enterprise. This software is known as Manufacturing Execution Systems (MES). This is possible by assessing the current production monitoring systems and identifying gaps in the flow of information. By doing so, it has become a tool for capturing data and extracting knowledge for making decisions. It was a tedious task to capture real time data due to the large amount of information, according to Banereej et al (2013).

MES does this autonomously by gathering the information in its raw format from the control system and generating usable trends, statistics and analysis for decision making. MES can also be seen as the intermediate level between the control system and the enterprise level, allowing for swift communication and data transfer.

The enterprise level incorporates Enterprise Resource Planning (ERP) software, which integrates with a decision support system (DSS). The ERP software did not always work together with the DSS, however, the ERP generally incorporated the supply chain management and customer relationship management, while the DSS concentrated on semi-structured decision making with information collected from the ERP. It was only recently that that the DSS tools were incorporated into the ERP system to enable it to perform as a complete package for the production and the enterprise, uniting all divisions from maintenance, human recourses and the warehouses (Shafiei & Sundaram, 2004). The following figure, Figure 3.5, show graphically, what the system incorporates.

Figure 3.5 ERP System

Acil Software, 2013. *Construction ERP Software to Minimize the Construction Complexities.* [Online] Available at: https://acgilsoftwares.wordpress.com/category/erp-software-for-construction-industry/

An ERP system is a central system that manages all aspects of an organisation; these include information about financial balances, customers, products, suppliers, production facilities, employees, etc. It has the ability to connect all the different facets of the organisation. It is now possible for the sales division to enquire about the inventory levels, check on orders or customers, track deliveries and receive payments. The manufacturing department can check the inventory levels, create new products, if need be, and manage the production schedule. This makes it possible for the marketing division to plan demand and forecast sales. The finance department would then be able to manage accounts, payments, wages, and balance sheets at the end of each period. The human resource department can use the system to track their employees, the dates they joined, the dates they left the company and the salaries earned. It aids in the facilitation of strategic human resources planning and allows for tracking the progression of employees, as well as their job criteria and experience. This aids the filling of posts when new opportunities present themselves internally. Using this system ensures that no division/department works in a silo, and instead has a central understanding of all aspects of the business.

From the above, it can be ascertained that each level rests upon the information obtained from the previous level. If the foundation level is not solid, it will be difficult to maintain and grow a business efficiently on a large scale. Figure 3.6 shows the actual layout of the systems in the plant, and how each level integrates into the entity.

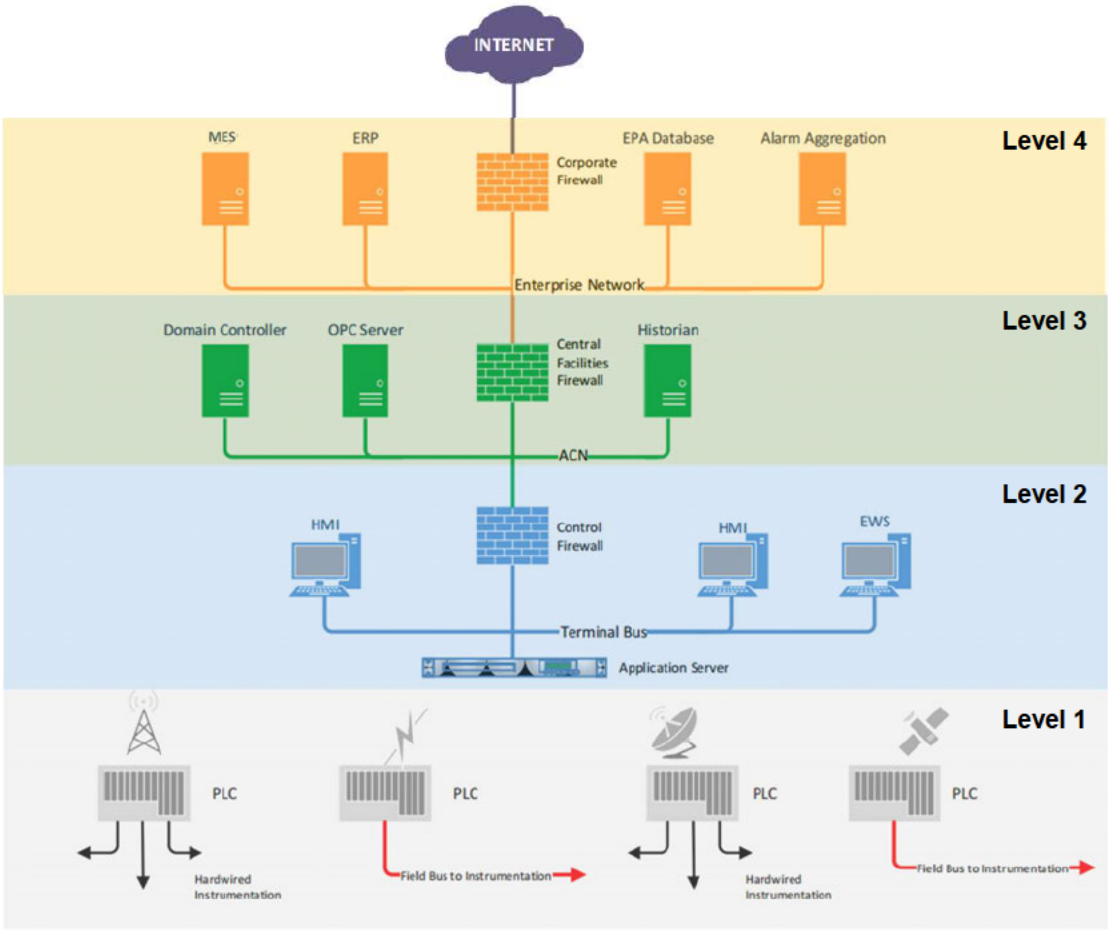

Figure 3.6 Complete automated infrastructure

Bagri, A., Netto, R. & Jhaver, D., 2014. Supervisory Control and Data Acquisition. *International Journal of Computer Applications* , 102(10), pp. 1-5.

3.2.4. Technology Taking Over Jobs

It can be seen that technology and automation have enhanced the way that organisations operate, however, there are many who are unable to fathom a future with technology and automation in the work place, as they assume that it will diminish the need for human workers and increase the unemployment rate. This has been a belief for many centuries. It was a British writer in 1772, Thomas Mortimer, who stated that machines were intended to almost totally exclude the labour of the human race. Mortimer was concerned with the introduction of automation in the saw-mills, and felt that if automation was introduced into the dockyards and other labour intensive industries, that thousands of useful workmen would lose their jobs (Mortimer, 1801).

Many years passed and these arguments lingered on until the 19th century, when a tipping point was reached between man and automation. In a well-known act of

destruction, a group of textile artisans sought to destroy the machines that aided with automating the textile industry. Feelings of insecurity in the workforce increased over time, resulting in Time Magazine (1961) commenting on the imminent arrival of the "The Automation Jobless".

"The number of jobs lost to more efficient machines is only part of the problem. What worries many job experts more is that automation may prevent the economy from creating enough new jobs. . . . Throughout industry, the trend has been towards bigger production with a smaller work force. . . . Many of the losses in factory jobs have been countered by an increase in the service industries or in office jobs. But automation is beginning to move in and eliminate office jobs too. . . . In the past, new industries hired far more people than those they put out of business. But this is not true of many of today's new industries. . . . Today's new industries have comparatively few jobs for the unskilled or semi-skilled; just the class of workers whose jobs are being eliminated by automation." (Time Magazine, 1961).

The fear of automation was so great that in 1964, President Lyndon B. Johnson enlisted a 'Blue-Ribbon National Commission on Technology, Automation, and Economic Progress', to engage with the rising production rate that threatened to outgrow the demand and increase unemployment. It was later deemed a false alert by the commissioner, who stated that:

"… technological change (along with other forms of economic change) is an important determinant of the precise places, industries, and people affected by unemployment. But the general level of demand for goods and services is by far the most important factor determining how many are affected, how long they stay unemployed, and how hard it is for new entrants to the labour market to find jobs. The basic fact is that technology eliminates jobs, not work" (Time Magazine, 1961).

Multiple decades later, these issues have arisen again, with many concerned about job loss and the utilisation of technology. Brynjolfsson and McAfee (2014) warned of dire consequences associated with automation and deemed the increasing level of automation as an emergency. They discuss these unsettling matters in their book, entitled 'The Second Machine Age'. They draw a picture of uncertainty and negativity with regards to the automation age stating:

“Rapid and accelerating digitisation is likely to bring economic rather than environmental disruption, stemming from the fact that as computers get more powerful, companies have less need for some kinds of workers. Technological progress is going to leave behind some people, perhaps even a lot of people, as it races ahead. As we’ll demonstrate, there’s never been a better time to be a worker with special skills or the right education, because these people can use technology to create and capture value. However, there’s never been a worse time to be a worker with only ‘ordinary’ skills and abilities to offer, because computers, robots, and other digital technologies are acquiring these skills and abilities at an extraordinary rate.” (Brynjolfsson & McAfee, 2014).

It can be said that over the past decades, amid the arguments of automation and unemployment, human labour still has not become obsolete. The labour market has fluctuated from era to era, however no exact correlation can be drawn to the advent of automation in the long run. No definite statements can be made about the increase in labour and for the extreme computing power that is available in cell phones, breakthroughs in medical technology and the improvement of the plant floor automation. It is obvious that the world is in a state of automation anxiety (Akst, 2013).

It can be said that the implementation of automation does have short term consequences that cannot be denied. A prominent economics writer, Sir James Stuart, was under the belief that technological unemployment would be catastrophic if innovations were to be introduced and implemented at a rapid pace. This would be a temporary situation, however, with newer prospects emerging from the current situation. He went on to solidify his position on automation by stating that he disapproved any innovation that might force a person to be unable to earn a living (Steuart, 1767).

Throughout history, it was found that many people only realised the benefits of automation and technology after many years of use. These people were known as ‘reactionaries’, and created extreme hype about the initial upheaval that automation and technology had caused. Some of these writers were vocal in their determination to stop the industrial era, but after many years of use, they succumbed to the pleasures that the new world had brought forward and most of these writers changed their views. Mokyr et al. (2015) add that some even went to the point of encouraging the use and

implementation of automation. Mildmay (1765) was against the inception of automation, however he conceded to the use of it and encouraged it, stating that if the new technology was utilised, other countries would overtake the momentum of Britain (Mildmay, 1765).

The acceptance of technology, however it may present itself, always seems to follow the same process. It can be argued that all people accept technology differently, however it seems that they all follow a predefined curve, known as the Technology Adoption Curve, state Park et al. (2015). Rogers (2003) classifies people into five groups; innovators, early adopters, early majority, late majority, and laggards.

New technology presents additional methods of accomplishing tasks that would normally use manual labour or take a long time to complete. The primary function of Figure 3.7 is to understand the rate of diffusion of the technology, and the usability factor of the technology. From the curve, it can be clearly established that the number of early adopters are minimal. It also explains the initial out cry of many laggards or late adopters, according to Rogers (1962), and it is among this late majority and laggards where the most fear towards technology is found.

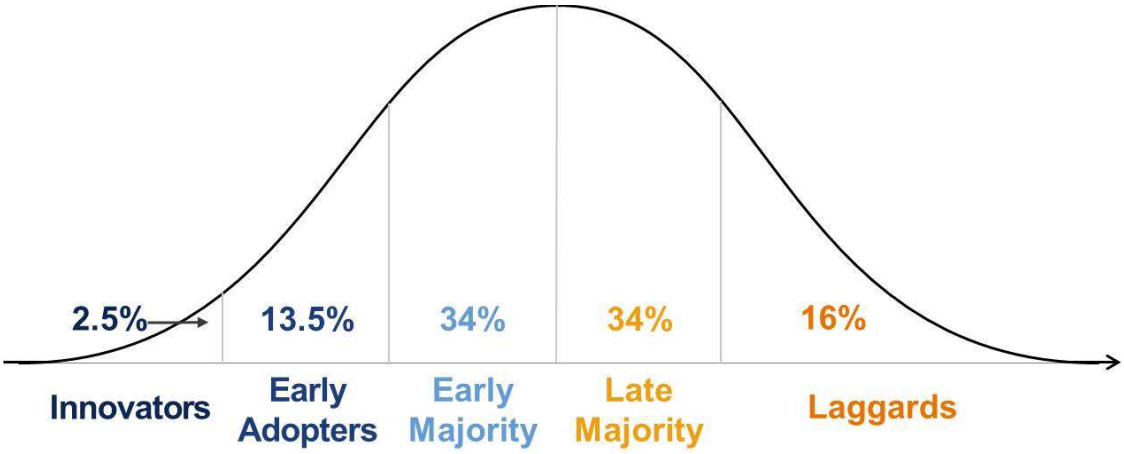

Figure 3.7 Technology Adoption Curve

Park, H., Sung, T. & Kim, S., 2015. Strategic Implications of Technology Life Cycle on Technology Commercialization. *International Association for Management of Technology*, pp. 2736-2748.

The adoption of technology was revisited in 1992 at the US South Convention, cited by Genvese (1992):

“The fate of Russia in the Crimean War, declared Thomas L. Clingman, powerful politician from North Carolina, teaches the need for railroads as a matter of military survival. Even the most ‘reactionary’ of Southerners, even George Fitzhugh, had to agree” (Genovese, 1992). These individuals at the convention were suck in the ‘Prisoners Dilemma’, which was the situation whereby each association would be irrational to not partake in the newest advancements, when if the end result would mean that everyone was worse off (Yadav, et al., 2016).

An argument can be made about the temporary problems that automation causes and the long term benefits that come about as a result of the innovations. Many have stated that these sorts of thinkers are unable to envision the future, and would rather look at immediate actions. The fact that the economy has soared and the employment level has eventually increased has proved many theorists incorrect. Technology has enabled new types of jobs to be created, such as robot manufacturers, programmers, maintenance personal and so on. Despite the fact that there seemed to be a few minor issues with incorporating the new technology, there were giant leaps forward in the years to come. The main issue that many have cited regarding automation is the resulting unemployment, which can be disproved by past experiences (Yadav, et al., 2016).

3.2.4.1. Unemployment in South Africa

According to RDM News Wires (2015), South Africa has lagged behind the technological advancements made by other countries. While 56 per cent of companies have implemented some sort of automation and technology in their organisation, South Africa has a mere 31 per cent of organisations that are technologically advanced. Further research found that 33 per cent of companies refuse to utilise new technology to enhance their strategies (RDM News Wire, 2015). Taking into consideration that many believe automation would deter the job market, with South Africa attaining a low rate of automation, one could assume that the employment rate would not be significantly low, however this is not the case.

The unemployment rate in South Africa fluctuated between 24 per cent – 32 per cent from 2000 to 2016. It should be noted, however, that the information gathered was

from a statistical count of actual job seekers, and Trading Economics (2016) reports that these figures do not include the 34.4 per cent that had stopped looking for employment. Figure 3.8 shows the fluctuation of active job seekers from the statistical analysis.

Figure 3.8 South African unemployment rate

Trading Economics, 2016. *Trading Economics.* [Online]
Available at: http://www.tradingeconomics.com/south-africa/unemployment-rate
[Accessed 01 May 2016].

The World Bank found that about 60 per cent of the unemployed are unskilled, that is, they did not complete matric (Bussiness Tech, 2015). In 2015 it was estimated that there were job losses in the finance sector numbering 31 000, in the manufacturing sector of 23 000, and the agricultural sector numbering 22 000. These losses can be attributed to poor income of the companies, improved methods of production in the companies or to companies closing down (SAnews.gov, 2015).

The losses can also be attributed to the jobless growth of the South African economy. It seems that the economy now creates less jobs than the number needed (Mesi, 2015).

The current forecasted GDP of South Africa achieved a growth of approximately 2.2 per cent to 2.7 per cent between 2015 and 2017. The growth is below the 4.5 per cent

anticipated growth, and Figure 3.9 shows that the unemployment rate has decreased (Mesi, 2015).

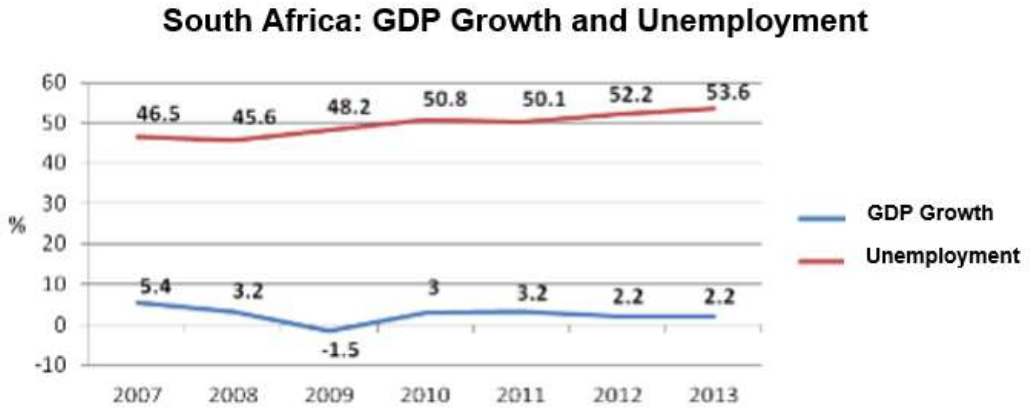

Figure 3.9 South African GDP

Mmesi, M., 2015. *South Africa's unemployment problem: What we need to know,* s.l.: In On Africa

It is vital to understand another predicament that has arisen; it seems as though there is a shortage of skilled labourers in the job sector, as the cost of labour for unskilled workers has grown exponentially (News24Wire, 2015). It seems as though a tipping point has been reached, in terms of the output that a person can give, compared to the amount they earn; labour costs increased in South Africa to 146.5 Index points at the end of 2015 (Trading Economics, 2016)

Figure 3.10 South African Labour Costs

Trading Economics, 2016. *South Africa Labour Costs.* [Online]
Available at: http://www.tradingeconomics.com/south-africa/labour-costs
[Accessed 01 May 2016].

Evan (2014) asserts that the minimum wage infringement for businesses deters them from progressing and employing more individuals, as their resultant staff costs rivals their income. This has forced most companies to look at other alternatives to turn a profit, besides technology, such as importing needed products for resale. This hurts the local economy, not just the labour market, but in terms of future growth.

A well-known economist, Mike Shussler (2012) was quoted in a report on unskilled labour costs by Clark (2012):

> "According to the 11th UASA (United Association of South Africa) Employment Report released by economist Mike Schussler on Friday, the employed unskilled workers in South Africa, in comparison with other countries surveyed, are being paid too much. This effectively means that it is too expensive to employ them for what they bring in terms of skills. …Further, the lower-level worker in the government sector is paid about 18 per cent too much." (Clark, 2012)

Schussler's findings, quoted by Clark (2012), are depicted in the graph below.

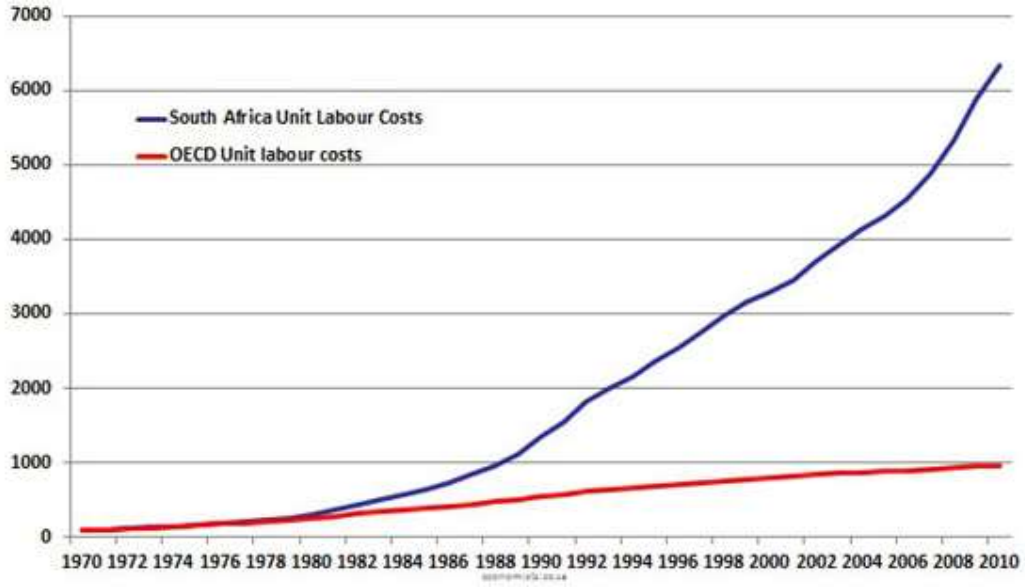

Figure 3.11 South African labour costs compared to the world

Clark, J., 2012. Unskilled labour in SA too expensive for the country. *MoneyWeb*, 2012 May.

It is clear that the labour costs in South Africa have grown exponentially over the years; this is not only detrimental in terms of employment, but also makes South Africa extremely uncompetitive in the global environment (Clark, 2012; de Jager, 2016). To put this in perspective, it was found that an average employee at ESKOM earns 20 per cent more than a PhD professor in Germany (de Jager, 2016). This is one of the reasons that people don't feel the need to complete a tertiary education. It can be assumed by these unskilled workers that they will get a job and be able to live comfortably enough without the hardship of studying further. de Jager and Schussler both agree that these costs could be minimised, with an increase in employment, by introducing technology to the working environment (Clark, 2012; de Jager, 2016).

3.3. Resistance to Change

The Oxford dictionary gives multiple definitions of what resistance is (Stevenson, 2010: 1512). These include:

- "The refusal to accept or comply with something – they displayed a narrow minded **resistance to** change";
- "The use of force or violence to oppose someone or something – government forces were unable to crush guerrilla-style resistance"; or
- "A secret organisation resisting authority, especially in an occupied country – he went underground and joined the resistance";

From the multiple explanations offered, a common thread that holds true among them is the fact that individuals prefer the current state that they know and will fight (even violently) to ensure that it remains the same. It also shows that people behave differently when faced with elements of change (Mittal & Griskevicius, 2014). People therefore need to be handled differently, and in order to have successful change implementation, peoples' concerns and fears need to be understood (Chew, et al., 2006; Sloyan, 2009).

In the perspective of organisations, people relate change to loss and resist the assumption of what could be lost at the risk of what might be gained. They try and maintain a status quo bias in order to feel safe. It is for this reason that resistance is thought of as employees attempting to disrupt the progression of a company and thereby forcing the organisation into disarray (Folger & Skarlicki, 1999). In the same

year, an opposing argument was brought forth by Dent and Goldberg (1999), who explained that individuals do not purposefully resist change, but rather resist the losses that they deem important to them. These include such items as status, pay, and most of all, comfort (Dent & Goldberg, 1999). Resistance to change can be the most overwhelming thing that an organisation deals with, however it should not be examined as a singular factor, but rather as a multifaceted strategic change-over (Bassey, et al., 2014). An organisation needs to take into consideration that there may be stoppages, instabilities, down time, and anger from the employees, along with their outbursts of frustration. This will be directly due to the fact that change causes emotional distress, and that people are unable to think logically when they feel threatened or anxious. It is also important to factor in that the most resistance to change commonly manifests from employees with the least amount of company ethos or disruptive behaviour. These views allow for a broader perspective of resistance to change.

3.3.1. The Reaction to Change

When there is change, the initial reaction is to put everything back the way it was and if that cannot be achieved, then resistance would be the next step. Peoples' reactions to change are defined by the way that they perceive the change and the way they feel about the way in which it is to be implemented, assert Mdletye et al. (2014). The reaction of resistance can commonly be divided into two groups, the first group of individuals locates irregularities and faults, allowing their fear to overtake their logical sense. They end up pretending to be ridiculing or ignorant of the change.

Change evokes feelings on an emotional level, therefore bringing out reactions of violence, sadness, and/or even happiness. These make individuals feel insecure and uneasy in their surroundings. If the change is perceived in a negative way, i.e. as a risk, the reaction then incorporates shock and defensive action such as anger. These perceptions are formulated by the information that the person has, or the lack of it. People also need to be assured that the changes will be beneficial to them, in a manner that they can relate to. Many argue that the lack of relevant information is the main reason for negative reactions from individuals, and these negative reaction eventually leads to fear of the unknown.

The second group of individuals usually agree to the change, but withhold information and do not partake in the change process. They instead try to show that the old ways are better due to the difficulty of the situation when trying to implement the change.

If, however, the change is perceived as justified, then it is accepted effortlessly, and this can be brought about by the person's perception of the organisation. From this it can be seen that the reactions differ with different people, depending on their perception of the change and the environment that they perceive as comfortable. If they are unhappy about what they assume to be harmful to their wellbeing and happiness, they will resist the change (Aliyu, et al., 2014).

It was Charles Darwin that stated, "It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change". It can then be argued that successful management of change is critical for any organisation to succeed and survive in the evolving global competitive environment (Bengat, et al., 2015).

3.3.2. Factors Impacting on Resistance to Change

From the journals articles of Kotter and Cohen (2002), Boohen and Williams (2012) and Meshkani (2013), among others, it is noted that there are multiple factors that directly impact the resistance to change. On closer inspection, however, there are four attributes that are common amongst all the change management gurus, and these are; fear, job security, trust and an individual's acceptance of change. It is important to understand these factors in order to understand the reasoning and perceived aspects that affect a person's ideology towards each characteristic. Schlesinger and Kotter (1979) explain that in a fast paced environment, it is difficult to keep a status-quo. They outline the different factors associated with the resistance to change, that align with the factors outlined in this study. The following figure gives an overview of the factors outlined.

Figure 3.12 shows the factors overlapping, and the central part of all the circles would be the point of most resistance. It can be understood that the resistance to change that individuals face is not a singular effect, but rather a multi-faceted problem. One of the greatest factors that deter the change is a person's self-interest, in other words their ability to accept change, be it good or bad. Their initial is for themselves and the consequences that they may face. This is followed by the issue of misunderstanding, which usually occurs when there is a lack of communication. Employees receive

incomplete or complicated information, to which they formulate a reaction. Employees have a low tolerance to misunderstanding new situations that arise in the working environment, which has a direct repercussion on their security at work, and they feel a lack of job security. Lastly, there are employees who enjoy the status-quo and would like things to stay the same way.

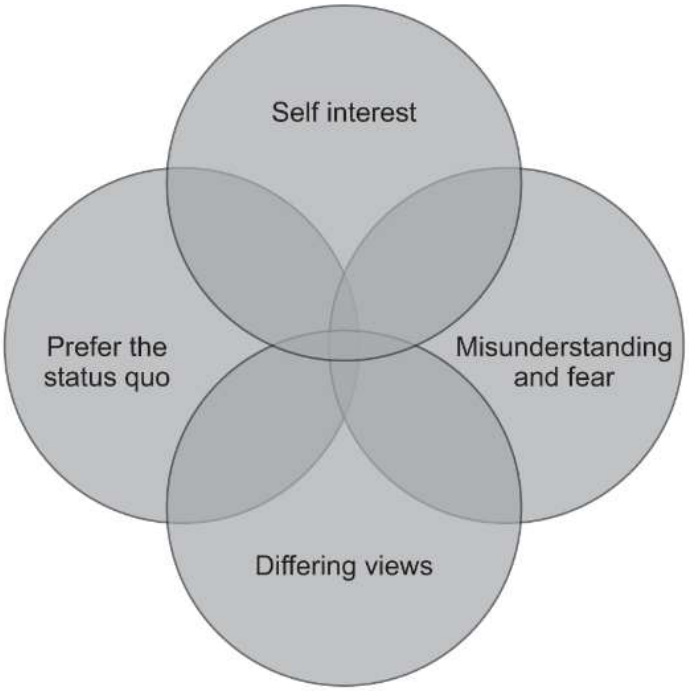

Figure 3.12 Factors Affecting Resistance
Adapted from Schlesinger, L. & Kotter, J., 1979. Choosing Strategies for Change. *Harvard Business Review 57, no. 2 ,* 57(2).

3.3.2.1. Individual's Acceptance of Change

When individuals are faced with changes, it implies that they need to change their habits and routines. This affects their self-interest (Figure 3.12). They need to learn and apply the new systems that are put into place. Unfortunately, some individuals are unable to do so due to personal characteristics and beliefs. These characteristics include a passion to ensure that they are always in control, intolerance and reluctance to try new endeavours. These are rooted in the personality of the individuals and stem from a need for structure. A person's characteristics have been deemed the biggest decider of their ability to accept change by Combe (2014).

It has been claimed that individuals with multiple skills can adapt to change much quicker, while those with a limited skillset are unable to adjust and cope with new tasks and roles. Many employees do not like to own up to the fact that they do not know certain tasks, but like to act as if they do. If there is to be a change, it could mean that their weaknesses will be brought to light. It also means that new skills have to be learnt and old habits unlearnt. Many try to keep the status-quo in order to alleviate the pressure of learning a new system or skill. Coch and French (1948) found that on average, a person takes a minimum of 8 weeks to learn new processes. Figure 3.16 illustrates the learning capacity of new learners and the successful transfer of knowledge to old employees. Coch and French (1948) found during their study that only 38 per cent of the workers managed to change their work habits and learn the new processes in order to move forward with the organisation. The other 62 per cent of the employees either became substandard workers of resigned during the training process.

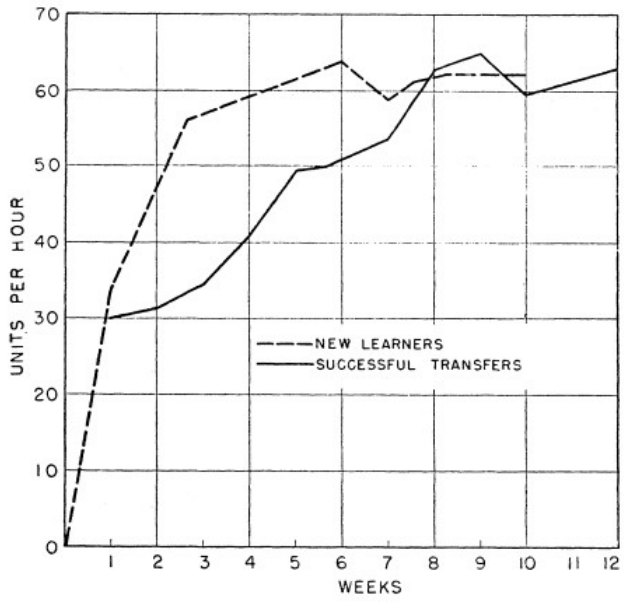

Figure 3.13 Learning curve of new information
Coch, L. & French, J., 1948. Overcoming resistance to change. *Human Relations,* Volume 1, p. 512–532.

Although this study took place in 1948, Burnes (2015), built upon these findings and found results in line with those of Coch and French (1948).

People have a need to ensure that if they do change, they will get rewarded for it immediately. This, however, is not possible but employees can be aided in the

transition by affording them short term and long term benefits in order to coerce them to change. Employees will resist change without the proper motivation, assert Nordin (2014).

3.3.2.2. Fear

Fear is an evolutionary trait that allows an organism to prepare for a dangerous event (Fear and Misunderstanding – Figure 3.12). This is an emotional response in which people respond differently to different stimuli. The greatest challenge to any individual is to anticipate the future, an abyss with unknown consequences. It is human nature to assume that there will be impending doom with catastrophic results. People need to know what the implications of the new change will be, and this has to do with Maslow's hierarchy of needs. When changes are made, productivity can drop significantly, causing it to be a risky process (Kotter, 1995). In the technology realm this is phrased as 'Technophobia', where individuals fear what can happen with the inception of new technology.

This, however, also brings about the fear of what has happened in the past, due to the individual's negative evaluation from past changes and the degree to which they see change as a threat to their interests. It could be that because of the past experiences, employees believe that any movement forward will also be bad (Jaramillo, et al., 2012). They have a fear of previous consequences of change, and this fear is magnified when they connect with others who have the same fears.

Muo (2014) speaks about the effect of 'groupthink' on individuals, which can lead to negative consequences. This means that all individuals become coerced by the majority opinion (Janis, 1972; Muo, 2006). Individuals are unable to make decisions for themselves, and rather take the opinions of others in resisting change. Alternatively, if the majority are for the change, this would be the best way in which to aid the change process.

3.3.2.3. Job Security

There needs to be positive relationship between the working environment and the resources used to complete specific tasks (Prefer the Status Quo – Figure 3.12). The employees need to feel safe and happy at their job in order to be productive, attest Bakker and Demerouti (2008). The premise that this is built upon is the role that intrinsic motivation with regards to growth, development and learning. Intrinsic

motivation plays a part in fulfilling the basic human need for autonomy, competence and relatedness (Ryan & Frederick, 1997). Intrinsic motivation is the driving force behind an individual to adapt or adopt change or new behaviours for their own satisfaction (Ryan & Frederick, 1997).

Ryan and Deci (2000) identified two needs that motivate, namely, intrinsic and extrinsic, similar to those of Maslow (1943). Extrinsic motivational factors are factors that affect the individual from the outside. These factors include success, interest, level of concern and feedback (Ryan & Deci, 2000). Extrinsic motivation plays a role in enabling an employee to dedicate their efforts to accomplishing a task with efficiency and effectives (Meijman & Mulder, 1988).

For an employee to be intrinsically and extrinsically motivated, May, Gilson and Harter (2004) argue that there are three psychological conditions that need to be met, namely safety, availability and meaningfulness. In order to feel safe, an individual requires the support of others and to be in a productive environment. This in turn harbours creativity and productivity, according to Oldham and Cummings (1996). By introducing automation into plants, certain employees feel disassociated from the environment and they no longer feel like they have a part in the 'team' this in turn lowers their feeling of safety (Holtzblatt, et al., 2013).

With respect to meaningfulness, this is the value that the individual believes they bring to the company. It is the fulfilment they need to validate that the tasks accomplished are a valuable contribution to the organisation (Van Zyl, et al., 2010). This will eventually facilitate personal growth and motivate the employee to be a better worker. There are several factors that aid with personal growth, according to May (2003). These are, judged in relation to an individual's own ideals, the value of a work goal or purpose, and the characteristics of the individual's job (May, 2003). With the introduction of automation, many feel that their labour skills are being diminished, and no longer have the same passion that once was there, even though this could be a chance to upgrade themselves by utilising the technology to their own benefit. It has been argued numerous times that although the new technology has the potential to make people lazy, it also opens up the opportunity for employees to concentrate of uplifting their social standing at work.

In order for an individual to fully recognise this opportunity, they need to be psychologically available. This means that they need to have the cognitive resources to truly engage themselves in their undertakings, explained Stander and Rothmann (2010). Saks (2006) believes that people have the ability to positively engage in their jobs and their lives, regardless of the situation.

A major factor that arises here is the fact that automation and technology could cause job losses. Individuals resist automation and technology on the basis that they are afraid for their job security. This is a valid point and cannot be disputed, however many argue that the technological improvements will validate the losses at that time, and that they will balance each other out in the long run (West, 2015).

3.3.2.4. Trust

The perception that employees need to have is that of a trust relationship with Management (Differing Views – Figure 3.12). It is difficult to create a long term employment relationship in this day and age. When trust is low in a company, any sort of change may be seen in a negative light, hence forcing the employee to start resisting it (Saruhan, 2013). Many studies have found that Management plays a role in encouraging trust within an establishment, however, not much has been done to enhance the trust within companies even with the Management on board. In addition, there have also not been any laws put in place to facilitate the factors around the perception of each party (Bosire, 2012).

There exists a gap between what employees expect and what employers perceive as the right way to accomplish change. The organisation justifies its actions by the efforts that they perceive they make to facilitate the changes; however, the employees feel that the changes are unjust and forced upon them, rather than explained to them (Chew, et al., 2006). When an organisation is perceived as highly supportive, change management is an easy task, however, if the organisation has a low perception of supportiveness, then change is almost impossible without resistance. Therefore peoples' perceptions and reactions need to be continuously monitored to ensure that the organisation can act at an early phase to counteract the negativity (Satardien, 2014). The ability of Supervisors and first line Management to show support is imperative to the semi-skilled and unskilled workers, as they mimic the actions of their

direct superiors. In stating this, the higher Management also need to encourage the changes as behaviour is filtered downward, added Ngima and Kyongo (2013).

All of this can only be achieved through valid communication. The importance of communication cannot be emphasised enough, especially during changes. Studies about communication have validated the belief that there is a positive correlation with correct information passed down to the employees and the trust that they give in return (Conrad, 2014). Proper communication aids in enhancing job satisfaction by easing the employees' fear of the changes to be implemented. Without the correct information, employees start to doubt the organisation, the doubt then turns into resistance, and productivity is lowered. This is magnified when new technology is introduced as one of the changes; without the correct information of what the technology is to be used for, and how the employees fit into the newer system, resistance will build.

Communication needs to be meaningful an educational, informing employees as to the intentions of the company and the strategies that are to be implemented. This is imperative as a positive outlook needs to be given from the start to get employees excited about the implementation of the new technology and changes; and resistance to change needs to be confronted from the beginning. A degree of 'cognitive organisational reorientation' is required when giving meaningful communication (Van Vuuren & Elving, 2008), which means that the changes are fully understood. Although the changes are understood by Management, it seems that very often, the essence of the change and the validity of it is lost when relaying it to the employees. This could be the point where the information gets affected and the employees feel as though they have not been given the full overview of future plans.

From the evidence found by Husain (2013), efficient and proper communication can control resistance to change. He indicates that the key to change management is proper communication. The employees' buy-in for the new implementations are the deciding factor for how successfully the changes are implemented. Employers need to assess the situation and address the crucial factors directly, in order to ensure that the employees are happy and motivated (Husain, 2013).

3.3.1. Elements being Resisted

This research focuses mainly on the resistance to technology and automation in a manufacturing environment. This resistance may be focused at the machinery as it directly infringes on the employees' livelihood, explains Muo (2006). It is important at this time to differentiate between resistance to perceived consequences and resistance to hardware. The latter implies that the individual resists the design and concept, and this is what is commonly known as a 'Luddite', "a person opposed to increased industrialisation or new technology" (Stevenson, 2010: 1052). It could also, however, be neither; the individual could resist the manner in which the machinery was implemented.

It can be stated that the newer technology is resisted when compared to the older technology. This may be due to the unknown consequences that it might bring. Individuals will feel as though their jobs are at risk and feel unsafe with the newer machines' capabilities. This fear dates back centuries, to the blacksmiths that were replaced by machinery to create better quality products (Wayne F. Cascio & Montealegre, 2016). In addition, employees will would also have to learn the operations of the new machines, and utilise newly needed skills that they may not possess.

3.3.2. Education Factor

With advancements in technology, it is undeniable that new skills need to be acquired. This means that the educational facilities and institutes need to cater for the evolving world, for 'knowledge is Power'; knowledge not only aids in finding good jobs and becoming financially secure, it also brings refinement to an individual's culture. Usually the best jobs go the most skilled person with a proper educational background (Gill, 2013). Education aids in empowering a person with information that can be used and applied to everyday life. Humans are born with a natural curiosity and a tendency to question everything. As society evolves and creates a smaller world in terms of communication and technology, this mind set also evolves to a longing to understand everything. The ability to learn broadens an individual's horizons for a better understanding of how society and life operates (Bulut, 2015). The ability to think rationally and understand concepts are vital to enhancing not only the individual, but also the world around them. It can be said that education allows for the reduction of

social and economic disparity, which will inevitably lead to shared equality (Keeton, 2014).

Furthermore, studies have shown that educated people have a longer life expectancy due to their healthier lifestyle (Mitra, 2011). Also, education makes it possible to have a more fulfilling job that embraces change and creativity, thereby boosting job satisfaction. A major factor of education in a developing country is the ability to alleviate poverty and induce change. By stating this, it should also be mentioned that it may not be an overnight change, but rather a gradual movement in a positive direction.

It is also important to acknowledge the belief that education dulls the ability to be a creative individual and forces the ideologies of what is believed to be a civilized society. Steve Jobs, Henry Ford and Richard Branson are but a few that do not possess a degree but are exceptionally successful. This has been a long debated subject, but this can all be summarised by the opening paragraph; humans are inquisitive and ask questions. While some people take the route of obtaining answers from the educational system to grow and be successful, others are resilient enough to question the mere possibility of what can be and pursue the answer for themselves, but not without acknowledging that their ideology and logical thinking was learnt.

Education should not be thought of as just arithmetic and a few languages; but rather as a skill set that is needed for application in life to solve problems. It is a mere stepping stone to a prosperous growth. Unfortunately in certain countries the basic education facilities are not available or are extremely poor, which inexorably leads to poverty and crime. There can be a causal relationship drawn between poverty and crime. Usually in poverty stricken areas and countries, the crime level is exceptionally high. The people from these areas are not able to get a good education and are therefore unable to get a good job, thereafter they make the decision to turn to under-handed methods of obtaining financial gains (Ngutu, 2014).

It seems as though people would rather take the easy way out, than work hard for what is needed. This short sightedness in people seems to be the downfall in many situations, especially when there are alternatives available to aid in these choices. There are a number of unskilled and semi-skilled jobs available for people to obtain, however these jobs are also hampering the growth of the country, because people

grasp opportunities to fulfil their basic needs of shelter and food, rather than the long term initiative of prospering and being successful (Hollensbe, et al., 2014).

The need for these jobs is enormous due to the literacy rate in developing countries (Mateus, et al., 2014), but the number of these jobs should not be growing, but rather evolving into posts for more skilled workers to force future prospective employees to study for these new positions. People are losing the basic need to question situations, and have become used to what they believe to be the norm. This could be due to a lack of education and rational thinking. This can be attributed to a understanding that one does not have to have an education to have a job. This is a poor message that has been communicated and cause people to get stuck in positions for years without being promoted or acknowledged due to their educational background. Communication needs to be positive and clear for people to understand the true repercussions of not having an education.

Not all of the individuals who take these unskilled or semi-skilled jobs do so because of laziness or lack of drive to better themselves. Some of the individuals are unable to get a proper education due to a lack of facilities. In South Africa, approximately 80 per cent of public schools do not have the basic necessities like electricity, correct laboratory facilities, text books and proper libraries, to mention a few (Equal Education, 2013). These are contributing factors that forces people into jobs that do not require any degrees. In instances such as these, the lack of education is no fault of the individual.

The level of education also plays an important role in the upliftment of people and society. In this technological age, these factors play a massive role, and it is sad that a growing nation like South Africa ranked last out of 140 countries in the 2015 World Economic Forum Mathematics and Science Education Survey (Mhlanga, 2015).

These statistics would be forced to change by the introduction of new technology and by lowering the need for more unskilled and semi-skilled jobs. By increasing the need for skilled workers, the education sector would have to adhere to the needs of the business sector, rather than vice versa. The implementation of technology to automate menial and routine jobs would displace the non-skilled person, but allow for more skilled personal to be employed at a more senior position (Keene & Handrich, 201). This does not imply that employees will instantly be dismissed, rather they will be given

the opportunity to study and learn to fulfil the responsibilities needed of them. It can be clearly seen that education plays a huge part in the upliftment of people and the country, but the change would be gradual. The paradigm shift to accept technology and automation will shape the future, giving people more meaningful jobs, and therein more meaningful lifestyles. This will also aid in decreasing poverty by forcing education. This will be possible because the need for educated employees will force the upgrading of educational facilities. This all hinges on the need for technologically educated personnel, and the reduction of job opportunities for unskilled and semi-skilled personnel.

Higher education is considered as any qualification obtained from a tertiary institute, such as a degree or diploma. It is understood that an individual with a higher educational level will be able to adapt to change easily, and will therefore not contribute to the resistance to change (Caruth & Caruth, 2013).

A study by Al-Abrrow and Abrishamkar (2013) produced results that indicate that a significant and positive relationship exists between the employees' educational level and their readiness to change. The ability to study and acquire knowledge at a higher educational level, enables an individual to improve their time management, personal management, problem-solving and communication skills. This will aid the ability of the individual to accept changes more openly when required. Gaylor (2001) believes that with a higher level of education, employees will be able to gauge the possibilities of the changes and technological advancements. It will also be easier for them to learn the new changes and adapt to new behaviour due to their greater level of knowledge and understanding adds Gaylor (2001). It can also be argued that since the individual is able to think for themselves at a higher level, they will be able to weigh up options and look at will would best benefit them, thereby bringing in the factors of trust and self-benefit.

3.3.3. The Age Factor

Darwish (2000) states that the higher the employees' commitment to the organisation, the lower their resistance to change is. Older workers are considered to be in the age group of 40 years and older. According to Walker (1999), the older age group has a higher commitment factor than the younger group, hence implying that the older group would be more susceptible to change (Walker, 1999). It is assumed that a worker with

more commitment to their work will put in additional effort to ensure that they conform and merge with the company's vision (Iverson, 1996). This however hinges on the fact that the older employees have had positive experiences with the organisation in the past, adds Steiner (1979), implying that they trust the organisation. This enables the acceptance of change. Conversely, Maaja (2004) contradicts this hypothesis, stating that older members do not support the organisation as well as the younger group. This stems from the belief that older employees will find it difficult to adapt to the changes that occur in the modern era (Maaja, 2004). Kunze (2013) is also under the impression that the older employees are not so susceptible to change. The belief that he disproved was the conviction that with age, people are more in control of their emotions and do not react irrationally to change (Florian Kunze, et al., 2013; Beadle, et al., 2014).

The study by Kunze (2013) also found that long term workers have tenure and status, which are contributing factors to resistance to change. In addition to the resistance, older workers seem to have a higher number of absenteeism leave days and sick days that are taken as a result of ill health. This is in line with the study of Lau and Woodman (1995), which examined the acceptance of change when participants had high commitment; the change was self-beneficial. If the change caused any perceived threat, they would resist it. From these studies it was found that age should not be used as a deciding factor, as commitment to the organisation will still be built upon trust and perceived benefits (Iverson & Roy, 1994; Wanberg & Banas, 2000). With the understanding that trust, and perceived benefits being the highest contributing factors to this group, one can assume that correct communication would play an imperative role to understand the employees needs and create a mutual understand of the future endeavors.

3.3.4. Distinguishing Resistance to Change Amongst Genders

There have not been many studies done to differentiate the acceptance to change amongst genders, however, it has been proven that men and women think and react differently to scenarios (Parcheta, et al., 2013). With the new perspective of female empowerment, it can be argued that females have a higher empathy factor than males in Management roles, thereby allowing them the ability to rationalise scenarios to assess the best course of action (Paustian-Underdahl, et al., 2014). It can also, however, be argued that due to this emotional hierarchy, women could be more resistant to change, over analysing situations (Bowles, et al., 2007). An opposing view

by Guerrero and Floyd (2006) is that women are also able to encode and decode emotions, which gives them the added benefit of expressing their internal emotional state, rather than acting upon it. By doing so, there are no mixed signals, but rather a clear communication path which aids in the acceptance to change, state Burgoon and Bacue (2003). Maddock (1999: 164) complimented this by stating that "Women focus on the relational aspect of how to do things, while men tend to be expected to think what to do". These arguments are based solely on the emotional aspect, which can be viewed as an inaccurate way to look at the issue, due to the fact that women are growing in industry and Management. This then begs the question of how a person behaves in a room of their peers. It would be at this point that ‘groupthink’ becomes prominent. Due to the lack of studies in this sector, not many examples have been examined (Larcker & Tayan, 2013). It is important to note that groupthink sometimes provides a negative understanding of a situation, and this can therefore be understood as harmful communication. Without a clear message from the employer, biased communications from unhappy or uninformed employees could flood the organisation, thereby increasing the resistance to change.

3.3.5. Overcoming Resistance

To overcome resistance it is important to understand the concept that resistance is not a single force, rather there are multiple forces. Lewin (1951) best explains the situation in his Force Field Analysis. He explains that there are two opposing forces that occur when change happens. These have a dynamic relationship and enable each other. He depicted them in the following diagram.

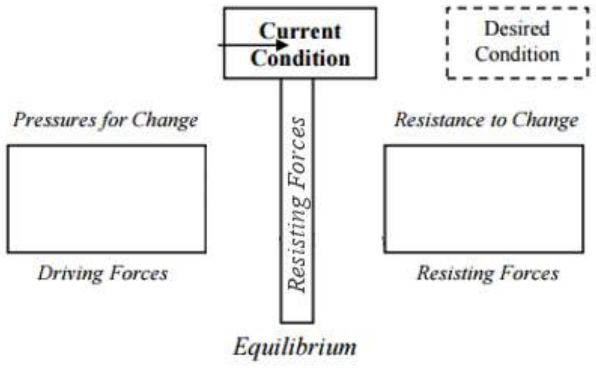

Figure 3.14 Lewins Force field Model
Lewin, K., 1951. *Field theory in social science; selected theoretical papers].* New York: Harper and Row.

In this theory, Lewin (1951) explains that the current condition will always have driving forces to change, however the effort to remain in a desired condition will always oppose the change, causing stress upon the equilibrium. These forces can occur as external or internal factors in an organisation. Managers and higher level executives need to have an active role in the change initiative. Having superiors embrace the change allows the employees to see the positivity that may transpire. The equilibrium needs to be maintained in order to keep a productive working environment. The forces of change and resistance need to be assessed correctly in order move to the desired condition where the company needs to be, and for the employees to feel safe.

Lewin (1951) explains that leaders can accomplish this in three ways; increase the driving force, reduce the forces of change or consider new driving forces. In a normal environment it seems that when the changing forces are increased, the forcefulness of the resistance also increases, thereby causing conflict. Either factor needs to be reduced in order to establish a stable equilibrium, however, by driving change, organisations are inadvertently forcing employees into conforming to conditions that may not be cohesive to them. Thus, a healthier option is to attempt to decrease the resistance, and in doing so, change can be implemented in a civil, productive manner.

Lewin's theory was further built upon, to show the enablers and the inhibitors of change (Beal, et al., 2005). The figure below illustrates these drivers which endeavour to portray that optimism can lead to a positive change management process. It shows that employers need to assist the employees to build up a resilience to change, and try to negate the 'what's in it for me' mentality with teamwork and communication.

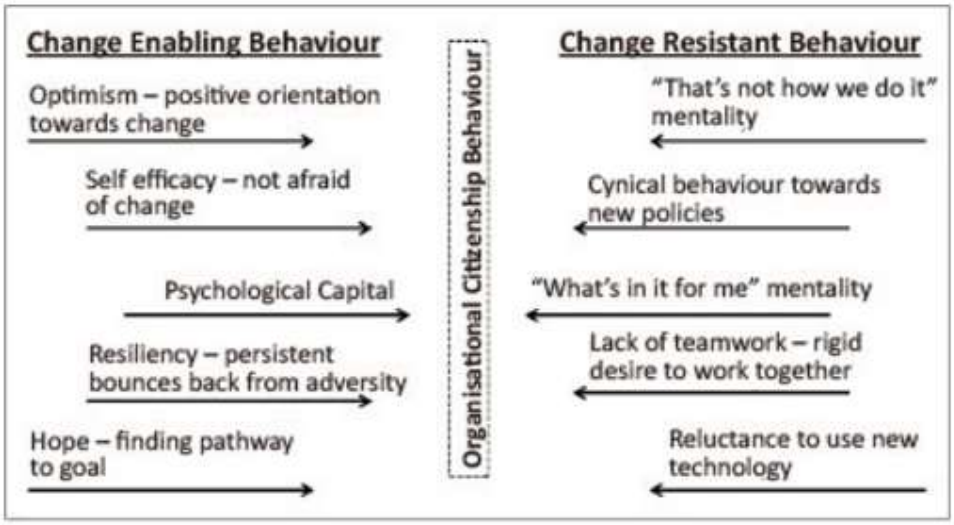

Figure 3.15 Expanded view if Lewin's Theory
Beal, L., Stavros, J. & Cole, M., 2005. Effect of psychological capital and resistance to change on organisational citizenship behaviour. *SA Journal of Industrial Psychology,* 39(2), p. 2013.

When investigating best practices to overcome resistance, all the great models and change principles are built on six fundamental principles that were conceptualised by Kotter and Schlesinger (1979). These are explained below:

1. **Education and Communication**

Employees need to be made aware in advance of changes that will be taking place so that they have enough time to understand the need and consequences. As explained earlier in the chapter, communication plays a vital role in the understanding of objectives. By doing so, employees are able to get accurate information, it negates the possibility of harmful "gossip" and assumptions taking place amongst the employees. Communication needs to be a continual activity so that the employees understand every activity and do not feel as if they are being forced into changing, but rather are moving towards a common goal together with the organisation. Change involves not only the organisation adapting and evolving, but also the employees changing their behaviour, and constant communication allows for this transformation to happen in stages (Bernerth, et al., 2011). Mazzei and Ravazzani (2011) add that Managers who communicate the changes to their employees can often decrease the amount of resistance experienced. With a good understanding of the changes, the employees are able to overcome differences by openly discussing their concerns and aligning their thinking with that of the organisation. If, however, the Managers'

communication contradicts their actions, it will cause the employees to lose trust in them, increase resistance to the changes and possibly result in conflict.

It was argued that educated employees can handle change with less resistance than their uneducated counterparts. However, it does also mean that they require additional information to understand why a change may or may not occur. It is fundamental to the longevity of change that correct understanding is achieved by correct communication for a cohesive understanding.

Assuming that the communication is correct and accurate, training will also aid in supporting the change. It will enhance the employees' skill level and give them a sense of pride. By ensuring that they are well trained and are taken through all the changes, employees know that they are not alone in the situation and that the organisation, along with their Management are trying to aid them in the transition (Berna-Martinez & Macia-Perez, 2012).

2. Participation and Involvement

By getting employees involved with changes from the onset, it shows them that they are a crucial part of the organisation and that their input is valuable. By increasing their role in the change process, it will motivate them to be more productive and excited about the change. In addition, Boohene and Williams (2012) state that it will aid the employees in gaining more trust in the organisation. This will inevitably reduce the resistance to the change as the employees feel part of the process. By involving the employees, it also assists in enforcing the reality of the change, as well as allowing the managers to obtain a better insight into the employees' perspective whist gaining more information that can assist with the changeover (Line, 2004). This allows for a two-way communication between the employer and employee to understand the hardships and struggle points. It would make it easier to rectify issues from the outset, rather than trying to formulate a "workaround" at a later stage. Not all employees have the same passion for getting involved but they can still provide valuable information that can assist with the change processes, add Courpasson et al. (2012). It has been proven that employees who get more involved with the change usually support the change and will not resist it (Jimmieson, et al., 2008; Van Dam, et al., 2008).

3. Facilitation and Support

There will always be employees that have a difficult time adjusting to the new changes and the processes put in place. It is at this point that management needs to step in to assist and support the employees to adjust. It will aid them with their fears of job loss, transformation or the perceived loss of status. Management needs to be able to negate the fear of the unknown by facilitating the change process with the employees at each step (Boohene & Williams, 2012). By doing so, this will further instil trust and a sense of empathy and belonging towards the organisation. Support includes items such as training, counselling and informative communication. This principle is reinforced by the Social Exchange Theory (SET) that Schoomaker and Harvey (2005) used in their study. It aids as a pathway in which the physiological capacity (PsyCap) can positively influence the change process. Social Exchange Theory can be explained as the process in which benefits are exposed in a manner such that they outweigh the costs involved (Cook & Rice, 2003). The SET suggests there are always benefits and costs that must be considered by both sides, and the extent to which each side determines the benefits of the exchange are greater than the exchange's costs is what drives the behavioral exchange (Homans, 1961). The benefits that someone receives from the exchange constitute the reward for their choice and participation in the exchange and serve to reinforce the behavior enacted in the exchange (Homans, 1961). In an organisation it was shown to improve the acceptance of change and new processes introduced, by effective teamwork with managers and employees working together (Podsakoff, et al., 2003). The figure below explains the process of facilitation of the SET.

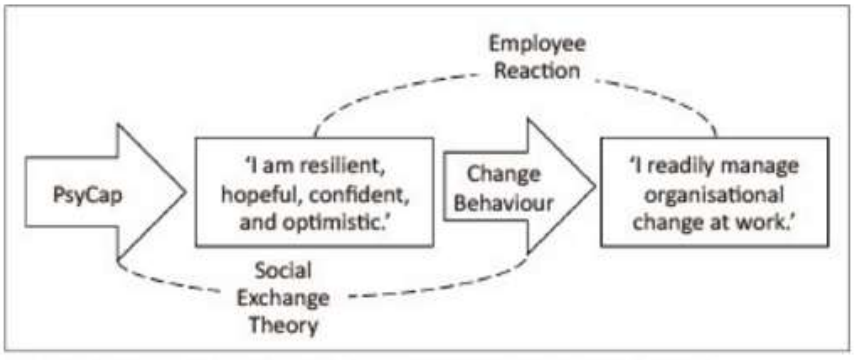

Figure 3.16 Social Exchange Theory
Beal, L., Stavros, J. & Cole, M., 2005. Effect of psychological capital and resistance to change on organisational citizenship behaviour. *SA Journal of Industrial Psychology,* 39(2), p. 2013.

Examining the behavioural traits of the relationship between the PsyCap and that of the organisation, it shows that enhanced interaction by the management with employees can lead to reduced resistance. Social exchange relationships are open-ended and mutually beneficial. The benefits exchanged in such relations are commonly socioemotional in nature. This results in social exchange relations comprising of stronger emotional ties between participants. Workers tend to have more positive work attitudes and engage in more positive behaviors when involved in these relationships. The Broaden and Built Theory shows that enforcing a positive mind-set can broaden an individual's way of thinking, thereby assisting them to see the 'bigger picture' (Fredrickson, 2001). The study by Fredrickson (2001) showed that when this theory is used in conjunction with the SET, employees are more responsive to change and more open to knowledge sharing and assisting each other to reach a common goal.

4. Negotiation

Employees are sometimes unable to see the benefits that a change will bring for themselves in the long run, so they need to be given incentives to coerce them to move on. If this does not work, they can be asked to leave with some compensation or given a promotion to a different area of the organisation (Boohene & Williams, 2012). Usually this is a stressful period for the employee and Management, so tension is rife. It is therefore vital that Management is able to keep calm and communicate the correct information to their employees, in order to come to an amicable decision. Successful negotiations rely on understanding the employees' psychology and interests to enable Management to understand their needs (Peleckis, et al., 2013).

5. Co-optation and Manipulation

An inexpensive method, and not an uncommon practice, is to try co-optation and manipulation. Usually, the most influential employees are found and persuaded to understand the changes and the reasoning for them (Duke, 2011; Anderson, 2011). The organisation has to be extremely selective of who they chose for this, what information is passed over and how the information is conveyed. With open communication, these individuals are kept within the control of the organisation. These individuals, whose leadership and opinions matter to the other employees, then act as the beacon to accept the changes. The organisations strive to keep these individuals

involved in the decision making processes and future planning (Lunenburg, 2010). This method of manipulation is not viewed as ethical and many researchers and leaders disapprove of it, as once this plan is discovered, the organisational credibility will suffer drastic consequences. (Beal, et al., 2005; Lunenburg, 2010).

6. Explicit and Implicit Coercion

As a last resort and when speed is an essential factor, coercion is the last resort. If the organisation has extreme power over decisions and the employees, this method will be common practice (Lunenburg, 2010). It occurs when the advantages of the changes overpower those of the employees, and employees may be threatened with job loss, salary loss, or transfers. Although at times this can be effective, there are many negative effects incurred. Employees begin to feel alienated and enraged, and conflict can ensue. This ultimately leads to an unproductive, inadequate team which has a high staff turnover rate.

3.4. Building the Research Model

3.4.1. The Status-Quo Bias Theory

Samuelson and Zeckhauser (1988) explain that the people will generally support what they believe to be their norm, regardless of whether or not it disadvantages them in the long run. This is known as the Status-Quo Bias Theory, and is divided into three categories:

1) An emotional hold that comes from the misconception of a consistent environment of regret avoidance and cost value. These psychological restraints stem from inaccurate conceptions of sunken costs, the consistency of the person's social standing, the ease of decision making from what has already been known, the avoidance of regret from bad decision making, and ultimately, the feeling of being in control of all that happens around the person (Polites & Karahanna, 2012).

2) Misconceived perceptions of changes and the costs that may go with them. It seems that a person sees loss as a greater factor than gains (Peng, et al., 2013). This phenomenon is labelled 'Loss Aversion'. It was found by Polites and Kankanhalli (2012) that people will use a less efficient system even when there is a better alternative available, due to the perceived value that their current system

gives over the newer, better one. Even when presented with incentives to change over to the newer system, there is resistance. The perceived value of changing to the newer system will be weighed against the current values and the changes that can occur with regards to learning the new system and what they might lose in credibility as the expert in their current capacity, with the current system. They see the perceived value of change as low, which adds to the resistance to change.

3) Rational decision making in the event of uncertainty and cost transition. Uncertainty brings about risk which could arise from changes brought about by new technologies, decisions or changing actions. These bring about different behaviours among different people (Heal & Millnery, 2013; Mittal & Griskevicius, 2014). Samuelson and Zeckhauser (1988) found that the majority of people try and stay in their same space and comfort zone that they feel safe, without trying to evaluate each choice in a rational frame of mind. The transition costs are experienced when changing to the new condition. This incorporates the learning, adapting and no longer being an expert in the person's space.

The above criteria created the theoretical foundation which is useful in providing an explanation for understanding the resistance to new changes in current information systems (Kim & Kankanhalli, 2009). These give an idea of the reason for the resistance to the acceptance of change regarding new systems and technology and therefore allow for a list of inhibitors to accepting a new system. These inhibitors include items such as uncertainty, regret, fear of the unknown, transition costs and perceived values.

3.4.1. Technology Acceptance Model

The Technology Acceptance Model (TAM) was first proposed by Davis (1989) and is still, to date, one of the most influential research models in studies that delve into the expectation of the use, and the adoption of information technology (IT) and information systems by individuals. It was adapted from the Theory of Reasoned Action (TRA), and specifically modified to ascertain the users' acceptance of information systems (Al-Adwan, et al., 2013; Ajzen & Fishbein, 1980). The TAM was introduced three years after the conceptualisation of the TRA (figure below), and used the TRA as a basis to explain the rejection or acceptance of new technology by users.

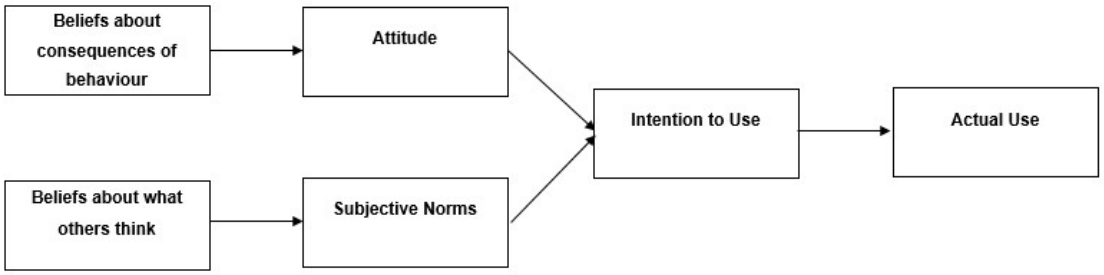

Figure 3.17 Adapted Theory of Reasoned Action
Adapted from Ajzen, I. &. F. M., 1980. *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall.

A relationship was drawn between behaviour and intention, by linking the relationships between attitudes, beliefs, behaviours and intentions (Fishbein, 1967). From this, Davis (1989) deduced that the behavioural intentions drive the subjective norms of an individual's behaviour. It was found that when new technology is introduced, users develop an attitude towards it, whether positive or negative, and this attitude then affects the behaviour of the individual. The TAM examines these behaviours of individuals, be they positive or negative, to gauge their acceptance of the new technology, explain Shroff et al. (2011). Ajzen and Fishbein (1975) describe attitude as an individual's positive or negative feelings (evaluative affect) about performing a target behaviour, and define subjective norm as a person's perception that most people who are important to them think they should or should not perform the behaviour in question. This suggests that the main determinate of a person's behaviour is their intention, and their intention to behave is determined by the person's perception and behaviour towards it.

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Since the conception of this model, many others have used this method in their studies to test the Technology Acceptance Model in the information/technological sphere (Lederer, 2000; Lule, 2012). There are two main constructs that Davis found to have a direct influence on the use of the technology. These constructs are the perceived usefulness and the perceived ease of use (Davis, 1989). By manipulating these determinates, Shroff et al. (2011) believe that greater control can be attained over the users' perceptions about a system, thereby predicting their actual usage of the system. The perceived ease of use (PEU) is determined from the system design and features, while the perceived usefulness (PU) is based on the assumption of the decreasing effort with regards to a certain job or system (Moore, 2012).

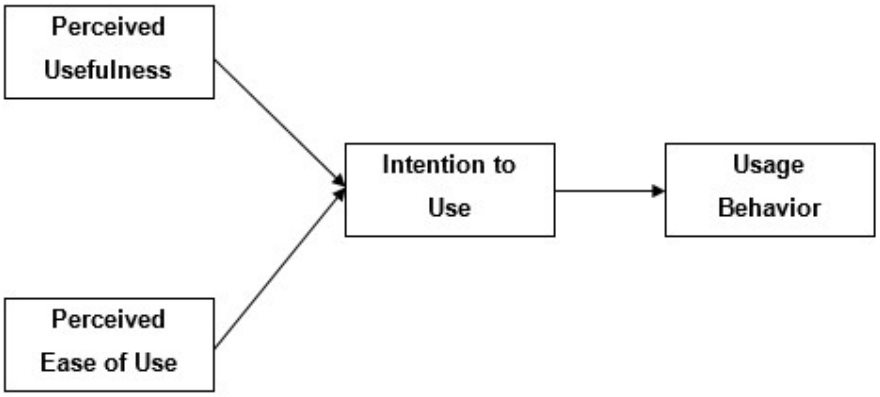

Figure 3.18 Technology Acceptance Model
Adapted from Salleh, M., 2011. *User Study Analysis of Intention to Use IEEE Xplore Digital Library Among the 4th year Students and Lecturers at School Of Microelectronic Engineering in University Malaysia Perlis,* Malaysia Perlis: s.n.

Although perceived ease of use and perceived usefulness were shown as distinct different factors that affected the usage of a system, it was found that perceived ease of use does contribute to having a perception of better performance, therefore contributing to the perceived usefulness (Davis, 1989; Guritno, 2013)

It was Davis in 1989 that proved the relationship between perceived usefulness and the perceived ease of use of prospective technology and/or a system, together with the impact of the users' attitude towards the said technology and/or system. It was also understood that perceived usefulness could influence a person's trust. Usefulness was found to be have the greatest influence on the intention to use a system, and this relationship was shown to be significantly greater than initially anticipated by Davis in 1989 (Cho & Sagynov, 2015). To improve an individual's attitude toward the use of new technology, factors such as familiarity, education and experience are crucial (Lymperopoulos, 2005; Poon, 2008). The individuals' ability to learn can be gauged by their level of education.

The effect that perceived usefulness has on attitude is validated by many studies, according to Chen (2002). The understanding is that the user's perception of the usefulness of the new system is directly related to the attitude they form, based on their belief of the system. It is for this reason that attitude is labelled as the key determinant towards the actual usage of the new system and/or technology. The perceived ease of use by the user is the determining factor for the user's attitude, states Fishbein (1975). Davis (1989) states in his TAM model that the perceived ease of use has a positive impact on using the new system, however, an assumption that the system is too complicated impacts negatively on the user's attitude towards the system (Rogers, 1962). Charles (2015) suggests that users need to have positive interactions with technology so that they can become confident about the perceived ease of use of new technology.

There are many researchers that are under the impression that the TAM is a very simplistic approach to the situation and negates certain important factors such as training, support and design (Bagozzi, 2007). Vrielink (2015: 5) state the understanding obtained from Benbasat and Barki (2007) is the TAM 'has diverted researchers' attention away from other important research issues and has created an illusion of progress in knowledge accumulation. Furthermore, the independent attempts by several researchers to expand the TAM, in order to adapt it to the constantly changing IT environments, has led to a state of theoretical chaos and confusion'. Nevertheless, the TAM is renowned for its highly reliable, predictable and valid model that has become the standard to determine the acceptance of a user (Legris, et al., 2003; Sharma & Chandel, 2013). The model also consists of theoretical

frameworks and an understanding of the acceptance and usage behaviours of users with regard to new technology (Shih, et al., 2011). It is for these reasons that this model has been used in the information and technology sector, and was chosen to be the basis of this study.

3.4.1. The Dual Factor Theorem

Herzberg (2003) developed a dual factor theory which proposes that there are two distinct sets of needs that people encompass with regard to their work, and these needs are grouped as motivational and hygiene factors. Motivational factors are those that ascertain the worker's satisfaction or dissatisfaction with a given job. This is unlike Maslow's theory in that Hertzberg argues that job satisfaction and dissatisfaction can be attributed to distinct causes, which are directly linked to the job itself. The surrounding factors that affect the person's dissatisfaction include salary, interpersonal relations and working conditions. Figure 3.19 illustration portrays the detail that each factor encompasses. It can be seen that the hygiene factors relate to the environment of the job, rather than to the job itself. The items on the left are known as preventatives, meaning that they are present to deter job dissatisfaction, and they are also known as the hygiene factors. It is important to note that these factors play a role in causing dissatisfaction when they are not present, however they do not motivate or cause satisfaction themselves. The factors appearing on the right are known as motivators, which is due to the fact that they are necessary for the improvement of the person's environment. Motivational factors include meaningful workflow, a sense of achievement and an opportunity for growth. The important point to consider is that these are not viewed as polar opposites on a linear spectrum, but rather as separate continua. It is further understood that the opposite of satisfaction is not dissatisfaction, and *vice versa*. Herzberg was under the strong impression that the 'opposite of satisfaction is no satisfaction, and that the opposite of dissatisfaction is no dissatisfaction' (Herzberg, 2003).

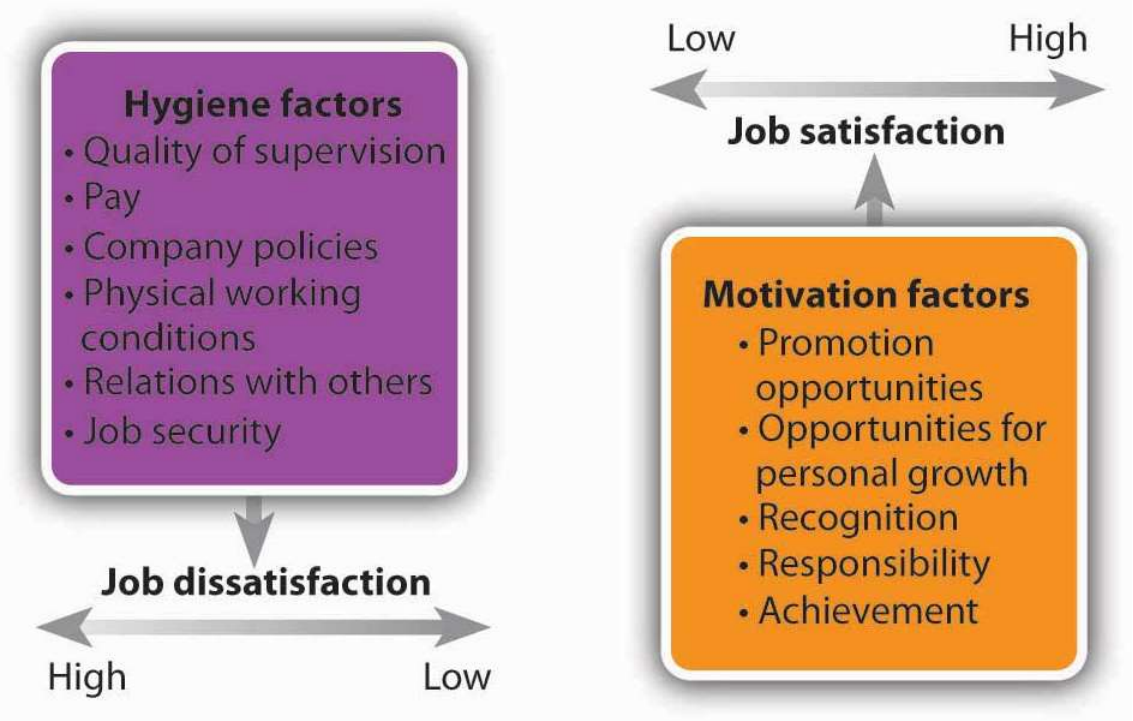

Figure 3.19 Herzberg Hygiene and Motivational Theory

Collins, K., 2012. *An Introduction to Business.* s.l.:s.n.

According to Management Science, motivation can be denoted as the encouragement of the person to achieve their goals or targets. The success of Managers is directly influenced by the skills and knowledge of their workers. By enabling the workers to achieve certain goals within predetermined criteria, it is possible to create a cooperative working environment with purpose and structure. It was from this logic that further researchers such as Schermerhorn (2001:286) was quoted as saying that, 'Frederick Herzberg's two factor theory offers another framework for understanding the motivational implications of work environments'. Robbins and De Cenzo (1998: 364) added, "… an individual's relation to his or her work is a basic one and that his or her attitude towards work can very well determine success or failure, Herzberg investigated the question: *What do people want from their job?*'.

The dual factor theory was also used in a study by Cenfetelli (2004) of information system adoption, to try and enhance the situation of the workers. Cenfetelli (2004) argued that when adopting and implementing information technology, successful adoption and implementation is best predicted by enablers, thereby implying that inhibitors are a cause for rejection. Enablers can be categorised as external beliefs,

such as ease of use and perceived usefulness, and these are thus the foundation of the system to adopt. Confetelli (2004) further explains that inhibitors can be seen as hygiene factors that have the power to deter the favourable usage of the system, however, if they are absent it may not favour the process. This implies an unbalanced relationship between inhibitors and enablers, as they are not the opposite of each other, rather an inhibitor can be seen as a distinct construct that can coexist with enablers. There was no mention of a specific inhibitor in Cenfetelli's (2004) model, however later studies proved that resistance could be used as one of the inhibitors as it idealises the behaviour of an inhibitor. A link was later constructed between the acceptance of information systems and the dual factor theorem by Bhattacherjee and Hikmet (2007). Their study on medical informatics aided in explaining the resistance of users to healthcare information, and it was from this link that many other studies where created.

There can be an association generated from these two ideologies. Mondy, Holmes, and Flippo (1940: 270) stated that 'Herzberg's motivators are most closely related to the esteem and self-actualization needs on Maslow's hierarchy and the hygiene factors closely correspond to the physiological, safety, and social needs'. The hygiene factors of Hertzberg could be related to Maslow's lower level of needs (esteem and self-actualisation), and this will be the area of dissatisfaction. Once these needs are achieved, as Maslow (1943) explained, the longing for self-actualisation and motivators begins to develop. Items such as fringe benefits or salary cannot be ignored as they will cause dissatisfaction and disruptive behaviour, but they are not motivators in the constructive sense; the dissatisfaction can only come about as a result of the job itself.

Herzberg argues that Managers spend too much time on the hygiene factors rather than the motivators. Just because good pay and benefits constitute a good working environment, they by no means insinuate the positive functionality of the individual. In order to effectively utilise individuals to their full capacity in the working environment, their hygiene as well as their motivational needs must be met. It has been noticed that numerous companies concentrate on the hygiene factors, such as pay and benefits, but still maintain a high staff turnover rate. Management and organisation lack motivation in the business sphere and concentrate on the hygiene factors in these instances. According to Flippo, Holmes, and Mondy (1940: 275-276), "it may be easier

to provide employees with improved pay, fringe benefits, or working conditions than a job that is more responsible or challenging".

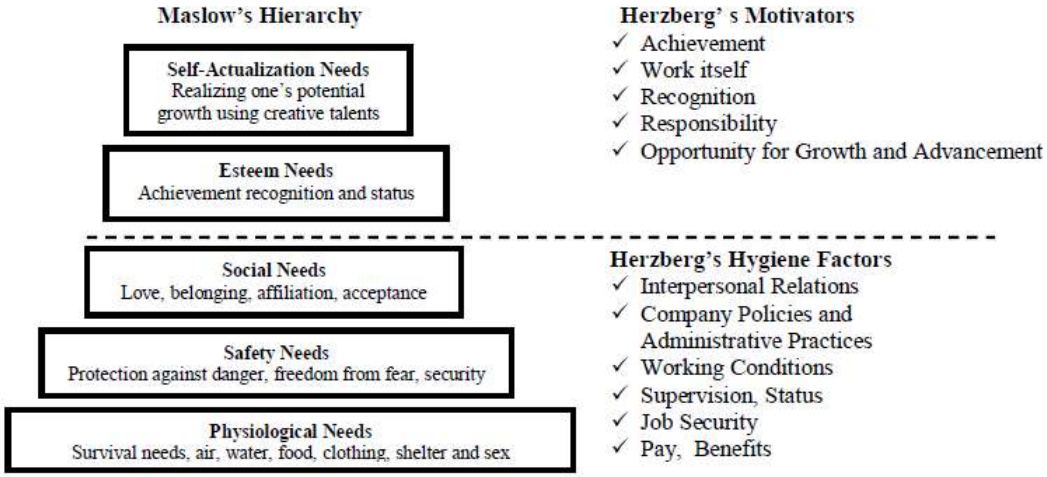

Figure 3.20 Maslow and Herberg Relationship
Ozguner, Z. & Ozguner, M., 2014. A Managerial Point of View on the Relationship between of Maslow's Hierarchy of Needs and Herzberg's Dual Factor Theory. *International Journal of Business and Social Science,* 5(7), pp. 207-215.

Incorporating Maslow's theory into the equation, can be understood that individuals have needs, and that these needs have to be met at specific times in their growth path in order to keep them motivated. As mentioned earlier, Herzberg's hygiene factor corresponds with Maslow's lower needs, and Maslow's upper needs correspond to Herzberg's motivators.

It is also argued by many that Herzberg and Maslow over-simplified the motivational process, as neither found conjunctions between organisational objectives and personal achievements. Along with this is the fact that every individual is different and therefore motivated differently. Taking this into consideration, Hodgetts (1986: 478) claims that, "Maslow's concept is useful for indicating that individuals have needs. However, in order to motivate workers, the manager must know which needs require satisfaction at which times". The reasoning is that although every individual is different, the ideology behind the theories is that it did not matter who the person is, each of them seeks out admiration and fulfilment. They need motivation and rewards of a different nature, depending on which level they are at.

Along with these similarities, there are also come distinctions between Maslow's Hierarchy of Needs and Herzberg's Theory of Motivation. Maslow's theory concentrates on the fact that people have needs, while Herzberg concentrates on the motivational and hygiene factor for achieving these needs. Herzberg's theory gives a philosophical view while Maslow's theory is descriptive in nature. These are but a few subtle differences (Maslow, 1943). As a result, they allow for the understanding of the holistic factors for motivation by Management.

With the improvement of an employee's development in their organisation, they then seek social accreditation and acceptance to satisfy their needs. Research into the drivers of motivation of workers found that the biggest contributor is that of the organisation's objectives. It is the understanding of where the organisation expects to be and how they as workers can contribute and be relied upon to achieve it. It is important that they are kept informed and that clear communication is established with each individual that is aligned with the company goals and actions.

3.4.2. Maslow's Hierarchy of Needs

With all the changes and adaptations of the global world, humans remain social creatures in that they have social and psychological needs, and these are shown in the way they interact and behave. They have needs, the fulfilment of which encourage happiness and motivates them to better themselves. Maslow analytically categorised these needs as; psychological, security, belonging to a group, the need for creativity and love (Maslow, 1943). By transposing these ideologies to the working sphere, a roadmap to relate the concepts with actions to motivate the employees can be created. This roadmap will enable the identification of needs (or rewards) that will encourage workers to be more efficient and effective, if met; while also recognising other factors that can lead to dissatisfaction and reduced productivity. These rewards include intrinsic and extrinsic rewards. From Figure 3.21 below, it can be noticed that the lower order encompasses extrinsic rewards, while the higher end talks to the intrinsic rewards required. Maslow (1943) believed that humans are always trying to satisfy certain unsatisfied needs. By utilising this fact, Managers are able to motivate employees to be more productive and enable them to enhance their current position.

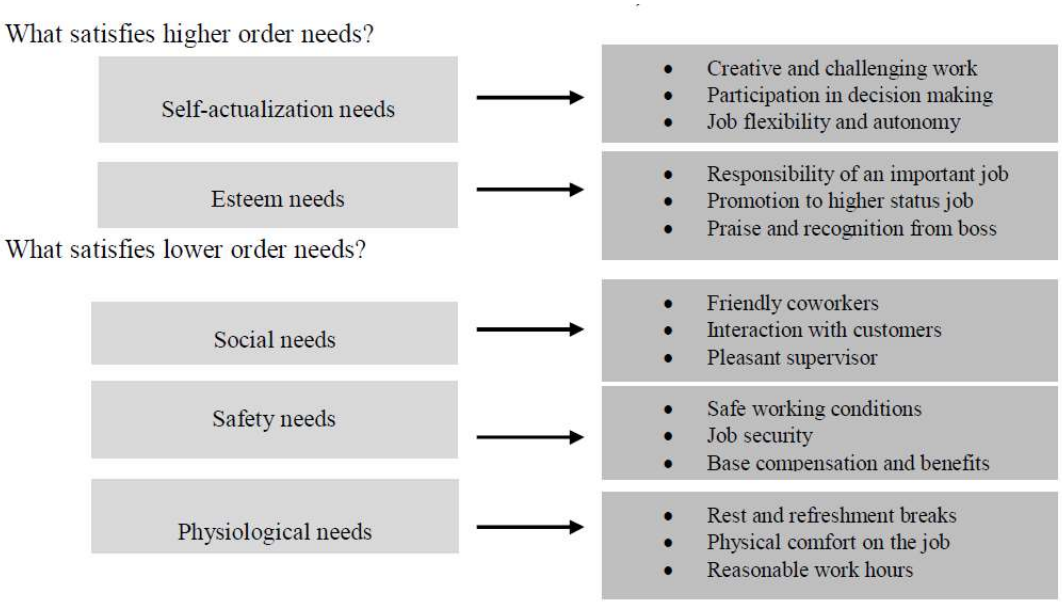

Figure 3.21 Opportunities for Satisfaction in Maslow's Hierarchy of Human Needs

Ozguner, Z. & Ozguner, M., 2014. A Managerial Point of View on the Relationship between of Maslow's Hierarchy of Needs and Herzberg's Dual Factor Theory. *International Journal of Business and Social Science,* 5(7), pp. 207-215.

Self-actualisation cannot be achieved without first attaining the fundamental physiological needs. These are items that the organisation has to provide in order to attract the employee, such as good working environments and basic salaries. Once this has become apparent to the worker, their needs adjust to the next level, which is that of safety. This is a vital motivator as it plays upon one of the oldest human traits, the will to survive and be free of fear. This relates to job security, insurance policies, safety and health. It is important to note that this fear is carried throughout Maslow's theory (Maslow, 1943), as this is not just an extrinsic factor, but rather and intrinsic one too. Seeing that humans are social creatures, it is only fitting that they feel a part of a group or a purposeful member of a team. In the working area, workers seek a group of friendly co-workers or management that they can relate to. It is difficult for an individual to perform at their peak if they do not feel comfortable in their environment. Seeing as that every person's perception of what their needs are differs in each category, however, in addition to the perception that they do not know exactly what they need, it makes it difficult for managers to create targets or put together a team that can achieve a pre-defined target effectively.

Once the above mentioned needs are met, individuals thereafter long to feel respected and seen as important in the eyes of others. These needs include items such as job titles and praises. Thereafter, the need for self-actualisation becomes apparent. This the individual's need to realise their potential and capacities in achieving certain goals and targets. An individual pursues challenging work tasks in order to satisfy their needs for creativity. This is the point at which the individual tries to "think out of the box" in order to solve problems and create new goals (Ozguner & Ozguner, 2014).

3.4.3. The Research Model

The Dual Factor Model of Information Systems brought the theoretical literature of the TAM and SQB together, in order to formulate the relevant concepts of inhibitors that impede the acceptance of a new system and the enablers that enhance the acceptance (Hsieh, et al., 2015). These opposing factors can be quantified. An enabler can be quantified as the perceived ease of use and the perceived usefulness of a system (Davis, 1989). The inhibitor will fall under the items of the Status Quo Bias, which is the resistance to change. The inhibitors are grouped into four broad categories, which make up the fundamental basis of resistance (Schlesinger & Kotter, 1979).

Automation in the industrial environment serves as the basis for better improvement and functionality. It also has the potential to create new jobs in sectors that did not exist. This implies that significant changes will be experienced. If such significant changes occur, given the human tendency to oppose change, many workers may resist the implementation of the sorts of changes which affect them directly. There are very few studies that examined the relationship between the acceptance of technology and that of resistance to the new technology. It is for this reason that the researcher chose to adapt a model to incorporate these two factors. As can be seen from the following figure, there are various theoretical relationships that exist between these factors.

Usually when new technology is implemented in the work environment, it directly affects the standard operations of a worker. If the changes are mandatory, workers are usually forced into using the technology as they do not have a choice, even if they revisited it at first. Another factor that can affect the users would be prior bad experiences, and prior studies support the theories of resistance.

The proposed model attempts to analyse the relationship between the intention to use technology and the resistive forces that may be felt. To find the acceptance of use, the TAM will be used as it looks at the relationship between the perceived ease of use and the perceived usefulness of the technology (Davis, 1989). From this model, the hypotheses were developed to investigated the relationships between the perceived ease of use, perceived usefulness and intention to use

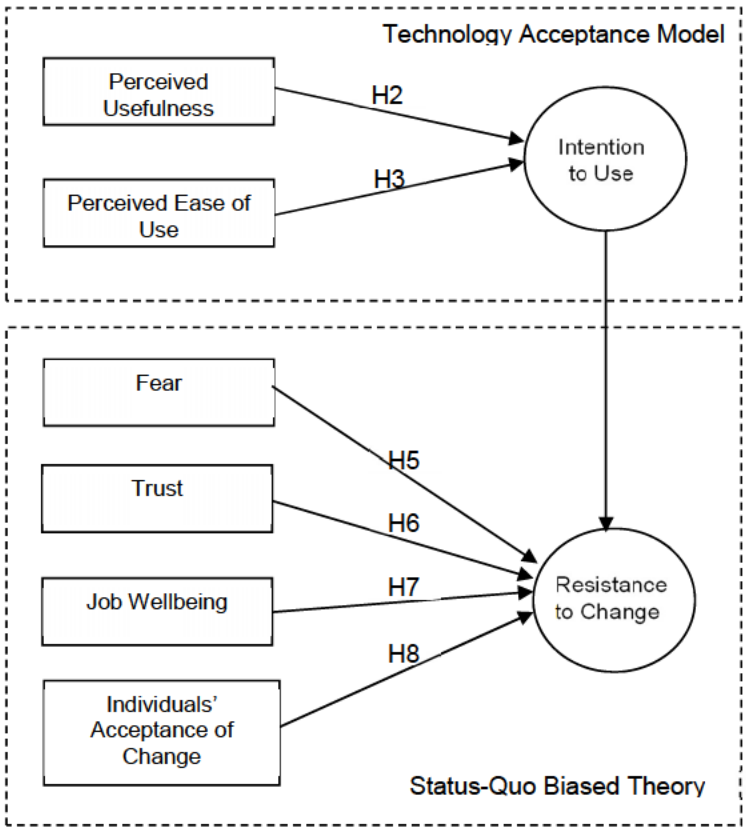

Figure 3.22 Relationship between TAM and Status Quo
Adapted from Hsieh, P., Lai, H. & Hong, Y., 2015. *Explaining Physicians' Acceptance and Resistance to the NHI Pharmacloud: A Theoretical Model and Empirical Test,* s.l.: PACIS

The SQB examines the resistive factors that the workers experience to identify the major factors that affect their decision not to consent to the new initiatives (Kim & Kankanhalli, 2009). The greater the intensity of these factors, the longer they will be retained (Samuelson & Zeckhauser, 1988). Increased fear, lack of trust, and poor sense of job wellbeing have a negative effect on the acceptance of change. The individuals' willingness to change also has a major role in the acceptance of change. If the individual cannot accept deviation from their norm, their resistance will increase,

thereby decreasing their acceptance of change. The hypotheses developed here investigated the relationship between fear, trust, job wellbeing, an individual's acceptance to change and Resistance. The diagram highlights some of the hypotheses (H) used in the research.

3.5. Conclusion

Automation in manufacturing is the key to organisations becoming more productive, with superior quality goods. Technology will further assist in third world countries where skill shortages are rife. The transition of automation and technology through the years has solidified a trend of continual improvement and change. Since the start of the industrial revolution, many people, including economists and organisations, have been afraid of the repercussions that the technological age has brought. Their main concerns where those of job losses and unemployment, but they were unable to see the new job opportunities that were created and the increased income that could be earned by skilled personnel. By enabling the unskilled population to earn a high income, it negates the drive to study further and pursue a high level career. It also damages the country's role in the global sphere.

All people have needs and motivational factors that drive their decisions. Maslow (1943) put these in a hierarchy that explains the processes that people go through before they feel comfortable enough to relax. Many people get comfortable at a certain stage or level and refuse to put themselves in a situation that they are unsure of. This, in turn, halts the process whereby they can improve themselves and their surroundings. Apart from fearing the unknown, they want to keep their knowledge to ensure that their jobs are safe, and when this dynamic shifts it scares them into the possibility that their job might be lost.

It is vital that the root cause of the resistance to new technology is found, so that it can be dealt with specifically. It has been proven that people will accept change if they deem it useful and helpful; however, if it is perceived to have a negative impact on them, they will resist it, regardless of whether their concerns are valid or not.

People can change their minds as to what they perceive as beneficial towards their wellbeing and it is this factor that needs looking at when trying to persuade them into accepting technological advancements, as these advancements are the way of the

future. The cost of labour is exorbitant when compared to output. To ensure that companies remain productive, people need to understand the consequences of the changes and the benefits that the changes bring about.

CHAPTER FOUR

Research Methodology

4.1. Introduction

This chapter will provide the methodology used in the current study. The nature of the research will be discussed to understand how the analysis was done. Research is described by Sekaren (2013) as an objective, critical, systematic, data-based investigation or scientific inquiry to find a solution to a specific problem or conduct an investigation into a specific problem. Basically, it provides the necessary information needed to make a proper informed decision. The data collected can be qualitative, quantitative, or both. The choice of the data collection method is dependent on the research done and the information needed. This chapter outlines and explains how these methods were chosen and used to obtain the results. Among other items, the population, sampling, data collection instrument and analysis of results will be discussed.

4.2. Hallmarks of Scientific Research

Decisions based on results from a well-planned and thought through research usually yields positive results. By conducting scientific research, the researcher focuses on solving a specific problem using a systematic, logical method to identify the dilemma, gather information, do a critical analysis, and lastly derive a valid conclusion. This type of research enables the researcher to state their results with confidence and accuracy, and subsequently enables other organisations and researchers to utilise the research for their own accord. With the research being more objective than subjective, this aids in emphasising the most significant issues that need attention (Sekaran, 2003). The hallmarks of scientific research are explained below.

4.2.1. Purposiveness

There is a specific aim that is defined in order to gain purpose and give direction to the study.

4.2.2. Rigor

A sound theoretical foundation and a good methodological design add rigor to a purposive study. Rigor implies scrupulousness, carefulness, and the level of precision in a research investigation. Research will lack rigor on the basis of using a small sample base that does not accurately reflect the feelings of the population. Biasness also plays a role in hampering the amount of rigor of a study. This means that the way in which the question is portrayed, addressed and framed can lead to participants giving answers that are not truthful and just. There exists the possibility that the researcher may misinterpret a response or miss out information that the researcher could have failed to include.

4.2.3. Testability

The information collected should be tested by applying certain statistical rules, such as a correlation analysis. This test shows whether or not a theory is sustainable. There are several other tests that aid in proving or disproving the research assumption. Thus, scientific research lends itself to logically testing data to discover whether or not it supports the research objective.

4.2.4. Replicability

The results of the tests need to repeatedly be supported by other studies when the same type of research is done in similar circumstances. The outcome of the study must not be achieved my mere chance, but must be a logical process that has repeatable results (Bryman & Bell, 2007).

4.2.5. Precision and Confidence

In research it is almost impossible to draw a definite conclusion from the data collected. With the vastness of the population of interest, and the vast number of factors in the universe; the factors that the findings are based on may not be that of the entire population of the universe. It is for this reason the research tools need to be designed to obtain results as close to reality as possible. This is referred to as the precision of the findings; to achieve results as close to ‘reality’ as possible. These results are based on certain estimates, and the probability that the estimations are correct is known as the confidence level. In order for a study to have scientific credibility, it is not enough to just be precise; there must be confidence in the claims also (Sekaran, 2003).

4.2.6. Objectivity

The conclusions drawn from the results should not be subject to emotions, rather they need to be based on facts, and this is known as objectivity. Misinterpreting the results can lead to devastating consequences, especially if the research is conducted by a pioneer in their field. Research becomes more scientific as the objectivity of the interpretation of the results increases (Sekaran, 2003).

4.2.7. Generalisability

Generalisability refers to the capacity of the applicability of the findings in a specific setting to other settings. This means that the broader the span of organisations that the research is able to generate answers for, the more useful the research is to others.

4.2.8. Parsimony

It is always best to have a simple explanation of problems and solutions. Complex frameworks and unmanageable numbers are not only difficult to work with, but also difficult to understand as a reader. This implies that the realisation of a parsimonious and meaningful research, rather than a decorative and cumbrous research, will be an enhanced model for finding a solution to a critical issue (Sekaran, 2003).

These factors will be used as a guideline when developing and structuring the research methodology. It is important to the researcher to be able to meet these criteria, in order to have the research provide a solid groundwork for the adoption of new technology and a step forward into the technological age.

4.3. Research Philosophies

Research philosophy relates to developing knowledge in a particular field. Knowledge does not have to be dramatic, as in ground-breaking theories, but may be any knowledge that can be gained to answer a specific problem. The philosophies adopted contain assumptions of how the researcher views the world. These assumptions reinforce the research strategy and the methods to carry forth the strategy, therefore implying that the research is influenced by practical considerations. The main relationship that needs to be brought to the forefront is that of knowledge and the process used to develop it. The three major research philosophies to be explored are axiology, ontology and epistemology. Each of these contains important differences which influence the way in which the research process is viewed.

4.3.1. Epistemology

Epistemology has its basis in what is deemed as acceptable knowledge in a field of study by answering a basic question of 'How do we know?' This allows for the separation to be made between true (adequate) knowledge and false (inadequate) knowledge. It delves in to the way a mind relates to realty, and whether these relations are invalid or valid (Ültanır, 20012). For that reason it incorporates the features of concepts, structuring concepts, validity of senses, logical reasoning, emotions, thoughts, memories, ideas and all items psychological. Epistemology can therefore be said to determine the false from the true by establishing an appropriate method of evaluation. There are three methods that are incorporated with this philosophy:

- Positivism

The researcher has an objective analytic role, working with a social reality. The outcome of this yields a law-like generalisation, much as those fashioned by the natural and physical scientists (Remenyi, et al., 1998). The researcher is in a position whereby they are not effected or affected by the research subject. This is known to be an intricate methodology of measureable observations that impact on the statistical scrutiny, such knowledge can only come from positive affirmation of theories through strict scientific method, refusing every form of metaphysics. Reducing the intricacy of a sequence of law-like generalities leads to interpretivism.

- Post-positivism

Post-positivism adopts the notion that 'reality' is only 'imperfectly and probabilistically apprehendable' (Guba & Lincoln, 1994). It points out that scientific reasoning is fairly similar to that of common sense reasoning. The post-positivist researcher focuses on the understanding of the study as it evolves during the investigation. It provides the researcher with more subjective measures for gathering information. Post-positivist research offers the social scientist the ability to do research using creative methodologies. The researcher does not rely on a single method of scientific inquiry as there is a belief that each method can have errors (Glicken, 2003). A way to avoid these errors, is to have a number of investigation methods, this would imply the utilisation of a mixed method of research.

- Interpretivism

Business situations open the door to unique individuals with a particular set of circumstances. This increases the complexity factor. This method allows the discovery of 'the details of the situation, to understand the reality or perhaps a reality working behind them', associated with 'constructionism' or 'social constructionism' – stating that reality is socially constructed. People interpret situations differently in order for them to acknowledge and understand the intentions, actions and motivations of others. Here it can be seen that social reality is interpreted and viewed by an individual according to their own ideological position (Auriacombe & Holtzhausen, 2014).

- Realism

This belief can be explained as 'social objects or phenomena, independent of an individual's effect on the way that people perceive their world, whether or not they are aware of it'. Realism does, however, share some philosophical characteristics with positivism, which is the belief that the social and natural sciences can use the same methods to collect data and give an explanation, however, Realism differs because it acknowledges the theoretical conditions not directly observed into their explanations. It recognizes a reality that is independent of the senses, but available to the researcher's theoretical deductions (Aliyu, et al., 2014).

4.3.2. Ontology

Ontology looks at the nature of reality to a greater extent than that of epistemology. Here the assumptions of the way the researcher views the world are examined (Antwi & Hamza, 2015). The three aspects of ontology are as follows:

- Objectivism

"This portrays the position that social entities exist in reality external to social actors concerned with their existence." (Saunders, et al., 2012: 10)

- Subjectivism

"Holds that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence." (Collins, 2010: 37)

- Pragmatism

"Believes that the most important determinant of the research philosophy adopted is the research question." (Saunders, et al., 2012: 24)

4.3.3. Axiology

Axiology can be defined as “the branch of philosophy dealing with ethics, aesthetics, and religion” (Guba & Lincoln, 2005), however, in this paradigm meta-framework, axiology is more specifically defined as a value-mediated position on “how researchers act based on the research they produce” (Lincoln, et al., 2011). Axiology can thereby be divided into two main areas: “ethics and aesthetics”. Ethics is concerned with the conduct that one should display (Sultana, 2014). Aesthetics is the interest with value judgments about what is attractive (Cooper, et al., 2016).

4.4. Aim and Objectives of Study

This study aims to look at the acceptance of technology by low-skilled workers, coupled with the effort to understand what areas can be concentrated on to make the transition a smooth one. Due to this being an enormous population to study, this dissertation will hone in on the automation in the manufacturing industry, namely Toyota South Africa Manufacturing. The study also aims to develop an automation/technology acceptance framework that can be applied in developing countries

The objectives of the study are as follows:

- To determine the level of acceptance of new technology by Toyota South Africa Manufacturing employees. (Hypothesis One – Hypothesis Three)
- To determine the aspects that intensify these employees’ resistance to change. (Hypothesis Four – Hypothesis Nine)
- To investigate the role communication can play to enhance the acceptance of automation. (Hypothesis Ten)
- To develop an automation/technology acceptance framework that can be applied in developing countries.

The questions developed to speak to these issues are:

- How will the employees feel about the acceptance of new technology?
- What aspects intensify their resistance to change?
- What role can communication play to enhance the acceptance of automation?
- What automation/technology acceptance framework can be applied in developing countries?

The Hypotheses proposed to be proved:

- Hypothesis One
    - The Perceived Usefulness is positively related to the Perceived Ease of Use of new technology in Toyota South Africa Manufacturing.
- Hypothesis Two
    - The Perceived Usefulness is positively related to the Intention to use new technology in Toyota South Africa Manufacturing.
- Hypothesis Three
    - The Perceived Ease of Use is positively related to the Intention to use new technology in Toyota South Africa Manufacturing.
- Hypothesis Four
    - The new technology will be accepted by the employees of Toyota South Africa Manufacturing.
- Hypothesis Five
    - Fear has a positive effect on resistance to change.
- Hypothesis Six
    - Trust has a negative effect on resistance to change.
- Hypothesis Seven
    - Job-welling has a negative effect on resistance to change.
- Hypothesis Eight
    - Personal acceptance of change has a negative effect on resistance to change.
- Hypothesis Nine
    - Individuals' resistance is negatively related to their intention to use new technology at Toyota South Africa Manufacturing
- Hypothesis Ten
    - Communication factors are highly connected to change activities

4.5. Location of Study

The study was conducted in KwaZulu-Natal in Durban, within Toyota South Africa Manufacturing (TSAM). This is the largest manufacturing company in South Africa with

a market share of 19.8 per cent in 2014, as stated in the South Africa Automotive Export Manual 2015 (2015).

The manufacturing plant is sub-divided into 9 plants, with each catering for a specific area in the creation and assembling of the vehicles. Of these plants, the largest and most vital is the Assembly Plant. This is the culmination of the product from the other plants. The plant is further subdivided into two areas, a Corolla Production Line and an International Multipurpose Vehicle (IMV) Production line. The IMV line assembles the Hilux and Fortuners. This line has the greatest earning potential as the IMVs (Hilux and Fortuners collectively) are the most produced vehicles. The idea of honing onto one specific assembly line is that the entire Manufacturing plant is broken down into these areas, with the IMV line being the area with the most focus, in order to cope with the required throughput to reach the required production targets.

These targets need to be reached with a minimal number of defects, and in a timely manner. Any loss in time affects the output negatively as the desired number of vehicles will not be produced. The target time in which to have a completed vehicle started and driven off the production line is 120 seconds. If there are fewer vehicles than the number needed when the deadline is reached, TSAM still has to foot the bill for the shipping costs of the total desired order. This negatively impacts on the image of the plant as it creates the impression that TSAM cannot fulfil their orders. From past experiences this has led to the company losing contracts and therefore losing income.

In order to be able to reach their goals and have minimal expenditure, it is vital that new effective ways be used to increase the productivity of the IMV Production Line. It is for this reason that this Production Line was chosen.

4.6. Research Method

The quantitative research method is a good fit for a deductive approach, whereby a theory needs to be justified by variables and narrowly defined research questions. The premise being investigated points to how the data is to be collected, such as a by means of a survey, as well as the statistical method with which the data will be correlated (Creswell, 2002). Quantitative studies facilitated the researcher to project the findings onto a sizeable population via an objective process. The data collected from the subset can be inferred as the findings for the entire population, and the

conclusions are drawn from statistical analysis (Thorne & M., 2002; Creswell, 2002) such as descriptive statistics, where standard deviations, means and percentages are reviewed to describe a situation and illustrate various situations. This study relies heavily on statistics derived from the survey (Dorato & C, 1993; Hodge & Steele, 2002).

The second quantitative research design uses statistical analyses to scrutinise the significant differences between various indicators, to draw a conclusion in conjunction with the research being done (Carpenter, et al., 2006; Davis, 1996; Kirschman & Greenstein, 2002). Thereafter, the study examines relationships that occur among a mixture of indicators (Davis, 1996; Kirschman & Greenstein, 2002; Shih, et al., 2011).

Qualitative research makes it possible to collect and analyse textual data such as interviews (Olds et al., 2005), and contextualises the information needed for the study. The questions answered by this method include:

- "What is occurring? "
- "Why does something occur?"
- "How does one phenomenon affect another?"

In order to make an informed decision on the method to be chosen, the researcher examined the both the Qualitative and Quantitative approach. This information allows for a direct comparison of the methods, the pros and cons of each method and how they could be used to develop a framework for the research outcome.

4.7. Qualitative Method

A qualitative method can be understood as an inductive process which is used to formulate a theory, states Liu (2016). The data can be collected in the form of an interview. The results are understood to be subjective as they describe a condition from the point of view of those experiencing it. The analysis of the information is a text-based activity with in-depth responses that are received from the interviewees. The response received is unstructured and/or semi-structured. The reliability and validity is heavily dependent on the researcher. The cost and time parameters of this type of research method are, however, very high due to the population size and the study can't be generalised, assert Antwi and Hamza (2015).

4.8. Quantitative Method

A quantitative method can be understood as a deductive process used to test a theory. The data is usually collected in the form of surveys. This method is objective as the observed effects have to be interpreted by the researcher. The analysis of the information received is number-based, which means that the information is less in-depth but can be used across a larger scale, with the responses being fixed in nature. Statistical tests are used when analysing the data. These methods can be reliable and valid, depending on the measurement instrument used. The time and cost parameters are fairly low while the generalisation is high, according to Park and Park (2016).

4.9. Mixed Methodology

While trying to find a best fit scenario, the researcher found work done by authors such as Cresswell (2014), Mouton (2006), and Bryman and Bell (2007), who identified three types of research methodologies namely qualitative, quantitative and mixed research methodology. The authors argue that qualitative research methodology is more relevant when the sample size is small, while quantitative methodology on the other hand, is more relevant in cases where the sample size is large. They argue that in some cases both methods can be combined. This best suits this research as it affords the perspective of the larger population, as well as an in-depth understanding of the perspective from the decision makers.

This study therefore utilised the mixed method, whereby quantitative research methodology was used for the large sample size comprising the general workers, and qualitative research methodology for the small sample comprising five Supervisors and five Managers. By mixing the datasets, the researcher was able to present an improved realisation of the issue, rather than if a single dataset had been used individually to understand the workers' perspective of introducing new automation. In this analysis, the mixed methodological approach was implemented to allow for vivid data in relation to the relatively unexplored area of what the real worker believes. Rocco et al. (2003) suggest that studies utilising mixed methods for this reason are "explicitly seeking a synergistic benefit from integrating both the post-positivist and constructivist paradigms. The underlying assumption is that research is stronger when it mixes research paradigms, because a fuller understanding of human phenomena is

gained" (Rocco, et al., 2003: 21). To obtain the synergy, both the quantitative and qualitative approaches to research, described by Rocco et al. (2003), were utilised.

A convergent parallel mixed methods design was chosen by the researcher. The method was designed whereby qualitative and quantitative data were collected in parallel, analysed separately, and thereafter merged. The quantitative data consisted of information gathered from closed-ended questions. The qualitative data comprised of open-ended questions that the researcher collected via interviews with the participants. Participants were able to supply their answers to the questions in their own words. This can be seen in Figure 4.1.

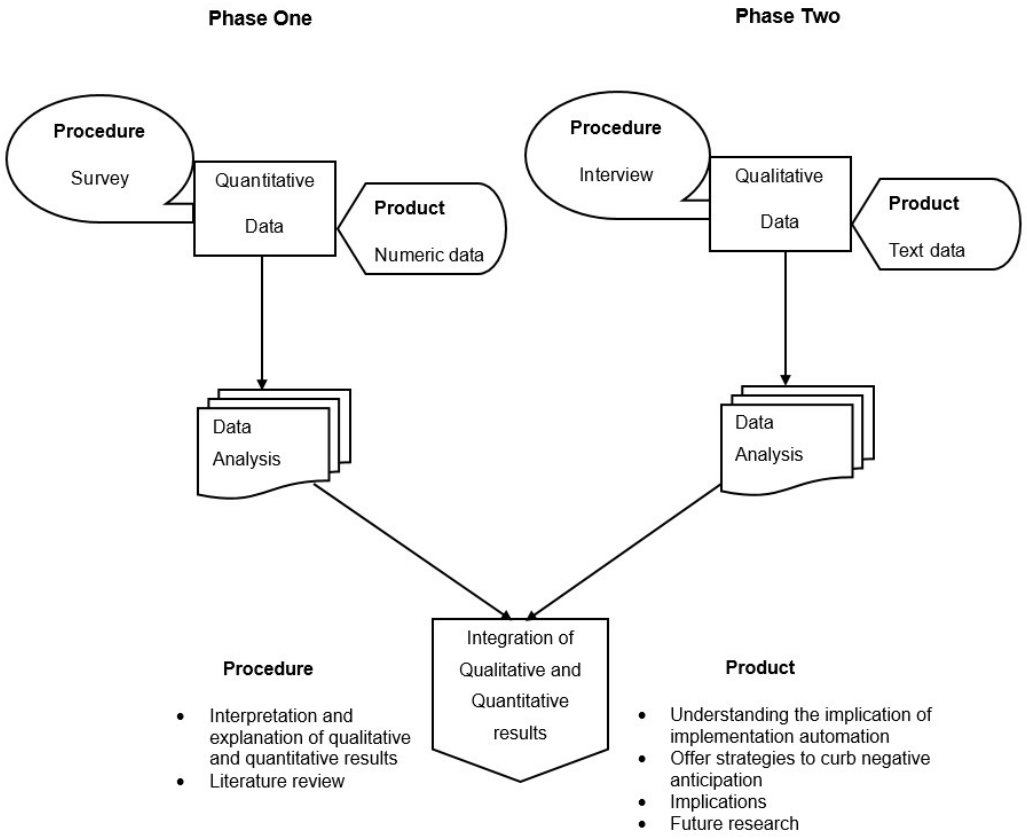

Figure 4.1 Convergent Parallel Mixed Methods Design

Adapted from Creswell, J. & Plano, C., 2011. *Designing and conducting mixed methods research (2nd ed.).* 2nd ed. Thousand Oaks, CA: Sage Publications.

Phase one comprises the initial quantitative data collection via surveys given to the semi-skilled workers, with phase two being the qualitative data collection by means interviews with the Managers. Separating the two phases allows for each paradigm to

be explained thoroughly. For this study, these two phases are described separately throughout the explanation and description of the methodology. This ensures that the differing perspectives are sufficiently characterised. This also implies that the population of this study consists of two groups, namely, the semi-skilled workers and the Managerial staff members.

4.10. Phase One: Quantitative Phase

4.10.1. Overview

The quantitative component of the research is defined as Phase One, and involves the formation, administration and evaluation of a questionnaire to the semi-skilled workers. The questionnaire is a simple instrument that is straightforward and clear, that enables the participants to understand the processes and ensures that they are able to finish the survey (Lambert, 2012). The questionnaire is able to reach a large number of people and is cheap to administer (Kara, 2013). Respondents read through the questions and give consideration to their answers, in their own time. This however means that there may be some delays in collecting some of the questionnaires as some respondents may take longer than others to complete the questionnaires (Kara, 2013). Although the respondents will each answer the exact same questions, it is important to note that they may interpret the questions differently and thus answer the questions differently (Kara, 2013). It is for this reason that the questions will be as unambiguous as possible.

4.10.2. Population and Sample Size

There are approximately 600 semi-skilled personnel that operate on the line, assembling the vehicles with minimal automation. The time frame to complete their functions is extreme and theirs is a tedious task that involves a great deal of concentration and focus, thus human error needs to be kept at a minimum. It will be an extremely lengthy and costly exercise for the researcher to reach every employee in order to conduct the survey, and furthermore, it will be difficult to categorise and analyse the unmanageable amount of data that will have been collected if every employee were to be included in the study.

When choosing the sampling method, the researcher looked at probability sampling versus non-probability sampling. These groups ultimately have one major differentiating factor, which is the confidence level that a sample selected will

represent the population. Due to the advantages of calculating biasness and errors in data, probability sampling has been chosen. Probability sampling can be defined as having the “distinguishing characteristic that each unit in the population has a known, nonzero probability of being included in the sample” (Henry, 1990: 25). Furthermore, it can be described as allowing each and every person in the population to have an equal chance of being selected. The ability to achieve this is vital as it eliminates the risk of the researcher biasing the selection processes based on their own desires and opinions (Frey, et al., 2000). By eradicating biasness, it makes it possible to generalise the data collected from the sample to the wider population, thereby enabling the sample to represent the population.

There were four types of probability sampling that the researcher considered, in order to choose the most appropriate one. These were:

- Systematic random sampling due to its convenience.
- Stratified random sampling, which involves grouping the population into ‘strata’ or subgroups with random sampling being chosen from each group (Fowler & Floyd, 1993; Henry, 1990). The groups initially planned were based on age and then further subdivided to educational level.
- Cluster sampling whereby groups where chosen based on natural clusters, rather than ‘strata’ that have been defined by the researcher. The drawback to this method is the accuracy of the statistics (Babbie, 1990).
- Simple random sampling technique which gives each and every participant an equal opportunity to partake in the study. This was accomplished by randomly choosing people and if they are not inclined to participate, another member can randomly be chosen.

After considering all these points, the simple random sampling technique was chosen. Seeing as the group of semi-skilled workers were relatively similar, a simple random sample of 315 semi-skilled workers was taken. This figure was chosen by consulting Sakaran’s Sample Table (Sekaran, 2003). Random sampling is said to provide impartial estimates of high precision.

4.10.3. Questionnaire Construction

The instrument was developed based upon the status quo bias. It consists of three sections, with the first section collecting demographic data relating to the individual such as age, sex and qualifications. This is nominal data used to develop groupings. These groups are identified by generations, namely X, Y and Z, as they are said to exhibit different behaviours (Chaminade, et al., 2005).

The second section is based on the Technology Acceptance Model which delves into the acceptance of new technology by using statements to understand the 'Perceived Usefulness' and 'Ease of Use'. Perceived usefulness is used to estimate the extent to which the participant believes that the new technology will enhance their working environment, while perceived ease of use is vital in estimating the openness of the participants to using the technology.

The last section aims to gauge the participants' resistance to change and the major contributing factors to their feelings. The areas examined are job satisfaction, trust, intrinsic change and fear.

4.10.4. Development of Question

Category	Question	Source
PU1	Automating certain processes would make it easier to complete.	Adapted from Davies (1989)
PEU1	Automation can assist to improve production.	Adapted from Davies (1989)
PU2	Automation would aid in elimination tiresome labour.	Adapted from Davies (1989)
PEU2	New technology is simple to use.	Adapted from Davies (1989)
PU3	Automating systems would make it possible for me to accomplish certain tasks quicker.	Adapted from Davies (1989)
PEU3	My interaction with new systems will be clear and understandable.	Adapted from Davies (1989)
BI1	I intend to increase using new technology that would make things easier.	Adapted from Davies (1989)
BI2	There are many interesting functions that I would like to use.	Adapted from Davies (1989)
BI3	I always try and use items that make my life easier.	Adapted from Davies (1989)
JW1	I am a valued employee	Adapted by the Researcher
PAC1	I am satisfied with the current way my job is done.	Adapted from Shah (2013)
PAC2	I am certain that I am the best at my job.	Adapted from Shah (2013)

R1	I am confident in my ability to learn and develop my skills for new applications.	Adapted from Razak (2013)
JW2	Being promoted due to new technology could aid me in gaining more respect	Adapted from Razak (2013)

Table continued…

Category	Question	Source
JW3	The thought of an affordable early retirement due to technological advancements appeals to me.	Adapted from Razak (2013)
T1	I believe that procedures used by Top Level Management to make changes are fair.	Adapted from Razak (2013)
T2	I have trust in Top-Level Management	Adapted by Al-Amer (2013)
T3	When there needs to be a change, I understand why.	Adapted by Al-Amer (2013)
F1	From what I know about automation, the impact it has on the plant alarms me.	Adapted by Al-Amer (2013)
F2	Not knowing what these changes from automating processes may bring, scares me even more.	Adapted from Razak (2013)
PAC3	My colleagues seem to resist the possibility of change to automation so I tend to agree.	Adapted from Razak (2013)
R2	I will oppose the change to automating system.	Adapted from Shah (2013)
R3	I have a low tolerance for change.	Adapted from Shah (2013)
R4	My personal interest counts more to me than that of the company.	Adapted from Shah (2013)
T4	I have had positive experiences from previous changes implemented in the plant?	Adapted from Razak (2013)
T5	Previous changes motivated me to work	Adapted from Razak (2013)
COM	Communication about changes are always comprehensive enough during changes?	Adapted from Razak (2013)
COM	What has most promoted the success of previous changes?	Adapted by the Researcher
COM	What kind of concerns have you had in previous change situations?	Adapted by the Researcher
COM	What has been the biggest challenge in previous change implementation?	Adapted by the Researcher
F4/COM	Has there been support always available in a change situation if needed?	Adapted from Razak (2013)
JW4/COM	How has your manager helped to implement the changes?	Adapted by the Researcher

COM	Has the background and the reasons behind previous changes been explained to you?	Adapted by the Researcher
F3	What expectations future changes do you foresee based on your previous experience?	Adapted by the Researcher

Table 4.1 Sources from which questions were developed

*Category column can be linked to the Figure 5.1 factors.

4.10.5. Scaling

The scale used is the Likert Scale, which does have a few drawbacks, such as the participants having a different measure for the ratings of favourable or unfavourable. It is seemingly impossible to prove that the Likert Scale beliefs are equally spaced, states Kothari (2008). The probability of two people feeling the same way about a point on how strongly they believe is extremely low, as each person may feel differently about each point. Even though these discrepancies exist, use of the Likert Scale has become acceptable in large sample sizes, and the scale can be analysed using inferential parametric statistical tests (Singh & Smith, 2000). It can be understood as the mean value that is examined to equalise and standardise the results, so as to extrapolate the information needed.

4.10.6. Pilot Test

The research instrument will be piloted with ten people. This activity aims to check amongst other things if:

- Certain words are not ambiguous;
- Statements are clear enough;
- The Questionnaire can be completed within a reasonable time; and
- If there are no double-barrelled questions and so forth.

The points made by the participants in the pilot study will be taken into consideration and the relevant adjustments made when the final research instrument was developed.

4.10.7. Administration

The questionnaires were hand delivered by the researcher to Management, along with the consent forms. These forms were then handed to the semi-skilled workers chosen at random, to be completed. The consent form explained the research, the purpose of

the research, as well as the participants included. The form went on to state that the participants had the right to decline or withdraw their consent to participate at any point, and that there was a stringent protocol for the confidentiality and anonymity of the data. The contact details of the researcher were provided, to give the participants an opportunity to ask any questions relating to the research. A date for the collection of the completed questionnaire was agreed upon by Management and the researcher, and two envelopes were provided for the collection of the information; one for the consent forms and the other for the questionnaires, to ensure anonymity (Refer to Appendix D).

4.10.8. Analysis of Data

The Statistical Package for Social Sciences (SPSS), version 23, was used to analyse the data collected. Both descriptive and inferential statistics were applied to analyse and summarise the data to unearth patterns.

4.10.8.1. Descriptive Statistics

Descriptive Statistics were used to transform the raw data into a form that provided information to describe a set of factors. From this, it was possible to obtain distribution patterns and a description of the basic demographic characteristics. Descriptive statistics include frequencies, dispersion and measures of central tendency. Frequencies refer to the number of times an item occurs, and thereafter the percentage of the occurrence can be calculated. An example is the analyses of the number of male and female respondents.

4.10.8.2. Reliability analysis

Reliability analysis is used for testing both stability and consistency. It is possible to determine the reliability of the questionnaire by means of Cronbach's Alpha. Chronbach's Alpha measures the internal consistency or average correlation of items in the survey. Cronbach's Alpha (α) is used to ascertain how well the items in a set are positively correlated to one another. An accepted Cronbach's Alpha coefficient needs to be over 0.5 (Sekaran, et.al. 2001).

4.10.8.3. Pearson's Correlation

"Correlation does not make any assumption on whether one variable was dependent on the other or not; neither does it delve into the interdependency of each variable. The statistical model estimates the degree to which the two variables are associated.

One can say that the correlation analysis tests for the interdependency of variables" (Schneider, et al., 2010). To show whether or not the two variables had a linear relationship, the Pearson Correlation would be used.

The formula contains *Xi* and *Yi* which are the data points of the variables; '-1' is the sample mean of *Xi* and represents a perfectly negative correlation between the two values. A result of '1' represents perfectly positive correlation between the two variables. If there is no relationship between the two variables, a value of '0' will be obtained. A value of '0' is usually impossible to get. As the variation of the data points increase around the best fit line, the value of 'r' gets closer to zero, however the equation does differentiate between dependent and independent variables. The letter 'r' represents the sample.

4.10.8.4. Structural Equation Modelling

Structural equation modeling (SEM) could be seen as a general term that describes a large number of stati0stical models used to evaluate the consistency of substantive theories with empirical data. SEM is an extension of general linear modeling procedure, which includes multiple regression and analysis of variance. It can be utilized to examine the relationship between latent constructs that are indicated by multiple measures (Salkind, 2007). SEM has two approaches, a hard-based modeling which encompasses testing theories, and a soft-based modeling which is used to test prediction. An example of soft-based modeling is the partial least square (PLS) modeling (Henseler, et al., 2009). The ability of SEM to examine a series of dependence relationships simultaneously makes it useful in testing theories that contain multiple equations involving dependence relationships. SEM therefore combines both multiple regression and CFA (MacCallum & Austin, 2000).

The soft modeling approach, which was the use of Partial Least Squares, was chosen to evaluate the structural model. PLS models are formally defined by two sets of linear equations, these are:

- the inner model which specifies the relationships between unobserved or latent variables; and
- the outer model which specifies the relationships between a latent variable and manifest variables (Henseler, et al., 2009).

4.10.8.5. ANOVA

An analysis of variance (ANOVA) is an inferential statistic used to analyze data from an experiment that has more than two levels of the independent variable. Given the two factors of age and gender, there were several types of effects to investigate. The main effect of a factor is defined as the difference of one factor to the overall population mean averaged over the levels of the second factor (Littell, et al., 2002). The structural model for two-way ANOVA with interaction is that each combination of levels of the explanatory variables has its own population mean with no restrictions on the patterns. By plotting theses means of the response variable for the two factors, give the ability to identify the presence of any interaction effects.

A ratio of the two independent variance estimates of the same population variance are used to distinguish differences in the overall group means, this is known as the F-statistic. A F-statistic close of 1 would imply that the variance between groups were unreliable, which could be attributed to chance. It can then be deducted that a larger F-statistic would be acceptable (Dean & Illowsky, 2009).

4.11. Phase Two: Qualitative Phase

4.11.1. Overview

Phase Two is the qualitative phase, and is aimed at exploring the views of the Managers on the implementation of new technology. This is done by semi-structured, face-to-face interviews. This instrument is considered appropriate, and in keeping with the interpretive philosophy of the study as ‘unstructured or semi-structured’. Interviews are often used by interpretive researchers and assume greater diversity in both the design and use of the research instrument, and in the nature of the responses from the participants (Bush, 2007). By interviewing people it is possible to find out what is on their minds. A framework is created for participants to share their views as they see fit during the interview (Ribbons, 2007). Ribbons (2007) states that in order to obtain rich and reliable data from the interviews, the following need to be taken into consideration:

- The interviewer and interviewee;
- What questions are asked;
- How the questions are asked;

- Recording; and
- Transcribing

By taking heed of these elements, the initial undertaking is to conceptualise and finalise the interview schedule. The planning process involves ensuring that the interview objectives explored the Managers' views on the implementation of new technology in the plant to maximise production.

4.11.2. Population and Sample Size

The Managerial facet of the study involves the entire Managerial staff consisting of six people. These Managers are divided into sections so as to make it easier to manage and supervise the workers. Each Manager is held directly responsible for the target and expected outcome to be reached for their section of the plant.

For the Managerial sector, a census was used to account for each and every Manager in the population. This would provide a true measure of the population, with no sampling error. Since there was a total population of six persons, this was be appropriate and justified.

4.11.3. Interview Question and Process Development

In order to ensure that the objectives of the study could be met, the researcher explored many journals and theses to generate the desired data. The following themes were identified:

- Perception of the implication of the installation of new technology;
- Problems that can be faced upon implementation of the technology;
- Factors that can strengthen and support the move into a technologically based environment;
- Suggestions for what can be done to improve the current situation (if any), as well as any ideas of alternate changes to improve the production rate.

It is important that the interviewees speak freely about what is on their minds, and are not persuaded to give any other perspective (Cohen, et al., 2007). In order to accomplish this, follow-up questions would be asked to probe and clarify what had been stated. The questions have to be simple, short and understandable, without having any ambiguity or sense of antagonism. These questions need to keep the interviewees at ease so that they will speak freely about what their opinion is, without

judgment, state Cohen et al. (2007). These questions need to be open-ended, so that the participants are not confined to answer a certain aspect, but rather touch on all aspects that they feel necessary within the aspects discussed. The only direct questions that would be asked would be to discover the interviewees' experience, age and qualification.

Although a semi-structured interview is quite flexible, the questions would be worded by the researcher who is conducting the interview. This implies that there could be a lack of consistency in the way the questions are posed, as different participants may interpret the way in which questions are posed in their own way. This means that the same questions may not be responded to consistently by the same respondent, based on how they were posed by the interviewer (McNamara, 2008). To keep a general standard, it is important that the researcher follows a quality process to collect reliable data (Glesne, 1998; Yin, 2003). Therefore, with all interviews it is important to have a number of elements:-

- Adequate time must be given to establish a rapport with the interviewee; thereafter conduct the interview and clarify all points mentioned (Cavana, et al., 2001).
- It is vital that the opening question outlines the topic without imposing any constraints. It needs to be broad enough to get a good conversation started, without digressing from the topic. If the interviewee does drift from the topic, sufficient follow up questions are needed to redirect the interview.
- The questions should not arouse any emotional reaction.
- Probing questions are imperative in exploring the deeper reasoning, to obtain a more refined outcome. Probing should stop before the respondent gets irritated or annoyed.
- Unbiased questioning should be used to ensure that the respondent does not give responses that he/she feels is the socially desirable response in that scenario.
- Silence could be used to further suggest to the interviewee that they need to give more information. This is a good technique as the respondent is not given a leading question to answer, but rather an opportunity to carry on with their thought process.

- Finally, when concluding the interview, the interviewee should be requested to sum up their key issues and clarify all items, to ensure that there are no misunderstandings and that valid data is being collected.

With the permission of the participants, all the interviews were digitally recorded in order to retain the information. Brief notes were made whilst the interview was in progress, to allow for probing questions to be formulated. All these considerations offered a reliable approach to the interviews, at the same time as increasing the trustworthiness of the data collected (Cavana, et al., 2001; Sekaran, 2003).

4.11.4. Pilot Study

A pilot study was carried out to test the questions developed and the approach taken. It was important to the researcher that the data collected would lead to appropriate results. Glesne (1998) suggests that researchers enter the pilot study with a different frame of mind from the one they have when going into the real study. With this in mind, the pilot study gave the researcher the opportunity to practice the deliverance and report when conversing with respondents, before the main data collection began.

There were two individual interviews done. The information was saved and analysed to verify questions raised and that the correct information was provided. The appropriateness of the wording used, explanations provided and the understanding observed were tested.

The pilot study showed that the questions honed in on the operational aspect of the environment, whilst staying true to the main function of productivity. It aided in solidifying the research group chosen from the Management facet, as they comprehended the factors and would be able to give the level of feedback appropriate to answer the level of questioning required for this study.

4.11.5. Administration

Before approaching the individuals, permission was obtained and an appropriate meeting time was set up. Ten interviews were done in total, with the participants agreeing to meet in a more social environment due to the highly stressed environment at the plant. A consent form was handed to the interviewees that stated that the participants had the right to decline or withdraw their consent to participate at any point, and that there was a stringent protocol of confidentiality and anonymity for the

data. This was also verbally reiterated to the participants to gain their trust, and ensured that they were comfortable with the experience, especially since the interviews were recorded. The participants were then encouraged to ask any questions about the research or the interview itself. The interviews took 20 – 50 minutes each.

4.11.6. Analysis of Data

"Repeatable results are achievable only if the interview schedule is tightly structured, with the properties of a questionnaire; so in a semi-structured approach, reliability may be compromised' states Bush (2007, p 93). This lapse of reliability can be overlooked due to the increased validity which is achieved by allowing the respondents free expression of their feelings and thoughts. It is for this reason that each participant was treated as a unique respondent. There was a balance that needed to be struck between getting the honest opinion of the respondent and generating valid data. Validity can be judged on the basis of a tool being able to measure what it claims. The validity of semi-structured interviews is again a problem due to the element of bias, the content of the questions and the characteristics of both interviewer and interviewee. Bush (2007), however, suggests that the notion of validity is associated with positivist research and quotes Kincheloe and McLaren (1998) and Bassey (1999) for their advocacy of 'trustworthiness' as a criterion instead of validity for paradigms other than positivism (Bush, 2007: Silverman, 2000).

Upon collection of all the data, the researcher needed to transcribe all the details from the recordings and compile them together with the notes taken. There was asmall degree of bias as the researcher only transcribed what was deemed relevant. There were nonverbal cues that were transcribed, such as silence, as it could communicate emotional distress, a pause for thought, or embarrassment. Words such as 'well… err… suppose…' are essential elements and as such were was not ignored.

Thereafter the transcripts were organised into sections that were defined by context. The interviewees were referred to by a number to maintain their anonymity. A secure document was created that linked the number code to the original participant, for reference purposes and data sectioning. This document was disposed of after the research to ensure that the information could not be retrieved to implicate any of the interviewees. The sectional data had numbers on it that could be used to link it back

to the original data; this aided with referencing the context that the information was given in. Multiple copies of the files were made so that the researcher would have backup files in the event of one being mislaid.

By reading, listening, organising, rereading and reorganising, the researcher became familiar with the material. It was possible to now make memos and summarise certain areas prior to the analysis.

Thereafter started the preliminary coding. This is where the researcher looked at how the respondents conceptualised certain ideas. Creating the numerous ideas enabled the start of the analysing processes. By using framework analysis, the researcher developed prior concepts as codes, which where sublevels of the ideas identified. As these codes built, there were new concepts that emerged to be evaluated. The researcher created numerous paths, sub-paths, divisions and concepts to ensure that all ideas, feelings, and comments where correctly identified and documented.

The researcher was the able to identify emergent concepts or themes from the categories and subcategories. Some of the themes that emerged were issues identified by the researcher at the early stages of the research. The data and themes therefore aided in confirming or negating certain issues.

4.12. Ethical Considerations

Prior to conducting any sort of research into the study, an ethical clearance application was submitted to the University of KwaZulu-Natal. This permission was needed from the campus in order to carry out the study and gather the relevant information. Upon granting of the request, the researcher was able to carry forth the desired study. Above all, it was crucial that the ethical issues in experimental design research did not infringe on any of the issues outlined in the framework developed by Patton (2002).

The need for the study, and the purpose was correctly described to the Organisational Contact (first point of contact in the organisation, aka, the Gatekeeper), as well as to the individuals participating in the study. The information provided in writing or verbally needed to be prepared in a language and way that the participants understood. The participants also needed to have explained the fact that the information that they were providing would not lead to any direct remuneration or benefits, however the results would be submitted to those who were responsible for the change. Furthermore, it was

stated to the Gatekeeper and the participants, that information would be provided without any links to particular individuals, and that anonymity would be maintained every step of the way.

A risk analysis was done to discover the possible physical or mental dangers that the participants could have been be exposed to, but the research project was deemed low risk. There were a few concerns as the study touched on sensitive issues such as the technology implementation and job satisfaction, which caused a little anxiety amongst the participants.

To ensure that this was not an issue, the confidentiality of each participant was guaranteed. The survey answer sheet and consent letter were stored separately. The Managers agreed that since the interviews were recorded, no mention of names, areas or dates would be made. They did however agree to sign the consent form to ensure that they were aware of their right to confidentiality. The researcher further assured the participants that when conducting the analysis of the data, no mention would be made of any individual. All data collected for this study was to be kept securely by the University of KwaZulu-Natal. All documentation would be locked in a secure environment for a period of five years, after which time it would be destroyed. The forms are merely an indicator that consent was given.

Consent was obtained for every part of the study, to safeguard the researcher and all participants involved. Consent was first gained from the organisation, by means of a Gatekeeper's letter, in order to gain information from the desired population of the establishment. Next was the permission granted by the University of KwaZulu-Natal to carry out the study, deeming it relevant subject matter. Consent forms were collected from the interviewees and the people taking the survey. The fact that the participants were free to stop the survey or interview at any time was reiterated, to certify the fact that they were in total control of their choices.

The researcher had to be wary that the participants did not feel pressurised into participating in the study. Participants were asked if they would like to take the survey, and if they refused, the survey was offered to the next person. There was no group hand out as this causes social pressure to conform and could make people feel that they needed to participate because the next person was doing so. In this case, the

data collected may not be a true reflection of the participant, as they would mark items at random for the sake of submitting.

The questions where structured to be clear and precise. It was vital that the questions did not come across as demeaning or intrusive to the participant. The questions had to be within the subject matter and pertain to the facts that needed to be collected. Follow-up questions during the interview needed to be straight forward, rather than leading questions to get what the researcher deemed as the correct response. When explaining the study and processes to the participants, the researcher has to be honest and explain all the items needed and the research. The study was not allowed to mislead the population in any way. When asking and answering these questions, it was not fair to put the participants under duress or mental strain. The participants should always feel calm and be able to answer questions freely.

4.13. Conclusion

This chapter provided a comprehensive account of the research design, and the methods utilised to enable the gathering and analysis of data. An overview of the different research methodologies considered was also documented, with the one chosen given precedence. It explained the mixed methodology processes and elaborated on each phase of data collection. The population, samples and analysis of data were also described. This gave an holistic view of the research structure and procedure.

CHAPTER FIVE

Presentation of Result

5.1. Introduction

A sample of 315 respondents comprising of semi to low-skilled workers were issued with a questionnaire and a further six Managers were interviewed. The information from the questionnaires was captured on SPSS version 23 and analysed, and the interviews were coded and grouped. These results from the questionnaires were portrayed in frequency tables and bar charts, and snippets of conversation from the interviews reported. Before the results of the questionnaire were reported, the Cronbach Alpha was calculated to ensure the internal reliability of the instrument.

5.2. Cronbach's Mode (Measure of Internal Reliability)

The Cronbach's coefficient was calculated using the responses obtained for the technological section of questions, and thereafter for the section of the questionnaire related to change. These were questions that sought to gain insight to answer the research questions. There are two tables below which portray the Cronbach Alpha for each section. The first section, Technology Acceptance, comprised of nine questions and the results are shown in Table 5.1. The next section dealing with Change comprised of 25 questions and can be seen in Table 5.2.

Reliability Statistics

Cronbach's Alpha	N of Items
.669	9

Table 5.1 Cronbach Alpha: Technology

Reliability Statistics

Cronbach's Alpha	N of Items
.543	25

Table 5.2 Cronbach Alpha: Change

A Cronbach Alpha of 0.5 and above is acceptable (Hair, et al., 2011), therefore it can be deduced that with a Cronbach Alpha of 0.669 for the section of questions on Technology, and a Cronbach Alpha of 0.543 for the questions related to Change, there was internal reliability of the instrument.

5.3. Structural Equation Model

A PLS algorithm was run on the research model to provide the standardised coefficients (β). The significance of each beta weight was determined by running a bootstrapping procedure. These results are illustrated in Figure 5.1. The coefficients and significance values will all be used to explain the effect that each independent variable in question has on the hypothesised dependent variables.

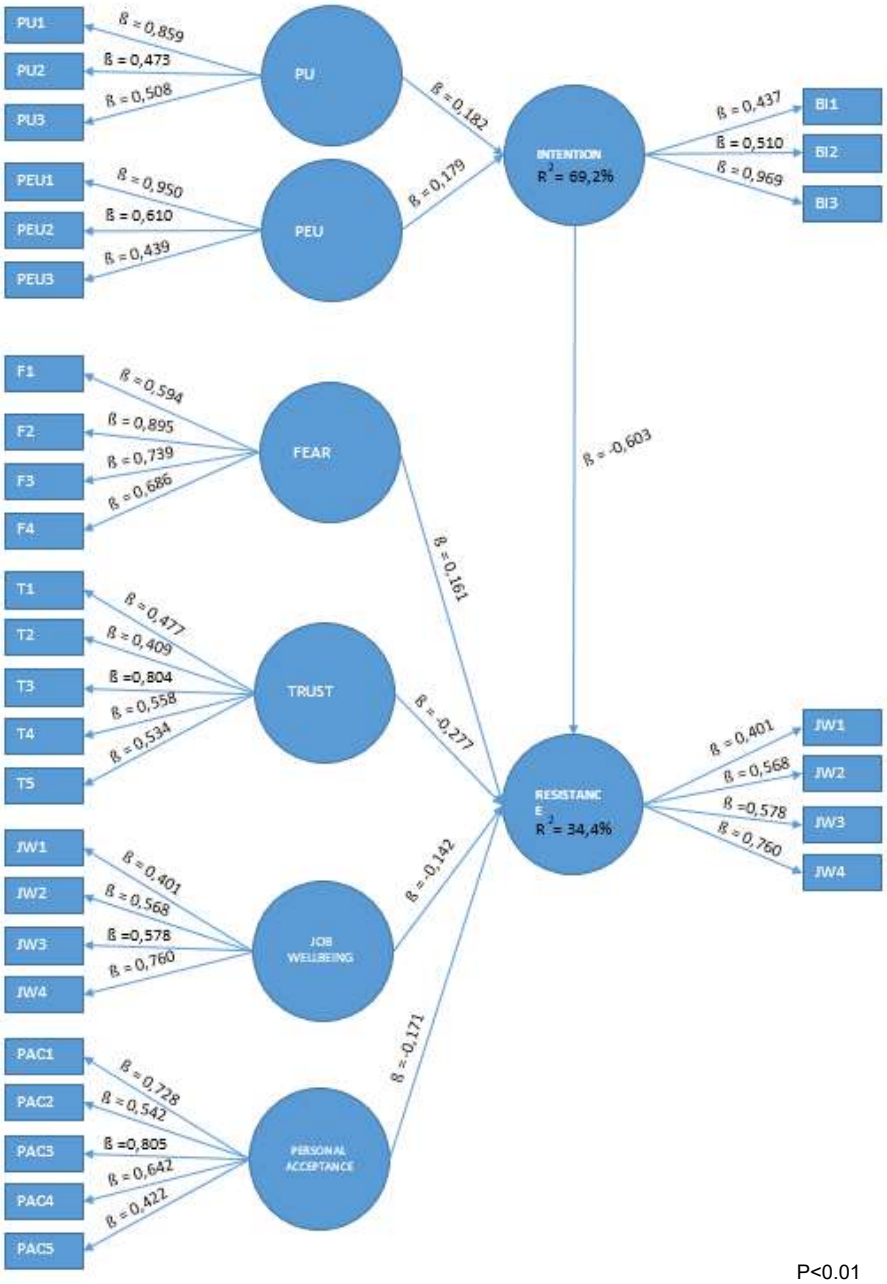

Figure 5.1Structural Equation Model

The bootstrap method in PLS-SEM had to yield estimated significance values (T-values) that exceed 1.96 for the relationships between constructs to be significant (Hair, et al., 1998). The findings confirmed that the loadings were above 0.4, and the t-values were greater than 2.58 which can be seen in Table 5.3. This indicated an acceptable indicator of reliability (Churchill, 1979).

Direction	**t-Value**
PU -> BI	2.603
PEU -> BI	2.903
Fear -> Resistance	2.852
Trust -> Resistance	2.870
Job Wellbeing -> Resistance	2.975
Personal Acceptance of Change -> Resistance	2.742
BI -> Resistance	2.761

Table 5.3 t-Values of Structural Equation Model

The results showed that there was a positive relationship between perceived usefulness of new technology (PU) and Intention to use new technology (BI) with a beta of 0.182, as well as between perceived ease of use of new technology (PEU) and Intention to use with a beta of 0.179. Furthermore, a positive relationship between fear and resistance existed with a beta of 0.161. Negative relationships were found to exist between trust and resistance, beta of 0.277, job wellbeing and resistance, beta of 0.142, and personal acceptance of change and resistance with a beta of 0.171. lastly the relationship between intention to use new technology and resistance was found to have a negative relationship with a beta of 0.603.

5.3.1. Explained variance (R^2)

Explained variance (R^2) is also known as the coefficient of determination which is a statistical measure of the variability in one variable that is explained by another (Field, 2005). There is no specific benchmark as to the acceptable value of R^2, it is used to merely illustrate how much of a particular variable is explained by another variable, or by a specified model. A PLS algorithm was run to ascertain the R^2's for the intention to use and resistance. The results indicate that the model accounts for 69.2% of variance of the intention to use and 34.4% of variance of resistance.

The model therefore has good predictive validity over intention to use and resistance. Hence, the implication for this study was positive in that it illustrates that the contributing factors that were chosen pay a role in the context of the structural model.

The following sections take a more in-depth look at the relationships between that exists between the variables using Pearson's Correlation. This was done to further explore the different dynamics that occurred.

5.4. Phase One: Quantitative Phase

5.4.1. Demographic Relationships and Study Variables

It was not the main purpose of the study to analyse the demographics of the participants, but the results were intended to assess the influence, or lack thereof, that these variables have on the findings. The demographics consisted of age, sex, and level of education. These were the major criteria that were used to differentiate the group of interviewees, in order to see the clusters that. This would therefore assist in planning for future strategic activities.

5.4.1.1. Age Ranges of the Participants in the Survey

Participants were asked to choose the age category appropriate to them. The ages were divided into three categories, namely 18 to 35 years (category A), 36 to 50 years (Category B) and 51 years and older (Category C). Figure 5.2 illustrates the results, showing that 9.5 per cent of the sample consisted of the oldest age range, while the middle aged group made up the largest percentage with 53.7 per cent, followed closely by the youngest category with 36.8 per cent.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-35	116	36.8	36.8	36.8
	36-50	169	53.7	53.7	90.5
	51+	30	9.5	9.5	100.0
	Total	315	100.0	100.0	

Table 5.4 Results of the Age Categories

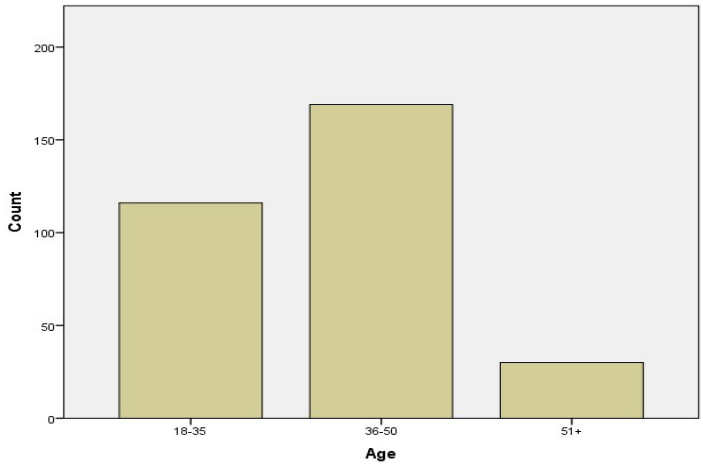

Figure 5.2 Results of the Age Categories

5.4.1.2. Gender Specifics of the Participants in the Survey

Participants were given the option of selecting ‘male’ or ‘female’ in order to indicate their gender and so that the researcher could determine the gender balance. The survey showed that although the male employees (57.8 per cent) exceeded the female employees (42.2 per cent), this was by a marginal amount of 15.6 per cent. The graph in Figure 5.3 depicts the gender distribution amongst the participants. Given that manufacturing and assembly was predominantly a male dominated industry, the dynamic shift to accommodate females in the workforce can plainly be seen.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	182	57.8	57.8	57.8
	Female	133	42.2	42.2	100.0
	Total	315	100.0	100.0	

Table 5.5 Number of Male vs Female Participants

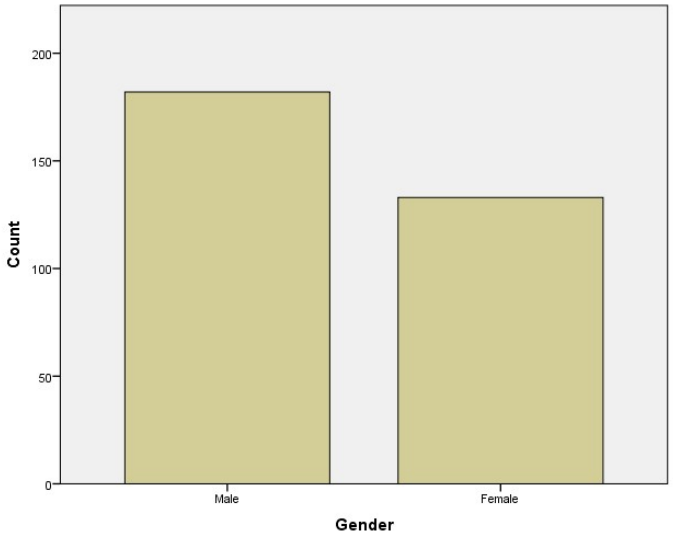

Figure 5.3 Number of Male vs Female Participants

5.4.1.3. Education Levels of the Participants of the Study

There were four categories to indicate the participants' levels of education, and the participants were required to select the appropriate level. Participants who selected the category, 'Diplomas or higher' (10.5 per cent), implied that they had attended a tertiary institute and qualified. From Figure 5.4 it can be seen that this is the lowest percentage. A 'Technical' qualification (35.2 per cent) would consist of educational levels at a level higher than that of a Matriculation, but not exceeding that of a Diploma or higher. This category consisted of people that were equipped with skills to maintain and repair machinery and/or other devices. The attainment of a 'Matric' (35.2 per cent) suggested that they had completed the secondary level of education and matriculated. Lastly, 'None' (10.5 per cent) meant that they had no formal qualification and had not completed high school (secondary level of education).

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma +	33	10.5	10.5	10.5
	TechQual	111	35.2	35.2	45.7
	Matric	124	39.4	39.4	85.1
	None	47	14.9	14.9	100.0
	Total	315	100.0	100.0	

Table 5.6 Educational Categories

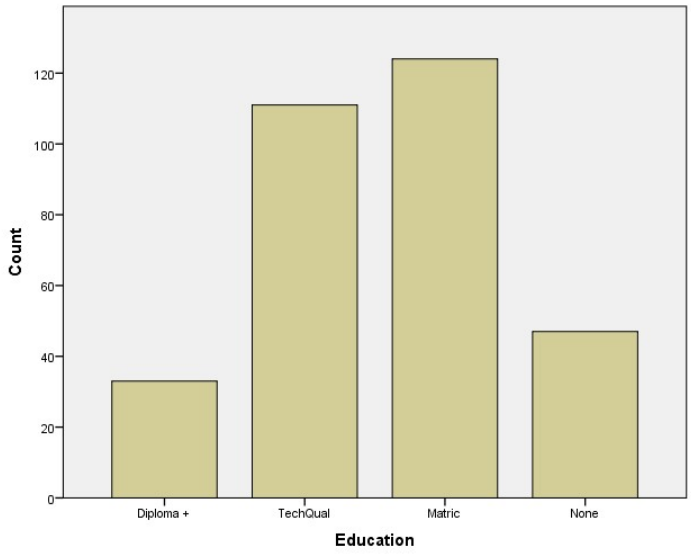

Figure 5.4 Educational Categories

5.4.1.4. Understanding the Demographics

It is imperative that the demographics be understood and evaluated as there has been much speculation in past research that points to biasness based on gender, age and/or educational levels. Seeing that there were no such studies based in an emerging third world country, these statistics should be evaluated with precision. By evaluating the gender distribution in relation to the level of education, it can be seen in Figure 5.5 that the education levels of females are starting to surpass those of males, even in the technical sphere, although males had a higher matriculation rate than females in the same category.

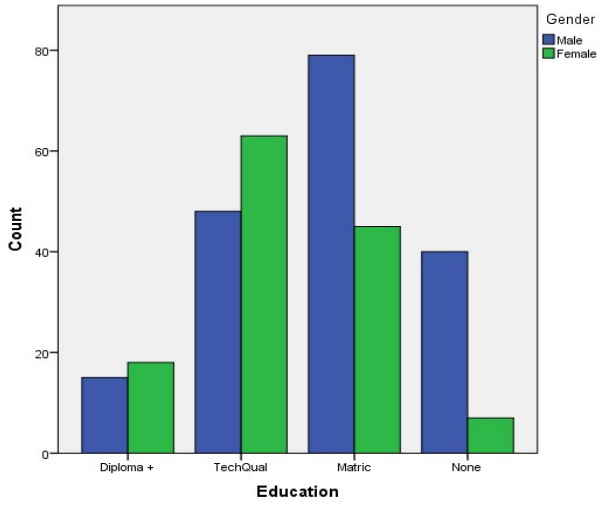

Figure 5.5 Educational Bias in Gender

Further evaluating the differences in the gender, a paradigm shift seems to be taking place with the numbers of younger generation employees. According to Figure 5.6, what seemed to be a male orientated working environment has seen an increase in the employment of young females in the manufacturing sector.

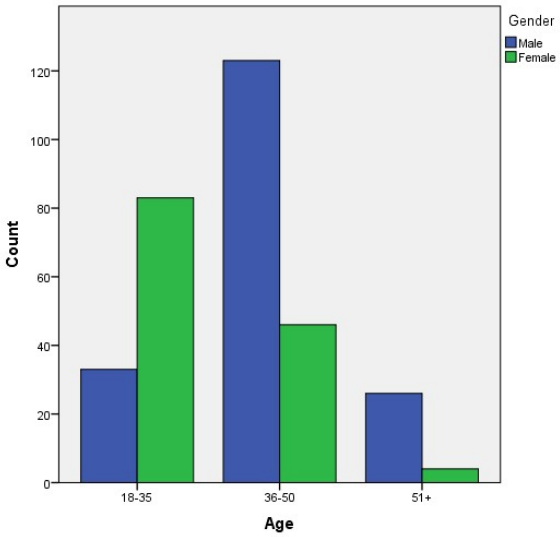

Figure 5.6 Age Bias in Gender

				Education			
				Diploma +	TechQual	Matric	None
				Count	Count	Count	Count
Age	18-35	Gender	Male	6	13	13	1
			Female	12	46	21	4
	36-50	Gender	Male	9	35	57	22
			Female	6	17	20	3
	51+	Gender	Male	0	0	9	17
			Female	0	0	4	0

Table 5.7 Table of Summarised Demographics

Further examination of the summarised demographics in Table 5.7 provided an overall perspective of the distribution. Any of these demographics could play a role in the main objectives of the study, however the biggest would be the ages of the respondents, as they also encompass the different educational levels. This shows the shift in dynamics for the different eras. Gender also needs to be taken into consideration as this could be a factor with regards to the way change is accepted or negated. The demographics will assist in honing in on the sectors of the production line that are more efficient,

more technologically minded and accepting of technology, and those that are resistant to technology.

5.4.2. Technology Acceptance Model

The TAM examined the participants' intention to use new technology. It was broken down into three sections, that is, the Perceived Usefulness (PU), the Perceived Ease of Use (PEU) and the Behavioural Intention (BI), which ultimately leads to the intention to use new technology.

5.4.2.1. Question Analysis

1. Automating Production Processes would Make them Easier to Complete

The frequency Table 5.8 shows that out of the 315 respondents, 179 (56.8 per cent) indicated that they did not perceive any advantages or disadvantages to automating their production processes. With that said, however, it is vital to note that only 5 respondents (1.6 per cent) expressed negative sentiments and strongly disagreed that there was any benefit to automation. A good 105 respondents (33.3 per cent) agreed while the remaining 26 respondents (8.3 per cent) strongly agreed that automating processes would make them easier to complete.

Automating Certain Processes would Make them Easier to Complete

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	5	1.6	1.6	
	Neutral	179	56.8	56.8	1.6
	Agree	105	33.3	33.3	58.4
	Strongly Agree	26	8.3	8.3	91.7
	Total	315	100.0	100.0	100.0

Table 5.8 Frequency Table Depicting whether Automating Certain Processes would Make them Easier to Complete

2. Automation can Assist to Improve Production

The Frequency Table 5.9 shows that out of the 315 respondents, 167 respondents (53.0 per cent) agreed with this statement, while 109 respondents (32.7 per cent) strongly agreed. 41 respondents (13.0 per cent) were neutral on the matter, whereas only 4 respondents (1.3 per cent) disagreed.

Automation can Assist to Improve Production

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	4	1.3	1.3	
	Neutral	41	13.0	13.0	1.3
	Agree	167	53.0	53.0	14.3
	Strongly Agree	103	32.7	32.7	67.3
	Total	315	100.0	100.0	100.0

Table 5.9 Frequency Table Depicting whether Automation can Assist to Improve Production

3. Automation would Aid in the Elimination of Tiresome Labour

The Frequency Table 5.10 shows that out of the 315 respondents, an astonishing 269 respondents (85.4 per cent) had a positive reaction to automation eliminating tiresome work, while only 4 respondents (1.4 per cent) had a negative response. The remaining 42 respondents (13.3 per cent) had a neutral reaction to this statement.

Automation would Aid in the Elimination of Tiresome Labour

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	4	1.3	1.3	
	Neutral	42	13.3	13.3	1.3
	Agree	91	28.9	28.9	14.6
	Strongly Agree	178	56.5	56.5	43.5
	Total	315	100.0	100.0	100.0

Table 5.10 Frequency Table depicting whether Automation would Aid in the Elimination of Tiresome Labour

4. New Technology that I have been exposed to in the production environment is Simple to Use

The respondents were asked to indicate whether or not the new technology that they have been exposed to are simple to use, such technologies include, robotics, PLC controlled actions, etc. The Frequency Table 5.11 shows that out of the 315 respondents, a combined 255 respondents (81.0 per cent) had a positive reaction to the perception that new technology that they have been exposed to in the production environment would be easy to use, while only 8 respondents (2.5 per cent) disagreed. The remaining 52 respondents (16.5 per cent) were neutral in their expectations.

New Technology is Simple to Use

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	8	2.5	2.5	
	Neutral	52	16.5	16.5	2.5
	Agree	147	46.7	46.7	19.0
	Strongly Agree	108	34.3	34.3	65.7
	Total	315	100.0	100.0	100.0

Table 5.11 Frequency Table Depicting whether New Technology is Simple to Use

5. Automating Systems would Make it Possible for Me to Accomplish Certain Tasks Quicker

The Frequency Table 5.12 shows that out of the 315 respondents, a combined 243 respondents (77.1 per cent) agreed that automating systems would make it possible for certain tasks to be accomplished quicker, while only 9 respondents (2.9 per cent) disagreed that this was the case. The remaining 63 respondents (20.0 per cent) were neutral in their expectations.

Automating Systems would Make it Possible for Me to Accomplish Certain Tasks Quicker

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	9	2.9	2.9	
	Neutral	63	20.0	20.0	2.9
	Agree	149	47.3	47.3	22.9
	Strongly Agree	94	29.8	29.8	70.2
	Total	315	100.0	100.0	100.0

Table 5.12 Frequency Table Depicting Automating Systems would Make it Possible for Me to Accomplish Certain Tasks Quicker

6. My Interaction with New Systems would be Clear and Understandable

The Frequency Table 5.13 shows that of the 315 respondents, a combined 279 respondents (88.6 per cent) agreed that perceived interaction with new systems would be clear and understandable, while only 5 respondents (1.6 per cent) disagreed. The remaining 31 respondents (9.8 per cent) were neutral in their expectations.

My Interaction with New Systems would be Clear and Understandable

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	5	1.6	1.6	
	Neutral	31	9.8	9.8	2.9
	Agree	103	32.7	32.7	22.9
	Strongly Agree	176	55.9	55.9	70.2
	Total	315	100.0	100.0	100.0

Table 5.13 Frequency Table Depicting Perceived Interaction with New Systems would be Clear and Understandable

7. I Intend to Increase Using New Technology that would Make Things Easier

The Frequency Table 5.14 shows that of the 315 respondents, a combined 264 respondents (83.8 per cent) agreed that they intended to increase using new technology that would make things easier, while only 13 respondents (4.1 per cent) disagreed that this would take place. The remaining 38 respondents (12.1 per cent) were neutral in their responses.

I Intend to Increase Using New Technology that would Make Things Easier

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	13	4.1	4.1	
	Neutral	38	12.1	12.1	4.1
	Agree	130	41.3	41.3	16.2
	Strongly Agree	134	42.5	42.5	57.5
	Total	315	100.0	100.0	100.0

Table 5.14 Frequency Table Depicting whether The Respondent Intends to Increase Using New Technology that would Make Things Easier

8. There are Many Interesting Functions that I would Like to Use

The Frequency Table 5.15 shows that a combined 253 respondents (80.3 per cent) agreed that they perceived the new technology to incorporate many interesting functions that they would like to use. 38 respondents (12.1 per cent) were neutral in their expectations and, interestingly, no respondents disagreed with the statement.

There are Many Interesting Functions that I would Like to Use

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Neutral	62	19.7	19.7	
	Agree	157	49.8	49.8	19.7
	Strongly Agree	96	30.5	30.5	69.5
	Total	315	100.0	100.0	100.0

Table 5.15 Frequency Table Depicting the Belief that there are Many Interesting Functions that the Respondent would Like to Use

9. I Always Try and Use Items that Make My Life Easier

The Frequency Table 5.16 show that out of the 315 respondents, a combined 256 respondents (81.2 per cent) agreed that they always try and use items that make their lives easier, while only 7 respondents (2.2 per cent) disagreed that this was the case. The remaining 52 respondents (16.5 per cent) were neutral in their responses.

I Always Try and Use Items that Make My Life Easier

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	7	2.2	2.2	2.2
	Neutral	52	16.5	16.5	18.7
	Agree	88	27.9	27.9	46.7
	Strongly Agree	168	53.3	53.3	100.0
	Total	315	100.0	100.0	

Table 5.16 Frequency Table Depicting whether the Respondents always Try and Use Items that make their Lives Easier

5.4.2.2. Overall

Table 5.17 shows the correlation between perceived usefulness (PU), perceived ease of use (PEU) and the intention to use (BI). It was found that there was a significant positive correlation between PU and PEU of 0.375, with a $p < 0.01$. PU and BI also had significant positive correlation of 0.292, with a $p < 0.01$. The strongest correlation of 0.468 was found between PEU and BI with a $p < 0.01$.

		PU	PEU	BI
PU	Pearson Correlation	1	.375**	.292**
	Sig. (2-tailed)		.000	.000
	N	315	315	315
PEU	Pearson Correlation	.375**	1	.468**
	Sig. (2-tailed)	.000		.000
	N	315	315	315
BI	Pearson Correlation	.292**	.468**	1
	Sig. (2-tailed)	.000	.000	
	N	315	315	315

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.17 Technology Acceptance Model Correlation

5.4.2.3. MALE

Table 5.18 shows the correlation between Perceived Usefulness (PU), Perceived Ease of Use (PEU) and the Intention to Use (BI) of the male participants. It was found that there was a significant positive correlation between PU and PEU of 0.329, with a $p < 0.01$. PU and BI also had a significant positive correlation of 0.280 with a $p < 0.01$. The strongest correlation was found between PEU and BI, of 0.395 with a $p < 0.01$.

		PU_M	PEU_M	BI_M
PU_M	Pearson Correlation	1	.329**	.280**
	Sig. (2-tailed)		.000	.000
	N	182	182	182
PEU_M	Pearson Correlation	.329**	1	.395**
	Sig. (2-tailed)	.000		.000
	N	182	182	182
BI_M	Pearson Correlation	.280**	.395**	1
	Sig. (2-tailed)	.000	.000	
	N	182	182	182

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.18 Technology Acceptance Model Correlation of Male Participants

5.4.2.4. FEMALE

Table 5.19 shows the correlation between Perceived Usefulness (PU), Perceived Ease of Use (PEU) and the Intention to Use (BI) of the female participants. It was found that there was a significant positive correlation between PU and PEU of 0.340, with a $p < 0.01$. PU and BI also had a significant positive correlation of 0.270 with a $p < 0.01$. The strongest correlation was found between PEU and BI, of 0.559 with a $p < 0.01$.

		PU_F	PEU_F	BI_F
PU_F	Pearson Correlation	1	.340**	.270**
	Sig. (2-tailed)		.000	.002
	N	133	133	133
PEU_F	Pearson Correlation	.340**	1	.559**
	Sig. (2-tailed)	.000		.000
	N	133	133	133
BI_F	Pearson Correlation	.270**	.559**	1
	Sig. (2-tailed)	.002	.000	
	N	133	133	133

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.19 Technology Acceptance Model Correlation of Female Participants

5.4.2.5. Age Group 18 – 35

Table 5.20 shows the correlation between Perceived Usefulness (PU), Perceived Ease of Use (PEU) and the Intention to Use (BI) of the youngest age group in the sample. It was found that there was a significant positive correlation between PU and PEU of 0.314, with a $p < 0.01$. PU and BI also had a significant positive correlation of 0.287, with a $p < 0.01$. The strongest correlation was found between PEU and BI of 0.408 and a $p < 0.01$.

		PU_2	PEU_2	BI_2
PU_2	Pearson Correlation	1	.314**	.287**
	Sig. (2-tailed)		.000	.000
	N	169	169	169
PEU_2	Pearson Correlation	.314**	1	.408**
	Sig. (2-tailed)	.000		.000
	N	169	169	169
BI_2	Pearson Correlation	.287**	.408**	1
	Sig. (2-tailed)	.000	.000	
	N	169	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.20 Technology Acceptance Model Correlation of Age Group between 18 - 35 Years

5.4.2.6. Age Group 36 – 50

Table 5.21 shows the correlation between Perceived Usefulness (PU), Perceived Ease of Use (PEU) and the Intention to Use (BI) of the middle age group in the sample. It was found that there was a significant positive correlation between PU and PEU of 0.663, with a $p < 0.01$. However, there was no significant correlation found between PU and BI or between PEU and BI.

		PU_3	PEU_3	BI_3
PU_3	Pearson Correlation	1	.663**	.355
	Sig. (2-tailed)		.000	.054
	N	30	30	30
PEU_3	Pearson Correlation	.663**	1	.129
	Sig. (2-tailed)	.000		.498
	N	30	30	30
BI_3	Pearson Correlation	.355	.129	1
	Sig. (2-tailed)	.054	.498	
	N	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.21 Technology Acceptance Model Correlation of Age Group between 36 - 50 years

5.4.2.7. Age Group 51+

Table 5.22 shows the correlation between Perceived Usefulness (PU), Perceived Ease of Use (PEU) and the Intention to Use (BI) of the eldest members in the sample. It was found that there was a significant positive correlation between PU and PEU of 0.371, with a $p < 0.01$. PU and BI also had a significant positive correlation of 0.235, with a $p < 0.05$. The strongest correlation was found between PEU and BI of 0.521, with a $p < 0.01$.

		PU_1	PEU_1	BI_1
PU_1	Pearson Correlation	1	.371**	.232*
	Sig. (2-tailed)		.000	.012
	N	116	116	116
PEU_1	Pearson Correlation	.371**	1	.521**
	Sig. (2-tailed)	.000		.000
	N	116	116	116
BI_1	Pearson Correlation	.232*	.521**	1
	Sig. (2-tailed)	.012	.000	
	N	116	116	116

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.22 Technology Acceptance Model Correlation of Age Group of 51 Years and Older

5.4.2.8. ANOVA Comparison of Means

This part of analysis is interested in establishing how gender differences impact on intention to use new technology considering the age of the respondents. A two-way

ANOVA comparison of means was performed using SPSS. Table 5.24 shows the results of the scores that were used to compare the constructs within the measurement model.

Source	F	Sig.
Corrected Model	5.091	.000
Intercept	6340.233	.000
Age	5.374	.005
Gender	.384	.536
Age * Gender	3.834	.023
Error		
Total		
Corrected Total		

Table 5.23 ANOVA Comparison of Means (Intention to Use) - Gender and Age

The ANOVA table gives F statistic = 0.535, p = 0.05; 0.384, p < 0.05 and 3.834, p = 0.23 for age, gender and age*gender respectively. This gives the notion that age had the greatest contribution to explain the intention of use.

Figure 5.7, shows that in the youngest age group there was significant difference, with females being more willing to use new technology than males, while the middle age group the males were slightly above that of the females, and the oldest generation very closely related.in the use of technology. It seemed that the eldest generation was more apt to using the technology than the middle aged category.

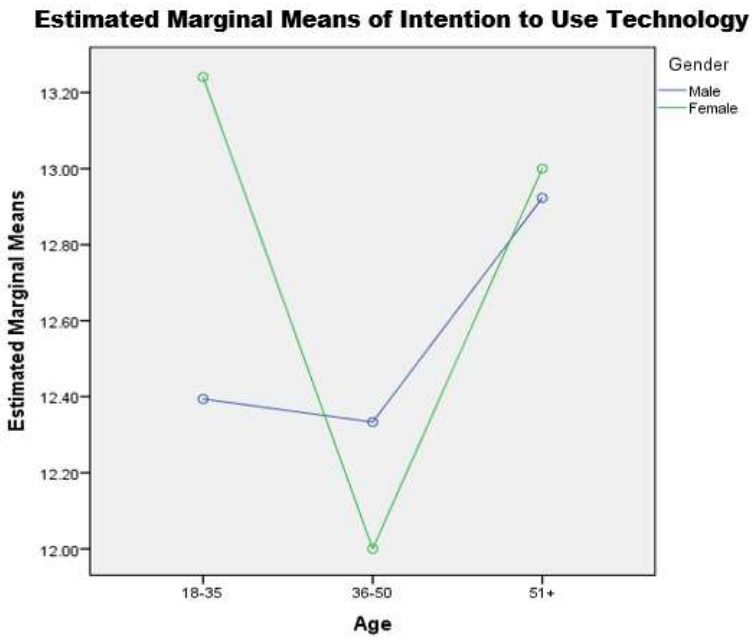

Figure 5.7 Graph of interaction effect between gender and Age for Intention to Use New Technology

5.4.3. Factors Affecting Resistance to Change

Resistance to change was broken down into the core components of fear, trust, job wellbeing and the individual's own acceptance of change. These were used to acquire details on the relationships that the workers developed with regards the reasons for the resistance.

5.4.3.1. Question analysis

1. I am a Valued Employee

The Frequency Table 5.24 show that out of the 315 respondents, 174 respondents (56.2 per cent) indicated that there were positive or negative feelings regarding their perception of being a valued employee. With that said, it is vital to note that only 22 combined respondents (6.9 per cent) disagreed that they felt valued as employees while a combined 119 respondents (37.8 per cent) felt as though they were valued employees.

I am a Valued Employee

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	8	2.5	2.5	
	Disagree	14	4.4	4.4	2.5
	Neutral	174	55.2	55.2	7.0
	Agree	93	29.5	29.5	62.2
	Strongly Agree	26	8.3	8.3	91.7
	Total	315	100.0	100.0	100.0

Table 5.24 Frequency Table Depicting whether the Respondents Perceive Themselves as a Valued Employee

2. I am Satisfied with the Current Way My Job is Done

The Frequency Table 5.25 show that out of the 315 respondents, 168 respondents (56.2 per cent) indicated that they strongly agreed that they were satisfied with the way their jobs were done, and 104 respondents (33.0 per cent) also agreed. It was only a collective 14 respondents (4.5 per cent) that disagreed. The remaining 29 respondents (9.2 per cent) were neutral in their belief.

I am Satisfied with the Current Way My Job is Done

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	4	1.3	1.3	
	Disagree	10	3.2	3.2	1.3
	Neutral	29	9.2	9.2	4.4
	Agree	104	33.0	33.0	13.7
	Strongly Agree	168	53.3	53.3	46.7
	Total	315	100.0	100.0	100.0

Table 5.25 Frequency Table Depicting whether the Respondents Feels Satisfied with the Current Way Their Job is Done

3. I am Certain that I am the Best at my Job

The Frequency Table 5.26 show that of the 315 respondents, 204 respondents (64.8 per cent) strongly agreed that they were the best at their job while 76 responds (24.1 per cent) also agreed. The remaining 35 respondents, (11.1 per cent), were neutral in

their response, and there were no respondents that disagreed with the belief that they were the best at their job

I am Certain that I am the Best at my Job

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Neutral	35	11.1	11.1	
	Agree	76	24.1	24.1	11.1
	Strongly Agree	204	64.8	64.8	35.2
	Total	315	100.0	100.0	100.0

Table 5.26 Frequency Table Depicting whether the Respondent was Certain that He/She was the Best at their Job

4. I am Confident in my Ability to Learn and Develop my Skills for New Applications

The Frequency Table 5.27 show that out of the 315 respondents, 159 respondents (50.5%) agreed that they were confident in their ability to learn and develop skills for new applications, while 99 respondents (31.4%) strongly agreed. 57 respondents (18.1%) were neutral about their belief, however there were no respondents that disagreed with the statement.

I am Confident in my Ability to Learn and Develop my Skills for New Applications

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Neutral	57	18.1	18.1	
	Agree	159	50.5	50.5	18.1
	Strongly Agree	99	31.4	31.4	68.6
	Total	315	100.0	100.0	100.0

Table 5.27 Frequency Table Depicting whether the Respondent was Confident in their Ability to Learn and Develop Skills for New Applications

5. Being Promoted Due to New Technology could Aid me in Gaining More Respect

The Frequency Table 5.28 show that out of the 315 respondents, 156 respondents (49.5 per cent) agreed that being promoted due to new technology could aid in gaining them more respect, while 102 respondents (32.4 per cent) strongly agreed that this

would result. 53 respondents (16.8 per cent) were neutral about this belief. The remaining 4 respondents (1.3 per cent) disagreed.

Being Promoted Due to New Technology could Aid me in Gaining More Respect

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Disagree	4	1.3	1.3	
	Neutral	53	16.8	16.8	1.3
	Agree	156	49.5	49.5	18.1
	Strongly Agree	102	32.4	32.4	67.6
	Total	315	100.0	100.0	100.0

Table 5.28 Frequency Table Depicting whether Being Promoted due to New Technology could Aid in Gaining more Respect

6. **The Thought of an Affordable Early retirement Due to Technological Advancements Appeals to Me**

The Frequency Table 5.29 show that out of the 315 respondents, 132 respondents (41.9 per cent) strongly disagreed that the thought of an affordable early retirement due to technological advancements appealed to them, while 30 respondents (9.5 per cent) also disagreed. 94 respondents (29.8 per cent) remained neutral about this belief. The remaining 59 respondents (18.8 per cent) collectively agreed that the thought of being able to have an affordable early retirement due to technology was an appealing prospect.

The Thought of an Affordable Early retirement Due to Technological Advancements Appeals to Me

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	30	9.5	9.5	
	Disagree	132	41.9	41.9	9.5
	Neutral	94	29.8	29.8	51.4
	Agree	33	10.5	10.5	81.3
	Strongly Agree	26	8.3	8.3	91.7
	Total	315	100.0	100.0	100.0

Table 5.29 Frequency Table Depicting whether Thought of an Affordable Early Retirement due to Technological Advancements Appeals to the respondent

7. I Believe That Procedures used by Top Level Management to Make Changes are Fair

The Frequency Table 5.30 show that out of a total of 315 respondents, 133 respondents (42.2 per cent) disagreed with the statement that the procedures used by Top Level Management to make changes were fair, with an additional 8 respondents (2.5 per cent) who strongly disagreed. 122 respondents (38.7 per cent) responded neutrally to this statement, and only 52 respondents (16.5 per cent) agreed that this was the case.

I Believe That Procedures used by Top Level Management to Make Changes are Fair

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	8	2.5	2.5	
	Disagree	133	42.2	42.2	2.5
	Neutral	122	38.7	38.7	44.8
	Agree	52	16.5	16.5	83.5
	Total	315	100.0	100.0	100.0

Table 5.30 Frequency Table Depicting whether the Respondent Believed that Procedures used by Top Level Management to Make Changes are Fair

8. I have Trust in Top Level Management

The Frequency Table 5.31 show that out of the 315 respondents, 144 respondents (45.7 per cent) disagreed with the statement and did not have trust in the Top-Leve Management, with an additional 8 respondents (2.5 per cent) that strongly disagreed. 108 respondents (34.3 per cent) responded neutrally and only 55 respondents (17.5 per cent) expressed trust.

I have Trust in Top Level Management

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	8	2.5	2.5	
	Disagree	144	45.7	45.7	2.5
	Neutral	108	34.3	34.3	48.3
	Agree	55	17.5	17.5	82.5
	Total	315	100.0	100.0	100.0

Table 5.31 Frequency Table Depicting whether the Respondent has Trust in Top Level Management

9. When there Needs to be a Change, I Understand Why

The Frequency Table 5.32 show that out of the 315 respondents, 144 respondents (45.7 per cent) responded neutrally to the statement that they understood why changes were made. 120 respondents (38.1 per cent) disagreed and a further 8 respondents (2.5 per cent) strongly disagreed with the statement. The remaining 43 respondents (13.7 per cent) agreed that they understood.

When there Needs to be a Change, I Understand Why

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	8	2.5	2.5	
	Disagree	120	38.1	38.1	2.5
	Neutral	144	45.7	45.7	40.6
	Agree	43	13.7	13.7	86.3
	Total	315	100.0	100.0	100.0

Table 5.32 Frequency Table Depicting whether Respondents Understand Why Changes were Made

10. From what I Know about Automation, the Impact it has on the Plant Alarms Me

The Frequency Table 5.33 show that out of the 315 respondents, 151 respondents (47.9 per cent) was neutral about the belief that the impact of technology alarmed them. 81 respondents (25.7 per cent) agreed that they were alarmed and a further 4 respondents (1.3 per cent) strongly agreed. 75 respondents (23.8 per cent) disagreed and 4 respondents (1.3 per cent) strongly disagreed that they were alarmed.

From what I Know about Automation, the Impact it has on the Plant Alarms Me

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	4	1.3	1.3	
	Disagree	75	23.8	23.8	1.3
	Neutral	151	47.9	47.9	25.1
	Agree	81	25.7	25.7	73.0
	Strongly Agree	4	1.3	1.3	98.7
	Total	315	100.0	100.0	100.0

Table 5.33 Frequency Table Depicting whether Respondents were Alarmed by the Impact of Technology

11. Not Knowing what these Changes from Automating Processes may Bring Scares Me even More

The Frequency Table 5.34 show that 141 respondents (44.8 per cent) was neutral about the unknown automation factors alarming them. 110 respondents (34.9 per cent) agreed that they were alarmed, with the reaming 64 respondents collectively agreeing (18.4 per cent) and strongly disagreeing (1.9 per cent).

Not Knowing what these Changes from Automating Processes may Bring Scares Me even More

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	6	1.9	1.9	
	Disagree	58	18.4	18.4	1.9
	Neutral	141	44.8	44.8	20.3
	Agree	110	34.9	34.9	65.1
	Total	315	100.0	100.0	100.0

Table 5.34 Frequency Table Depicting the Respondents' Reactions to Unknown Changes from Automating Processes

12. My Colleagues Seem to Resist the Possibility of Change to Automation so I Tend to Agree

The Frequency Table 5.35 show that of the 315 respondents, 149 respondents (47.3 per cent) were neutral about following the trends of their colleagues with regards to resisting new technology. 86 respondents (27.3 per cent) disagreed with the statement, along with 6 respondents (1.9 per cent) who strongly disagreed. The remaining 74 respondents (23.5 per cent) agreed with the statement.

My Colleagues Seem to Resist the Possibility of Change to Automation so I Tend to Agree

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	6	1.9	1.9	
	Disagree	86	27.3	27.3	1.9
	Neutral	149	47.3	47.3	29.2
	Agree	74	23.5	23.5	76.5
	Total	315	100.0	100.0	100.0

Table 5.35 Frequency Table Depicting whether Respondents Agree with their Colleagues

13. I Will Oppose the Change to an Automated System

The Frequency Table 5.36 indicate that 144 respondents (45.7 per cent) responded neutrally to the statement about opposing the change to an automated system. 95 respondents (30.2 per cent) would not oppose automation, and 6 respondents (1.9 per cent) were vehement about not opposing automation. The remaining 70 respondents (22.2 per cent) agreed that they would oppose the introduction of an automated system.

I Will Oppose the Change to an Automated System

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	6	1.9	1.9	
	Disagree	95	30.2	30.2	1.9
	Neutral	144	45.7	45.7	32.1
	Agree	70	22.2	22.2	77.8
	Total	315	100.0	100.0	100.0

Table 5.36 Frequency Table Depicting whether Respondents will Oppose the Change to an Automated System

14. I have a Low Tolerance for Change

The Frequency Table 5.37 show that of the 315 respondents, 144 respondents (45.7 per cent) were neutral about their tolerance for change. 93 respondents (29.5 per cent) agreed to having a low tolerance for change, with 10 respondents (3.2 per cent) strongly agreeing that this is the case. 62 respondents (19.7 per cent) disagreed, along with 6 respondents (1.9 per cent) who strongly disagreed.

I have a Low Tolerance for Change

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	6	1.9	1.9	
	Disagree	62	19.7	19.7	1.9
	Neutral	144	45.7	45.7	21.6
	Agree	93	29.5	29.5	67.3
	Strongly Agree	10	3.2	3.2	96.8
	Total	315	100.0	100.0	100.0

Table 5.37 Frequency Table Depicting whether the Respondent has a Low Tolerance for Change

15. My Personal Interest Counts More to me than those of the Company

The Frequency Table 5.38 indicate that out of the 315 respondents, 169 respondents (53.7 per cent) were neutral about the hierarchy of their interests. 76 respondents (24.1 per cent) agreed that their interests where more important than those of the company, and a further 8 respondents (2.5 per cent) strongly agreed. 58 respondents (18.4 per cent) disagreed with this statement, and 4 respondents (13 per cent) strongly disagreed.

My Personal Interest Counts More to me than those of the Company

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	4	1.3	1.3	
	Disagree	58	18.4	18.4	1.3
	Neutral	169	53.7	53.7	19.7
	Agree	76	24.1	24.1	73.3
	Strongly Agree	8	2.5	2.5	97.5
	Total	315	100.0	100.0	100.0

Table 5.38 Frequency Table Depicting whether the Respondents' Personal Interests Count More to Them than those of the Company

16. I have had Positive Experiences from Previous Changes Implemented in the Plant

The Frequency Table 5.39 show that out of 315 respondents, 147 respondents (46.7 per cent) were neutral regarding their experiences from past change management. 108 respondents (34.3 per cent) however disagreed with the statement, along with a further 14 respondents (4.4 per cent) who strongly disagreed. This equated to 38.7

per cent. Conversely, a collective of 19.6 per cent agreed about having a positive previous change experience.

I have had Positive Experiences from Previous Changes Implemented in the Plant

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	14	4.4	4.4	
	Disagree	108	34.3	34.3	4.4
	Neutral	147	46.7	46.7	38.7
	Agree	40	12.7	12.7	85.4
	Strongly Agree	6	1.9	1.9	98.1
	Total	315	100.0	100.0	100.0

Table 5.39 Frequency Table Depicting whether Respondents have had Positive Experiences from Previous Changes Implemented in the Plant

17. Previous Changes Motivated Me to Work

The Frequency Table 5.40 show that 149 respondents (47.3 per cent) were neutral about change being a motivating factor. 86 respondents (27.3 per cent) agreed that this was the case, along with another 6 respondents (1.9 per cent) who strongly agreed to change being a motivating factor. Conversely, 66 respondents (21.0 per cent) disagreed with this statement and 8 respondents (2.5 per cent) strongly disagreed.

Previous Changes Motivated Me to Work

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	8	2.5	2.5	
	Disagree	66	21.0	21.0	2.5
	Neutral	149	47.3	47.3	23.5
	Agree	86	27.3	27.3	70.8
	Strongly Agree	6	1.9	1.9	98.1
	Total	315	100.0	100.0	100.0

Table 5.40 Frequency Table Depicting whether Previous Changes Motivated Respondents to Work

18. Communication about Changes is Always Comprehensive Enough During the Changes

The Frequency Table 5.41 show that of the 315 respondents, 156 (49.5 per cent) were neutral about communications being comprehensive. 91 respondents (28.9 per cent)

felt that the communication was comprehensive, and 14 respondents (4.4 per cent) strongly agreed. 41 respondents (12.0 per cent) disagreed with this statement, along with a further 13 respondents (41 per cent) who strongly disagreed.

Communication about Changes is Always Comprehensive Enough During the Changes

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly Disagree	13	4.1	4.1	
	Disagree	41	13.0	13.0	4.1
	Neutral	156	49.5	49.5	17.1
	Agree	91	28.9	28.9	66.7
	Strongly Agree	14	4.4	4.4	95.6
	Total	315	100.0	100.0	100.0

Table 5.41 Frequency Table Depicting whether Communication about Changes was Always Comprehensive

5.4.3.2. Overall

Table 5.42 shows the correlation between fear, trust, job wellbeing, acceptance and resistance. It was found that the strongest correlation was between trust and resistance, which had a significant negative correlation of -0.298, with $p < 0.01$. This was followed by acceptance and resistance, with a significant negative correlation of -0.283 and $p < 0.01$. Thereafter, there was a significant positive correlation between fear and resistance of 0.276, with $p < 0.01$. Lastly, there was a significant negative correlation between job wellbeing and resistance of -0.252, with $p < 0.01$.

		Fear	Trust	JobWellBeing	Acceptance	Resistance
Fear	Pearson Correlation	1	-.156**	-.267**	-.484**	.276**
	Sig. (2-tailed)		.006	.000	.000	.000
	N	315	315	315	315	315
Trust	Pearson Correlation	-.156**	1	.074	.147**	-.298**
	Sig. (2-tailed)	.006		.188	.009	.000
	N	315	315	315	315	315
JobWellBeing	Pearson Correlation	-.267**	.074	1	.798**	-.252**
	Sig. (2-tailed)	.000	.188		.000	.000
	N	315	315	315	315	315
Acceptance	Pearson Correlation	-.484**	.147**	.798**	1	-.283**
	Sig. (2-tailed)	.000	.009	.000		.000
	N	315	315	315	315	315
Resistance	Pearson Correlation	.276**	-.298**	-.252**	-.283**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	315	315	315	315	315

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.42 Overall Factors Affecting Resistance

5.4.3.3. Male

Table 5.43 shows the correlation between fear, trust, job wellbeing, acceptance and resistance of the male participants. It was found that the strongest correlation was between trust and resistance, which had a significant negative correlation of -0.453 and $p < 0.01$. This was followed by job wellbeing and resistance, with a significant negative correlation of -0.291 and $p < 0.01$. Thereafter there was a significant positive correlation between fear and resistance of 0.268, with $p < 0.01$. Lastly, there was a significant negative correlation between acceptance and resistance of -0.243, with $p < 0.01$.

		Fear_M	Trust_M	JobWellBeing_M	Acceptance_M	Resistance_M
Fear_M	Pearson Correlation	1	-.098	-.292**	-.365**	.268**
	Sig. (2-tailed)		.188	.000	.000	.000
	N	182	182	182	182	182
Trust_M	Pearson Correlation	-.098	1	.039	.027	-.453**
	Sig. (2-tailed)	.188		.598	.716	.000
	N	182	182	182	182	182
JobWellBeing_M	Pearson Correlation	-.292**	.039	1	.825**	-.291**
	Sig. (2-tailed)	.000	.598		.000	.000
	N	182	182	182	182	182
Acceptance_M	Pearson Correlation	-.365**	.027	.825**	1	-.243**
	Sig. (2-tailed)	.000	.716	.000		.001
	N	182	182	182	182	182
Resistance_M	Pearson Correlation	.268**	-.453**	-.291**	-.243**	1
	Sig. (2-tailed)	.000	.000	.000	.001	
	N	182	182	182	182	182

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.43 Factors Affecting Resistance of the Male Partisans

5.4.3.4. FEMALE

Table 5.44 shows the correlation between fear, trust, job wellbeing, acceptance and resistance of the female participants. It was found that the strongest correlation was between acceptance and resistance, which had a significant negative correlation of -0.361 and $p < 0.01$. This was followed by fear and resistance, with a significant negative correlation of -0.278 and $p < 0.01$. Thereafter, there was a significant negative correlation between job wellbeing and resistance of -0.200, with $p < 0.01$. Lastly, there was a no correlation between trust and resistance.

		Fear_F	Trust_F	JobWellBeing_F	Acceptance_F	Resistance_F
Fear_F	Pearson Correlation	1	-.232**	-.261**	-.632**	.278**
	Sig. (2-tailed)		.007	.002	.000	.001
	N	133	133	133	133	133
Trust_F	Pearson Correlation	-.232**	1	.135	.336**	.014
	Sig. (2-tailed)	.007		.120	.000	.873
	N	133	133	133	133	133
JobWellBeing_F	Pearson Correlation	-.261**	.135	1	.762**	-.200*
	Sig. (2-tailed)	.002	.120		.000	.021
	N	133	133	133	133	133
Acceptance_F	Pearson Correlation	-.632**	.336**	.762**	1	-.361**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	133	133	133	133	133
Resistance_F	Pearson Correlation	.278**	.014	-.200*	-.361**	1
	Sig. (2-tailed)	.001	.873	.021	.000	
	N	133	133	133	133	133

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.44 Factors Affecting Resistance of the Female Partisans

5.4.3.5. Age Group 18 – 35

Table 5.45 shows the correlation between fear, trust, job wellbeing, acceptance and resistance of the youngest members of the sample. It was found that the strongest correlation was between trust and resistance, which had a significant negative correlation of -0.398 and $p < 0.01$. This was followed by job wellbeing and resistance with a significant negative correlation of -0.222 and $p < 0.05$. The other variables remaining, namely, fear and acceptance, did not show any significant correlation.

		Fear_1	Trust_1	JobWellBeing_1	Acceptance_1	Resistance_1
Fear_1	Pearson Correlation	1	-.172	-.324**	-.572**	.044
	Sig. (2-tailed)		.065	.000	.000	.636
	N	116	116	116	116	116
Trust_1	Pearson Correlation	-.172	1	.289**	.295**	-.398**
	Sig. (2-tailed)	.065		.002	.001	.000
	N	116	116	116	116	116
JobWellBeing_1	Pearson Correlation	-.324**	.289**	1	.782**	-.222*
	Sig. (2-tailed)	.000	.002		.000	.017
	N	116	116	116	116	116
Acceptance_1	Pearson Correlation	-.572**	.295**	.782**	1	-.155
	Sig. (2-tailed)	.000	.001	.000		.098
	N	116	116	116	116	116
Resistance_1	Pearson Correlation	.044	-.398**	-.222*	-.155	1
	Sig. (2-tailed)	.636	.000	.017	.098	
	N	116	116	116	116	116

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.45 Factors Affecting Resistance in the Age Group between 18 - 35 Years

5.4.3.6. Age Group 36 – 50

Table 5.46 shows the correlation between fear, trust, job wellbeing, acceptance and resistance of the middle age group. It was found that the strongest correlation was between fear and resistance, which had a significant positive correlation of 0.342 and $p < 0.01$. This was followed by job wellbeing and resistance, with a significant negative correlation of -0.272 and $p < 0.01$. Thereafter there was a significant negative correlation between acceptance and resistance of -0.237, with $p < 0.01$. There was no significant correlation found between trust and resistance.

		Fear_2	Trust_2	JobWellBeing_2	Acceptance_2	Resistance_2
Fear_2	Pearson Correlation	1	-.105	-.277**	-.374**	.342**
	Sig. (2-tailed)		.176	.000	.000	.000
	N	169	169	169	169	169
Trust_2	Pearson Correlation	-.105	1	-.042	-.053	-.057
	Sig. (2-tailed)	.176		.589	.493	.464
	N	169	169	169	169	169
JobWellBeing_2	Pearson Correlation	-.277**	-.042	1	.834**	-.272**
	Sig. (2-tailed)	.000	.589		.000	.000
	N	169	169	169	169	169
Acceptance_2	Pearson Correlation	-.374**	-.053	.834**	1	-.237**
	Sig. (2-tailed)	.000	.493	.000		.002
	N	169	169	169	169	169
Resistance_2	Pearson Correlation	.342**	-.057	-.272**	-.237**	1
	Sig. (2-tailed)	.000	.464	.000	.002	
	N	169	169	169	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.46 Factors Affecting Resistance in the Age Group between 36 - 50 Years

5.4.3.7. Age Group 51+

Table 5.47 shows the correlation between fear, trust, job wellbeing, acceptance and resistance in the oldest age group. It was found that the strongest correlation was between fear and resistance, which had a negative correlation of -0.411 and $p < 0.05$. It was interesting to note that for this age group, they did not seem to have any other significant correlations.

		Fear_3	Trust_3	JobWellBeing_3	Acceptance_3	Resistance_3
Fear_3	Pearson Correlation	1	.078	.085	-.201	-.411*
	Sig. (2-tailed)		.682	.655	.287	.024
	N	30	30	30	30	30
Trust_3	Pearson Correlation	.078	1	-.538**	-.189	-.357
	Sig. (2-tailed)	.682		.002	.318	.053
	N	30	30	30	30	30
JobWellBeing_3	Pearson Correlation	.085	-.538**	1	.803**	.111
	Sig. (2-tailed)	.655	.002		.000	.559
	N	30	30	30	30	30
Acceptance_3	Pearson Correlation	-.201	-.189	.803**	1	-.243
	Sig. (2-tailed)	.287	.318	.000		.195
	N	30	30	30	30	30
Resistance_3	Pearson Correlation	-.411*	-.357	.111	-.243	1
	Sig. (2-tailed)	.024	.053	.559	.195	
	N	30	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.47 Factors Affecting Resistance in the Age Group of 51 Years and Older

5.4.3.8. ANOVA Comparison of Means

This part of analysis delved into establishing how gender differences impacted on the different factors that affected resistance considering the age of the respondents. A two-way ANOVA comparison of means was performed using SPSS. Table 5.48 shows the results of the scores that were used to compare the constructs within the measurement model.

Source	Dependent Variable	F	Sig.
Corrected Model	Job Wellbeing	6.304	.000
	Acceptance	9.255	.000
	Fear	6.881	.000
	Trust	16.736	.000
Intercept	Job Wellbeing	15575.617	.000
	Acceptance	2136.431	.000
	Fear	3815.503	.000
	Trust	4136.846	.000
Age	Job Wellbeing	12.155	.000
	Acceptance	16.546	.000
	Fear	13.352	.000
	Trust	35.159	.000
Gender	Job Wellbeing	.904	.342
	Acceptance	.724	.395
	Fear	1.959	.163
	Trust	.124	.725
Age * Gender	Job Wellbeing	1.960	.143
	Acceptance	10.823	.000
	Fear	1.250	.288
	Trust	.294	.746

Table 5.48 ANOVA Comparison of Means (Factors Affecting Resistance) - Gender and Age

The ANOVA table gives F statistic = 12.155, $p < 0.001$; 0.904, $p = 0.342$ and 1.960, $p = 0.142$ for age, gender and age*gender respectively for job wellbeing. Looking at Acceptance, the F statistic = 16.546, $p < 0.001$; 0.724, $p = 0.395$ and 10.823, $p > 0.001$ for age, gender and age*gender respectively. Fear was the next factor investigated that yielded a F statistic = 13.352, $p < 0.001$; 1.959, $p = 0.163$ and 1.250, $p = 0.288$ for age, gender and age*gender respectively. Lastly, Trust returned a F statistic = 35.159, $p < 0.001$; 0.124, $p = 0.725$ and 0.294, $p = 0.746$ for age, gender and age*gender respectively. This gives the notion that age had the greatest contribution to explain the intention of use. The plots below give a clearer understanding of the findings.

Figure 5.8 shows that the youngest generation had the least amount of concern with their job wellbeing. Can be clearly seen that the youngest females are the least concerned from the entire age groups. The greatest differences were found in the oldest segment where females had the highest concern with their job wellbeing as compared to their male counterparts. The middle-aged group was more concerned with their job wellbeing than the other groups, but here again, females' concerns were less than that of the males'.

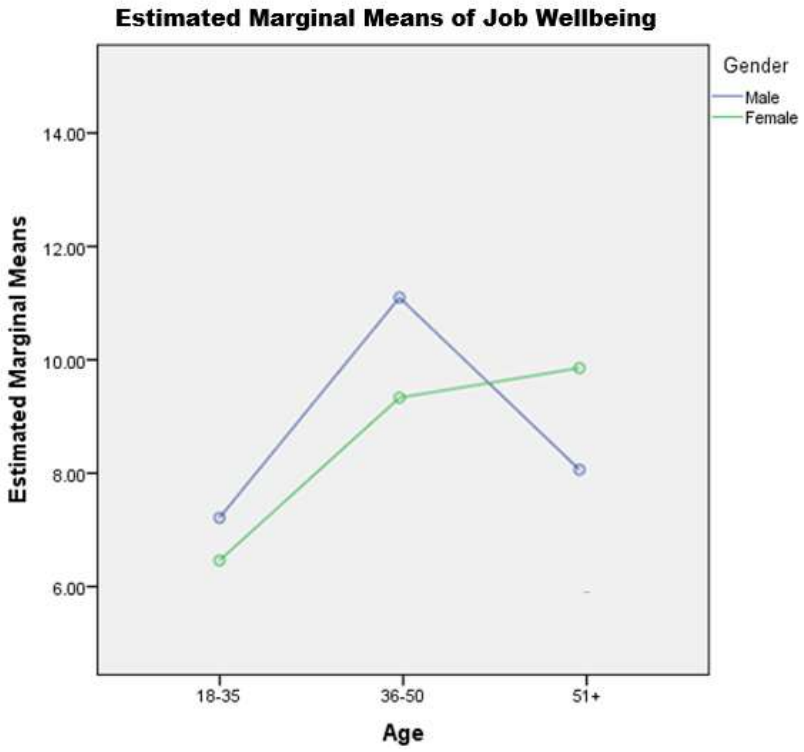

Figure 5.8 Graph of interaction effect between gender and Age of Job Wellbeing

Figure 5.9 indicates that females had the most acceptance in the youngest group, and the least in the eldest. The middle-aged group seemed to be close in comparison with their personal acceptance to change. The eldest group did have a clear difference in acceptance, with the older males being more accepting of change than the females, which was a direct opposite to the youngest group.

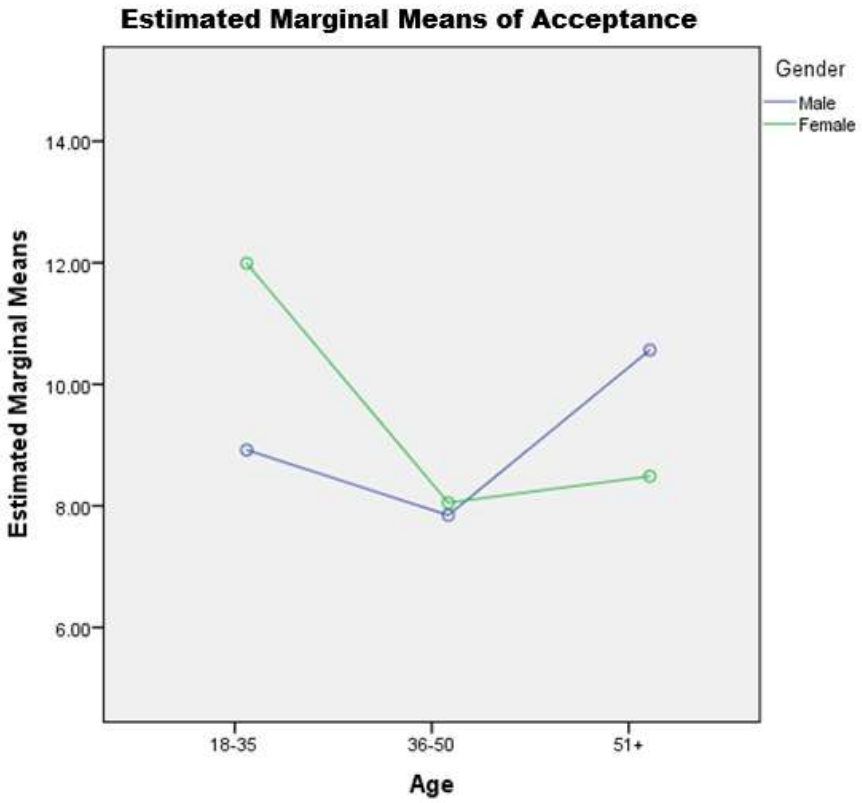

Figure 5.9 Graph of interaction effect between gender and Age of Acceptance

Figure 5.10 shows that the youngest age group has the most amount of fear as compared to the other two groups, with males being more afraid than females. The middle age group has a similar pattern with females have less amount of fear than the males, but this is reversed in the eldest age group, with males having less fear than that of females. It can be clearly identified that as the age groups increases, fear decreases amongst the genders.

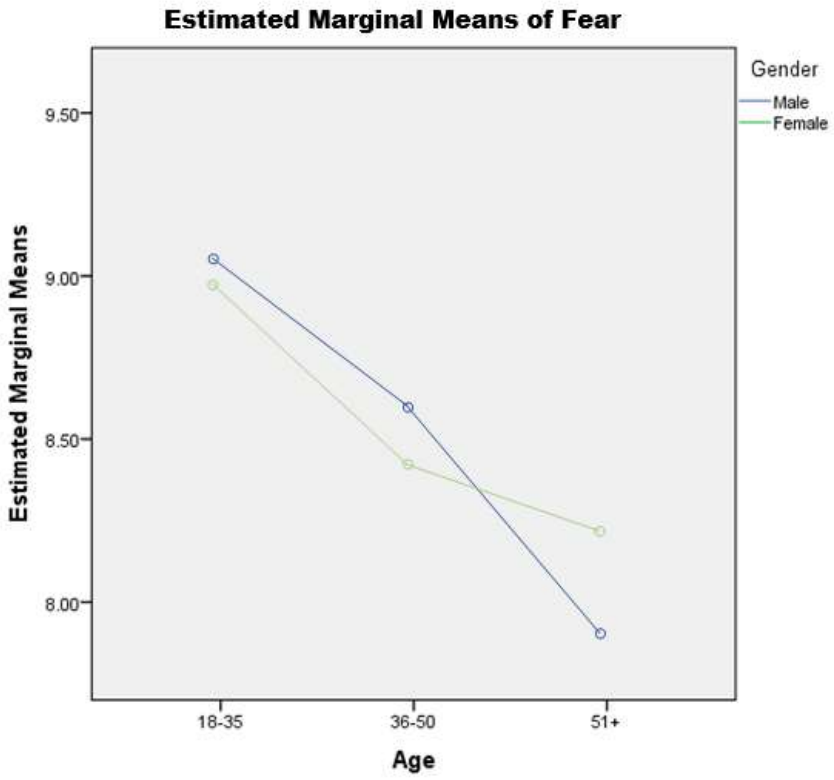

Figure 5.10 Graph of interaction effect between gender and Age of Fear

From Figure 5.11, it can be identified that the middle age group had a lower level of trust as compared to the other two groups. The younger females show a higher trust factor than that of the males. The differences in male and females imply that there are subtle differences, however, it was the age factor that had the greatest affect.

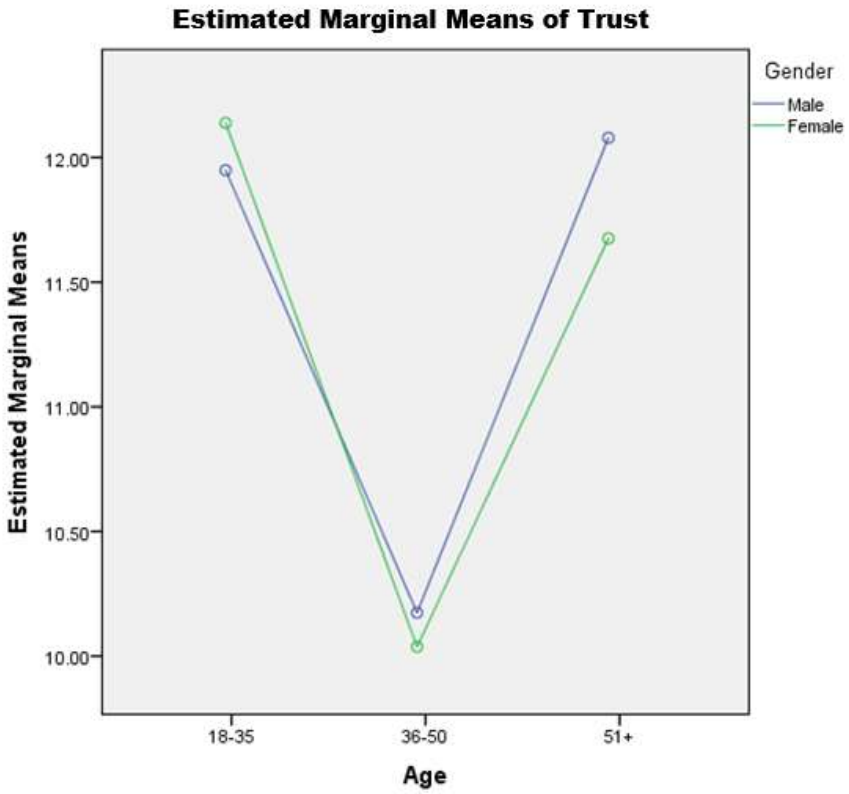

Figure 5.11 Graph of interaction effect between gender and Age of Trust

5.4.4. Intention to Use vs. Resistance to Change

An evaluation was done to find out if there was a relationship between the intention to use new technology (BI) and the resistance towards change.

5.4.4.1. Overall

Table 5.49 shows a very significant negative correlation between resistance and BI of -0.514, with $p < 0.01$.

		Resistance	BI
Resistance	Pearson Correlation	1	-.514**
	Sig. (2-tailed)		.000
	N	315	315
BI	Pearson Correlation	-.514**	1
	Sig. (2-tailed)	.000	
	N	315	315

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.49 Relationship between Resistance and Intention to use technology

5.4.4.2. MALE

Table 5.50 shows that there was a very significant negative correlation between resistance and BI of -0.474, with $p < 0.01$ in the male segment of the sample.

		BI_M	Resistance_M
BI_M	Pearson Correlation	1	-.474**
	Sig. (2-tailed)		.000
	N	182	182
Resistance_M	Pearson Correlation	-.474**	1
	Sig. (2-tailed)	.000	
	N	182	182

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.50 Relationship between Resistance and Intention to Use Technology in the Male Segment of the Sample

5.4.4.3. FEMALE

Table 5.51 shows that there was a very significant negative correlation between resistance and BI of -0.595, with $p < 0.01$ in the female segment of the sample.

		BI_F	Resistance_F
BI_F	Pearson Correlation	1	-.595**
	Sig. (2-tailed)		.000
	N	133	133
Resistance_F	Pearson Correlation	-.595**	1
	Sig. (2-tailed)	.000	
	N	133	133

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.51 Relationship between Resistance and Intention to Use Technology in the Female Segment of the Sample

5.4.4.4. Age Group 18 – 35

Table 5.52 show that there was a significant negative correlation between resistance and BI of -0.331, with $p < 0.01$ in the youngest age group of the sample.

		BI_1	Resistance_1
BI_1	Pearson Correlation	1	-.331**
	Sig. (2-tailed)		.000
	N	116	116
Resistance_1	Pearson Correlation	-.331**	1
	Sig. (2-tailed)	.000	
	N	116	116

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.52 Relationship between Resistance and Intention to Use Technology in the Age Group of 18 - 35 years

5.4.4.5. Age Group 36 – 50

Table 5.53 show that there was a significant negative correlation between resistance and BI of -0.576 with $p < 0.01$ in the age group of 36 – 50 years old.

		BI_2	Resistance_2
BI_2	Pearson Correlation	1	-.576**
	Sig. (2-tailed)		.000
	N	169	169
Resistance_2	Pearson Correlation	-.576**	1
	Sig. (2-tailed)	.000	
	N	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.53 Relationship between Resistance and Intention to Use Technology in the Age Group of 36 - 50 years

5.4.4.6. Age Group 51+

Table 5.54 shows that there was a significant negative correlation between resistance and BI of -0.751, with $p < 0.01$, in the eldest age group of the sample.

		BI_3	Resistance_3
BI_3	Pearson Correlation	1	-.751**
	Sig. (2-tailed)		.000
	N	30	30
Resistance_3	Pearson Correlation	-.751**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.54 Relationship between Resistance and Intention to Use Technology in the Age Group of 51 Years and Older

5.4.4.7. ANOVA Comparison of Means

This part of analysis investigated how gender differences impact on resistance to use new technology while considering the age of the respondents. A two-way ANOVA comparison of means was performed using SPSS. Table 5.55 shows the results of the scores that were used to compare the constructs within the measurement model.

Source	F	Sig.
Corrected Model	4.515	.001
ntercept	8896.154	.000
Age	4.363	.014
Gender	.339	.561
Age * Gender	3.893	.021

Table 5.55 Table 5.23 ANOVA Comparison of Means (Resistance) - Gender and Age

Figure 5.12 shows that the youngest group had the least resistance, with females being less resistance than males. The middle aged and eldest group, saw the reverse, males were less resistant to change, with the eldest group being the most resistant. Although there are the subtle differences between the genders in each age group, the overall ager categories seem to have the most effect.

5.4.1. Factors of change

This section looked at the factor that affected change in the past and the workers' feelings towards the future decisions. It tried to highlight what the workers felt on an emotional level with regards to the extrinsic actions of the Management

5.4.1.1. Successful Change in the Past

From the information provided, it can be seen that the most effective variable for a successful change implemented in the past was that of good communication, with 64 per cent of the participants in agreement. The next factor that was deemed important was good planning, with 30 per cent of the participants choosing this. Table 5.56 shows these results along with the other factors that the participants felt contributed to a successful change.

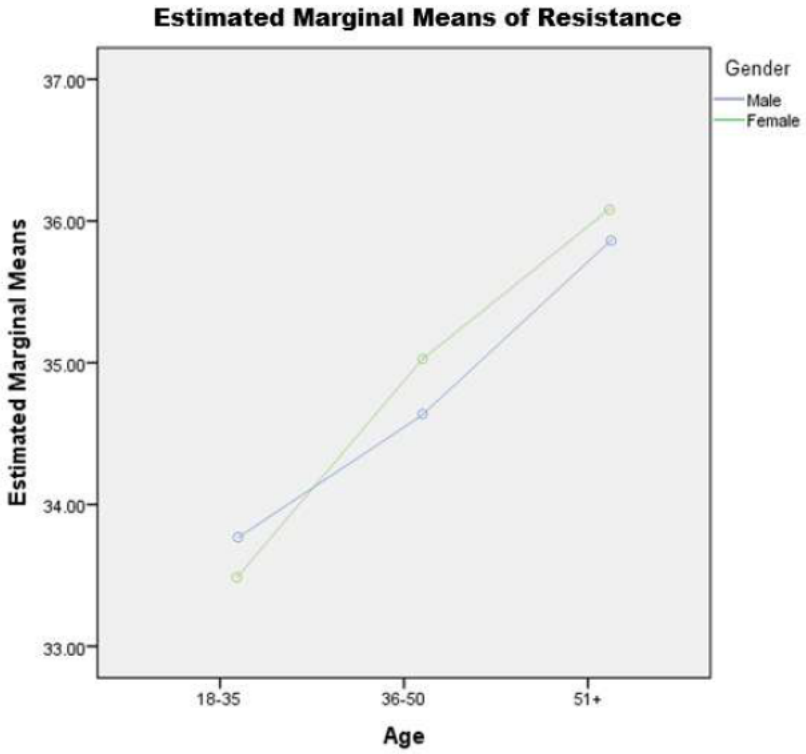

Figure 5.12 Graph of interaction effect between gender and Age of Resistance

Successful Change in the Past

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Good Planning	96	30.5	30.5	30.5
	Benifits to my personal work	8	2.5	2.5	33.0
	Good change communication	202	64.1	64.1	97.1
	Company Culture	5	1.6	1.6	98.7
	No successful change	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Table 5.56 Factors that Prompted Successful Changes

5.4.1.2. Major Concerns

The main factor chosen by the participants for concerns faced with changes that were not successful was that of not fully understanding the change. 80 per cent of the participants found this to be an issue. Not understanding the changes could be directly linked to not communicating the correct activities and reasons for the change. This can be seen in Table 5.57.

Concerns

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	·Concerns of the change impacts to my personal work	16	5.1	5.1	5.1
	Increaced workload	37	11.7	11.7	16.8
	Not Fully understanding the change	252	80.0	80.0	96.8
	No concerns	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

Table 5.57 Major Concerns Faced with Past Changes

5.4.1.3. Challenges Faced

There were three major challenges that participants focused on when asked. These were that the changes were too slow and complicated (15 per cent), not enough training was provided (28 per cent), and the greatest challenge was the lack of communication (55 per cent). This is depicted on Table 5.58

Challenges

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not enough communication	174	55.2	55.2	55.2
	change is slow and complicated	48	15.2	15.2	70.5
	Not enough training	88	27.9	27.9	98.4
	No help to me	5	1.6	1.6	100.0
	Total	315	100.0	100.0	

Table 5.58 Challenges Faced with Change

5.4.1.4. Managers Support

Managers play a vital role when there are changes to be made. Their presence and encouragement aids in the processes to enable the employees to feel at ease and accept the new challenges. 55 per cent of the sample believed that their managers gave them no support and help in the change processes, but 45 per cent believed that they got the support and encouragement that they needed. Table 5.59 shows these results.

Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	141	44.8	44.8	44.8
	No	174	55.2	55.2	100.0
	Total	315	100.0	100.0	

Table 5.59 Managerial Support

5.4.1.5. Managers' Interaction

It seems that the workers felt as though the managers did not offer any assistance with regards to the changes (36 per cent), but many also felt that there was a major lack of feedback (35%). These were the two major factors that could be witnessed in Table 5.60.

Managerial

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Promoting benefits of change	19	6.0	6.0	6.0
	Feedback and listening	111	35.2	35.2	41.3
	Gives me feedback	50	15.9	15.9	57.1
	Pushing me to do the work	21	6.7	6.7	63.8
	No help	114	36.2	36.2	100.0
	Total	315	100.0	100.0	

Table 5.60 Managers Interaction During the Change Processes

5.4.1.6. Explanation of Change

48 per cent of the employees felt that no explanation was given of the changes that had taken place, and 28 per cent felt that the changes and the need for the changes had not been clearly stated. Nevertheless, 19 per cent of the participants believed that they did get some explanation for the transformation that was taking place. Table 5.61 shows these results.

Past Changes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In detail	15	4.8	4.8	4.8
	Some extent	60	19.0	19.0	100.0
	Not clearly stated	89	28.3	28.3	81.0
	No explanation	151	47.9	47.9	52.7
	Total	315	100.0	100.0	

Table 5.61 Explanation of Change from Management

5.4.1.7. Future Expectation

From Table 5.62, it is clear that the majority of the participants were unclear about the future changes, but they did not necessarily have strong negative or positive views of the changes either.

Future Expectation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Positive	22	7.0	7.0	7.0
	Neutral	264	83.8	83.8	90.8
	Negative	29	9.2	9.2	100.0
	Total	315	100.0	100.0	

Table 5.62 Future Expectations

5.5. Phase Two: Qualitative Phase

The data gathered from the semi-structured interviews are also presented in this chapter. There were six Managers that were interviewed from TSAM, with the focus of the interviews being an exploration of their experience and views with regards to the new technology, its implementation and the associated change process. A number of themes were identified and set out in the interview schedule; these included:

- Benefits of technological advancements;
- Managers' perspectives of the effect of the new technology on the workers;
- The impact that the implementation of new technology has on Management;
- Problems faced when implementing new technology; and
- Strategies developed to implement changes and overcome resistance.

Since the interviews were semi-structured, these themes were not always explicitly clear in the questions, but rather emerged as part of the narrative across the responses. The interviews were recorded and thereafter transcribed, in order to facilitate analysis. The analysis began with reading the transcripts repeatedly, in order to acquire a sense of patterns and categories that occurred. The categorisation of data was performed in accordance to the study done by Charmaz (2008), which explained the use of 'open coding' and 'selected or focused coding'. The transcripts were read repeatedly with parts of the text being coded by the concept that they engaged with, hence no predetermined categories were used. Thereafter the codes were scrutinised in accordance with the themes of the study. The categories according to which the data was organised were defined by the codes that emerged. Connections between categories emerged by reassembling the codes, and these connections were then grouped in accordance to the themes explored via the interviews.

The method of repeatedly coding, categorising and thereafter grouping similar categories was inductive due to the codes and categories emerging from the data itself. This process was iterative due to the reading and rereading of data at the focused coding stage, where the themes emerged from the data. The data was then organised from the entire range of transcripts under the broader categories. The respondents were labelled as Respondent 01, Respondent 02 … Respondent 10, in order to maintain anonymity while keeping true to each interview. There was some repetition in the categories, however it was vital that a true representation of each theme was portrayed. Following the organisation of the categories into the overall themes, the essence of each respondent's views were further analysed. A comprehensive summary was then achievable.

5.5.1. Benefits of technological advancements

Respondents spoke about their ideology of technology and past experiences. They identified with the experiences that they had encountered, which touched on how they assumed the new technology could change the way processes and events occur now. The respondents had a similar idea of what they envisioned as the future, even though their experiences differed. This could be based on the fact they viewed' the bottom line as an overall effect on the organisation from a financial point of view, rather than just from an emotional stand point. It was also witnessed that they identified numerous

situations in which they put the employee first. The table below shows the categories obtained and the number of times in which they appeared.

Categories	Number of Scripts in which the Categories were Evident
Positive perception	6
Profitability	5
Safety	3

Table 5.63 Categories Indicating the Benefits of Technological Advancements

5.5.2. Managers' Perspective of New Technology Towards Workers

The employees were the ones directly affected by the introduction of new technology, as their everyday processes were changed from the norm. The acceptance of the changes had to come from the persons working with it, and legislation or policies would not regulate this acceptance in any form. Therefore, the way in which the technology was introduced and implemented was vital from a Management stand point. The impact was evident in the different reactions that employees exhibited when identifying the change of processes, when deciding how to accept them and if the changes were worthwhile, as they would ultimately be the ones that utilised the technology most efficiently. The responses led to views that identified a few categories, as shown in Table 5.64.

Categories	Number of Scripts in which the Categories were Evident
Simplify job processes	5
Safety	4
Job enhancements	3

Table 5.64 Categories Indicating the Managers' perspectives of the Impact of New Technology on the Workers

5.5.3. The Impact that the Implementation of New Technology has on Management

Given the crucial role that Management play in the implementation of new technology, their feelings and opinions were probed. Change initiatives to implement new technology had to adopt a top-down approach, therefore it was vital that Management agreed with what would transpire. Respondents demonstrated similar standpoints as to the way that the technology would affect them, and the following categories developed:

Categories	Number of Scripts in which the Categories were Evident
Positive perception	6
Increased efficiency	4
Access to information	3

Table 5.65 Categories Indicating the Impact that the Implementation of New Technology has on Management

5.5.4. Problems Faced when Implementing New Technology

Some major issues emerged when discussing the implementation of new technology and automation in the plant. The issues raised were reiterated numerous times by multiple respondents, regarding what they identified as major setbacks that needed to be addressed. Their views were important as they were pre-existing issues encountered once again that could be addressed with future implementation. The categories that arose are displayed in the table that follows.

Categories	Number of scripts categories evident in
Identify demographics	5
Skilled personnel to head changes	4
Communication and inclusion	3

Table 5.66 Categories indicating the Problems Faced when Implementing New Technology

5.6. Conclusion

This chapter presented the results of the various statistical analysis tools applied. The information portrayed was obtained via SPSS Version 23 software. The chapter endeavoured to create the basis for the following chapter, where the results will be discussed in detail. The values obtained and conclusions reached in this chapter were based on factual information and statistical analysis.

CHAPTER SIX

Discussion of Results

6.1. Introduction

The preceding chapter illustrated the responses from the surveys conducted. The data collected from the questionnaires and interviews was analysed using recognised statistical techniques. This chapter discusses the results obtained in relation to the aims and objectives of the study, and endeavours to bring to light imperative relationships and data that would be beneficial in the formulation of the model.

This chapter has been developed in parts to allow for a coherent flow of data that can be easily read. The sections are in line with those of the research method.

Phase One:
Analyses the quantitative data

Phase Two:
Analyses the qualitative data (Phase Two)

Comparison of Data:
Correlates the data obtained from the first two parts, to draw a valid conclusion and create an acceptable conclusion.

6.2. Phase One: Quantitative Analysis

6.2.1. Demographics of the Quantitative Sample

The demographics showed that although there were more males than females, the difference in the numbers was not that great and this could be understood as a good sample. In addition to this, it was found that there were more females in the younger group than males. This shows the shift in dynamics as the automotive industry was taken for granted in the past as a male dominated industry. The information obtained from this section was used to create mini clusters to further understand the relationship analyses.

The educational factor showed that the majority of the participants had matriculated, therefore creating the belief that the individuals had the educational background to

understand the change principles needed. It was further found that there were people with higher qualifications working in tasks that did not require any specific skills. It has long been thought that there was a shortage of skills in South Africa, however, this investigation revealed that there are skilled people performing menial jobs due to a lack of technologically advanced jobs available.

6.2.2. Level of Acceptance of New Technology by Toyota South Africa Manufacturing Employees.

The relationships between the PU and PEU were examined as they constitute the workers' beliefs of what they deemed beneficial with minimal effort (Davis, 1989). To identify this relationship, both PU and PEU needed to be positively related to the BI of use. Furthermore, a new system that was deemed to be easier to use and more useful, would be accepted much quicker. The aim of this section, therefore, was to recognise the relationships that emerged from the research feedback acquired.

6.2.2.1. Relationship between Perceived Usefulness and Perceived Ease of Use

The data analysed showed a strong positive relationship between the Perceived Usefulness and the Perceived Ease of Use within the overall population. It was however, also important to investigate the level of acceptance within each cluster, so as to allow for a proper understanding of the segmented sample.

The different genders had a similar belief within this category, as they both showed a strong positive relationship between the Perceived Usefulness and the Perceived Ease of Use. By further delving into the segmented clusters, it was found that all the age groups also had a similar relationship.

It is important to understand that these correlations did not take into consideration the software glitches, hardware malfunctions or incorrect translations of inputs or outputs associated with the introduction of new technology. The intention was to show that in the event of implementing new technology, the Perceived Ease of Use and Perceived Usefulness would be high enough for the individuals to accept the changes. These results reaffirmed the results obtained from a previous study by Davis (1989). The strong positive relationship between Perceived Usefulness and Perceived Ease of Use proved that the employees would be more likely to use the technology, than if the

relationship was weak. The relationship also suggested that the employees deemed technology that was easy to use as useful (Ndubisi & Jantan, 2003).

From the information acquired and examined, Hypothesis One could therefore be accepted. Hypothesis One states that:

The Perceived Usefulness is positively related to the Perceived Ease of Use of new technology in Toyota South Africa Manufacturing.

6.2.2.2. Relationship between Perceived Usefulness and The Intention to Use New Technology

The data analysed showed a strong positive relationship between the Perceived Usefulness and the Intention to Use the New Technology within the overall population. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. By investigating each cluster, the different genders yet again had a similar belief within this category, as they both showed a strong positive relationship between the Perceived Usefulness and the Intention to Use New Technology. The different age groups, however, had distinct differences among them.

The youngest age group was in accordance with the overall view, in that there was a strong positive correlation between the Perceived Usefulness and the Intention to Use the New Technology; however there was no correlation in the largest group of 36 – 50 year olds. This contradicts what most studies have shown; that they were regarded as technologically acceptant and easily trainable (Lancaster & Stillman, 2002). A possible explanation for this contradiction could be due to this generation's scepticism and motivation, which made them susceptible to feelings of demotivation and they viewed their jobs as menial, suggested Wong and Chin (2016). These individuals could be looking for a job that challenged them and forced them to feel like they have accomplished tasks, even if it was labour intensive.

Although the middle age group (36 – 50 year olds) indicated that they possibly did not find the technology useful, the oldest generation (51 + years) exhibited a slight positive relationship. This indicated their understanding and ability to still try and make their work life easier. It was assumed that the elderly would resist the use of technology as they would be ingrained in the methods that they had been using for many years, however new studies have shown that the findings of this study were in line with the current paradigm shift. These studies showed that the older generation are adapting

to the newer technology and utilising it to make their lives easier, more understandable and more efficient (Ofcom, 2010; Bowker Market Research, 2012; Damodaran et al., 2014).

The data obtained did have conflicting information within some of the clusters, however, the overall relationship showed that there was a significant positive relationship that existed between the Perceived Usefulness and Intention to Use the New Technology. It could be assumed that the employees could formulate a constructive view if the technology proved that it could be useful to them. The findings of this study thus echoed those of Davis (1989), who verified that the Usefulness would directly impact on the Intention to Use the New Technology.

From the information acquired and examined, Hypothesis Two could therefore be accepted. This hypothesis states that:

The Perceived Usefulness is positively related to the Intention to use new technology in Toyota South Africa Manufacturing.

6.2.2.3. Relationship between Perceived Ease of Use and Intention to Use New Technology

The data analysed showed a strong positive relationship between the Perceived Ease of Use and the Intention to Use the New Technology within the overall population. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. By investigating each cluster, the different genders yet again had a similar belief within this category, as they both showed a strong positive relationship between the Perceived Ease of Use and the Intention to Use New Technology, but the female sample showed the strongest correlation amongst all the clusters. Seeing that males portrayed less anxiety than females, this would explain the importance of technology being easy for the females (al-Absi & Abed, 2014), i.e. females needed to understand that the new technology would not be complicated or cause major disruptions in their day to day activities.

The different age groups once again displayed different views. The youngest and oldest generations harmonised in their strong positive relationship between the Perceived Ease of Use and the Intention to Use New Technology. It was the females in the youngest group that aided in the strong positive relationship as there was a big

difference with the view. The 36 – 50 year age group once again defied normal expectation as there was no significant relationship formulated. In a reverse finding, the middle aged females were less enthusiastic to use the technology as compared to the males. As explained before, this could be due to their need to have a challenging and job experience and/or not wanting to conform (Lancaster & Stillman, 2002).

Although the data obtained did have conflicting information within some of the clusters, the overall relationship showed that there was a significantly positive relationship that existed between the Perceived Ease of Use and the Intention to Use New Technology. These finding agreed with those of Davis (1989), who also stated that the Perceived Ease of Use not only aided in proving the Intention to Use the New Technology, but also proved the assumption that by enabling the employees to work with the new technology more frequently, they would find it easier to adjust and inevitably use it to enhance their job performance.

From the information acquired and examined, Hypothesis Three could therefore be accepted, which states that:

The Perceived Ease of Use is positively related to the Intention to Use New Technology in Toyota South Africa Manufacturing.

6.2.2.4. Interpretation of Findings for the Acceptance of Technology

The research provided findings for the relationships between the following:

- Perceived Usefulness and the Perceived Ease of Use of new technology
- Perceived Usefulness and the Intention to Use New Technology
- Perceived Ease of Use and the Intention to Use New Technology

The results have shown that, overall, there was a positive trend to use the new technology, but the middle aged group did not conform to the norm. As explained at the outset, this was characteristic of this age group. These characteristics thus make them the target group when trying to implement new technology.

With this stated, the positive results obtained could be used to accept Hypothesis Four, which states that:

The new technology would be accepted by the employees of Toyota South Africa Manufacturing.

6.2.3. Aspects that Intensify the Resistance to Change

Examining the four main aspects that affected resistance, namely, fear, trust, job wellbeing, and acceptance, provided a better understanding of the issues that employees felt were most imperative for them to feel comfortable with, when encountering change.

6.2.3.1. Fear

It could be assumed that when a change was perceived as being threatening to the norm, that a person would fear the repercussions that could prevail (Hultman, 2003). By investigating the relationship obtained from the data, a strong overall positive relationship was found between fear and resistance to change. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. This implied that as the fear factor increased, the resistance towards the change would also increase.

It was found that there was a significant positive relationship among most of the clusters, with the youngest age group having the greatest fear. This was the age group that was less intimidated by diversity and status. They could be seen as eager to please and to take on new challenges and technology (Madinda, 2014). Additionally, they were new to the working environment and thus inexperienced, and felt that they still had a lot to prove. They therefore needed stability in order to perform their tasks optimally, as suggested by Wainaina et al. (2014) and as a result, had a high fear factor.

The anomaly that was found was in the oldest age group. A significant negative relationship emerged. This implied that fear of change did not affect the older generation, or they didn't mind it as they were awaiting retirement and felt secure in their jobs (Mulders & Wadensjö, 2015).

From the information acquired and examined, it emerged that an overall significant relationship existed between resistance and fear, which implied that Hypothesis Five could be accepted. This hypothesis states that:

Fear has a positive effect on resistance to change.

6.2.3.2. Trust

It was vital that the employees trusted their management and understood what was expected (Sørensen, et al., 2011). The data showed an overall significant negative relationship between fear and resistance. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. This meant that as the trust decreased, the resistance would increase. Decreasing the trust greatly impacted the change process (Clarke, 2016), such as impeding the employee's satisfaction with the job environment, thereby destroying the safety needs discussed by Maslow's hierarchy of needs (Maslow, 1943).

Two groups that did not have any correlation with trust and resistance were those of females and the age group of 18-35 year olds. By delving deeper into the demographics, it was found that the younger cluster was made up mainly of females, which would explain the slight negative movement of the age cluster that also involved the males. Although this skewed the results, it could be stated that since females try to avoid conflict (Furumo, et al., 2014), they were more susceptible to believing that management had their best interests in mind. The male population focused rather on the job on hand to create an opinion based on action rather than on emotion (Njoroge & Yazdanifard, 2014; Furumo, et al., 2014) . it was also found that middle aged group had the least amount of trust as compared to the other two groups. The Gender factor, although played a part in correlation, did not have a drastic difference such as the age factor.

Although there were conflicting views within the sample, the overall relationship showed a significant negative relationship between trust and resistance. Therefore, Hypothesis Six could be accepted, which states that:

Trust has a negative effect on resistance to change.

6.2.3.3. Job Wellbeing

Job wellbeing was a vital factor that had a direct impact on the employees' satisfaction in the organisation. If an employee was unsure about their future in the company, it would be difficult to get the best out of them (Imran & Majeed, 2015). The data found that overall there was a significant negative relationship between job wellbeing and resistance, and this was in line with the findings of past studies. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were

formed This relationship showed that as the feeling of job wellbeing increased, the resistance to change would decrease.

The factor with the least significance was that of the youngest age group; but by analysing the other clusters, it was found that the female sample also had a low significance level. The male cluster had the highest significant negative relationship. As explained earlier, it can be deduced that the relationship was influenced strongly by the female factor in the segment.

By comparing studies that looked at the turnover rate of males compared to females, drastically conflicting results were seen, with many studies stating that there was no difference between the two, merely a sense of job wellbeing that needed to be achieved (Khan, 2013). The results of this study could be linked to the labour laws and policies that were confined to South Africa. The Employment Equity Act favoured women in the workplace, in that there was a push to equalise the gender biasness that had been present in the past (Women: Rebuplic of South Africa, 2015).

Another anomaly appeared within the oldest cluster. As explained before, this could be attributed to their belief that their jobs were secure because of their years of service.

Although conflicting views were ascertained here, the overall relationship showed a significant negative relationship between job wellbeing and resistance. Therefore, Hypothesis Seven could be accepted, which states that:

Job welling has a negative effect on resistance to change.

6.2.3.4. Personal Change

Many try to hold on to a sense of control and psychological safety, therefore their ability to change and accept it could be understood as an emotional decision to understand if they were ready or not. Understanding the contributing role that acceptance had to resistance, would aid in understanding the employees' level of readiness to change in the company, asserted Weiner et al. (2008). Overall, there was a strong negative relationship between personal change and resistance. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. This meant that the employees were not ready for change. The two major outliers were the females who showed the least acceptance, and the younger generation who seemed to have the least resistance, despite being mostly made up of females.

According to Jerome et al. (2014), the younger generation could be assumed to have a higher acceptance to change, with females showing the higher acceptance than males. This feeds back into the fact that females did not want to cause conflict. They could be enticed to support the new technology and learn additional methods to supplement or even improve their current working practice.

Although conflicting views were ascertained here, the overall relationship showed a significant negative relationship between personal acceptance and resistance. Therefore, Hypothesis Eight could be accepted, which states that:

Personal acceptance of change has a negative effect on resistance to change.

6.2.3.5. Interpretation of Findings for the Resistance to Change

By examining the relationship of each factor that contributed to resistance, it could be deduced that the foremost reason would be the lack of trust that existed between the individual and the organisation. This trust had to be instilled and nurtured by the Management team.

The factor that individuals seemed least concerned about was that of job wellbeing. This could be attributed to the unions and job laws in South Africa. It showed that the employees did not fear the idea of losing their jobs, but would resist change if they did not see any benefit to them in a personal capacity.

6.2.4. The Relationship between Resistance to Change and Intention to Use New Technology

This study confirmed the negative relationship that existed between the Resistance to Change and the Intention to Use the New Technology. This was fortified by using Pearson's correlation, as well as SEM to identify the relationships that were formed. These results concurred with those of previous studies done by Poon et al. (2004) and Bhattacherjee & Hikmet (2007), which found that higher user Resistance did have the potential to decrease an individuals' Intention to Use the New Technology.

The youngest age group, was found to have the least resistance while there was a stronger negative correlation between the oldest age group.

From the information acquired and examined, Hypothesis Nine could therefore be accepted, which states that:

Individuals' resistance to change is negatively related to their intention to use new technology at Toyota South Africa Manufacturing.

6.2.1. The Role Communication could Play to Enhance the Acceptance of Automation

Femi (2014) stated that communication was crucial when handling unfamiliar scenarios, as it reaffirmed the trust and loyalty of the employees and increased their job performance. It was important in this study to discover what role communication played, and the perceptions of automation maintained by the employees.

The majority of the participants felt that when there was a successful change, the reason behind it was good communication (Figure 5.33). It showed that the individuals would accept the change if they were aware of the transformations. The predominant response to good communication aided in the belief that trust could be built between the organisation and its employees.

Conversely, it was found that when changes were either not accepted or did not work out as planned, employees blamed these on a lack of understanding of the process (Figure 5.34). This finding further solidified the notion stated above with regards to successful change. Communication was thus vital in enabling the employees to fully understand what was proposed and how they would fit into the equilibrium. It was therefore evident that failure to communicate effectively meant that changes could not be fully implemented.

Communication came up as a major factor once again when asked about the challenges that the employees faced. It could be ascertained that employees felt as though they should be informed about changes, not as management saw fit, but rather until they understood the issues at hand.

From the responses obtained from the individuals, it could be reasoned that Hypothesis Ten could be accepted. This hypothesis states that:

Communication factors are highly connected to change activities.

6.3. Phase Two: Qualitative Analysis

The analysis of the qualitative data obtained from the interviews, along with the illustrative quotes obtained from the respondents, is presented below. The sections

are arranged such that they speak to the overall theme, the categories that emerged from the themes and a summary of the findings within the themes. Literature reviews have also been drawn in to further emphasise the points and findings made.

6.3.1. Benefits of technological advancements

The respondents showed a positive attitude towards new technology and automation, as all six of the respondents used words like 'better', 'improvement', 'positive' and 'beneficial' to describe their feelings towards new systems. A number of items were discussed, among which were the improved efficiency that would come with the new technology and the cost saving that would be evident. The options expressed by the respondents included:

> "*We need automated systems*" (Respondent 01).
>
> *"… has always been beneficial*" (Respondent 02).
>
> *"… improves your process"* (Respondent 03).
>
> "*New technology brings new opportunities*" (Respondent 04).
>
> *"… makes the business profitable*" (Respondent 06).

Respondent 05 believed it was best…

> "… *not to try and upgrade hardware and software continuously. New technology would not be the best way forward without getting full value from what was already installed*."

This was an apt opinion as there needed to be proper justification shown for the improvement of processes, with just reasons as to the motivation for and benefits of the change.

Overall they seemed enthusiastic about the technology, and were eager to express how it could be used. Results achieved by moving forward with advancements and the introduction of new technology were readily provided. The first item discussed was the profitability factor. They understood that there would be major cost savings by improving certain processes. Many had similar viewpoints, as shown by the quotes below:

> *"… huge cost saving"* (Respondent 01).

"…improve process… reduce errors" (Respondent 02).

"*We have products that are developed quicker, faster, more efficiently, more reliablely, more consistently, and (it) makes organisations more profitable"* (Respondent 04).

"… allows their business to be profitable" (Respondent 06).

They gave multiple examples of how this would assist in the organisation. One example in particular came from Respondent 02, who also included the quality aspect:

"*And from a quality point of view, we used to have skids that knocked against each other, (which) had tailgates and bonnets opening and hitting against each other, which caused a lot of damage and a lot of panel repairs*"

A few of the interviewees also spoke about the consistency and reduction of errors.

A vital aspect expressed by the respondents was that of safety. They were explicit in their demand that new technology added a higher safety factor that would assist in ensuring the wellbeing of the employees. Respondent 01 spoke about the heavy lifting that the employees had to endure:

"*Right now, I do not believe we should have multiple people loading and unloading parts, which leads to damages and unnecessary down time when they do not feel like working;, not to mention (personal) injury when heavy parts are lifted incorrectly*."

This was reiterated by Respondent 02, who stated that…

"We had two cases of severe injury, which spun off the automation of the mezzanine floor."

This was seen as a concern by Management, and they implemented new automation that assisted in ensuring that safety was maintained in the plant. Respondent 03 also made the statement that new technology could assist "to make it safer".

The consensus seemed to be unanimous that new technology, when implemented correctly, would provide tremendous benefits. Management was able to look at the new implementation from an holistic view that would benefit the organisation as a whole. This positive feedback could also be seen from the gestures made by the

respondents when interviewed. Most of these respondents leaned forward when discussing the benefits and advantages during their interview, and thereafter sat back in their chairs. A few also spoke faster, with a change in the tone of their voice. These are characteristics of excitement and enthusiasm (Zhou & Zhang, 2008). It appears they found the interview as an outlet to express their true views and passion.

6.3.2. Manager's Perspective of New Technology and its Effect on Workers

It was found that many employees believed that Management did not always put the needs and best interests of their employees first (Lederman, 2015). Osabiya (2015) added that the actions of management directly affected the motivation of the employees, and lead to either a successful end result or to devastating results. It was interesting to find in this study that the Managers did not only look at the situation from an organisational standpoint, but rather also considered the implications that the changes would make on the individual employee at ground level. The option that the majority of the respondents made mention of was that of simplifying the tasks at hand. This was followed by the idea of a safer working environment so that there would be fewer fatalities, and finally by the opportunity for job enhancements. The Management did see that the technology affected the employees directly and showed signs of trying to maintain the ethos of the organisation.

The respondents made multiple mention of these facts and many reiterated them as the interviews progressed. Some of these remarks were:

> "*As I mentioned before there are huge cost savings, maximising time to get additional products, (and) therefore added profit; obviously (with) minimal injury, and therefore (with) increased safety*" (Respondent 01).
>
> "*So from a safety point of view it had benefits*" (Respondent 02).
>
> "*It can make that opportunity to skill up much shorter through operator training simulators*" (Respondent 04).

Respondent 03 mentioned the approach taken by Toyota Japan when implementing new technology, which implied that Toyota South Africa would follow suit:

"Toyota Japan for instance. That job won't go away because you replaced it with an automated process. That person, whose job was replaced, would be up-skilled, provided that they bought into (the change)."

Respondent 03 also made a point in stating:

"Don tell someone they will become a manager in six years because of the piece of technology".

Instead, Respondent 03 was adamant that the employees be motivated correctly, by telling them*:*

"With this piece of technology you will learn something new, something you don't know right now".

Unfortunately, jobs would be lost in the process of optimising solutions and moving into a more profitable realm. Respondent 02 spoke about decreasing the headcount in the automation initiative, which was also seen as a cost saving; but Respondent 03 spoke about having them moved to elsewhere in the plant. Respondent 04 stated that it was unfortunate that there would be job losses:

"… on the lower level of the organisation those jobs may be scarce".

Respondent 05 also made mention of jobs that were no longer needed since the introduction of technology, while Respondent 06 reiterated that positions could become redundant.

The Managers were of the explicit opinion that even though certain tasks would be mundane and no longer needed, there would be new avenues of growth with enhanced working environments. Respondent 06 explained that:

"People need to realise that sooner or later, because if they realise it too late (and) they don't adapt to the technology, then they have bigger issues when it comes to other advancements in their career."

Respondent 06 then furiously added:

"*They cannot be living in the past*."

This was an assertive response from which it could be inferred that although Managers tried to facilitate the forward movement of the employees, they could not hinder the progress of the organisation.

There was a steadfast opinion amongst the respondents that an organisation was built with people, and that it would stay that way. They were of no mind to have a fully automated, unmanned plant. This was evident with many respondents stating that:

> "*Automation has its place in industry and we need to obviously be careful and choose where we want to use automation to improve certain aspects; but at the same time we shouldn't…*" (Respondent 02).
>
> "*The fact is that in some cases technology will replace people - that happens. It shouldn't be the reason for the technology to replace people, it should be to augment…*" (Respondent 03).
>
> "*But at the end of the day, humans still operate the plant. A human still makes the decision of whether to start or stop, and a human is ultimately responsible for the profit of the organisation. We would never move away from it.*" (Respondent 04).

It was clear that there was no direct intention to negate workers from their jobs, but rather to enhance the working environment and to try and increase the skill set of the workers so that they could be more efficient.

Respondent 06 explained:

> "*If the business profits, so do the people*"

Respondent 04 explained their plans to assist with simplifying the process, to keep time and attendance records:

> "*They want to (install) line-side clock-in stations that automatically give you a full (record of) attendance, instead of people calling on the radio, line by line, (to see) who is here or not. Now we will have an automatic system, where each group leader will have a little touch pad and he would be able to manage his head count based on that. So if people are going to surgery or absent, or whatever it might be, he will be able to track them."*

In general, there seemed to be a unanimous pledge to try and create an environment that all the employees would feel comfortable in, as explained by Respondent 01, who felt that the technology…

"… leads to a healthier work environment."

6.3.3. The Impact that the Implementation of New Technology has on Management

Since change is usually met with scepticism and fear, which ultimately leads to resistance, it seemed that the Management overcame this hurdle by focusing on what the technology could actually do to better their job performance. There was an overwhelmingly positive perception of the benefits that were experienced. The responses included phrases such as:

"*It has changed my life for the better*" (Respondent 01).

"*Technology should always be positive*" (Respondent 03).

"*Technology is definitely there to simplify the process*" (Respondent 04).

"*I wouldn't have been able to do my job if it weren't for technology*" (Respondent 05).

"*I am all for new technology*" (Respondent 06)

Since the Management role encompassed many tasks that required information obtained from the field to formulate future plans and understand past actions, it was not surprising to find that all of the respondents were pleased to have a tool that assisted with data manipulation. This was a task usually done by a person, and could potentially have many errors, since it needed to be translated into readable patterns. Respondent 02 mentioned that:

"*The document is only as good (as the intention behind its use). If you (are) basically capturing it and using it to analyse the data, it's a different story; but if you just (capture the data) for the sake of capturing it, because somebody told you that you need to capture this thing, you do it as it is your work for today and it becomes rubbish tomorrow; (you) just tick, tick, tick and tomorrow they throw it in the bin. It is not being used for anything, there is no historical data, there is no trend analysis, there's nothing*."

This feeling was reiterated by Respondent 04, who said that…

> *"You can have all the information in the world, but if you do nothing with it, what's the point of collecting the information?"*

Respondent 01 went on to state that…

> *"It's simpler to obtain data, get information and understand the information, compared to the PLC reporting system that just captured data and gave raw information that needed to be interpreted."*

Respondent 02 also added that…

> "*From a Management point of view, you have all of this data at your fingertips now that you can analyse, which will help you make the plant more efficient*."

It could clearly be seen that the individuals understood that information was vital to the future of an organization. These four respondents were visibly passionate about these facts. One could only assume from the tone of their voice that they had difficulty in this area and need an easy solution. One would take their actions as frustration with their current situation.

By obtaining correct, valid data that was easily understood, time and therefore money was saved. This also assisted in that Managers dealt with multiple tasks simultaneously, and being able to find new avenues to assist with the activities could assist them to be more effective. This was evidenced by the statements by Respondent 06:

> "*If I could reduce the time it takes for me to accomplish the most frequent tasks I have on my schedule, then I (could) get more time to spend on other more demanding tasks… (This can be achieved if I can) automate the small things and more frequent tasks, and then I know I will work more efficiently*".

Respondent 01 concurred with this, stating:

> "*I am able to complete my job in less time, without the stress of manipulating data and verifying numbers. It has all been done in the backend and I get a clean report that is easily understandable (and) that I can use."*

Respondent 03 explained that as a Manager, it was beneficial to use technology:

> *"… to make your life better, to make it run faster, to make it run more efficiently, (and) to make less mistakes."*

Respondent 04 provided a more in-depth explanation and added some points with regards to the benefits of using new technology:

> *"Technology is definitely there to simplify the process, (to) make it more consistent and also allow you to take advantage of market conditions... Industries use a continuous improvement methodology to extract benefits, so they use the system and the data from the solution of the technology, and they would implement a continuous review and try to bring down their worst performers or improve their top performers."*

While Respondent 04 explained the ease of having technological advancements to complete tasks, Respondent 05 revealed (tongue-in-cheek) another benefit obtained by utilising the technology available, namely the ease with which the plant could be monitored:

> *"I can sit in the coffee shop and see what's happening in the plant.*"

Respondent 5 had a confident look of self-satisfaction upon making this comment, one could see that he enjoyed his power of knowledge at his convenience.

All these respondents showed a positive relationship with the technological advancements and were able to utilise them to their full extent. It seemed here that Management was committed to trying to utilise the technologies that were available. Respondent 02 shed light on the possible reason for this finding:

> *"...because there are now younger people that have come into the senior positions, and they are now pushing technology."*

This was a valid point and it was ascertained that Managers favoured the advancements and the simplified work environment that it offered them.

6.3.4. Problems Faced when Implementing New Technology

The issue that was prevalent amongst the majority of the respondents, which was seen as the greatest hindrance to the success of the implementation of new technology, was that of resistance from the workers. As Respondent 02 stated:

> *"(It is) something that they do not understand (and) they are afraid of it… Something automated is out of their hands and they don't have full control over it".*

Respondent 02 identified the lack of technological know-how as the greatest gap that existed between the workers and Management in the organisation. This lack of knowledge accounted for the workers trying to ensure the security of their jobs by resisting the changes. Respondent 04 explained to the researcher that the initiative to implement automation was not about jobs being lost, but rather about new ones being created, but unfortunately it seemed that this message was not clear enough to the employees.

From the information gathered, it was obvious that many of the Managers noted a difference in the employees' approach when it came to age demographics. The Managers were in agreement that the younger workforce welcomed the technological advancements, as evidenced by the following statement:

> *"The youth of today do not want to go onto a packing line and pack a box"* (Respondent 02).

Respondents 02 and 04 both commented directly on the aging workforce:

> *"You usually find a lot of resistance from the older employees because they are used to doing things in a certain way and (are) not necessarily ok with the latest technology"* (Respondent 02)

> *"If your workforce is an aging workforce, I think it's a lot harder to introduce new technology because (their) ability to change and adapt is (lessened)"* (Respondent 04).

The management seemed to gravitate towards the younger workforce. This could be due to the perception that they are technologically savvy and willing to work with the new systems as they felt it was something they were used to:

"The younger employees that we have at the moment; everyone is used to smart phones and things like that. They (are) quite ok with things like that and they (are) quite receptive to (them)." (Respondent 02)

"*They've been exposed to new technology, they've used touch screens, iPhones, iPads, Android devices. They're used to Wi-Fi and tablets, so they are (a) different workforce that is entering. So the jobs that need to be created for the people coming in, in the future, need to be very different to the jobs that exist today and automation is providing that platform*" (Respondent 04).

While some of the other respondents subtly hinted at the fact that things were changing and certain jobs would be lost; they made mention that more would be gained in the technological sphere. It seemed that Management understood that the changes were imminent; however they appeared to be positive about reassuring employees of their jobs.

The technology that was chosen to enhance or improve a process played a tremendously important role, according to Respondent 03:

"You would never implement technology that would be negative."

Respondent 02 shared the sentiment when speaking about the inception of an idea:

"*The difficulty comes obviously from the specification phase and trying to get everyone to agree on the spec.*"

Respondent 04 was also vocal about ensuring that the use of the technology known by all, while Respondent 05 warned of the negative effects of poorly implemented technology:

"If you (are) looking, for instance, (at) a SCADA system; it has to work well and be commissioned well. If it is not working well, then it can be very devastating. Even things like InBatch; I've seen some of those where the guys have done a very bad job at modelling the plant, and the software doesn't (add) any value, it's actually more (of) a distraction. It is important to spec. it well and to clearly define what you want to achieve with it. Automation or even an IT system; there's times when people have bought them and don't know what to use them for, so what is the purpose of the software?"

This was a valid issue that many seemed to face, with technology being blamed for incorrect results and validations. Respondent 05 highlighted the fact that people could incorrectly design and implement systems. This created the perception that the new advancements were an unnecessary waste of time, whereas the failure had occurred because the planning and implementation phase was flawed. When implementing new technology, Respondent 06 stated that it was necessary to ensure that the technology would function correctly, prior to implementation:

> *"… verify and validate the new technology, to see that it is working for them and meets their needs, and obviously optimise on the improvement going further. It is just a continuous cycle of business improvement*" (Respondent 06).

In conjunction with the poor planning and implementation of the technology, skill shortages were also identified as a cause for the failed implementation of new technology. Poor planning and insufficient foresight could be the traits of unskilled personnel who assumed that the technology would be able to meet requirements, without thinking the process through sufficiently. Respondent 01 spoke about the lack of knowledge that leadership had, stating:

> "*Get (the) qualified people needed to drive the process. If they are unsure about the changes and the technology that they are bringing in, (this) creates doubt in the minds of the workers, which in turn leads to fear. This makes them resist the new systems before they even know what it is and how it will affect them."*

Respondent 01 also made mention of how leadership, or the lack thereof, could lead to an increase in the workers' resistance towards the new systems. It was vital that the specification and explanation were well structured in order to have a fluid transition to the new system. Knowledge of the technology and the required outcome would be critical in making the installation a success.

> "*The fundamental problem that we have is skill shortages today. You have a lot of skilled people leaving the industry and taking the skills with them, but the youth that are coming in do not have the experience (required) to optimise processes efficiently, like their skilled neighbours*" (Respondent 02).

Respondent 02 spoke about the workers involved with the technology after it was implemented, and explained that there were serious gaps in the skill set required.

Respondent 02 was forthright in adding that the greatest struggle was to train the maintenance members on the new technology.

Respondent 03 understood the hardships associated with a lack of skills and tried to explain that employees could be up-skilled, provided that they bought in to the new technology. Respondent 06 agreed with this and stated:

> "*It's the businesses' prerogative to up-skill their people, but after three failed attempts to up-skill up a person, they needed to look at hiring new people.*"

It was evident that the respondents were well aware of the resistance that they encountered when introducing new technology. The age group of the users was highlighted, together with the idea that as technology changed, so too did the job (Respondent 05). As the discussion went on, however, it became apparent that the resistance could also have been brought about as a result of inadequate leadership and communication, especially if the incorrect technology was introduced and implemented. Seeing that the workers would be given the opportunity to enhance their skills, it would depend on the willingness of the person to acquire these skills and utilise them efficiently. Respondent 06 addressed the learning curve of the employee and added:

> *"It also depends on the application; how much it affects their job."*

These were aspects that had a direct impact on the acceptance of the technology by the workers.

It was interesting to watch a few of the respondents answer this question, as three of the respondents were careful with the words that they chose and the demeaner in which they articulated their view. As much as they sincerely seemed concerned about the employees, they reiterated the fact that people were important. It was as though they were trying to get a point out, but did not want to come across as heartless towards the employees. It was this empathy that may have clouded a few respondents' remarks. The answers received can therefore be looked at as a little biased based on the interactions of the respondents when interviewed.

6.3.5. Strategies Developed to Implement Changes and Overcome Resistance

When asked how the change process could be improved, many of the respondents mentioned getting the employees involved from the inception of the projects. There was also mention of designing solutions around the employee. Some of the comments to this affect are shown below:

> *"They also need to involve the employees from the outset to make them feel as though they are part of the change. This will also make them feel like a contributing factor (to) the technology and accept the changes much (more easily) since they believe they had a say in it."* (Respondent 01).

"… got to get the people involved: that's the only way you can really do this" (Respondent 03).

> *"If your user is part of your requirement study and your design, as well as your implementation process, and the benefits are (communicated) to them (such) that they understand what benefit the automation or solution offers them in terms of technology and how it is going to make their lives easier. Then your change management process is quite easy"* (Respondent 04).

These respondents were of the firm belief that the workers would be more susceptible to change if they were involved more closely with the project. Respondent 04 went on to elaborate on other techniques that he would be willing to try, such as:

> *"...looking at how the operator would operate the plant and design the best philosophies around that. So the plant gets designed around the operator and no longer on what is technologically available. So there would be an assessment done, based on the core competencies that the operator would generally have in that area, and they then design the solution based on those core competency skills, so that the operator can then use that technology in a safe way."*

It was clear that Management saw employees as an integral part of the movement forward. They saw promise in the idea of trying to get the employees to understand the changes, rather than force them upon them, as this would lead to extreme resistance. Respondent 05 explained their technique used to understand the

employees and spoke to them in order to learn what they found important and what it would take for them to change:

> "*You (have) got to be in line with wherever that person is; you (have) got to be in tune with him. That's the best way, you have to listen*".

Respondent 03 also took a similar approach stating that:

> *"... the guy that is there on the floor and actually does something; if the technology will touch him, you (have) got to talk to him. 'What are you doing? What would you like to do differently? What would help you? What would make it easier? And how can we help you do a better job? What are your pains?' And address (those) and have him (to) be part of the process."*

Respondent 03 explained that there needed to be a conversation between the parties involved and that a true understanding needed to be reached in order to get the trust of the worker and lower their resistance. Respondent 06 explained that employees needed to see the need for change.

> "*They don't see it as changing for the sake of changing; they want to see that their change is for the sake of benefit. They need to see the benefits, they can appreciate the benefits. It all boils down to communication: if they say that the change is hurting them, you need to know why. Make sure that they understand the change, why it is there and how it helps them. They can see for themselves that their jobs are easier now and that their job security will also be secure*" (Respondent 06).

The ultimate goal was to have a valid dialogue with the employees and ensure that they understood what was to transpire. Respondent 01 summed it up by stating that:

> "*At the end of it, it's all about communication, communication, communication.*"

The understanding and trust needed to be evident between worker and employee for a better relationship to exist.

Once the system was installed, Managers found that the training offered needed to be structured differently according to the needs of the employees. Respondent 04 stated that new technology:

"… requires a skill set, so there has to be an investment in training"

Respondent 02 mentioned the difficulty in training the relevant persons. This was a training and communication strategy that management saw fit to keep, but ensuring that workers were involved from the onset would make the training curve much shorter.

A good point was made by Respondent 02, which spoke to the issue of designing systems. Seeing that the new workforce were technologically savvy, the design needed to incorporate items that they felt comfortable with:

> *"If I look at it, what they are doing now is making it very much like operating on a tablet. I think people have become very used to the whole 'click and drag and drop'. I have noticed that a lot of these systems that they have created use that methodology and background. People are ok with that operation. So they don't feel uncomfortable to be 'dragging and dropping' and things like that on the little tablet because they (are) used to that already on their devices (that) they have already; like their phones and things like that. I think if it's designed properly and not too complicated it should be easily accepted, even (by) a novice."*

Ensuring that the employees felt comfortable with the new technology would assist in the training and utilisation of the equipment.

6.3.6. Summary

From the suggestions obtained, it was evident that Management were consistent in their views about technological advancements which would enhance the organisation. They also understood the hardships and the unfortunate circumstance of a few jobs being lost due to the redundancy of that particular task upon being replaced by an automated process. They did, however, plan for new jobs that would appear and seemed to be trying to improve the skill level of their current employees.

The pattern of improvement and change was present in all of the interviews, along with strategies that were assumed to be successful in the acceptance process. The workers were held in high regard, with Management explaining that they would try to incorporate the workers from the inception of the project, so that their input could be used to build a system that would be better understood and utilised. There was an underlying tone of respect towards the workers from Management, who also tried to

explain that they were trying to improve the business, and that when the business prospered, so too would the workers.

6.4. Comparison of Data

The comparison of data from the semi-skilled workers and the Management added another dimension to the study, as it allowed for the exploration of similarities and differences in the perceptions and experiences. This allowed the researcher to obtain an holistic view from both significant stakeholders involved.

6.4.1. Convergence of Acceptance

It was vital to understand the acceptance of new technology in order to proceed with the study. There seemed to be a sense of positive perception towards new technology and automation that could assist with the menial/routine tasks and make the workers' work life easier. Both workers and Management recognised the change in the technological environment and understood that certain changes were inevitable. This was one of the strongest reasons that both parties had a positive perception of the new technology, even though it was evident that many reservations were held. It could also be inferred that the workers were not entirely ready for certain changes and this was understood by the Management, who acknowledged that different tactics needed to be applied to different groups in order to gain this acceptance. These views seemed to converge with a basic understanding that the new technology would assist in the future and that the introduction of automation would imply multiple changes.

There was a correlation between the acceptance of new technology by the younger generation when compared to the older generation, which the managers were aware of. This proved that managers did acknowledge their strong points with regards to technological changes, and it showed that this was the area that they concentrated on due to the susceptible nature of this generation.

6.4.2. Divergence of Acceptance

There was a discrepancy in the understanding of the workers' acceptance of technology. It was proven that they would accept it, but they still resisted the implementation of the technology due to fear of the implications. Management however, was under the assumption that the changes were explained clearly and that the benefits were shown. Workers still showed resistance towards the implementation

of the new technology, which stemmed from fear and trust. Although Management believed that communication was clear and concise, it was apparent that the workers did not have a full understanding of the changes and therefore feared the repercussions. The Managers were able to elaborate on communication and the importance of it, and there was a unanimous understanding of the importance of it and the implementation, however it seemed that the employees had a different perception.

Furthermore it could be inferred that due to the lack of, or inefficient communication, workers were afraid that all their jobs could be replaced by technological advancements. The interviews held with management repeatedly reiterated the fact that human capital was important and that the plant would never be run entirely by machinery. This seemed to be lost in the communication protocol that was being used.

6.4.3. Misconception of Acceptance

It was mentioned earlier that the youngest generation of employees was generally the most accepting of the new technology, and the older employees did not take on change easily. Although this was true and Management did acknowledge it, the research done showed that the older generation was capable of change and would change, however when it came to change with regards to technology, this diminished. Management was under the assumptions that they were difficult because of their age and that the new technology would disrupt their feelings of adequacy in completing their tasks.

The research showed that this was not entirely correct, which begged the question: “How were the changes communicated to them?” There seemed to be a misconception that the older staff would be difficult, however, if it was proven that they were willing to accept the technology and use it, different approaches and methods would need to be embarked upon. There was confirmation that there was an inkling for change, but inadequate communication and a poor attitude towards the older generation seemed to be a hindrance.

6.4.4. Education

There was a comment made about the lack of skills in Southern Africa, with the assumption that the newer generation was not adequately equipped to handle a technologically advanced plant (Respondent 04). The research showed quite the opposite; from the sample taken, there were many that did not have a complete formal

education, but this was the older generation who would be phased out due to retirement. There were workers that took on jobs that required minimal education, but they possessed a technological or diploma qualification; this was approximately 46 per cent of the sample. The lack of confidence with regards to the educational facet of the workers seemed to have been misjudged by Management. Although many of them did not have experience, the fact that they had obtained these qualifications showed that they were capable of learning and understanding. They were in professions that were always associated with minimal educational needs and deemed as semi to low-skilled workers. The fact that they had taken these positions showed that there was a lack of positions rather than a lack of skills.

6.5. Conclusion

This chapter highlighted the findings of the research, which endeavoured to show the views of the semi to low-skilled workers and the understanding of Management about the introduction of technology. It was brazen in highlighting a few misconceptions regarding the beliefs surrounding skill shortages and the lack of communication regarding change, and it indicated that people were able to accept to new technology but feared the process.

CHAPTER SEVEN

Recommendations and Conclusion

7.1. Introduction

This research study was undertaken to explore the views and experiences of the semi to low-skilled workers at Toyota South Africa Manufacturing concerning the implementation of new technology in the plant. It also incorporated the views of Management, to understand their perspective and their feelings towards the movement to a technologically advanced workplace. As was evident in the study, the views obtained from the respondents were based on their own experiences and personal opinions on the subject matter.

From the exploration of the perceived notions of the participants and their experiences, a deduction could be made in order to encapsulate the findings. The point of caution in the findings is that the views were from a limited sample associated with a single segment of the vast industrial workforce that could be found in an emerging third world country. There were, however, convincing themes that arose from the data, which highlighted the structural issues which would be common in all facets of the workforce. In addition, the area focused upon constitutes the largest manufacturer in Southern Africa, thereby giving a great deal of insight into the operational and functional behaviours of companies and employees. The major focus was on the workers' perspectives regarding the change, and on the overall goal of Management. By means of traditional social sciences research, the findings of this study could be set against existing research literature where meaningful comparative interpretations could be drawn, as well as to add new perspectives through justifiable and well-structured reasoning.

7.2. Research Questions

The framework of the study was built around the following research questions

- **What is the level of acceptance of new technology by Toyota South Africa Manufacturing employees?**

From the research performed, it was found that there was a significant possibility of acceptance towards new technology, as it seemed that the workers understood the

prospective benefits of implementing new technology. The extent of this belief will influence the adoption of the new technology and their expectations may differ from that which will be implemented (Mannan & Nordin, 2014), however, this research proved that they were willing to accept it.

It showed that employees needed to be motivated in order to gain an enthusiasm for the new trend. The motivation needed to address the employees' core needs and their basic wants (Saeed & Asghar, 2012; Ozguner & Ozguner, 2014). The understanding was that the new technology would be considered allowable if it showed just cause in terms of benefits.

The critical determinant for accepting new technology was identified to be Perceived Usefulness in numerous studies by Davis (1989); Hu et al., (2003) and Nanayakkara (2007). This study aided in verifying that the workers were able to comprehend the usefulness and understood the benefits that ensued from using new technology.

- **What aspects intensify the resistance to change?**

It was evident that the primary factor that enhanced resistance was trust. Line et al. (2005) explained that trust was an attribute that was built up over time, and that many found it difficult to trust total strangers. It could also be stated that trust is primarily associated with leadership. This would suggest that Management did not represent trustworthy leadership figures. Management were known to have the relevant knowledge and understanding of activities and future plans, to which the workers were not privy, and workers were under the impression that this information was not being given to them (Line, et al., 2005). The data obtained showed that there was a split between the workers about their interactions with Management, showing that there was a great portion that believed that there should be more interaction and relationship building between Management and workers.

According to Line et al. (2005), it could be understood that if Management had an attitude of distrust towards their employees, then the employees would respond with a feeling of distrust. From the interviews conducted with the Management in this study, no distrust that was expressed by them towards their workers; therefore distrust could be negated in the effort to find the greater cause for the perceived inadequate communication.

When giving trust, people feel vulnerable and need to be engaged with to make them feel as though their views are being respected and that Management are being open and honest. Constant communication and truthful information will assist to negate trust issues, inform Mdletye et al. (2014).

The next factor that was discovered to be predominant was that of the employees' personal acceptance of change. The perception of change was not uniform with all individuals, and even though management attempted to clearly convey the changes, people comprehended it differently. This was in keeping with the findings of Bovey and Hede (2001). The workers' preferences for predictability and stability also played a crucial role in influencing their individual reactions to the news of the change, and these preferences were rooted in the person's characteristics, according to Oreg (2003). The resistance seemed to increase if the change process was complex and required considerable adaption. Individuals found it difficult to let go of their status quo and adapt to new ones. Many of these items, as mentioned before, could be attributed to personal characteristics of rigidity and intolerance to change (Lilford, 2014).

It can be understood that these characteristics need to be addressed by Management, in order to understand and address the negative perceptions and experiences of the workers, before, during and after the change process, as suggested by Mdletye et al. (2014).

The third factor that arose was that of fear, it was clear that the workers' perception of the information received, or the lack thereof, increased their fear towards the changes (Vithessonthi, 2007). This would also explain the increased lack of trust which was discovered to be the main factor to the resistance to change. Many researchers, such as Agboola and Salawu (2011); Hand and Trahant (2006) and Kotter and Schlesinger (1979) understood fear to be expressed as, how the change will affect the induvial personally, which addressed the essence of the psychological impact that the change brought about.

Kotter and Schlesinger (1979) also explained that fear arises from low tolerance to change, which was found to be the second predominant factor that affected resistance to change. They explained that the fear arose from the fear of not being able to adjust

accordingly to the new behaviour and of being unable to develop the necessary skills needed. This further proved the above mentioned factors.

It can therefore be anticipated that increased interaction and communication from Management will assist to lower the first two factors, thereby dissipating their fears.

- **What role can communication play to enhance the acceptance of automation?**

Communication seemed to be the predominant factor highlighted in all the interviews and surveys conducted. This was understandable, as a lack of information leads to uncertainty, which increases the resistance to accept new technological advancements, according to Line et al. (2005). From the data acquired, it was noted that not all workers felt involved in the process and therefore sought more information. Although there was a discrepancy between Management and employees in terms of the communication that was offered, it did correlate with the fact that various employees needed different information or forms of communication in order to fully understand the changes taking place. It was for this reason that their personal acceptance of change would decrease, and in the process increase their resistance to new automation (Simoes & Esposito, 2014). This study revealed that the workers felt as though they needed clearer answers, and while the Managers understood that communication was the key to success, they need to realise that the current level or form of communication is not necessarily adequate.

- **What automation/technology acceptance framework could be applied in developing countries?**

It can be difficult, or nearly impossible to implement new automation in a plant if the workers do not corporate. It is vital that their collaboration is obtained in order to proceed. From the information acquired and philosophies inferred, the following framework was devised by the researcher in order to improve the process. This framework is introduced and explained in the ***Recommendations*** section.

7.3. Recommendations

It was the aim of the researcher to develop a framework that could be used to enhance the acceptance of technology. This was accomplished and depicted in figure 7.1. The presentation of recommendations are laid out so that it could be easily understood with the context of the framework.

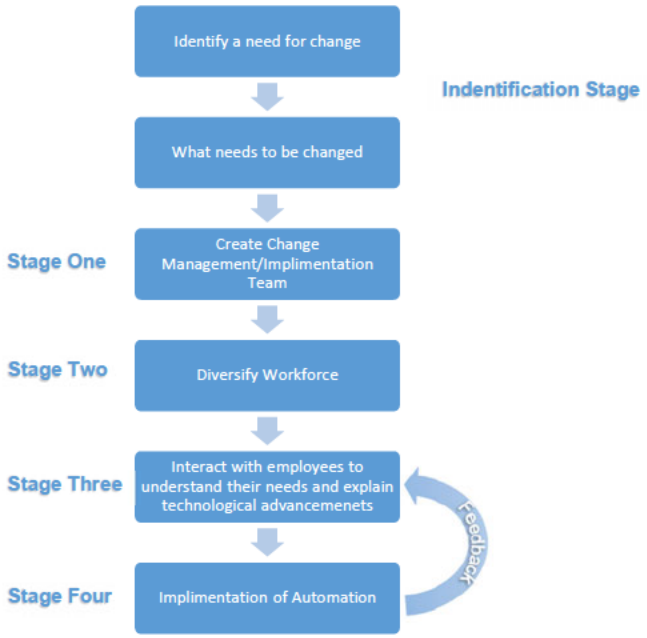

Figure 7.1 The Researcher's recommended framework for technological change (Significance of the study)

Identification Stage:

The identification stage is made up of two steps, firstly, it is vital to identify if change is needed. This is done by understanding what the current situation is and what the desired result would be. The second step involves finding the tools needed to achieve the task, as well the different apparatuses that could be utilized to accomplish the desired effect. Once correct understanding of the change is gained and a knowledgeable strategy is developed to attain the result, one can start with the following stages to accomplish it successfully.

Stage One:

The fundamental step will be for management to assemble a team that understands the automation technology that will be implemented and how it will affect the workers.

These items need to be explicitly explained to the workers, with a consistent understanding of how the new technology will affect them and why it will be implemented. Without a clear sense of the total intention, many workers will struggle to understand the need and not accept the technology willingly (Kezar, 2011). Management need to have a good idea about every facet of the new implementation, in order to explain the change to the workers with confidence. It is important to warn, however, that being too confident creates a sense of condescension (Anderson & Brion, 2016), and this can make the employees feel unimportant and increase their resistance to the new technology. For this reason, the Management team needs to have both a good IQ, to allow for understanding of the technology, and a good EQ to enable an understanding of the person that they are dealing with.

It had been found that line Managers play a critical role when changes are implemented as the workers look to them for answers and guidance (Armstrong, 2009). It is for this reason that the line Managers need to be incorporated into the implementation team, as they should take on the additional responsibility of employee relations and synchronise communication in order to have concise understanding from upper Management down to the workers. The difference between the main implementation team and the line Managers is that the line Managers do not have to possess the same level of technological skills, rather, they should serve as facilitators for the change process (Cummings & Hyman, 1995).

Stage Two:

Thereafter, the work force needs to be identified and diversified in order to communicate the correct message. It has been found that HR Managers are better equipped to aid in this process as they have the recourses and capabilities to facilitate the process. There are several actions that Ulrich (2013) and Simoes and Esposito (2014) identified that HR professionals should be proficient at when implementing changes, these are: “identifying and framing problems, building relationships of trust, solving problems, and creating and fulfilling action plans” (Ulrich, 1997: 31). It can be understood that HR are the stepping stone between employees, line Managers, and top Management, to help understand the dynamics of interpersonal relationships with change (Muncer & Kabwe, 2015).

The school of thought is that the employees are influenced by their interaction with their environment, and/or the way in which they reason to themselves the situation that they are in (Burnes, 2004). It then stands to reason that the success of the change hinders on the perception of the employees and their interaction with the environment (Kavanagh & Ashkanasy, 2006). It should be stated that the environment that plays an imperative part in the influence on an individual, and the environment is influenced by the groups that are formed in the working environment (Lewin, 1947). These groups usually have specific people that are more influential than others, and therefore people look to them for approval and guidance (Smith & Fink, 2015). By classifying the groups and identifying these influential people, Management can proceed to communicate with and persuade a handful of individuals, rather than the entire workforce.

By understanding the workforce, Management is able to identify the different groups and facilitate communication with them in a manner that is coherent to them and will allow for their understanding. It is evident from the information obtained that although the Management at Toyota South Africa Manufacturing feels there is adequate and relevant communication, the workers have concerns as they do not feel that management gives them sufficient feedback and assistance. It can therefore be ascertained that not all of the workers fully understand the communication, and Management has made assumptions about many details regarding their workforce's understanding of the current and upcoming changes. These assumptions include issues such as skill shortages and that the older generation is not susceptible to change. By grouping the individuals, management will be able to get a better understanding of their workforce and give out the relevant communication in a way that they will understand.

Stage Three:

Once the crucial groups and members are identified, the team needs to interact with the workers to get a better understanding of the process which they need to automate. The operator is the person that will be most knowledgeable in the functions of the area and will have picked up 'certain tricks' to improve on the process time. This interaction will aid in two ways: firstly, the manager will get a better understanding of the process and what will be needed to automate the area, and secondly, the employee will feel as though they are a part of the change and will be more open to accepting it (Thomas,

2014). By understanding the method used by the employee to carry out their day to day tasks, Management will be allowed to design a more efficient system that will cater for the improvements and workability that will enhance production. Ensuring that the correct information is passed to the employee and that a justifiable understanding is reached by the implementation team makes it possible, not only to design a superior automation system, but also to get early by-in from the workers, as they will have a sense of importance and value by providing input with the machinery (Sidin & Pasinringi, 2014). This action will alleviate the distrust that the employees feel towards the process and lower their fear of what may happen, thereby making them more acceptable of change.

At this point it will be possible to gauge the incentives that employees crave, namely, material and non-material incentives. Material incentives can be categorised as economic gain, while non-material incentives relate more to social standing and acceptance, explain Fang et al. (2014). There may be a wide range of benefits that will appeal to the employee, such as job relevance, increased levels of Management engagement, enhanced learning to further their career growth and obviously, economic remuneration. These enticements will further assist in swaying the mind-set of employees to realise that there will be benefits from the onset, but as stated before, the workforce diversity needs to be understood in order to present the correct incentives.

Stage Four:

The final stage of the framework incorporates a repetitive loop, which involves constant feedback. This feedback loop creates a channel that allows for corrective action to be taken by understanding the workers' concerns. These actions may include adapting communication protocols to ensure better understanding, and modifying the implementation or adapting the process design to incorporate new information. By ensuring that this loop is kept constant, the implementation phase will be completed with an enhanced system, and the operators will be more willing to work and assist with the automated system.

This should create a positive perception of both the technology and Management, thereby influencing the adoption of the automated machinery. By ensuring there is constant feedback and modifications, it will seem to the worker that the automation will

be an improvement of their current status quo. The vital point is that the workers will see the benefits of using the technology, for the betterment of the company as well as themselves.

In order to accomplish this task, it is imperative that the implementation team engage constantly with the workers to gauge their feedback. Their key task will be to ensure that there are no negative perceptions, or that the negativity can be addressed and repudiated, as negativity influences the emotional reactions that intensify the resistance to change. By minimising the negativity, workers will come to understand that their views are important, and this may result in a much shorter turnaround time for technology to be accepted. This will also assist in improving the quality and productivity of the automation system, as points with which the workers struggle will be identified, understood and addressed, hence the need for the feedback loop in the implementation.

7.4. Possible Areas for Future Research

As evident from the literature presented in this study, the focus was aimed at a generic area of the largest manufacturer in Southern Africa. Considering the size and regional diversity, population differences and the context of the research, future areas of research can be developed to enhance the findings of this dissertation.

One possible area of research could be to explore the opinions and views of senior Management and stakeholders, in conjunction with those of the workers. To put this in context, it will be beneficial to get their views on the future development plans for the company from a business view point. Here it will be important to investigate the experiences and perceptions of the decision makers, of their change management policies and procedures with regards to the implementation of new automation in the plant. It will aid in verifying the change framework proposed in this study and acquire further information that may assist in streamlining the framework.

It will be advantageous to reconstruct the research with a larger sample, to further enrich the precision and generalisation of the study. This will also provide an opportunity to expand on the concepts that where developed from this study. By involving a greater number of participants, both semi to low-skilled workers and Managers, additional subject matter will be provided that will strengthen the results

stated in this study, and/or give rise to additional information to aid in improving the framework.

Further research can incorporate other industries from other geographic locations. The ethnic diversity that South Africa has provided a great baseline for this research, however, probing into other developing third world countries with similar groups of individuals will allow for a comparison to be drawn. This comparison may aid in the amendment of the framework to incorporate the like-mindedness of certain areas.

Lastly, further research can be done succeeding the implementation of the framework, to acquire post analysis of the research, as it will be beneficial to understand the change in perceptions and measure the acceptance by the workers. This proposed study will also contribute to further solidifying the information stated in this research and supplement theories that may arise following the practical implementation of the framework.

7.5. Conclusion

In order to survive in the current turbulent business environment, a company must be willing to change and adapt with the technological advancements available. Many organisations are anxious to change, but find it difficult due to the resistance from the employees. It is for that reason that Management needs to understand their diverse work base and how to clearly communicate the changes to them; therefore companies need to be vigilant in the methods that are employed to carry out the technological enhancements. Hence, Management interaction needs to be different from the conventional techniques, and old practices and styles need to be modernised to ensure better productivity and growth. It is a common thread that communication plays a vital role in the change process, and developing third world countries have the advantage of an eager youth to endure change, and older generations that will accept it. The ability to change is a difficult one, but with the correct guidance, it can be achieved.

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APPENDIX A

Gate Keeper's Letter

TOYOTA

TOYOTA SOUTH AFRICA MOTORS (PTY) LTD
P O Box 26070 Isipingo Beach 4115 Kwa Zulu Natal, South Africa
Tel +27 (0) 31 910 8757
Fax +27 (0) 31 910 8279

RE: Permission to acquire information at Toyota

I, Collin Naidoo, hereby give authorization for Suven M Ramsunder to carry forth a study at Toyota South Africa Assembly Plant for the collection of information to be utilised for his Dissertation.

[redacted]

Collin Naidoo
Senior Manager
Tel: 031 910 8757
Fax: 031 910 8279
Cell: 071 854 2222
Email: vnaidoo9@toyota.co.za

APPENDIX B

Ethical Clearance

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

14 April 2016

Mr Suven Mohanlal Ramsunder 203503043
Graduate School of Business and Leadership
Westville Campus

Dear Mr Ramsunder

Protocol reference number: HSS/0188/016D
Project Title: Developing an Acceptance Model towards Technology by understanding the Workers' perspective

Full Approval – Expedited Application

In response to your application received 08 April 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours [redacted]

.....
Dr S [redacted] (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

Cc Supervisor: Dr Elias Munapo & Dr B Zondi
Cc Academic Leader Research: Dr M Hoque
Cc School Administrator: Ms Zarina Bullyraj

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 **Email:** ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za

APPENDIX C

Quantitative Questionnaire

DECLARATION OF CONSENT

PROJECT TITLE:

RESEARCHER

Full Name: Suven M Ramsunder

School: Graduate School of Business and Leadership

College: University of KwaZulu Natal

Campus: Westville Campus

Contact: 082 260 6370

Email: smramsunder@gmail.com

SUPERVISOR

Supervisor: Dr. Bonginkosi Zond

School: Graduate School of Business and Leadership

College: University of KwaZulu Natal

Campus: Westville Campus

Contact: 074 412 4054

Email: bongszondi@gmail.com

Proposed Qualification: Doctorate in Business Administration

HSSREC RESEARCH OFFICE

Full Name: Prem Mohun
HSS Research Office
Govan Bheki Building
Westville Campus
Contact: 0312604557
Email: mohunp@ukzn.ac.za

I, Suven M Ramsunder, Student no. 203503043, am a student, at the Graduate School of Business, at the University of Kwazulu Natal. You are invited to participate in a research project entitled: Developing an Acceptance Model towards Technology by understanding the Workers' perspective. The aim of the study is to determine the level of acceptance of new technology by Toyota South Africa Manufacturing.

Through your participation, I hope to understand the aspects that intensifies the resistance to change, thereby allowing the conception an automation/technology acceptance model that could be applied in developing countries. I guarantee that your responses will not be identified with you personally. Your participation is voluntary and there is no penalty if you do not participate in the study. Please sign on the dotted line to show that you have read and understood the contents of this letter. The questionnaire will take approximate 10 minutes to complete.

DECLARARTION FOR CONSENT

I…… (Full Name) hereby confirm that I have read and understand the contents of this letter and the nature of the research project has been clearly defined prior to participating in this research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participants Signature……

Date…….

General information.

1. What is your age?

   □ 18 – 35 □ 36 – 50 □ 51+

2. What is your gender?

   □ Male □ Female

3. What is your highest level of education?

   □ Diploma or above □ Technical Qualification □ Matriculation □ None of these

Please answer all the following questions by choosing one of the boxes labelled 1 (Strongly Disagree) – 5 (Strongly Agree):

What is your opinion about new technology and automation?

		1	2	3	4	5
1.	Automating certain processes would make it easier to complete.	□	□	□	□	□
2.	Automation can assist to improve production.	□	□	□	□	□
3.	Automation would aid in elimination tiresome labour.	□	□	□	□	□
4.	New technology is simple to use.	□	□	□	□	□
5.	Automating systems would make it possible for me to accomplish certain tasks quicker.	□	□	□	□	□
6.	My interaction with new systems will be clear and understandable.	□	□	□	□	□
7.	I intend to increase using new technology that would make things easier.	□	□	□	□	□
8.	There are many interesting functions that I would like to use.	□	□	□	□	□
9.	I always try and use items that make my life easier.	□	□	□	□	□

What is your view on change?

		1	2	3	4	5
1.	I am a valued employee	□	□	□	□	□
2.	I am satisfied with the current way my job is done.	□	□	□	□	□
3.	I am certain that I am the best at my job.	□	□	□	□	□
4.	I am confident in my ability to learn and develop my skills for new applications.	□	□	□	□	□
5.	Being promoted due to new technology could aid me in gaining more respect	□	□	□	□	□

		1	2	3	4	5
6.	The thought of an affordable early retirement due to technological advancements appeals to me.	☐	☐	☐	☐	☐
7.	I believe that procedures used by Top Level Management to make changes are fair.	☐	☐	☐	☐	☐
8.	I have trust in Top-Level Management	☐	☐	☐	☐	☐
9.	When there needs to be a change, I understand why.	☐	☐	☐	☐	☐
10.	From what I know about automation, the impact it has on the plant alarms me.	☐	☐	☐	☐	☐
11.	Not knowing what these changes from automating processes may bring, scares me even more.	☐	☐	☐	☐	☐
12.	My colleagues seem to resist the possibility of change to automation so I tend to agree.	☐	☐	☐	☐	☐
13.	I will oppose the change to automating system.	☐	☐	☐	☐	☐
14.	I have a low tolerance for change.	☐	☐	☐	☐	☐
15.	My personal interest counts more to me than that of the company.	☐	☐	☐	☐	☐
16.	I have had positive experiences from previous changes implemented in the plant?	☐	☐	☐	☐	☐
17.	Previous changes motivated me to work	☐	☐	☐	☐	☐
18.	Communication about changes are always comprehensive enough during changes?	☐	☐	☐	☐	☐

19. What has most promoted the success of previous changes?

- ☐ Good planning
- ☐ Benefits to my personal work
- ☐ Good change communication
- ☐ Company culture
- ☐ There has been no successful change
- ☐ Other:_____

20. What kind of concerns have you had in previous change situations?

- ☐ Concerns of the change impacts to my personal work
- ☐ Concerns of the increased work load
- ☐ Not fully understanding the change or its reasons
- ☐ I have not had any concerns
- ☐ Other: _____

21. What has been the biggest challenge in previous change implementation?

- ☐ Not enough communication
- ☐ The changed way of working is slow or complicated
- ☐ Not enough training
- ☐ The change was not designed to help my work, I did not get any benefit
- ☐ Other: _____

22. Has there been support always available in a change situation if needed?

- Yes
- No

23. How has your manager helped to implement the changes?

- Working actively in the new way
- Promoting the benefits of the change
- Asking for feedback & listening
- Giving feedback of my work
- Pushing me to work in the new way
- My manager has not helped
- Other: _____

24. Has the background and the reasons behind previous changes been explained to you?

- Yes, in detail
- Yes, to some extent
- They have not been clearly stated
- No explanation at all has been provided

25. What expectations future changes do you foresee based on your previous experience?

- Positive
- Neutral (no expectations)
- Negative

Thank you for your time to participate in this survey.

APPENDIX D

Interview Schedule

Graduate School of Business and Leadership,

University of KwaZulu-Natal,

Westville Campus,

Dear Participant

INFORMED CONSENT LETTER

My name is Suven M Ramsunder. I am Business Graduate candidate studying at the University of KwaZulu-Natal, Westville campus, South Africa.

I am interested to determine the level of acceptance of new technology by Toyota South Africa Manufacturing employees. I am using Toyota South Africa Manufacturing as my case study.

To gather the information, I am interested in asking you some questions.

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The interview may last for about 1 hour and may be split depending on your preference.
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- The research aims at knowing the challenges of your community relating to resource scarcity, peoples' movement, and effects on peace.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to be interviewed, please indicate (by ticking as applicable) whether or not you are willing to allow the interview to be recorded by the following equipment:

	willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

I can be contacted at:

Email: smramsunder@gmail.com

Cell: 082 260 6370

Supervisor is Dr. Bonginkosi Zondi

Email: bongszondi@gmail.com

Cell: 074 412 7052

You may also contact the Research Office through:

P. Mohun

HSSREC Research Office,

Tel: 031 260 4557 E-mail: mohunp@ukzn.ac.za

Thank you for your contribution to this research.

DECLARATION

I…… (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

…… **……**

SIGNATURE OF PARTICIPANT **DATE**

Interview Schedule

1. What is your opinion on the implementation of new technology in the plant?

2. What are you views on the change process in the plant?

3. What do you think are the main contributing factors associated with the implementation of automation in the plant?

4. What could be the opportunities available by implementing new automation in the plant?

5. What in your opinion could be done to improve the acceptance of the new technology?

6. How would the implementation of automation affect you and your managerial duties?

7. Do you have any comments that you would like to make with regards to the study and implementation of automation?