WORKERS' PERCEPTION REGARDING THE INTRODUCTION OF TECHNOLOGY AT CHIADZWA DIAMONDS MINES IN ZIMBABWE.

By

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DECLARATION

I, Leo Munyaradzi Chimeri, hereby declare that this research project entitled: Workers' Perception Regarding the Introduction of Technology at Chiadzwa Diamond Mines in Zimbabwe, written and submitted by me to the University of Venda in fulfillment of the requirements for the degree of Master of Arts in Industrial Sociology, is my original work. No part of this research project has been published or submitted for the purposes of a degree at this or any other institution. All literature sources used have been duly acknowledged.

Signature .... **Date** 01/06/15

L.M. Chimeri

DEDICATION

This dissertation is dedicated to

- My mother, Ms Martha Jekwa for your everlasting love, support and belief in me always. You are my pillar of strength and your love keeps me going.
- My father, Mr Enos C Chimeri for believing in me and giving me every opportunity possible to make the most of my education.

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- Last, but not least, I would like to thank the Almighty God for the gift of life and giving me the strength, wisdom and showing me the light always.

Aluta Continua (The struggle continues)

ABSTRACT

The purpose of this study was to investigate the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines. The study was quantitative in nature and a descriptive research design was used. A selected sample size of 60 workers (30 skilled and 30 unskilled) was drawn out from Chiadzwa Diamond Mines three companies namely; Mbada Diamonds, Anjin and Diamond Mining Company. Simple random sampling was used in this study and the data collection instrument was a questionnaire. Participants were required to complete the questionnaire using Likert-type scale responses (ranging from 1: strongly disagree, 2: disagree, 3 not sure 4: agree: 5 strongly disagree). The Statistical Package for Social Sciences (SPSS) version 19.0 was used to carry out data analysis. The Mann Whitney U test was used to test for the significance of differences in the perceptions of skilled and unskilled workers. No statistically significant differences were detected between skilled and unskilled workers in most of their perceptions regarding the introduction of technology. However, only 4 out of 78 perceptions had statistically significant differences.

The study found that introduction of technology leads to dehumanisation effects on workers such as alienation, specialisation, deskilling, redundancy, monotony and poor job satisfaction. However, to a lesser extent it led to an increase of production, profits and safety at the workplace. Nevertheless, these positive effects such as increase in profits benefits management more than the workers. Therefore, juxtaposing the negatives and positives of technology, the study concluded that workers bear the brunt whilst management gets the best out of technology. As a result, there is a dire need to strike a balance between positives and negatives. This enables a win-win situation to prevail whereby workers realise a quality work life whilst management surpass its goals. This study recommends the use of Human Resource Models to enable the positive inculcation of introduction of technology by workers since workers are a unique and precious resource that deserves a fulfilling work life across all different levels in organisations.

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ABBREVIATIONS AND ACRONYMS

HRD	Human Resource Development Professionals
SPSS	Statistical Package for Social Sciences
TAM	The Technology Acceptance Model
TRA	The Theory of Reasoned Action
USA	United States of America
USD	United States Dollar
XRT	X-Ray Transmography

CHAPTER 1
INRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

Among all the major natural resources on earth, diamonds have often been considered the most mysterious. For centuries they have been acknowledged for their extraordinary brilliance and hardness. Battles have been fought over diamonds, fortunes have been won and lost and lovers around the world have prized the stone as a token of their deepest affections (Spektorov, Prinsloo and Linde, 2011). This shows that mining for diamonds play a vital role in national economies, national security, and in the life of each individual. The mining industry is a major force in the world economy, occupying a primary position at the start of the resource supply chain. This is evidenced by huge sums of capital, national economies and companies are investing in it. According to the Ministry of Commerce, China placed 1, 8 billion (USD) in direct overseas investment in the mining sector in 2004 (Guen, 2006). The investments are worth every cent because of huge profits that are repaid. In 2012, the Global Diamond Industry reported that diamond mines in the world produced 124 million carats of rough diamonds worth 71 billion (USD) of diamond jewellery (Epstein, 2012). However, an efficient and productive mining industry requires constant investment in latest technology and equipment each and every year to remain competitive. This is evidenced by the Department of Commerce which said that United States of America (USA) companies invested over (USD) 1 trillion dollars in new equipment and software in 2000s (Meade, Rzeznik, and Robinson-Smith, 2003).

Industries, therefore are currently undergoing new technological changes to increase production and remain competitive, however, technological change does not occur in a vacuum. Whenever it occurs, there are positive and negative effects that are associated with it. In the mining industry receptivity, resistance, commitment, cynicism, stress and related personal reactions are factors to be expected when technological changes take place. Negative perceptions may arise from the link between technology and scientific management practises such as standardisation and specialisation which may lead to poor job satisfaction, alienation and failure to self-actualise

(Nelson, 1992). Furthermore, worker's job security is not guaranteed in times of technological changes because technology is associated with retrenchments and unemployment (Skidelsky, 2013); fear of the unknown and anxiety affect worker's job performance and their relationships in times of changes. Uneasiness is expected from most people when the status quo shifts because people need time to adjust to changes. Besides, change is usually inconvenient even if such change is expected to influence a situation from bad to good. It is in human nature to resist change even when it represents growth and development. Human beings are not robots which are programmed to react to any changes; humans have got special needs and perceptions that need to be considered when introducing technology at the workplace to produce quality work life. This view is supported by Abraham Maslow's (2004) hierarchy of needs which note that the greatest need of a human being is for self-actualisation. Hence, this study determined workers positive and negative perceptions regarding the introduction of technology in the mines and how this has technology affected worker's quality of work life.

1.2 Background to the study

Amidst economic hardships and high unemployment rate, the people of Zimbabwe looked up to God for divine intervention. Their prayers were answered in 2006, when "manna" in the form of diamonds fall from heaven, just like the story of Israelites in the wilderness (Exodus, 16:15-16). Only in Zimbabwe and nowhere else, has diamonds been picked in the fields and exchanged for food and fruits, such as tomatoes (Kabemba, 2010). According to Mzaca and Mangena (2010:7), Zimbabwe's former Minister of Finance, Tendai Biti described Chiadzwa diamond fields as 'the biggest find of alluvial diamonds in the history of mankind'. At Chiadzwa Diamond Fields there are more than five companies mining there. However, this study concentrated on Mbada Diamonds, Anjin and Diamond Mining Company. In 2009, Mbada Diamonds mine in Chiadzwa was given a license to mine diamonds by the Zimbabwe's Ministry of Mines. To maximise production Mbada Diamonds, Anjin and Diamond Mining Company are making use of modern technology unlike the 20,000 illegal artisanal miners who were working on the land and using the most basic tools and thereafter illegally selling their diamond finds to dealers outside the country (Sachikonye, 2007).

In 2009, Mbada Diamonds invested 100 million (USD) in the form of equipment and machinery to be used for building, physical processing, water, road and security infrastructure (Jonas, 2010). In 2012, an X-Ray Transmography machine (XRT) was introduced (Mazire and Mushawevato, 2012). XRT is a state of the art diamond recovery machine that enables diamond sorters to separate rubble from diamonds during the grading process (Mazire & Mushawevato, 2012). The machine's enhanced selectivity technique allows for the recovery of diamonds only and limits the extraction of other problematic minerals whose behaviour is similar to diamonds when exposed to X-ray radiation. Before the introduction of the XRT, Mbada Diamonds relied on "eye and hand sorting" which Mines and Mining Development Minister Dr ObertMpofu described as "mechanised panning".

However, these seemingly endless technological changes put much strain on workers resulting in them experiencing uncertainty, insecurity, exhaustion, stress and anxiety. Although, XRT is great leap forward for Chiadzwa Diamond Mines from "mechanised panning" to automated mining, nevertheless the process brings about many work life difficulties to workers. Introduction of technology enables jobs and tasks to be designed in accord with the principles of scientific management like standardisation, specialisation, and simplification (Skidelsky, 2013). The problem is that these principles can lead to severe consequences for the individual workers. It has been shown that simple, routine, none-challenging jobs often produce dissatisfaction and demoralisation of workers, high absenteeism and turnover and low work motivation (Herzberg, Mausner and Snyderman, 2004). In addition, Abraham (2000) says that simple and routine jobs lower productivity, causes workplace aggression, stress and burnout, for example a worker can be demoralised and burnt out by just loading diamond rubble in a XRT machine every day of his work life.

Introduction of technology is a problem for workers because it leads to alienation. Alienation is a condition in which man becomes isolated and cut off from the product of his work after having given up his desire for self-expression and control over his own fate at work (Marx, 1997). This leads to loneliness, meaningless, isolation and apartness which in turn is associated with anxiety. All these effects lead to estrangement in respect to both personal and social identities (Deery and Plowman, 1991).Workers would lose touch with their environment and relationships with people around them. Furthermore, alienation is linked to various conditions such as dissatisfaction at work, cynicism, burnout and depersonalisation (Sanders, 1997), work stress and alcohol use (Frone, 1999), powerlessness and a lack of control (Kanungo, 1992) and emotional labour (Ashforth and Humphrey, 1993). All these factors cause workers to have a miserable work life. Although Marx regarded managers as akin to puppets who carry out the wishes of the capitalist owners, managers can also experience alienation as do other workers (Lee and Ashforth, 1993).Therefore, introduction of technology is a phenomenon that needs to be looked into, to improve quality of work life.

Fear of being replaced by machines and losing jobs through retrenchment incite negative perceptions towards the introduction of technology (Arce, 1993). Displacement from jobs and substitution of human labour with technology for example, computing machinery frightens workers. According to Rifkin (1996) technological innovation may be seen as the direct cause of the destruction of employment. Furthermore, worker's fear of not possessing the skills necessary for learning and carrying out the required work leads to resistance to technology (Jaevenpaeae, 1997). When technological change is imposed on the workplace, employees must learn to cope with the new technology. Organisations generally provide formal and informal learning and training at all levels (Watkins &Marsick, 1994). However, it can be unfortunate that workers may not be prepared to learn the skills that are required for the technological change to take place (Korunka, 1996). Therefore, it leads to resistance of introduction of technology.

Workers hold negative perceptions towards the introduction of technology because of fear of the unknown. According to Mabin, Forgeson and Green (2001) fear of the unknown is defined as being uncertain about the nature of change. It is a feeling of not knowing what is going on and what the future is likely to hold. This makes it possible for workers to have a dark image of the unknown consequences of technological change. Fear is often considered as a factor that triggers worker's resistance to change (Kotter and Cohen, 2002). This becomes a barrier to workers acceptance of technological change because it exerts a negative effect on worker's rational thinking. Dubrin and Ireland (1993) noted that resistance to technological change is attributed to employee's fear of poor outcomes, the unknown, and realization of pitfalls with the change. Therefore, this study found out that introduction of technology at the workplace is a big challenge to workers that needs to be addressed through a holistic approach that involves consideration of workers' perceptions and needs.

1.3 Statement of the Problem

Introduction of technology usually has positive effects on mining companies such as increasing production, safety, efficiency and reducing cost of production. However, technological changes do not occur in a vacuum. Whenever it occurs, detrimental behaviours such as anxiety, stress, fear of the unknown, uncertainty and insecurity are also associated with it. In addition, introduction of technology is associated with negative effects such as poor job satisfaction, job enrichment, change of job content, fear of the unknown, retrenchment and technological unemployment. These factors emanate from technology's use of scientific management practices such as specialisation, standardisation, and time optimisation for each and every operation. Scientific management practices assess workers as machines, for example there are monitors and television cameras inside Mbada Diamonds plant to monitor each and every movement of workers. This increases production but does not give value to human factors which alienates and deskills workers. Alienation of workers culminates in powerlessness, loneliness, meaninglessness and isolation at the workplace.As noted by Abraham Maslow's (2004) hierarchy of needs, workers have special needs and perceptions that need to be considered when introducing technology at the workplace so that they can self actualise. One other problem is that introduction of technology may lead to retrenchment.

According to Hawkins (2009) mechanisation led to the retrenchment of more than 13 000 mineworkers in Zimbabwe between 1995 and 1999.The global economic meltdown witnessed in 2008/2009 coupled with political, social and economic instability also led to the retrenchment of many workers in Zimbabwe. The scenario forced many companies to retrench workers in a bid to keep their operational costs down (Maunganidze, Mupezeni and Pfebeni, 2013). Therefore, given all these negative effects, it is understandable that workers may resist introduction of technology at the workplace. Research indicates that 70 percent of technological change initiatives fail with the main reason being human resistance to technological change (Beer and Nohria, 2000). The presence of different perceptions towards the introduction of technology reveals the need to balance the positive and negative perceptions so as to generate a more realistic position to promote a positive outcome and prevent a harmful one. This should create a win – win situation between Chiadzwa Diamond Mines management and the workers where by production and profits increase juxtaposed with quality of work life for workers. Therefore, a deeper analysis of the perceptions that predispose resistance to the introduction of technology by workers was desirable so as to transform an embedded negative resistance into positive pursuit of company goals and a quality of work life that leads to self actualisation of workers.

1.4 Purpose of the study

The purpose of this study was to investigate the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines.

1.5 Research Objectives

The main objective of this study was to determine the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines. The specific objectives were:

(a) To determine whether workers support or resist introduction of technology at Chiadzwa Diamond Mines

(b) To compare whether the perceptions of skilled and unskilled workers differ regarding the introduction of technology at Mbada diamonds.

(c) To suggest appropriate models that Human Resource Development (HRD) professionals can try with respect to improving workers perception, response and adaptation to technological changes.

1.6 Hypothesis

This study tested the following hypothesis:

H_0 is the null hypothesis, H_1 is the alternative hypothesis; P is the P value that is the probability of obtaining test static which has a significance value level of 0.05. P value can either be equal to, greater than or less than 0, 05. If P value is greater than 0, 05 it means it accepts the null hypothesis and if it is less than 0, 05 it means it rejects the null hypothesis. Therefore, this study tested the following statistical hypothesis equation:

H_0: P > 0, 05

H_1: P < 0, 05

Hypothesis 1

(a) The perceptions of skilled and unskilled workers regarding the introduction of technology are the same.

(b) The perceptions of skilled and unskilled workers regarding the introduction of technology are not the same.

Hypothesis 2

(a) Workers resist the introduction of technology at Chiadzwa Diamond Mines

(b) Workers support the introduction of technology at Chiadzwa Diamond Mines .

1.7 Significance of Study

The study was significant given that, although, the technological change literature is rich, there seems to be a surprising gap in the literature concerning the role and nature of worker's perception towards technological changes in organizations. In particular, this study aimed to contribute in this area by examining the link between various perceptions on one hand and resistance to technological change and support for technological change on the other hand. This study suggested Human Resource Development Professionals (HRD) models which help workers perceive the introduction of technology positively. This may enable new technology to be specified, designed and implemented in a way that promotes employee responses that are beneficial to the employee and the company.

1.8 Motivation of the study

The researcher has an uncle who was demoted from being a diamond sorter to being a security guard at Mbada diamonds mine after the introduction of a new technology called the X-Ray Transmography (XRT).Introduction of XRT meant that fewer workers were needed to do the job of a diamond sorter. My uncle became one of the victims of the introduction of this machine because of his limited education and skill background, since he had only attained Zimbabwe Junior certificate. This study was also motivated by the researcher's academic trip to the Nissan factory in South Africa, Roselyne plant in Pretoria organised by his supervisor Doctor Zikhali in 2011. When touring the Roselyn plant, it was so unbelievable to see a car being manufactured from scratch to end product and the researcher discovered that there was so much specialisation for tasks in the plant. Cars are manufactured like scones because each process is three minutes from scratch to a brand new car. The workers were bored and alienated from the final product;

some of the worker's job is just to fix a bolt the whole day and nothing else. That is where the researcher discovered that technology causes industrial workers to have a less than satisfactory work life. Therefore, there was a need to determine workers perceptions on how introduction of technology affects their work life and how it can be improved.

1.9 Definition of Operational Terms

Diamond refers to a very hard native crystalline carbon valued as a mineral (Elliot, Hawker and Soanes, 2005).

Job satisfaction refers to the worker's affective response resulting from an evaluation of work values and work rewards (Locke, 1999).

Perception is the sciences of human thought, feeling and behaviour that is influenced by and have influence on other people (Hogg and Vaughan, 2002)

Resistance to Change refers to a process of refusal by decision-makers to be influenced or affected by the views, concerns or evidence presented to them by those who propose change (Agocs, 1997).

Organisational Change refers to transformational process where a company moves from the known to the unknown (Werner, 2007).

Technology refers to the art or science of applying scientific knowledge in practical ways in the industry to improve production, for example, designing of new machines (Hornby, 2010).

Technophile refers to individuals who perceive new technologies as people's salvation, which will solve all human beings problems (Kellner, 2003).

Technophobia refers to individuals who condemn technology as the major source of problems of the modern age (Kellner, 2003).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

There is a wide range disciplines that has studied and published how technologies diffuse or spread among people. The theoretical framework of this literature review is based on Diffusion of Innovations Theory by Rogers. However, other theories such as Technology Acceptance Model (Venkatesh and Bala, 2008) and The Theory of Reasoned Action (Ajzen and Fishbein, 1980) are discussed in this chapter. Diffusion of Innovations Theory by Rogers (1995) will be employed in order to explain and critique the factors that promote or hinder the acceptance of a technology at the workplace. The chapter reviews related literature with regard to: workers perceptions towards the introduction of technology.

2.2 Diffusion Theories

Many authors have written about the adoption of new technology. The earliest description of Diffusion research was incepted in 1903 by French sociologist Tarde (Tarde, 1995). Tarde schemed the original "S-shaped innovation curve" as he understood that the majority of innovations have an S-shaped rate of adoption. Through the slope of the S-curve, Tarde identified those innovations with a relatively fast rate of adoption called "steep slope" versus those with a slower rate called "gradual slope". This conception was further examined by Ryan and Gross who in 1943 published their study which described the diffusion of hybrid seed among a group of Iowa farmers. They found out that diffusion was a social process through which subjective evaluations of an innovation spread from earlier to later adopters rather than one of rational economic decision making (Valente, 1995). In addition, Ryan and Gross in 1943 discovered that the pace of adoption among those studied followed an S-curve when plotted on a cumulative basis over time. This anchored the studies of Tarde in 1903 reported 40 years

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2.3 Diffusion of Innovations

Rogers (1995) is depicted as the initiator of technology adoption research, even though many researchers came before him (Sahin, 2006). Diffusion of Innovations Model by Roger's (1995) is regarded as one of the finest models as far as diffusion and adoption of technology is concerned (Sahin, 2006). It stands out as one of the best models because of its usefulness in different areas such as industry, business and public health. Rogers (1995) defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Innovation is an idea, practice or object that is professed as new by an individual or other unit of adoption (Rogers, 1995). In diffusion models, the innovation is the central point of the analysis around which everything else revolves (Tornatzky and Fleischer, 1990). According to Rogers (1995), innovators are the first to adopt the innovation; these are individuals who look for change and accept it. Rogers (1995) classified the early adopters as deliberate and the late majority as skeptical. The laggards are the last in a social system to adopt an innovation; at this point the rate of adoption drops back.

According to Rogers (1995), change agent is an individual who is engaged or enlisted by a change agency to promote innovation or introduction of new technology. The change agent works hands in glove with innovators to increase the tempo of the process of diffusion in the beginning stages. The most important requisite for a change agent is to have good communication skills with potential adopters, being hold in high esteem by potential clients and be able to weigh up their actions with clients. Worth noting is that, Rogers (1995) highlighted the significance of the social network encapsulated in the diffusion process. In view of the fact that diffusion is a social process, the rate of diffusion is higher if early adopters are opinion leaders and are acquaintances and have links with potential adopters in a variety of groups, for example, departments and roles, therefore, diffusion according to Rogers (1995) takes place at fairly constant rate until a critical mass is reached. Therefore, diffusion of innovations model is a blueprint on how technology can be adopted, harnessed and implemented in an industry.

2.4 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) by Ajzen and Fishbein (2009) proposes that the best predictor of behaviour is a person's intention to perform or not to perform that behaviour. According to the TRA, it is possible to predict behavioural intention from a person's attitude about performing the behaviour and the person's perceived social support from important interpersonal referent for performing the behaviour. The term "subjective norm" refers to how people think their actions will be regarded by family members, friends, employers or other significant referents. According to the model, both attitude and subjective norm must be assessed in order to accurately predict intention and in turn predict behaviour. TRA states that an attitude is based on the combined set of beliefs one holds to be true about an action. In the case of the TRA, however, attitude is comprised of the set of beliefs an individual holds about performing some action rather than beliefs about some attitude object. These set of beliefs are comprised of two types that is beliefs about the consequences that will occur from performing the action and evaluation of those consequences. Through understanding what the individual believes, an awareness of the consequences of performing an action and how the individual evaluates these consequences; it is then possible to predict attitude from a combination of these two sets of components. To clarify, the sum of the value of each belief about the behavioural consequences multiplied by the value of its evaluations predicts an individual's overall attitude. Therefore, TRA can be used to predict workers behaviour in response to introduction of technology.

2.5 The Technology Acceptance Model

The Technology Acceptance Model (TAM) by Davis is one of the most prominent models correlated to technology acceptance (Rogers, 2005). TAM has demonstrated and proven to be a good theoretical model in helping to describe, explain and predict user behaviour of information technology (Legris, Ingham and Collerette, 2003). According to Ajzen and Fishbein (2009), TAM is well thought-out to be a significant and influential extension of Theory of Reasoned Action. Davis, Bagozzi and Warshaw (1989) came up with TAM to give an explanation on why a user accepts or rejects information technology. TAM furnishes sociologists and information technology researchers with a basis on how external variables influence belief, attitude and intention to use information technology. Two cognitive beliefs are postulated by TAM which is perceived usefulness and perceived ease of use. According to TAM, an individual's use of technology or information technology system is determined or influenced directly or indirectly by the individual's behavioural intentions, attitude, perceived usefulness of the system and perceived ease of the system. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. Therefore, TAM can be used to predict workers behaviour in response to introduction of technology.

2.6 Theoretical Framework

There is a tremendous volume and diversity of literature published on technological change. However, different approaches and models have been taken to explain the factors that influence the adoption of a new technology by workers. In this study, limited attention will be devoted to different Diffusion of Innovation by Rogers (1995). According to Hall (2004), a survey on the diffusion of innovations from a microeconomic perspective argues that the three part linear model of innovation that is invention, innovation, and diffusion, still serves as a useful organising principle in understanding technology and technological change. This confirms that Diffusion of Innovation theory gives a better understanding of technology adoption and how to implement it in different organisations.

2.7 Workers Perceptions Regarding Technology

The central construct of this study is workers perceptions regarding the introduction of technology. The literature related to innovation and technological change has much to offer in relation to worker's perceptions. According to Hogg and Vaughan (2002) perception is the sciences of human thought, feeling and behaviour that is influenced by and have influence on other people. Thought and cognition is defined as mental activities that mediate between the world out there and what people subsequently do. In other words, these mental activities contribute to how individuals understand the world, and how they act in response to this understanding. Perceptions of technology can be categorised into either technophobia or technophile. Technophiles perceive new technologies as people's salvation, that will solve all people's problem and technophobia's condemn technology as the major source of problems of the modern age (Kellner, 2003). Technophiles such as Al Gore, Tony Blair and Bill Gates (1995) support new technologies and reject its criticism because technology promises more jobs, exciting economic opportunities, more leisure, better education and enhanced democracy.

This may also be true in the mining industry because technology is an important strategy that increases production, improves safety and reduces direct mining costs. On the other hand, technophobia's perceive modern technology primarily as instruments of domination that threatens individual freedom, autonomy and creativity. According to Simpson (1994) technology imprisons people in technological cage and reduces human life to being mere instrumentality. Technology alienates people from nature, those around and reduces possibilities of self-development. Webster and Frank (1995) interpret emergent technologies as tools used by capitalists to ensure their domination and to overpower or seduce the working class into unrealistic dreams of technophile. These perceptions of technology act as determinants of worker's reactions towards introduction of technology at the workplace. In this study technophobe are those workers who support introduction of technology and technophile are the workers who resist technology. Introduction of technology in the mining industry raises perceptions amongst workers this may influence workers either to resist or support these changes.

2.8 Factors That Influence Workers' Perceptions Regarding Introduction of Technology

There are a plethora of factors that affect and influence workers perceptions regarding the introduction of technology which includes: need for personal growth, locus of control, internal motivation, past experience, organisational commitment, type of the change, communication, degree of involvement and the threats and benefits posed by the change programmes (Werner, 2007). According to Giangreco and Peccei (2005) individuals perceptions of the actual content and the outcomes of a change initiative and the extent they will personally gain or lose as a result of the change are strong predictors of their perceptions regarding change and their level of resistance to the change. A description of some of the factors influencing perceptions regarding introduction of technology among workers is provided in detail below.

2.8.1 Threats and benefits of technological change

In an organisation when technological change programs are introduced, workers and managers consider whether the proposed changes will be of any benefit to them. One of first aspect that workers do is to consider whether their own individual skills and competencies match the new challenge (Chreim, 2006). As a result they weigh the probability of success or failure in their new given tasks and roles. In a study by Oreg (2006) of 177 defence firm workers, results showed that individuals were concerned more with their job security in face of introduction of technology. In turn job security was strongly related to their perceptions and emotional reactions to introduction of new technology. If introduction of technology threatens their power and prestige there is likelihood that workers can be negative about it. In Oreg's (2006) study, the themes that emerged were that, workers embraced the change if they believed it would enhance their jobs and improve their services to the organisation. Nevertheless, if they perceived that they lacked the personal capabilities and competencies for success they were unwilling to accept the change. Individuals also accept and support change if they deemed the change consistent with their existing capabilities and the existing culture. Therefore, threats and benefits of technological change influence workers to either support or resist it.

2.8.2 Perceived Change in Power

According to French and Raven (1999) power is defined as the perception by a worker that another worker has a legitimate right to prescribe and influence behaviour over them and the obligation to accept that influence. In addition, Pierce and Newstrom (1995), define power as the ability to change one's environment. Power is aligned with a position in an organisation. This means that a higher level of hierarchical position in an organisation is associated with a higher level of power. As the worker go up the hierarchical ladder so is the level of power. In this view, any technological change that shakes up power or hierarchical structure in an organisation may lead to creation of three different groups of workers.

A first group comprises of any worker who will receive or gain greater power in this organisation as a result of this technological change. A second group involves of any worker whose power is reduced in an organisation as a result of change. The last group is made up of any worker whose power remains untouched and does not fluctuate in the wake of introduction of technology at the workplace. The last group is safe from any power changes. Workers whose power is lessened as a result of introduction of technology my respond to this change differently than those whose power is catapulted as a result of this change or than those who will uphold their current level of power. Consequently, workers strong feelings of reduction in power might lead to resistance to technological change since they may perceive and feel that their organisation has maltreated them (Fasolo and Davis-LaMastro, 1990).

If a perceived change in power is thought out to be a mistreatment committed by the organisation, then workers may have a negative response to the change. On the other side of the coin, workers who will have more power as a result of change may have a positive response to introduction of technology. The reason being that they may view this perceived gain in power as a benefit provided by the organisation and feel indebted to pay back the organisation by providing support for change (Eisenberger, 1996). Conclusively, perceived change in power influences workers to support or resist introduction of technology at the workplace.

2.8.3 Perceived Change in Status

Perceived change in status influences workers to support or resist introduction of technology at the workplace. According to Lovaglia and Houser (1996) workers status is based on the prestige, honour and respect accorded to them by other members of the group. Formalised positions and status rankings my often correspond or run parallel but they are not identical (Waldron, 1998). There is always a difference in one way or another. An organisation induces resistance to technological change, particularly when a change negatively affects their status quo (Smith, 1992). In addition, Spreitzer and Quinn (1996) found out that middle managers claimed that higher-ranked executives resisted change efforts if it affects their status. Likewise, Smith (1992) found out that people in power often try to maintain the status quo when a proposed change is perceived of having a negative impact on their power. Perceived loss of status enacts a defence mechanism which may lead to resistance to change.

Furthermore, Kovach (1997) asserts that the achievement of status is one of the important concerns of workers at the workplace. Workers tend to associate power with social status, maintaining that the greater the power, the higher the rank of social status becomes. However, when technological change affects workers status in a negative way, they have a tendency, conscious or unconscious, to behave in ways that may maintain their status. Based on the social exchange theory (Blau, 1994) and the norm of reciprocity (Gouldner, 1990), it is argued that workers will view a decline in their status in an organisation as a negative treatment they receive from an organisation. They feel obliged to return a negative treatment to the organisation (Gouldner, 1990). Workers become easily annoyed and upset when something demeans their status. Therefore, when a change affects workers' status, they tend to have a negative response to such change.

However, to a lesser extent, it can be argue that workers facing technological change will react positively when they feel that such change will provide them a higher status in an organisation. This is because workers may perceive a higher status as a positive treatment they receive from an organisation and feel obliged to return a positive favour or benefit to the organisation, leading them to support the change. In line with this discussion, it can be reasoned out that there may be a link between workers' perceptions of change in status resulting from technological change and their reactions to change.

2.8.4 Personal growth, autonomy and Challenges

Need for personal growth, autonomy and internal work motivation are positive factors that influence workers' perceptions regarding introduction of technology at the workplace. Judge (1999), examined seven dispositional constructs related to coping with organisational change. They surveyed 514 managers in six organisations. The organisations had undergone recent changes that involve major reorganisation efforts, introduction of new technology, downsizing, changes in top management, mergers and acquisitions, and business divestments (Lau and Woodman, 1995). The dispositional constructs studied were narrowed down into two factors, which the researchers labelled self-concept and risk tolerance. Self-concept was comprised of internal locus of control, positive affectivity, self-esteem, and self-efficacy. Risk tolerance was made up of higher openness to experience, lower risk aversion, and higher tolerance for ambiguity (Stopford, 2003). All these factors were correlated to an individual's success in coping and dealing with organisational change. Therefore, impliedly when workers are granted the power to control their work and the change process; it is highly possible that they may be positive about the change since it brings in new challenges and opportunities (Eaton, 2010). Workers in an organisation seek personal growth and exciting challenges and if introduction of technology affords them that opportunity they can support. This is in line with Abraham Maslow's (2004) hierarchy of needs which notes that one of the greatest needs of a human being is to self-actualise. Self-actualization is difficult to attain or rather impossible to attain but if workers perceive that introduction of technology brings personal growth they can support it.

2.8.5 Participation in the technological change effort

According to Lines (2004), participation is the taking part of workers or involvement in the initial assessment and development of the technological change plan. In addition, to participating in the process, it also involves the right to veto decision that concern technological change plan. Therefore, it means workers become part of the technological change plan from start to finish and it prevents any possibility of making unpopular decision making in the change plan. Participation in change initiatives was associated with more positive views of the change, reduced resistance, and improved goal achievement (Chreim, 2006). This is evidenced by Giangreco and Peccei (2005) study of managers of an Italian electric company. They found out that workers perceptions of their participation in the development and implementation of the change initiative was associated with more positive attitudes towards the change and reduced resistance to change. In a study examining participation, Msweli-Mbanga and Potwana (1991), as quoted by Judge (1995), reported that access to participation in a meaningful way, receiving information and the ability to express opinions and involvement in decision making built a positive attitude within individuals involved. This is manifested through responding favourably to participation opportunities by attending meetings, providing input, working harder and accepting possible disruption of relationships with colleagues. In relation to this, workers in the mining industry, given the opportunity to actively participate will possibly portray positive perceptions regarding introduction of technology in the mining industry. However, little active participation means resistance to change through the loss of comfort and privileges, the interests of the individual versus the organisation and the possible loss of jobs (Lines 2004). Therefore, organisation must give workers an opportunity to participate in technological change plans to prevent resist to technological change and encourage support for it. When workers participate actively the chances are slim that they can resist and denounce technological change initiates that they have also helped to plan.

2.8.6 Personal resilience and openness to change

Individual personality also has a greater influence on how a particular individual will perceive introduction of technology at the workplace. Wanberg and Banas (2000) examined the influence of personal resilience on an individual's willingness to accept technological change and found that self-concept and risk tolerance were related to an individual's success in coping with change. Bovey and Hede (2001) identified certain defence mechanisms used by individuals in dealing with change and explored the relationship of irrational thoughts and the perceived impact of change to resist. Factors examined which influence a predisposition towards resistance included an inclination to seek routines, negative reactions to announcements of change, a short-term focus and a rigid or inflexible point-of-view. Wanberg and Banas (2000) reported that personal resilience, which they defined as a combination of self-esteem, optimism, and perceived control, was a predictor of a worker's willingness to accept change hence possibility of a positive perception regarding the introduction of technology at the workplace.

However, worth noting is that personal resilience is not definitely predictive of a more positive view of technological change. In other words, the opposite may be true that, workers with personal resilience may accommodate a change whether or not they agree with the change or whether or not they perceive it is beneficial. Moreover, Bovey and Hede (2001) discovered that individuals who do not want to take responsibility and have a tendency to blame others are more likely to resist change. In addition, individuals who are inert, passive and who avoid life's difficulties and to not take control of their own destinies were significantly more likely to resist change. The researchers also found that the higher the individual's perception of or feelings about the change impact, the greater the association between these tendencies and resistance. Education plays an important part in individuals as far as technological change is concerned and openness to change. It has a positive impact on perceptions regarding introduction of change because workers with higher education level are better equipped to meet new challenges at work (Iverson, 1996). Education broadens ones scope of ideas and thinking which helps in weighing the pros and cons of introduction of technology. As a result, it opens up one's mind to change and new ideas which impacts positively to introduction of technology at the workplace.

2.8.7 Organisational commitment

According to Lines (2004) organisational commitment is defined as the relative strength of an individual's identification and involvement in a particular organisation. Vakola and Nikolaou (2000), regard commitment as an attitude that reflects the nature and quality of the linkage between a worker and an organisation. Since good turn deserves another, it is argued that commitment often establishes an exchange relationship in which individuals attach themselves to the organisation in return for certain rewards from the organisation (Robbins and Odendaal, 2005). When individuals are join organisations, they come with certain needs, skills, expectations and they look forward to finding a good work environment where they can be able to use their talents, abilities and satisfy their needs. When an organisation offer and provide these opportunities there is high possibility that they increase their commitment.

Darwish (2000) outlines that organisational commitment plays an important role in worker's acceptance of technological change. In addition, Iverson (1999) ranked organisational commitment as the second most important determinant after union membership concerning perceptions regarding introduction of change at the work place. More specifically, Lau and Woodman (1995), argued that a highly committed worker is more willing to accept organisational change if it is perceived to be beneficial. However, other researchers indicated that workers who are highly committed worker may resist change if they perceive it as a threat to their own benefit (Oreg, 2006).

According to Iverson, (1996), workers with high organisational commitment are more willing, enthusiastic and motivated to put more effort in a technological change project. As result, they are more likely to develop positive perceptions regarding technological change. Similarly, Guest (1998), as quoted by Vakola and Nikolaou (2005), suggested that organisational commitment mediated the total causal effects of positive affectivity, job security, job satisfaction, job motivation and environmental opportunity on technological change. Therefore, organisational commitment is a factor that influences positive perception regarding introduction of technology at the workplace.

2.8.8 Individual Attitudes

According to Trader and Leigh (2001) individual attitude is directly linked to resistance to introduction of technology. Attitude then is a critical success or failure factor of introduction of technology. Bovey and Hede (2001), state that resistance can be seen as a natural and normal process brought by distorted beliefs or by individual's tendency to assess situations using extreme categories. Furthermore, these authors view resistance as that which comes from the impact of change perception and which is made up of irrational ideas and affect. Resistance can be viewed as a negative emotional reaction activated by the inconsistencies and differences between the cognitive schemes of individuals and those present in the proposals for change (Campbell, 2000). Explanations relating to negative attitudes towards change link, well with factors that lead to resistance to change as noted by Mcshane and Von Glinow (2008). These include the fear of the unknown, loss of control of work patterns, uncertainty about new processes and expected results arising from the change. Increase in the demands of work generated by the change, misunderstandings and unclear demands in the change process are also factors that lead to resistance. There is a link between worker's perceptions and attitudes in response to introduction of technology in for example mining industry.

Piderit (2000) proposes that individual's responses to change can be analysed through the concept of attitudes. The concept comprises three dimensions, the cognitive dimension, which involves beliefs that express positive or negative judgments about an object, the affective dimension, which covers feelings and emotions about the object and the behavioural dimension, based on past behaviour or future action intentions in relation to the object of change. Elrod and Tippett (2002) concurred with Piderrit (2000), when they explored people's attitudes to alterations in the organisational structure and routine on a daily basis throughout the period of change. Their results indicate that resistance becomes stronger when attitudes in relation to change are negative, or when people's job definition and security are under threat. Therefore, individual attitude towards the introduction of technology influence workers perceptions towards it.is directly linked to resistance to introduction of technology

2.8.9 Fear of Unknown Consequences of Change

According to Mabin, Forgeson and Green (2001), fear of unknown is defined as being uncertain about the nature of change. It is a feeling whereby a worker does not know what is going on and what the future is likely to hold. This makes it possible that workers may have a dark image of the unknown consequences of a change. Fear is often considered as a factor that triggers workers resistance to change (Kotter and Cohen, 2002). This becomes a barrier to workers acceptance of change because it exerts a negative effect on workers rational thinking. Dubrin and Ireland (1993) noted that resistance to change is attributed to worker's fear of poor outcomes, the unknown, and realisation of pitfalls with the change.

Fear drives workers into protection mode. In order to get rid of feelings of fear, workers either accept the situation as it is and live with it or remove the source of fear or alter the change. Technological change communications are more likely to reduce workers resistance to change (Cobb, Wooten and Folger, 1995). This is because these communications will reduce anxiety about change (Kanter, 1995). Moreover, it increases a perception of fairness of technological change amongst workers (Cobb, 1995). Past research has found that technological and organisational change is related to anxiety and stress (Leana and Feldman, 1992). Most change management models and frameworks have emphasised the roles and effects of communication during the change process (Galpin, 1996). Therefore, fear of unknown influences workers perceptions regarding introduction of technology at the workplace.

2.9 Effects of Technological Change on workers

Introduction of technology at the workplace raises positive and negative perceptions amongst workers. These perceptions influence workers to support or resist new technology depending on how it affects the quality of their work life. Studies examined individual's reactions to the announcements of change and reported that their concerns and perceptions are determined by personal, organisational implications and outcomes of the change (Giangreco and Peccei, 2005). Mcshane and Von Glinow (2008) proposed that, there are major direct costs caused by technological change to workers, including threats to autonomy, job security and career opportunities. However, according to Werner (2007), technological change, for some individuals, can pose threat, for others a challenge and an opportunity. Drawing from above, it is quite evident that introduction of technology has positive and negative effects on workers. Top of the list is scientific management practises that come with introduction of technology that has detrimental effects on the work life of workers.

2.9.1 Scientific Management

In 1911, Taylor published his famous book, *Principles of Scientific Management*, in which new principles of industrial organisation are suggested (Caldari, 2007). Analysis of Taylor's Scientific Management Approach about human factors asserts that workers are lazy and have an inclination for less work, be unproductive, not to struggle for the progression of enterprise, be de-motivated and do not have a defined mission and vision (Celik and Dogan, 2011). Taylor observed that this unproductive work attitude and environment existing in some industries may cause substantial damages to production. To turn these factors causing inefficiency and effecting production negatively into neutral or to minimise them, caused him to come up with Principles of Scientific Management (Simsek, 2009).

The essence of Principles of Scientific Management is minute division of labour, repetition of simple movement, predetermined methods of work, minimum training required, incentive of a monetary nature and time optimisation for each operation (Nelson, 1992). Scientific Management produce high wages, high profits and, consequently, harmony between employers and employees (Caldari, 2007). Scientific management meets with widespread support of economist and scholars such as Gantt, Cooke and Emerson (Caldari, 2007). Thornstein Veblen greatly appreciated the scientific organisation of labour and workshops because it looks capable of increasing technical and general efficiency (Rutherford 2003). However, Scientific Management also has fierce opponents. In 1911, *The Engineer* magazine declared scientific management as unfair and inhuman because of division of labour and the necessity of the separation of thought from action, for the working of the system (Caldari, 2007).

Celik and Dogan (2011) also assert that Taylor overlooked subjects such as solidarity, faithfulness of the employer seeing to his workers, emotional responsibility, motivating and giving value to workers. Taylor considers only the payment factor for workers motivation factor. This has laid the groundwork for the studies of scientists such as Fayol and Weber who have regarded these critiques as base for reconsideration and have built their thoughts on Taylor's teachings (Celik and Dogan, 2011). John Commons notes that scientific management is dangerous and problematic because of extreme standardisation of processes which increases the conflicts between employees and employers. According to Caldari (2007), Common's most important question is; *can scientific management deal scientifically with organisations as well as individuals*? Given the above, this study supports the view that Scientific Management views workers as working machines and it does not give value to the human factor but only considers production. Therefore, scientific management complements, if not completes factors that are associated with introduction of technology at the workplace; such standardisation and division of labour that have negative effects on workers.

2.9.2 Alienation of Workers

The introduction of technology at the work place leads to alienation of workers. The term "alienation'' originates from the work of Karl Marx on the effects on workers on the capitalist labour process (Deery and Plowman, 1991). According to Karl Marx (1997) alienation is a condition in which man becomes isolated and is cut off from the product of his work, having given up his desire for self-expression and control over his own fate at work. Marx (1997) reveals that alienation is not equivalent to reutilisation or unhappiness, rather, alienation is a distorted relation of the worker to himself, his human nature and his fellow workers. The chief crime of alienation is not that it causes unhappiness, but that it is wasteful of the intelligent and purposive character unique to human beings. Instead of expanding a worker's creative and social identity, it stifles what Marx called a worker's "species-being" as well as his human nature. This is not a change that can be readily exhibited, described, or even identified by an alienated worker.

According to Marx (1997) there are four types of alienation in labour, which include alienation from the act of production, alienation from man's "species-being," and alienation from fellow workers. In addition, alienation is described from the act of production as labour that is "external to the worker," that "does not belong to his essential being" and in which "he does not affirm himself but denies himself". As a result of this, "the worker therefore only feels himself outside his work" because "the worker's activity is not his spontaneous activity…it belongs to another". Marx (1997) conceives man's labour as closely tied to man's identity, which results in "the loss of his self" and yields "self-estrangement". According to Ashforth and Humphrey (1993) self-estrangement is also called "self-alienation". Workers find that they enact roles in which they are estranged from the kind of life of which they are capable. Self-estrangement prevents people from relating to and being with other people in the world. They become detached from the world with other and live in their own word that is very lonely and miserable.

According to Marx (1997) man is a distinguished species being, who is able to "universalise" himself through consciousness than animals. This "species-being" is the basis for sociality in man and also defines man's relation to labour, or life activity, which becomes the "object of his will and of his consciousness". Under conditions of alienated labour, work is not directed by the will and consciousness of human nature but is merely a "means of satisfying…the need to maintain physical existence". As a result, man is unable to apply what makes him most human to his life activity and his views are narrowed. Man's focus becomes individual life, which "becomes the purpose of the life of the species".

Without the ability to see man's essential nature and universal species-being behind individual life, it leads to estrangement from other men through, "viewing the other in accordance with the standard and the relationship in which he finds himself a worker". This constant stress and strain in the process of labour contributes to alienating workers from man's species-being and from his fellow workers. An individual loses touch with the authentic self and perceives that they are acting contrary to a central, valued and salient self. Thus, the individual experiences a rupture between the inner self and the artificial self-created by their perceptions of organisational life. Attention to aspects of work may mask for a time the negative effects of alienation but sooner or later a range of symptoms would emerge to adversely affect work performance.

Workers experience alienation due introduction of technology which brings automation and scientific management principles such as specialisation, time optimisation and repetition of tasks and predetermined methods of work (Nelson, 1992). All these factors impact negatively in workers which culminate into feelings of a lack of control and powerlessness especially when important aspects of work spill over to affect the individual's life more. This form of alienation can be interpreted in psychological terms as feeling unable to achieve self-realisation and satisfy ego-esteem needs. Kanungo (1992) argues that conditions leading to the loss of individuality deprive the workers of self-fulfilment or the realisation of whom they are or what their essential nature is and that is not good for human dignity. However, worker empowerment initiatives, such as power sharing may provide a solution to the problem of powerlessness experienced by workers (Spreitzer, 1996).

Although worker empowerment may be seen as a solution to powerlessness, it appears to be more rhetoric than reality because several studies cast doubt on whether it really works (Hales, 2000). The problem appears to be whether there is real transfer of power to workers for more control over their work situation. Thompson and McHugh (2002) conclude that worker empowerment is pseudo power and it is simply an underhand way of increasing worker's responsibilities whilst actually maintaining power in the hands of managers. Claydon and Doyle (1996) say that it is a fact that managers, especially at lower levels are often unwilling to relinquish control over subordinates. Drawing from above, worker empowerment initiates failed to give powers to workers to control their work situation. Therefore, alienation is a negative effect that is brought by introduction of technology.

According to Marx (1997) deskilling is the process by which skilled labour within an industry or economy is alienated through the separation between conception and execution. In this circumstance, a large part of the technology came to be personified in machinery and equipment, what Karl Marx called 'Modern Industry' and Braverman identified as mechanization and automation (Shaw and Das, 2013:2). The introduction of machinery means that the control of the production process goes from human hand to the machine and the skill of the worker is no longer required. Deskilling of workers weakens their resistance to capitalist control of the labour process (Marx, 1997). Since workers cannot compete with technological change, they gradually become depend on the machine and are forced to adapt it since management would want it that way. In other words workers do not have an option because the management is in control and machines can also do better than them.

2.10 Deskilling

2.10.1 Background and effects of Deskilling in the Industry

Marx (1997) was the first to establish that there is a long-run tendency for workers to become deskilled in the process of production in a capitalist economy. Marx (1997) identified the deskilling process through the separation between conception and execution that gives rise to alienation of labour. When Marx (1997) worked on the labour process theory, he noted this tendency in the vehicle manufacturing industry in England. The first stage of production was organised in the house premises of the weavers or producers, either independently or under putting out system. In case of independent production, the weaver or producer had complete control on the labour process by means of production, that is, raw material and instrument or tools and possessed weaving knowledge and skill. There was thus the unity of conception and execution in the labour process. In case of the putting-out system, the dealer supplied the raw materials to the producer. The producer or craftsman owned the instrument of production that is the tool with which he performed the work. The work involved the control, judgment and craft-knowledge of the craftsman. There was a unity of conception and execution in the labour process because the producer had to decide when to work, how to work (Marx, 1997).

However, the deskilling process started and occurred when the factory system began to displace the artisan shop and it picked up pace as production increasingly mechanised with the adoption of steam power (Atack, Bateman and Margo, 2008). Work that had previously been performed by artisans was now decomposed into smaller, highly specialised, sequences which require less skill but more workers to perform (US Department of Labor, 1999). Some innovations were even designed to be deskilling. For example, Eli Whitney, a pioneer of interchangeable parts, described the objective of this technology as "to substitute correct and effective operations of machinery for the skill of the artist which is acquired only by long practice and experience; a species of skill which is not possessed in this country to any considerable extent" (Habakkuk, 1992). There were also developments in continuous-flow production that enabled workers to be stationary while different tasks are moved to them. It had identical interchangeable parts that allowed complex products to be assembled from mass produced individual components by using highly specialised machine tools to a sequence of operations (Frey and Michael, 2013).

Although, the first assembly-line was documented in 1804, it was not until the late nineteenth century that continuous-flow processes started to be adopted on a larger scale. This enabled organisations such as the Ford Motor Company to manufacture the T-Ford at a sufficiently low price for it to become the people's vehicle (Mokyr, 1990). Crucially, the new assembly line introduced by Ford in 1913 was specifically designed for machinery to be operated by unskilled workers (Hounshell, 1995). Furthermore, what had previously been a one-man job was turned into a 29-man worker operation, reducing the overall work time by 34 percent (Bright, 1998). The example of the Ford Motor Company thus underlines the general pattern observed in the nineteenth century, with physical capital providing a relative complement to unskilled labour, while substituting for relatively skilled artisans (Atack, 2004). Hence, as pointed out by Acemoglu (2002): "the idea that technological advances favour more skilled workers is a twentieth century phenomenon."

The modern pattern of high skilled jobs emerged in the late nineteenth century, as manufacturing production shifted to increasingly mechanised assembly lines. This shift can be traced to the switch to electricity from steam and water-power which, in combination with continuous-process and batch production methods, reduced the demand for unskilled manual workers in many hauling, conveying, and assembly tasks, but increased the demand for skills (Goldin and Katz, 1998). In short, while factory assembly lines, with their extreme division of labour, had required vast quantities of human operatives, electrification allowed many stages of the production process to be automated, which in turn increased the demand for relatively skilled blue-collar production workers to operate the machinery.

In addition, electrification contributed to a growing share of white-collar non production workers (Goldin and Katz, 1998). Over the course of the nineteenth century, establishments became larger in size as steam and water power technologies improved, allowing them to adopt powered machinery to realize productivity gains through the combination of enhanced division of labour and higher capital intensity (Atack, 2008). Furthermore, the transport revolution lowered costs of shipping goods domestically and internationally as infrastructure spread and improved. The market for artisan or skilled workers goods early on had largely been confined to the immediate surrounding area because transport costs were high relative to the value of the goods produced. With the transport revolution, however, market size expanded, thereby eroding local monopoly power, which in turn increased competition and forced firms to raise productivity through mechanisation. As establishments became larger and served geographically expended markets, managerial tasks increased in number and complexity, requiring more managerial and clerking employees (Chandler, 1997).

This pattern was, by the turn of the twentieth century, reinforced by electrification, which not only contributed to a growing share of relatively skilled labour that had higher educational attainment but also increased the demand for unskilled workers (Allen, 2001). According to Nordhaus (2007) new technology was ushered in by what is commonly referred to as the Computer Revolution which began with the first commercial uses of computers around 1960 and continued through the development of the Internet and e-commerce in the 1990s. As the cost per computation declined at an annual average of 37 percent between 1945 and 1980, telephone operators were made redundant.

The first industrial robot was introduced by General Motors in the 1960s and in the 1970s airline reservations systems led the way in self-service technology (Gordon, 2012). During the 1980s and 1990s, computing costs declined even more rapidly, on average by 64 percent per year, accompanied by a surge in computational power (Nordhaus, 2007). At the same time, bar-code scanners and cash machines were spreading across the retail and financial industries and the first personal computers were introduced in the early 1980s, with their word processing and spread sheet functions eliminating copy typist occupations and allowing repetitive calculations to be automated (Gordon, 2012). This substitution of labour led to deskilling of many workers in the industries.

2.10.2 Effects of Deskilling on Skilled and Unskilled Worker

As seen from above, introduction of technology results in physical and cognitive skill degradation and substituting of skills through the simplification of tasks (Parasuraman, 2000). However, it does not end on deskilling workers skills only but it furthermore more affects and divides the labour market. It affects wages, job description, education and training of skilled and unskilled workers. According to Goldin and Katz (2009) educational wage differentials in the US narrowed from 1915 to 1980. However, both educational wage differentials and overall wage inequality have increased sharply since the 1980s in a number of countries (Murphy, Riddell and Romer, 1998). Although there may be many reasons behind it, consensus is broad that this can be attributed to acceleration in the need of highly skilled workers caused by the introduction of new technology driven by the adoption of computers and information technology (Bresnahan, Brynjolfsson and Hitt, 2002).

Furthermore, the Computer Revolution can go some way in explaining the growing wage inequality of the past decades. For example, Krueger (1993) finds that highly skilled workers using a computer earn roughly earn 10 to 15 percent more than others but also that computer use accounts for a substantial share of the increase in the rate of return to education and training. In addition, more recent studies find that computers have caused a shift in the occupational structure of the labour market. Autor and Dorn (2013), for example, show that as computerisation erodes wages for labour performing routine tasks, workers will reallocate their labour supply to relatively low-skill service occupations. More specifically, between 1980 and 2005, the share of US labour hours in service occupations grew by 30 percent after having been declining in the three decades before.

Furthermore, in the US there is a huge gap between the lowest and highest job-skill worker. This indicates that deskilling leads to polarisation of the labour market where by a low skilled worker earns little compared to high skilled workers. Brown and Philips (1996) found out that certain food manufacturing jobs which were partially mechanised during the late nineteenth century, reduced workers' wages. New technology replaced skilled workers with workers of lesser skills. However, to a lesser extent Chin (2006) found out that the introduction of steam shipping to merchant shipping had a more different pattern because it reduced the skill requirements of some jobs and increased skills of other jobs. There are also some examples where whereby introduction of technology created new highly skilled occupations, such as the creation of the occupation of typographers following the introduction of the linotype machine. Nevertheless, introduction of new technology leads to replacement of unskilled workers and reduction of wages.

However, it is worth noting that with this rapid introduction of at the workplace, no group of workers is safe, whether skilled or unskilled. There used to be a broad consensus that technological advance favours more highly skilled workers and that the solution for low-skilled workers was to train for better jobs (Taboola, 2013). However, technological progress is now taking up the better jobs too. A wide range of jobs that used to be skilled, secure and irreducibly human are now becoming casualties of technological change. Sectors that used to be immune to productivity increases such as education and health care technology is reducing the demand for skilled labour (Taboola, 2013).

This follows the trend that Braverman (1998) put forward that automation first upgrades skills and then accelerates the historic deskilling trend. High skilled jobs may be reduced in value such as data analysis and legal research. However, it is worth pointing out that many new types of job may be created by technology. For example drivers of multi-car road trains, big data analysts or robot mechanics but these jobs are not many. Given that a handful of technicians might replace a fleet of taxi drivers or a single data analyst and software can replace many quantitative researchers. One example is that Twitter, the social-media giant, is valued at 9 billion US dollars but employs just about 400 people worldwide (Taboola, 2013). Therefore drawing from the above, technology leads to deskilling of workers which divides and affects the labour market differently depending on whether they are highly skilled or not.

2.11 Unemployment

2.11.1 Background and Effects of Unemployment

Throughout history, technological progress has enormously shifted the composition of employment, from agriculture and the artisan shop, to manufacturing, mining and clerking, to service and management occupations. The concern over technological unemployment has proven to be correct. In 1819, an economist called Ricardo suggested that labour saving technology reduces the demand for undifferentiated labour which leads to what John Maynard Keynes calls technological unemployment (Skidelsky, 2013). Economically, an invention that replaces workers by machines will have effects on all product and factor markets. An increase in the efficiency of production which reduces the price of one good, will increase real income and thus increase demand for other goods. As a result, as noted by Aghion and Howitt (1994) technological progress has two competing effects on employment Firstly, as technology substitutes for labour, there is a destruction effect, requiring workers to reallocate their labour supply.

The second effect is that introduction of technology has a capitalisation effect. More companies enter industries where productivity is relatively high thereby leading employment in those industries to expand. Although the capitalisation effect has been predominant historically, the discovery of means of economising the use of labour can outrun the pace at which industries can find new uses for labour, as Keynes (1993) pointed out. However, the reason why human labour has prevailed relates to its ability to adopt and acquire new skills by means of education (Goldin and Katz, 2009). Yet as introduction of new technology become too much it becomes increasingly challenging to keep up with the pace (Brynjolfsson and McAfee, 2011).

The pace of technological innovation is still increasing, with more sophisticated software technologies disrupting labour markets by making workers redundant. As noted by Brynjolfsson and McAfee (2011) computerisation is no longer confined to routine manufacturing and mining tasks. The autonomous driverless cars, developed by Google, provide one such example of how manual tasks in transport and logistics may soon be automated (Benedikt and Osborn, 2013). In the 20th century there were difficulties of replicating human perception, asserting that driving in traffic is not under threat to automation (Levy and Murnane, 2004). However, six years later, in October 2010, Google announced that it had modified several Toyota Priuses to be fully autonomous (Brynjolfsson and McAfee, 2011). This clearly evidences that technology is increasing at a breath taking pace and workers are the victims of it. Workers become redundant because machines and devices become more advanced, powerful and capable of efficiently performing tasks more than workers (Taboola, 2013). When technological changes take place, two different aspects of human work are affected. On the one hand, physical work of humans is replaced by mechanisation; on the other hand, sensory and intellectual capabilities or work tasks are replaced by automated devices or computers (Chen, Cheng and Zhang, 1999). Therefore, machines take up the work done by workers leading to loss of jobs in the industry for the workers.

2.11.2 Effects of Unemployment on skilled and unskilled workers

According to Skidelsky (2013) technological unemployment has been on an upward trend over the last 25 years. This is evidenced by the total number of manufacturing jobs in United States of America which fell by 2.1 million from 15.8 million in 2001 to 13.7 million in 2007 (Ahearn, 2012). In 2011, 1.9 million jobs were lost and total manufacturing employment standing was down at 11.7 million. Although, technological unemployment affects the whole spectrum of workers, unskilled workers are the most affected than skilled workers. According to Moreno-Galbis and Sneessens (2003) the unemployment rise over the last decades observed in many European Union countries such as England and Spain has been particularly strong among low-skilled workers. This phenomenon is usually accompanied by a deterioration of economic conditions of low skilled workers. In the US and UK, this phenomenon is associated with greater wage inequality across skill groups (Krugman, 1994).

Investment in new technologies raises the relative demand for skilled workers wich may lead to more low-skilled unemployment unless the change in relative demands is compensated by a change in the relative wages or in relative labour supplies (Machin and Van Reenen, 1998). Bias technological change combined with relative wage rigidities may thus lead to “skill mismatch”

(Moreno-Galbis and Sneessens, 2003). This has led to more attention being paid to an alternative interpretation in terms of job competition between highly and low skilled workers. Highly skilled workers manage to increase their probability to get a job displacing low skilled ones. This leads to the "ladder effect" (Collard, Fonseca and Munoz, 2003). The ladder effect is a situation whereby high-skilled workers have moved down the occupational ladder, taking on jobs traditionally performed by low-skilled workers. It results in pushing low-skilled workers even further down the occupational ladder and even out of the labour force (Beaudry, Green and Sand, 2013).

Unfortunately for skilled workers, organisations may wish to hire highly skilled workers for low skilled jobs, to avoid training cost or because they have a high productivity (Gautier, 1999). It is also generally observed that many workers in Europe have obtained high levels of education. This has led to a structural change in the composition of the labour force, which has essentially taken place for new entrants in the labour market (Robinson and Manacorda, 1997). In many Oraganisation for Economic Cooperation and Development (OECD) countries such as USA, Australia, Mexico. Germany and UK, investment in human capital or education has significantly increased despite a stable wage premium (Muysken and TerWeel, 1999).

Youngsters invest more in human capital not because the relative wage for high-skilled on complex jobs has increased, but rather because a higher education level increases the number of job opportunities. Recent empirical works suggest that the proportion of "overqualified" workers is far from negligible although hard to evaluate (Hartog, 2000). However, Beaudry, Green and Sand (2013) document a decline in the demand for skill over the past decade, even as the supply of workers with higher education has continued to grow. This has resulted in a high proportion of overqualified workers as noted by Hartog (2002).

However, unemployment is not only being unable to find a job or a loss of job in the labour market but it comes in different forms. Disguised-unemployment and under-unemployment are other forms of unemployment. Industries are finding it difficult to keep unemployment down. There is a great deal of work-sharing especially in underdeveloped countries. It is the accepted means of making a limited amount of available work go around; economists call this "disguised unemployment" (Skidelsky, 2013). Workers who are not laid off but are forced to work reduced hours for less pay also contribute to the labour recession. According to the Solidarity Research Institute Report (2008) underemployed people are those who work for less than 35 hours per week. In 2008, South Africa under-employed workers constituted 15,3 percent of the total number of employed people. Therefore, unemployment comes in different forms that involve disguised-unemployment and under-unemployment. Conclusively, introduction of technology leads to different forms of unemployment that contribute to labour recession and it affects skilled and unskilled workers differently.

2.12 Job Satisfaction

2.12.1 Effects of Job satisfaction

Introduction of technology at the workplace affects job satisfaction of workers. Edwin Locke's (1996) defines job satisfaction as a pleasurable or positive emotional state resulting from an appraisal of one's job or job experiences. In addition, Weiss (2002) defines job satisfaction as a positive or negative evaluative judgment one makes about one's job or job situation. Llies and Judge (2004) remark that job satisfaction is also an attitudinal concept reflecting one's evaluation about one's job, as well as, an emotional reaction to it. Job satisfaction is a result of an individual's perception and evaluation of their job influenced by their own unique needs, values and expectations, which they regard as being important to them (Sempane, 2002).

Spector (1997) states that job satisfaction influences people's attitude towards their jobs and various aspects of their jobs. Job satisfaction is affected by personal and organisational factors, which cause an emotional reaction affecting organisational commitment (Mowday, Steers and Porter, 1999). The consequences of job satisfaction include better performance and a reduction in withdrawal and counter-productive behaviours (Morrison 2008). Since job satisfaction involves worker's affect or emotions, it influences an organisation's well-being with regard to job productivity, workers turnover, absenteeism and life satisfaction (Spector, 2008). Motivated employees are crucial to an organisation's success and therefore understanding people in their jobs and what motivates them could be a driving force in strengthening organisational commitment (Schein, 1996). Organisational commitment has attracted considerable interest as attempts have been made to better understand the intensity and stability of an employee's dedication to the organisation (Lumley, 2010). Allen and Meyer (1990) identified a link between organisational commitment and workers turnover and concluded that workers who are strongly committed to the organisation are less likely to leave it.

According to Lyer, and Soberman (2006) job satisfaction is of interest to researchers, due to its relationships with job performance and organisational commitment. More importantly, employed individuals spend most of their time doing their jobs; as a result, individuals' feelings about their jobs are likely to affect those impacting their lives in general. In fact, Judge and Watanabe's (1994) study support this view by showing a positive relationship between job satisfaction and life satisfaction. Similarly, Landry (2000) also found a positive correlation between life and job satisfaction of librarians in public libraries. Furthermore, according to Judge and Llies, (2004), job satisfaction affects one's positive mood after working. In turn, job satisfaction is important regarding personal well-being and organisational effectiveness. Therefore, the optimal functioning of their organisation depends in part on the level of job satisfaction of employees, hence the emergence of the statement, "Happy employees are productive employees" (Saari and Judge, 2004). For performance to be optimal, an employee's full potential is needed at all levels in organisations; this emphasises the importance of workers job satisfaction (Rothmann and Coetzer, 2002).

According to Rothmann and Coetzer, (2002) job satisfaction among workers is an indicator of organisational effectiveness and it influence personal factors. Job satisfaction can be defined as an individual's total feeling about their job and the attitudes they have towards various aspects or facets of their job, as well as an attitude and perception that could consequently influence the degree of fit between the individual and the organisation (Ivancevich and Matteson, 2002). A person with high job satisfaction appears to hold generally positive attitudes and one who is dissatisfied to hold negative attitudes towards their job (Robbins, 1993). Spector (1997) explains that for researchers to understand these attitudes, they need to understand the complex and interrelated facets of job satisfaction. A facet of job satisfaction can be described as any part of a job that produces feelings of satisfaction or dissatisfaction (Spector, 1997). This perspective can be useful to organisations that wish to identify worker retention areas in which improvement is possible (Westlund and Hannon, 2008).

2.12.2 Job Satisfaction Facets that Needs to be Considered when Introducing New Technology

- **2.12.2. 1 Pay and promotion**

When management introduce new technology, pay and promotion of workers must be considered because it is associated with workers satisfaction of workers. In a study by Yang, Miao and Zhu (2008) to evaluate the influence of pay increases on job satisfaction in the Chinese military, it was found that pay is an important factor affecting overall job satisfaction. Promotions provide opportunities for personal growth, more responsibilities and increased social status (Robbins, 1993). Job satisfaction is likely to be experienced by individuals who perceive promotional opportunities to be fair (Spector, 1997). However, to a lesser extent although money is important to individuals, research has shown that individuals who earn more are not necessarily more satisfied in their jobs (Spector, 2008). It is not always the case that when workers earn more they become more satisfied. It must not be forgotten that although money makes a difference, it is not everything a workers' needs.

- **2.12.2.2 Supervision, nature of work and communication**

Management must take into consideration supervision, nature of work and communication when introducing technology at the workplace because it is very important to workers. According to Spector (1997) an immediate supervisor's behaviour is a determinant of job satisfaction. Workers' satisfaction increases when the immediate supervisor is understanding, friendly, offers praise for good performance, listens to workers' opinions and shows personal interest in them (Robbins, 1993). The nature of the work may be influenced by the supervisor's behaviour. The nature of work satisfaction is defined as the workers' satisfaction with the type of work they do (Spector, 1997). Workers prefer work that is mentally challenging because it provides them with opportunities to use their skills and abilities and offers a variety of tasks, freedom and feedback on how well they are doing (Robbins, 1993). The formation of specific goals, feedback on progress towards these goals, and reinforcement of desired behaviour allstimulate motivation and require communication. The fewer distortions, ambiguitiesand incongruities that occur in communication within organisations, the more satisfied employees will feel with regard to their work (Robbins, 1993).

- **2.12.2.3 Fringe benefits and contingent rewards**

In times of technological change, management need to consider fringe benefits and contingent rewards of workers because it may encourage workers to support it. Spector (1997) divides fringe benefits into monetary and non-monetary benefits. Increasing intrinsic and extrinsic fringe benefits that attract workers attention may subsequently increase their performance and induce higher levels of organisational commitment (Suliman and Iles, 2000). According to Spector (1997) examples of contingent rewards are appreciation, recognition and rewards for good work. Worker dissatisfaction may result if workers perceive that their efforts are not recognised or that their rewards are not equitable tied to their performance or tailored to their needs (Robbins, 1993). Contingent rewards support the reinforcement theory of motivation, in terms of which performance-relevant behaviours will increase in frequency if rewarded (Spector, 2008). Therefore, reviewing and considering of workers fringe benefits and contingent attract workers to support introduction of technology.

- **2.12.2.4 Operating conditions and co-workers**

Perceptions of fairness are important determinants of worker's behaviour and reactions to work and introduction of technology (Spector, 2008). According to Martins and Coetzee (2007), workers' motivation and organisational culture are affected by how a worker's need and objectives are integrated with the needs and objectives of the organisation, work life balance practices and physical work environment. Work fulfils an individual's social factor need. Therefore, having friendly and supportive co-workers leads to increased job satisfaction (Robbins 1993). According to Ghazzawi (2008), worker's co-workers, the groups they belong to and the culture to which an individual is exposed all have the potential to influence job satisfaction. Specific job characteristics lead to positive psychological states such as experiencing the meaningfulness of work, feelings of responsibility and knowledge about the products of work, which in turn lead to satisfaction with the job (Judge, Bono and Locke 2000).

Autonomy gives rise to feelings of responsibility. Knowledge about the products of work is gained through job feedback. When these characteristics are combined, the scope and complexity of a job is defined. High scope results in high levels of job satisfaction, while low scope leads to boredom and dissatisfaction. Aspects of the job and the organisational environment relate to job satisfaction and as a result some situations produce positive job satisfaction, while others produce job dissatisfaction (Spector, 2008). Therefore, operating conditions and co-workers must be put into consideration when management introduces new technology at the workplace because it influences support or resistance for change.

- **2.12.2.5 Organisational commitment**

The concept of organisational commitment has attracted considerable interest in an attempt to understand and clarify the intensity and stability of workers dedication to organisations (Lumley, 2010). In the context of this study, organisational commitment is regarded as a perception or attitude, as it relates to individuals' mind sets about the organisation (Allen and Meyer 1990). Gbadamosi (2003) contends that the more favourable an individual's attitudes toward the organisation, the greater the individual's acceptance of the goals ofthe organisation, as well as their willingness to exert more effort on behalf of the organisation. Mathieu and Zajac (1990) believe that developing a better perception of the progression associated with organisational commitment has an effect on workers, organisations and the world in general.

The level of workers' organisational commitment will possibly ensure that they are better suited to receiving both extrinsic rewards which include remuneration and benefits and psychological rewards which include job satisfaction and associations with fellow workers related to associations. Organisational commitment is generally assumed to reduce abandonment behaviours, which include tardiness and turnover. In addition, workers who are committed to their organisation may be more willing to participate in extra-role activities, such as being creative or innovative, which frequently guarantee an organisation's competitiveness in the market (Katz and Kahn, 1998).

Organisational commitment is viewed as a psychological connection that individuals have with their organisation, characterised by strong identification with the organisation and a desire to contribute to the accomplishment of organisational goals. Meyer and Allen's (1991) three-component model of organisational commitment is therefore of relevance to this study. Meyer and Allen (1991) conceive of organisational commitment as reflecting three core themes namely affective, continuance and normative commitment. Commitment can be seen as an affective point of reference towards the organisation that is affective commitment, acknowledgement of the consequences of leaving the organisation that is continuance commitment, and an ethical responsibility to stay with the organisations known as normative commitment. Three core themes are given in detail below:

- **Affective commitment**

Affective commitment is the individual's psychological or emotional connection to, identification with and participation in the organisation (Meyer and Allen 1997). Workers who are affectively committed to the organisation will probably carry on working for it because they want to achieve the organisations objectives. Individuals who are dedicated at an emotional level usually remain with the organisation because they see their individual employment relationship as being in harmony with the goals and values of the organisation for which they are currently working. Affective commitment development involves identification with the organisation and internalisation of organisational principles and standards (Beck and Wilson 2000). Therefore, affective commitment must be considered when introducing technology at the work place since it influences positive support for adoption of it.

- **Continuance commitment**

Continuance commitment is regarded as an awareness of the costs associated with leaving the organisation (Meyer and Allen, 1997).As a result of the individual's awareness or consideration of expenses and threats linked to leaving the organisation, continuance commitment is considered to be calculative (Meyer and Allen, 1997). Individuals with continuance commitment remain with a specific organisation because of the money they as workers earn as a result of the time spent in the organisation and not because they want to. This differs from affective commitment, where individuals remain with an organisation because they want to and because they are familiar with the organisation and its principles. Conclusively, continuance commitment must be considered when introducing technology at the work place since it influence negatively on adoption of new technology at the workplace.

- **Normative commitment**

Normative commitment can be explained as a sense of responsibility to continue employment with a specific organisation (Meyer and Allen, 1997). The internalised idea of responsibility and commitment allows workers continued membership that is appreciated by a specific organisation (Allen and Meyer, 1990). The normative element is seen as the commitment individuals consider morally appropriate regarding their remaining with a specific organisation, irrespective of how much status improvement or fulfilment the organisation provides the individual over the years (March and Mannari, 1977). Therefore, Meyer and Allen (1991) three core themes namely affective, continuance and normative commitment signifies that it is important to consider workers organisational commitment because it enables management to know the type and level of commitment before imposing new technology to workers. This enables good planning on the management side on how to have a positive approach on workers at the same time the workers gets the right approach and consideration that they deserve as far as their commitment to their organisation is concerned.

2.12.3 Factors Affecting Job Satisfaction

- **2.12.3.1 Promotion opportunities based on merit**

When management introduces new technology at the workplace, it must consider many factors that affect job satisfaction. Promotion is considered as one of the important sources of job satisfaction (Locke, 1996). A study by Sharma and Jyoti (2006) provides supporting evidence that shows that promotion is the most influential factor that affects the job satisfaction of school teachers. As a result, what constitutes the base of promotion may also affect the job satisfaction of workers. Regarding this notion, Locke (1996) remarks that promotion based on merit or ability to do the job is one way of promoting a sense of fairness or equity to workers, which is likely to be related to the job satisfaction of workers. In other words, those who perceive more promotion opportunities due to their ability to do their jobs are more likely to be satisfied with their work. Therefore, promotion based on merit is a factor whichinfluences job satisfaction that needs to be considered when introducing new technology.

- **2.12.3.2 Job Characteristics and complexity**

In classifying job characteristics, Hackman and Lawler (1991) identified four core components: variety, autonomy, task identity, and feedback. They found that these four dimensions showed a strong positive correlation with job satisfaction. It was suggested that for maximum workers' motivation on the job, all four components should be maximized. Hackman and Oldham's (1995) job characteristics model identified five core dimensions of job complexity. Job complexity is composed of feedback, autonomy, task identity, task significance and skill variety.

Complex or rich jobs are expected to increase both job satisfaction and job performance for workers (Hackman and Oldham, 1996). However, it has been suggested that Hackman and Oldham's model of job characteristics is too narrow, which could cause problems because some characteristics of the job are omitted (Morgeson and Humphrey, 2006).

It was stated that a more comprehensive work design measure is needed, which led to the creation of the Work Design Questionnaire (WDQ), a measure that assesses characteristics of work including task characteristics that involve autonomy, task variety, task significance, task identity, and feedback from the job, knowledge characteristics. The second one is job complexity which involves information processing, problem solving, skill variety, and specialization. The third one is social characteristics which comprises of interdependence, interaction outside the organisation and feedback from others. The fourth one is contextual characteristics which involve ergonomics or relationship between workers and their environment, physical demands, work conditions, and equipment use.

In a meta-analytic review of Hackman and Oldham's original job characteristics model, Fried and Ferris (1997) found empirical relationships between job complexity, job satisfaction and job performance. Increased satisfaction can be expected as a result of increased job complexity because when the job characteristics that make up job complexity are increased, workers feel a sense of meaningfulness and responsibility regarding their jobs (Judge, Bono and Locke, 2000). These feelings in turn lead to increased levels of job satisfaction. Employee performance can also be increased with higher levels of job complexity because these job characteristics were specifically identified to show that productivity would increase if jobs were designed in a way that would make them more meaningful and challenging to the employees (Hackman and Lawler, 1991).

If workers are in complex jobs, they will feel that their job is worthwhile and not a waste of time, thus increasing job performance. However, the individual difference of growth needs strength which can affect their relationship with job performance (Hackman and Oldham, 1995). This is a flexible difference that influences how workers will respond to jobs that have high job complexity such that workers with high growth need strength will respond more favourably to high complexity jobs. Regarding the relationships of job complexity with satisfaction and performance, Humphrey, Nahrgang and Morgeson (2007) found that 34 percent of the variance in performance and more than 55 percent of the variance in satisfaction was a function of job characteristics. They also found that the job characteristics and relationships that come out are mediated by critical psychological states as proposed by Hackman and Oldham (1996). Therefore, job characteristic and complexity is an important factor that needs to be considering when introducing new technology at the workplace.

- **2.12.3.3 Cognitive Ability**

Cognitive ability is one of the best predictors of job performance, accounting for over 25 percent of the variance in performance (Hunter and Hunter, 1994). It predicts performance better than all other measures of ability, traits, ordispositions that have been tested (Schmidt and Hunter, 2004). Cognitive ability is a good predictor of job performance because people with higher levels of cognitive ability acquire a greater amount of knowledge and are thus able to better perform a variety of behaviours on the job (Schmidt, Hunter and Outerbridge, 1996). When studying how individuals differ in their levels of cognitive ability, it has been found that knowledge is not only based on individual ability but also somewhat on processes, individual personality, and interests. The Ackerman's Process Personality Interest Knowledge (PPIK) model suggests that knowledge is based on both ability and non-ability traits (Ackerman, 1996). One of the non-ability traits that have been studied is an individual's level of investment. An individual's investment in a particular job or activity can partly determine the knowledge that they attain (Chamorro-Premuzic, Furnham, and Ackerman, 2006). If workers are satisfied with their job, they would most likely be more invested in it than someone with lower levels of satisfaction.

According to the gravitational hypothesis by Wil, Desmarais and Sackett, 1995), workers will gravitate toward jobs that have ability requirements that match their cognitive abilities (Wilk, Desmarais and Sackett, 1995). In other words, both individuals who, in terms of cognitive ability and over-qualified for their jobs will likely seek other employment opportunities that are a better match for their abilities. Consequently, because of this phenomenon, people with high cognitive ability will be in better jobs that require higher abilities. These types of jobs are likely to be more satisfying as noted by Hackman and Oldham (1995). In other words, cognitively ability should be positively correlated to job satisfaction, due to the tendency for high-ability individuals to occupy jobs with more desirable characteristics. Therefore, workers' cognitive ability is a factor that needs to be considered when management introduces new technology at the work place.

2.13 Bureaucracy

Efficiency through introduction of new technology brings high level of bureaucracy in the organisation. Bureaucracy has the predisposition to encourage lack of innovative ability due to the rigidity of structures and procedures. In addition, bureaucracy leads to narrow technical perceptions that are linked to detailed specification of tasks and high specialisation of skills (Dale, 2000). It also leads to inefficient resource use because of cumbersome procedures or contributions by individuals may not be clearly exposed in the mix of interactions and difficult access to the organisation for outsiders due to high formality of relations (Hersey, Blanchard and Johnson, 1999). According to Dale (2000) bureaucracy is often attributed to its disregard for the values associated with maintaining the autonomy of workers to apply their cognitive abilities in performing organisational tasks.

Its rigidity is viewed as responsible for low productivity resulting from disgruntlement, which is a result of the treatment of workers as minors who cannot make decisions without being coerced to do so. As noted by Jreisat (1999) organisations do not exist in a vacuum. Their environments have critical effects on every aspect of their performance. The political, legal, economic, and cultural elements of society exert a variety of pressures and influences on the management of organisations. In view of the points raised by Jreisat (1999), it can be safely concluded that those organisations that do not reduce the pressures in the environments where they operate, such as those in Zimbabwe, may continue to compromise on their employment of concepts such as bureaucracy.

Bureaucracy also leads to impersonality. The strong conviction that Weber as cited by Elwell (1999) held was the separation of official activities from those that are personal, resulting from the rational legal authority that is anchored in impersonal rules that have been legally established. This means bureaucracy is characterised by impersonal decisions, based on formal rules that are applied consistently. Emotional expressions are generally discouraged and are usually devalued as irrational. As further noted by Moorhead and Griffin (1992), bureaucratisation is conceived as the tendency towards the complete achievement of the formal system, which ensures that workers make decisions in the best interest of the organisation rather than for their own interests. It is important to appreciate the benefits that can be derived from impersonality in the running of organisations because impersonality emphasises standardisation and the use of policies and rules, which can be learnt by the workers. The rules and policies are supposed to provide some degree of objectivity in dealing with matters that affect the organisations, which is supposed to promote productivity. According to Chambers, (2003) rules and policies promote standardisation, which has a certain democratic uniformity, in which all are treated fairly. It has to be noted that though organisations are regarded as bureaucratic, they are not always fair in the treatment of workers as rules are not always followed. For example, workers sometimes use their discretion in carrying out tasks. Therefore, introduction of new technology may lead to a higher level of bureaucracy which impacts negatively on workers.

2.14 Positives Effects of the Introduction of Technology

Introduction of technology through automation offers considerable benefits in decreasing human workload and improving worker's performance and worker safety, when the introduction is properly designed and used (Parasuraman, 2000). Automation essentially substitutes capital for labour and other inputs to achieve the same or a better production outcome. Worker's numbers and labour costs reduce as operators undertake multiple tasks at the same time and require less time for shift changes. Automation reduces the cost of transporting and housing employees at remote mine sites, and is also related to environmental and social impacts. Automation may also reduce the workload by increasing the support of physical and cognitive work tasks (Wickens, 2004). The various technical efficiencies that can be achieved are multifaceted and interrelated, and arise both at the process level and at the wider system level, if processes are better integrated.

According to Fisher and Schnittger (2012) remote controlled and automated equipment operates in a more predictable, controlled and precise manner. This eliminates a range of inefficiencies, for instance unnecessary movements to place equipment in precisely the right position, for instance in the manual operation of ship loaders; a reduction in the use of energy and consumables, for instance because automated processes measure and adjust input requirements in real time.

Efficiency is important for any organisation that intends to succeed in its endeavours. According to Apple (1990) efficiency is the proportional relationships between the quality and quantity of inputs and the quality and quantity of outputs produced through standardisation of procedures. As a result, it can be stated that efficiency is associated with achievement of objectives that are realised through the use of minimal resources. It is in view of the importance of efficiency in organisations that it cannot be ignored if organisations are to succeed. Organisations that are focused and guided by the purposes that they are meant to accomplish cannot realise their objectives without attaching value on efficiency. Despite the importance of efficiency, the word has often in majority of cases attracted mixed sentiments from theorist.

As averred by Sergiovanni and Starratt (1993) the modern organisation is seen by some people as a marvel of accomplishment and efficiency, though others view the same modern organisations as a beast that dehumanises the sprit, cripple creativity and warps the personality. Dehumanisation of worker can be safely attributed to the unwavering desire by organisation to achieve the necessary amount of efficiency. It is the desire to realise efficiency that provoke some theorist and management experts to attack introduction of new technology for its dehumanising characteristics. On the other hand, in the case of not automating everything, the highest level of technological capability would have been harder to achieve (Satchell, 1998). According to Wickdens (2004) higher levels of safety can be achieved by increasing the distance between human operators and the actual production process. Introduction of technology in the mining industry comes with both positive and negative effects but as far as this study is concerned, the assumption is that negative effects outweigh the positive effects.

2.15 Conclusion

In a nutshell, there are many theories on adoption of technology changes. This study's literature review focused on Diffusion of Innovation Theory by Rogers (1995). However, Technology Acceptance Model and The Theory of Reasoned Action were also outlined for the purpose scope of understanding the concept of technology introduction. All these theories act as a guideline on how technology can be adopted and implemented in an organisation. These theories reduce or prevent resistance to the introduction technology at the workplace. It can be summed up that introduction of technology may arise negative and positive perceptions amongst workers. Workers may negatively perceive introduction of technology because it affects their quality of work life and above all it comes with unhealthy factors like stress, anxiety and uncertainty; but introduction of technology may be regarded as good because it maximises production and makes work easier.

CHAPTER 3

RESEARCH METHODOLOGY

3.1Introduction

This chapter outlines the research methodologies that were administered in this study. This entails the following aspects: nature of the study, the research design, population and location of the study, sampling procedure, data collection method, data analysis and ethical considerations.

3.2 Research Approach

This study adopted a quantitative approach as it was based on precise, objective, and generalizable findings. Quantitative research is an enquiry approach useful for describing trends and quantifying variables found in the literature. The study was quantitative in nature because it pursued knowledge or the facts of phenomena, prediction of behaviour and expression of opinion. This research therefore quantified the perceptions of workers regarding the impact of the introduction of technology at Chiadzwa Diamond Mines.

3.3 Research Design

This study was quantitative and descriptive in nature. Descriptive research examines a situation as it is; it does not involve changing or modifying the situation nor is it intended to detect cause and affect relationships. The researcher used descriptive study because he was describing the perceptions of workers regarding the introduction of technology without necessarily explaining these perceptions causes or why they came to be that way.

3.4 Location of the Study

The location of this study wasChiadzwa Diamonds Mines. There are more than five companies but this study focused on three companies namely; Mbada Diamonds, Anjin and Diamond Mining Company. Chiadzwa Diamond mines are located in Chiadzwa rural area of Marange, about 100 kilometres South-West of the city of Mutare in Manicaland Province of Zimbabwe.

3.5 Population of the Study

Chiadzwa Diamond Mines have an average of 1500 workers per company. However, according to Mbada Diamonds CSR Report (2012), the Mbada Diamonds is the biggest company with 1500 workers including the management where population of the study. Therefore, the study population was comprised of 3000 Chiadzwa Diamond Mines workers including the management.

3.6 Sampling Procedure

Simple random sampling was used in this study. Simple random sampling was the ideal type of probability sampling because each individual case in the population theoretically has an equal chance of being selected for the sample. The target sample size was small for easier management purpose. A selected sample size of 20(10 skilled and 10 unskilled) workers per company was drawn to give a total sample size of 60 (30 skilled and 30 unskilled) workers to reach the target set for the study. Equal numbers of skilled and unskilled workers were selected to allow proportional representation of the two work groups. The criteria for inclusion in the sample for the proposed study were that participants should be workers or the management of Mbada Diamonds, Anjin and Diamond Mining Company and they should be willing to partake in the research study voluntarily.

3.7 Data Collection Method

The data collection instrument used in this study was a semi close ended questionnaire. Closed questions provide a set of predetermined answers from which the respondents have to choose applicable answers. Although some questions probed to allow participant to motivate their answers, most questions targeted obtaining information or establishing a relationship between certain variables for example the negative perceptions of workers towards resistance to introduction of technology. After drawing a total sample size of 60 (30 skilled and 30 unskilled) workers to reach the target set for the study, the researcher with the help of two research assistants distributed questionnaires to the workers to indicate the extent of agreement with given questions. Participants were required to complete the questionnaire using Likert-type scale responses (ranging from 1: strongly disagree, 2: disagree, 3 not sure 4: agree: 5 strongly disagree). The workers managed to return the filled questionnaires to the researchers when they knocked off at 16:30 hours.

3.8 Validity and Reliability

The validity method used in this study was content validity. Content validity refers to the extent to which an instrument covers the complete content of the particular construct that it sets out to measure. Content validity was ensured by constructing questions that covered all possible perceptions of workers regarding the introduction of technology. Each item on the questionnaire actually measured the central construct of the study, which was worker's perceptions regarding the introduction of technology. The researcher ensured that all the questions are appropriate to what the study hypothesis seeks to test. Reliability is the extent to which a measuring instrument is repeatable and consistent. The reliability method used by this study was internal reliability or internal consistency. All items on the questionnaire were formulated in a way that there was a high similarity among them since they were suppose to measure one common construct, that is worker's perceptions regarding introduction of technology.

3.9 Data Analysis

The data was descriptively analysed in a quantitative manner. Analysing data involves drawing conclusions about it, representing it in tables, figures and in pictures and drawing intelligible conclusions about it. After collection, the data was coded and entered into the computer using the MS Excel 2010 software package. Thereafter, the Statistical Package for Social Sciences (SPSS) version 19.0 was used to carry out data analysis. Nonparametric tests were used because workers' perceptions rankings on a Likert scale were not absolute. Nonparametric tests or distribution-free tests are statistical assessments which analyse the data without assumptions about the distribution. The frequency, mean and standard deviation of the gathered data was calculated. In addition, the Mann U Whitney test was used to test for the significance of differences in the perceptions of skilled and unskilled workers regarding the introduction of technology at Mbada Diamonds. The Mann-Whitney was used because it compares the order of the data of two groups using an ordinal scale of measurement with the goal of measuring whether the differences in the order can be explained by chance factors alone (Bless and Kathuria, 1993). In the context of this study, the Mann-Whitney test was used to test whether there were differences between the perceptions of skilled and unskilled workers with respect to respect to introduction of technology at the workplace. Thereafter, the following statistical equations were used to test the two hypotheses: H_0: P > 0, 05 P and H_1: P< 0, 05. H_0 is the null hypothesis, H_1 is the alternative hypothesis; P is the P value (probability of obtaining test static) which has a significance level value of 0.05.

The results showed that out of 78 perceptions of skilled and unskilled workers, only 4 perceptions had statistically significant differences, whilst 74 perceptions had no statistically significant differences. Therefore, 95% of the perceptions had no statistically significant differences (P>0.05), whilst a mere 5% of the perceptions had statistical significant differences

(P<0.05). Consequently, it can be summed up that the results showed that skilled and unskilled workers perceptions were the same because there were no statistical significant differences (P>0.05). Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same, workers resist the introduction of technology and that human resource models help to improve response and adaptation of workers to technological change

3.10 Ethical Consideration

Ethical issues were addressed to protect the rights of respondents. Participants in this study were approached about the research with an explanation of what the study was all about after the approval from the Research Ethics Committee at the University of Venda, before the commencement of the study. All subjects signed and returned a copy of a letter of consent, indicating their willingness to participate in the study and accepting the conditions thereof. The researcher had an obligation to ensure that the respondents remain unharmed during the study. The researcher did not do anything that endangered the respondents. Every respondent had the right to his or her identity being kept undisclosed. In this study, the identity of respondents was not disclosed. Moreover, the fact that the questionnaire was self-administered ensured that respondents remain anonymous. Confidentiality of information was maintained by storing the recorded information in a locked safe place. After all the analysis, original data was stored in safe and after completion of the study it was destroyed. Publication of the findings was done with the permission from the participants.

3.11 Summary

In this chapter, a clear description of how the researcher planned to do her study was outlined. The chapter outlined the design and methods of the study; the purpose of the study, the research population and location; sampling procedures; data collection methods; data analysis; ethical considerations; and pilot study. The chapter ended with a summary of the study.

CHAPTER 4

PRESENTATION OF THE RESULTS

4.1 Introduction

In this chapter, the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond mines are presented. First, the demographic information is presented before skilled and unskilled workers' perceptions regarding introduction of technology are presented.

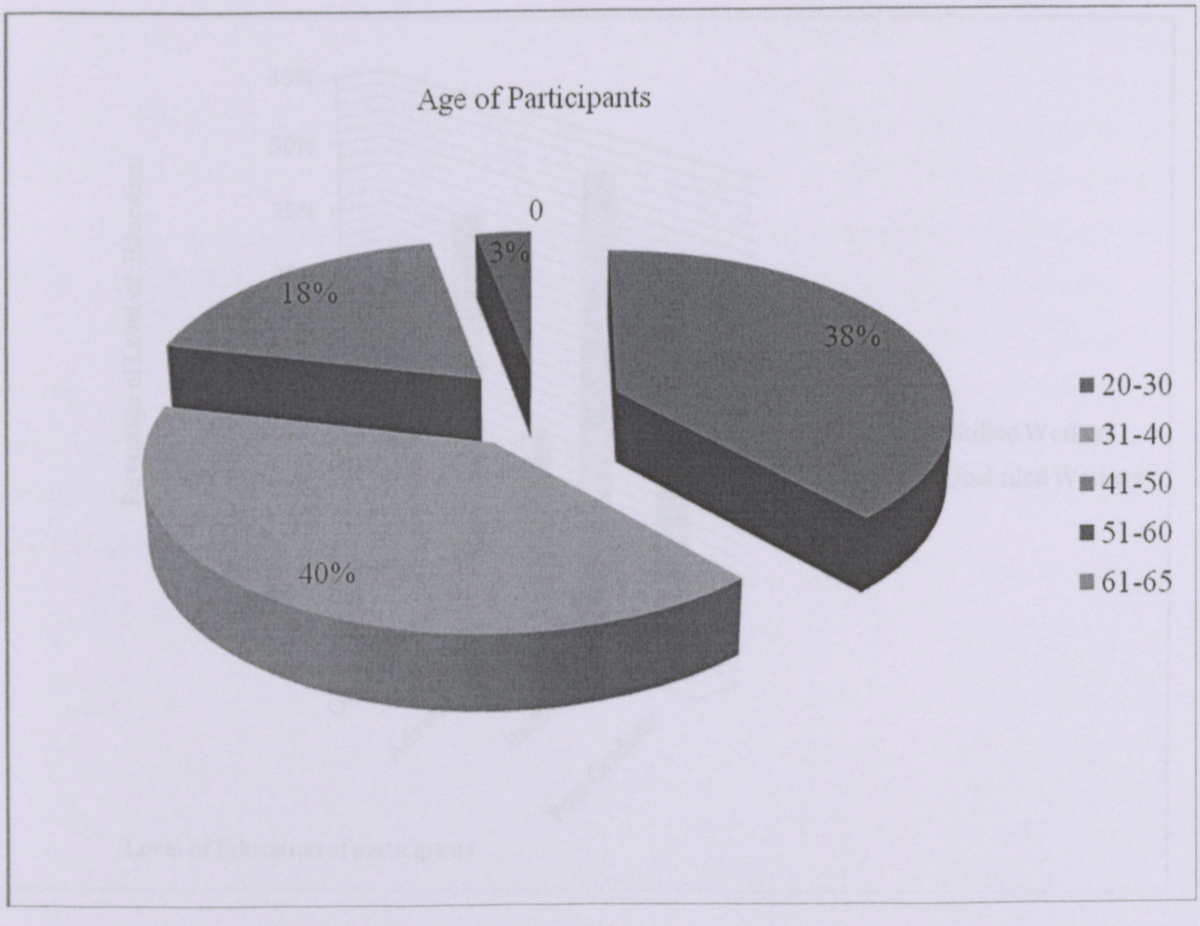
4.2 Demographic Information of Respondents

The total number of workers who participated in this study was 60, with skilled workers constituting 50 % and unskilled workers constituting 50 %. This study comprised of three Chiadzwa Diamond mining companies that are, Mbada Diamonds, Diamond Mining Company and Anjin Mine. Out of the 60 workers, 20 workers were drawn from each company and they consisted of 10 skilled workers and 10 unskilled workers. This was done to allow proportional presentation of all the three companies. The age of participants and the level of education of participants are presented in Figure 4.1 and Figure 4.2, below.

4.2.1 Age of Participants

Figure 1, shows the age of participants that is depicted as follows, 38% were between the age of 20 to 30 years, 40% were between the age of 31 to 40 years, 18 % were between the age of 41-50 and 3 % were between age of 51-60 years. There were no workers between the age of 61 to 65 years. Out of the 60 participants, 89% were males and only 13 %. This evidences gender imbalances that still exist in the mining industry in Zimbabwe and the corporate world at large.

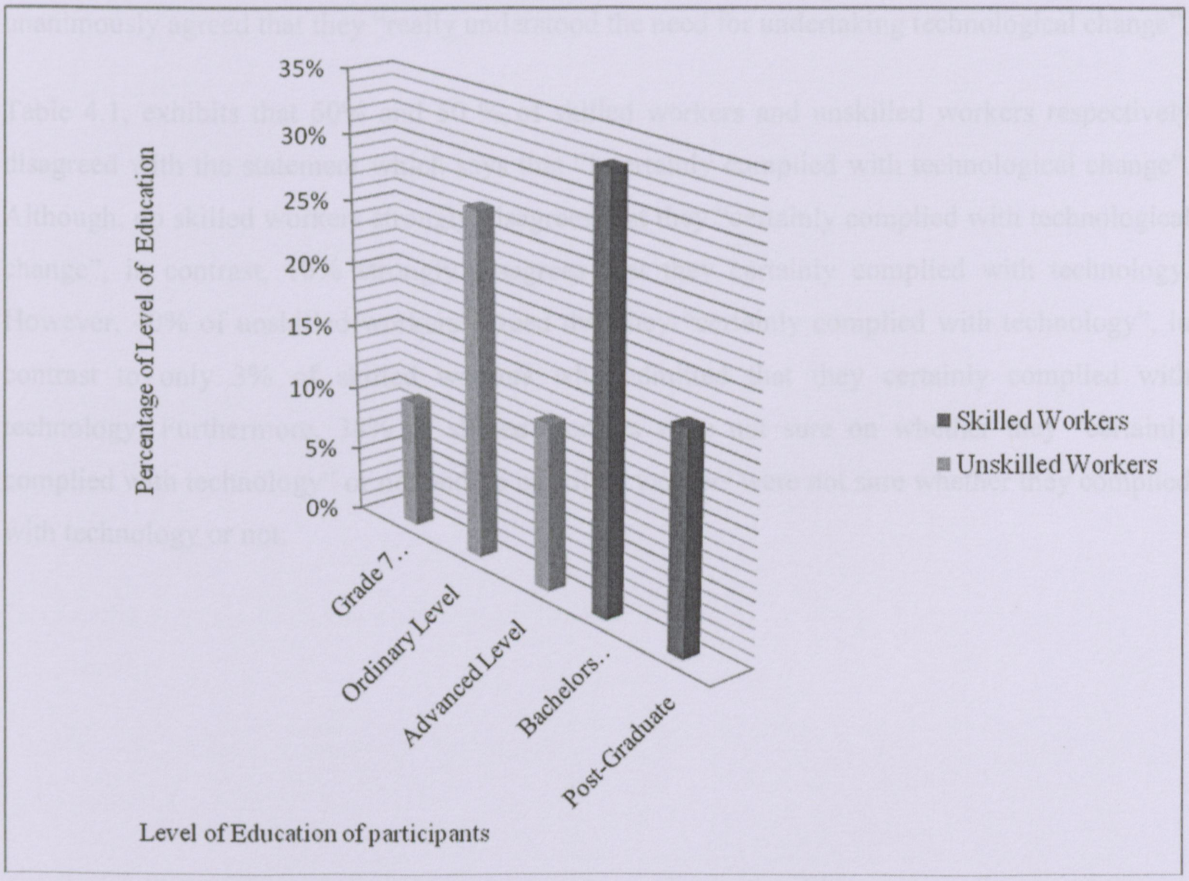
Figure 4.1 Age of Participants



4.2.2 Level of Education of Participants

Figure 4.2, shows the diverse levels of education of unskilled workers as follows, 10 % highest qualification was grade 7, 27 % reached Ordinary level and 13% attained Advanced level. Furthermore, skilled workers level of education were as follows, 33 % were Bachelor's degree holders and 17 % were post graduate certificate holders. This indicates that there is a big difference in education levels of workers at Chiadzwa Diamonds Mine.

Figure 4.2 Level of Education of Participants



4.3. Levels of Agreement of Perceptions regarding support for technological changes

Skilled and unskilled workers' levels of agreement with the perceptions or statements relating to introduction of technology at Chiadzwa Diamonds mines are presented in Table 4.1. These levels of agreement were based on a Likert-scale ranging from 1: disagree, 2: somewhat agree, 3: agree and 4: strongly agree. It can be deduced from Table 4.1 that both skilled and unskilled workers disagree (53% and 46%) that "Technological change got my full support". No skilled or unskilled worker strongly agreed "that technological change got my full support". Both skilled and unskilled workers' disagreed (57% and 50%) that they "really understood the need for undertaking technological change". However, 13 % and 20% of skilled and unskilled workers unanimously agreed that they "really understood the need for undertaking technological change".

Table 4.1, exhibits that 60% and 50 % of skilled workers and unskilled workers respectively disagreed with the statement which says that "I certainly complied with technological change". Although, no skilled workers strongly disagrees that they "certainly complied with technological change", in contrast, 10% strongly disagrees that they certainly complied with technology. However, 40% of unskilled workers agreed that they "certainly complied with technology", in contrast to only 3% of skilled workers who admitted that they certainly complied with technology. Furthermore, 38% of skilled workers were not sure on whether they "certainly complied with technology" or not and no unskilled workers were not sure whether they complied with technology or not.

Table 4.1 Levels of Agreement of Perceptions regarding support for technological changes

	Perceptions	Levels of agreement (%)									
		Skilled Workers					Unskilled Workers				
		1	2	3	4	5	1	2	3	4	5
1	Technological change got my full support	13.3	53.3	6.7	26.7		20	46.7	20	13.3	
2	I really understood the need for undertaking technological change.	10	56.7	13.3	20		16.7	50	13.3	20	
3	I certainly complied with technological change.		60	36.7	3.3		10	50		40	
4	My colleagues supported technological change		56.7	23.3	20		10	50	20	20	
5	I felt confident that I could adjust to the change.		56.7	30	13.3		36.7	26.7		26.7	10
6	I liked the technological change from the start.		53.3	10	23.3	13.3		53.3	6.7	16.7	23.3
7	I encouraged my colleagues to adjust to technological change.		53.3		46.7			46.7		53.3	
8	I experimented with the technological change as soon as I could.	33.3	30		30	6.7	13.3	53.3		30	3.3
9	Introduction of new technology increased productivity in the company		10	3.3	63.3	23.3		10	3.3	56.7	30
10	Introduction of new technology increased morale	6.7	46.7	20	26.7		10	43.3	20	16.7	10

11	Technological change results in increased production and huge profits	3.3	76.7	20						3.3	70	26.7
12	Technological change is necessary for the company to succeed and remain competitive	6.7	43.3	10	40			10	30	26.7	26.7	6.7

Key: Levels of agreement were based on a Likert-scale ranging from **1:** Strongly disagree, **2:** disagree, **3:** Not sure **4:** agree, **5:** Strongly agree.

4.4 Mean Ranks of Perceptions regarding support for technological changes

Table 4.2, exhibits the mean ranks of perceptions regarding support for technological changes. As shown in Table 4.2, there was a highly statistical significant difference in the perceptions of both skilled and unskilled workers ($P < 0.05$) with respect to "I felt confident that I could adjust to the change". However, apart from the perception that "I felt confident that I could adjust to the change", there were no statistically significant differences ($P > 0.05$) in the perceptions of skilled and unskilled workers. Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same and that they resist introduction of technology at the workplace.

Table 4.2 Mean Ranks of Perceptions regarding support for technological changes

Perception (N= 60)		Mean Ranks		Level of Significance
		Skilled	Unskilled	
1	Technological change got my full support	31.83	29.17	0.524
2	I really understood the need for undertaking technological change.	31.17	29.83	0.746

3	I certainly complied with technological change.	31.60	29.40	0.580
4	My colleagues supported technological change	31.75	29.25	0.543
5	I felt confident that I could adjust to the change.	34.70	26.30	0.049
6	I liked the technological change from the start.	29.78	31.22	0.728
7	I encouraged my colleagues to adjust to technological change.	29.50	31.50	0.609
8	I experimented with the technological change as soon as I could.	29.08	31.92	0.505
9	Introduction of new technology increased productivity in the company	29.63	31.37	0.660
10	Introduction of new technology increased morale	30.37	30.63	0.950
11	Technological change results in increased production and huge profits	29.53	31.47	0.578
12	Technological change is necessary for the company to succeed and remain competitive	30.05	30.95	0.834

Note: **N** refers to the number of workers who took part in the study

4.5 Levels of agreement of Perceptions regarding resistance of technological changes

Levels of agreement of skilled and unskilled worker' perceptions regarding resistance of technology are presented in Table 4.3. Both skilled and unskilled workers agree (53% and 47%) agree that they "did not want to accept the change". No skilled workers strongly agrees but 13% of unskilled workers strongly agree that they "did not want to accept the change". This shows that most of skilled and unskilled workers do not want to accept technological change. However, 20% of both skilled and unskilled workers were not sure that they "did not want to accept the change". Table 4.3 indicates that both skilled and unskilled workers agree (63% and 50%) that technological change confused them. The confusion is even more to unskilled workers where by 27% strongly agreed that introduction of technology confused them. Only a paltry 20 % and 17% of skilled and unskilled workers respectively, disagrees that introduction of technology confuse them. In addition, most skilled and unskilled workers agree (60% and 50%) that they are worried that they might lose their jobs as a result of introduction of electronic machines. The worry is even worse amongst unskilled workers, since 30% strongly agreed compared nil amongst skilled workers.

Table 4.3 Perceptions regarding resistance of technological changes

	Perceptions	Levels of agreement (%)									
		Skilled Workers					Unskilled Workers				
		1	2	3	4	5	1	2	3	4	5
13	I did not want to accept the change.		13.3	20	53.3	13.3	6.7	13.3	20	46.7	13.3
14	I felt angry about technological change.		30	10	60			36.7	3.3	53.3	6.7
15	I gradually liked the technological change.		56.7	43.3				63.3		36.7	

16	Technological change confused me.		23.3		63.3	13.3	6.7	16.7		50	26.7
17	I felt that management ignored our concerns about the technological change.		40		60			30		70	
18	I felt that there was too little time for me to adjust to the technological change.		36.7		63.3			30		70	
19	I was concerned that my job performance might drop because of the change.		16.7	6.7	63.3	13.3		13.3	3.3	70	13.3
20	I worried that I might lose my job as a result of electronic machines introduced		20		60	20		20		50	30
21	The technological change made me doubt my ability.		36.7		33.3	30		23.3		46.7	30
22	The change made me lose prestige relative to my colleagues.		33.3		33.3	33.3		20		46.7	33.3
23	I complained about the technological change with my colleagues		40		33.3	26.7		30		43.3	26.7
24	I have figured out unintended ways to use the technological change that no one had anticipated	26.7	43.3	6.7	23.3		23.3	56.7	3.3	16.7	
25	Technological change led to less emotional interaction with other workers		16.7	10	63.3	10	10	6.7	6.7	66.7	10

4.6 Mean Ranks of Perceptions regarding resistance of the introduction of technology.

Table 4.4, presents mean ranks of perceptions regarding resistance of the introduction of technology at the workplace. As shown in Table 4.4, there were no statistically significant differences (P > 0.05) in the perceptions of skilled and unskilled workers. Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same and that they resist introduction of technology at the workplace.

Table 4.4 Mean Ranks of Perceptions regarding resistance of technological changes

Perception(N=60)		Mean Rank		Level of Significance
		Skilled	Unskilled	
1	I did not want to accept the change.	31.70	29.30	0.567
2	I felt angry about technological change.	30.30	30.70	0.920
3	I gradually liked the technological change.	31.50	29.50	0.601
4	Technological change confused me.	29.20	31.80	0.520
5	I felt that management ignored our concerns about the technological change.	29.00	32.00	0.421
6	I felt that there was too little time for me to adjust to the technological change.	29.50	31.50	0.587
7	I was concerned that my job performance might drop because of the change.	29.68	31.32	0.665

8	I worried that I might lose my job as a result of electronic machines introduced	29.30	31.70	0.554
9	The technological change made me doubt my ability.	29.10	31.90	0.509
10	The change made me lose prestige relative to my colleagues.	29.17	31.83	0.528
11	I complained about the technological change with my colleagues	29.40	31.60	0.603
12	I have figured out unintended ways to use the technological change that no one had anticipated	31.20	29.80	0.737
13	Technological change led to less emotional interaction with other workers	30.38	30.62	0.951

Note: **N** refers to the number of workers who took part in the study

4.7 Levels of Agreement Perceptions Regarding Work Life and Environment

Levels of agreement of skilled and unskilled worker' perceptions regarding work life and environment are presented in Table 4.5. Both skilled and unskilled workers equally disagree at 57% that technological change enhanced their position in the company. However, 43% and 33% of skilled and unskilled workers respectively, agreed that technological change enhanced their position in the company. Table 4.5 indicates that both skilled and unskilled workers agree (50% and 47%) that new machines do not complicate the way they do their work. In addition, 27% and 20% of skilled and unskilled workers strongly agree that new machines do not complicate the way they do their work. This supports the notion that introduction of technology enable the breakdown of complex tasks into more simple and repetitive tasks.

Both skilled and unskilled workers equally agree (68%) that the wide use of technology generates lack of satisfaction in them. In contrast, only 17% and 13 % of skilled and unskilled workers respectively, disagrees that the wide use of technology generates lack of satisfaction in them. This shows that workers are not satisfied buy the introduction of technology. In a similar trend, 68% of both skilled and unskilled workers agree that in their work area they work according to a strictly laid down procedure. A minority of 17% of skilled workers strongly disagrees and 10% of unskilled workers disagree that they work according to a strict laid down procedure. This shows that introduction of technology make use of scientific management principles.

Table 4.5 Levels of Agreement Perceptions Regarding Work Life and Environment

Perceptions		Levels of agreement (%)									
		Skilled Workers					Unskilled Workers				
		1	2	3	4	5	1	2	3	4	5
26	Technological change enhanced my position in the company		56.7		43.3			56.7		33.3	10
27	I tried to think of ways of doing my job effectively.		53.3	13.3	33.3			60	10	30	
28	I know I am very capable of keeping up with new techniques and knowledge required for my job.		53.3	3.3	43.3			83.3		6.7	10
29	I was satisfied with my working conditions before new technological changes than after		13.3		86.7			20		70	10
30	New machines do not complicate the way I do my work		23.3		50	26.7		23.3	10	46.7	20
31	Changing the way I do my work gives me confusion		43.3		26.7	30	10	33.3		23.3	33.3
32	New technology resulted in additional work load	26.7	60		13.3		33.3	56.7		10	
33	The use of new machines generates chaos in the workplace		43.3		56.7			40		60	
34	I like being highly involved in the production		30		63.3	6.7	6.7	23.3		50	20

	process than making use of new machines											
35	I am satisfied with the opportunities for advancement in this company.		36.7	13.3	50				40	10	40	10
36	New technology generates fear because there is a sense of loss of control and competency.		20		66.7	13.3			16.7		63.3	20
37	I was allowed to participate in decisions making regarding this technological change.		60		40				63.3		13.3	23.3
38	I feel this technological change granted me more power and status in the organisation.		53.3	10	36.7				56.7	10	33.3	
39	I am certain about my job security in this company.	16.7	50	10	11.7			26.7	43.3	6.7	23.3	
40	I am certain about what my responsibilities will be 12 months from now	3.3	50	16.7	30			3.3	53.3	13.3	20	10
41	I am still afraid of some aspects of technological change.		30	6.7	43.3	20			10	13.3	63.3	13.3
42	When someone praises this company, I feel like a personal compliment		43.3	20	36.7				50	13.3	26.7	10
43	I am satisfied with ways in which I can express my creativity on my job	23.3	46.7		30			23.3	56.7		10	10
44	The company values my contribution to its wellbeing		50	13.3		36.7			60	3.3	30	6.7
45	I feel technological change takes me backwards in the rank		36.7	63.3				13.3	23.3		63.3	

46	I am certain about what my future career picture looks like in this company.	3.3	60	13.3	23.3			13.3	53.3	10	23.3	
47	I really have no chance of giving my opinions on technological change to decision-makers.		26.7	10	50	13.3		6.7	23.3	10	36.7	23.3
48	Technological change gives me more power to do my job.		53.3	6.7	40				60	6.7	23.3	10
49	I take pride in doing my job as well as I can.		56.7	43.3				10	46.7		43.3	
50	I am very confident at learning and developing new skills relevant for my job.		56.7		30	13.3		20	50		30	
51	I feel this change gives me a greater sense of control in doing my job.	13.3	53.3		33.3			13.3	63.3		23.3	
52	The new technology was very compatible with my job.		56.7	13.3	30				63.3	6.7	30	
53	I learned about the technological change to increase my job security.		46.7		53.3			10	70		20	
54	I have learned ways to make my job easier with the technological change.		46.7		53.3				56.7		33.3	10
55	I modified the change to make it fit my work	20	50	6.7	23.3			20	60	6.7	13.3	
56	Technology creates a much better working environment		10		73.3	16.7			6.7		70	23.3
57	The wide use of technology generate lack of satisfaction in me		16.7		66.7	16.7			13.3		66.7	20
58	Technological change brought massive work to	16.7	60		23.3			16.7	66.7		16.7	

	do											
59	Introduction of new technology made my work easier		26.7		50	5			36.7		36.7	26.7
60	In my work area we work strictly according to laid down procedure	16.7			66.7	16.7			10		66.7	23.3
61	In my work area there is flexibility to change work practises whenever it is necessary	36.7	53.3		10			40	56.7		3.3	

4.8 Mean Ranks of Perceptions Regarding Work Life and Environment

As shown in Table 4.6, there was a highly statistical significant difference in the perceptions of both skilled and unskilled workers (P < 0.05) with respect three perceptions that are; "I know I am very capable of keeping up with new techniques and knowledge required for my job", "I am very confident at learning and developing new skills relevant for my job" and "I learned about the technological change to increase my job security". However, apart from the above three perceptions, there were no statistically significant differences (P > 0.05) in the perceptions of skilled and unskilled workers. Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same and that they resist introduction of technology at the workplace.

Table 4.6 Mean Ranks of Perceptions Regarding Work Life and Environment

Perception(N=60)	Mean Rank	Level of

		Skilled	Unskilled	Significance
1	Technological change enhanced my position in the company	29.85	31.15	0.741
2	I tried to think of ways of doing my job effectively.	31.40	29.60	0.652
3	I know I am very capable of keeping up with new techniques and knowledge required for my job.	34.27	26.73	0.041
4	I was satisfied with my working conditions before new technological changes than after	30.20	30.80	0.853
5	New machines do not complicate the way I do my work	29.32	31.68	0.573
6	Changing the way I do my work gives me confusion	30.87	30.13	0.864
7	New technology resulted in additional work load	31.73	29.27	0.534
8	The use of new machines generates chaos in the workplace	30.00	31.00	0.795
9	I like being highly involved in the production process than making use of new machines	29.40	31.60	0.585
10	I am satisfied with the opportunities for advancement in this company.	30.00	31.00	0.810
11	New technology generates fear because there is a sense of loss of control and competency.	29.27	31.73	0.518
12	I was allowed to participate in decisions making regarding this technological change.	29.60	31.40	0.644
13	I feel this technological change granted me more power and status in the organisation.	31.05	29.95	0.784
14	I am certain about my job security in this company.	31.80	29.20	0.538

15	I am certain about what my responsibilities will be 12 months from now	30.38	30.62	0.955
16	I am still afraid of some aspects of technological change.	29.03	31.97	0.477
17	When someone praises this company, I feel like a personal compliment	30.58	30.42	0.968
18	I am satisfied with ways in which I can express my creativity on my job	31.20	29.80	0.735
19	The company values my contribution to its wellbeing.	31.08	29.92	0.772
20	I feel technological change takes me backwards in the rank	31.23	29.77	0.701
21	I am certain about what my future career picture looks like in this company.	31.82	29.18	0.515
22	I really have no chance of giving my opinions on technological change to decision-makers.	30.30	30.70	0.925
23	Technological change gives me more power to do my job.	30.97	30.03	0.815
24	I take pride in doing my job as well as I can.	31.35	29.65	0.670
25	I am very confident at learning and developing new skills relevant for my job.	34.80	26.20	0.035
26	I feel this change gives me a greater sense of control in doing my job.	31.80	29.20	0.513
27	The new technology was very compatible with my job.	31.20	29.80	0.721
28	I learned about the technological change to increase my job security.	35.10	25.90	0.016
29	I have learned ways to make my job easier with the technological change.	31.20	29.80	0.725

30	I modified the change to make it fit my work	31.80	29.20	0.524
31	Technology creates a much better working environment	29.18	31.82	0.460
32	The wide use of technology generate lack of satisfaction in me	29.67	31.33	0.657
33	Technological change brought massive work to do	31.33	29.67	0.666
34	Introduction of new technology made my work easier	31.28	29.72	0.710
35	In my work area we work strictly according to laid down procedure	28.83	32.17	0.375
36	In my work area there is flexibility to change work practises whenever it is necessary	31.58	29.42	0.586

4.9 Levels of Agreement on How Human Resource Models Help To Improve Response and Adaptation to Technological Change by Workers

Levels of agreement of skilled and unskilled worker' perceptions regarding how human resource models help to improve response and adaptation to technological change are presented in Table 4.7. Both skilled and unskilled workers disagrees (60% and 58%) that "A model that is easy to understand was used to introduce technology at the workplace". In addition, 23% of both skilled and unskilled workers were not sure that a model that is easy to understand was used to introduce technology at the workplace. However, 17% and 13% of skilled and unskilled workers respectively, agrees that a model that is easy to understand was used to introduce technology at the workplace. This shows that technology is introduced at workplace without following some clearly defined human resources models which may enable workers to adjust easily.

Table 4.7 shows that both skilled and unskilled workers both disagree (63%, 80%) that, "There has been a two-way communication in technological change decision-making process". This outlines that workers ideas, contribution and feedback is overlooked in the midst of introduction of technology. However, 27% and 20% agree that, “There has been a two-way communication in technological change decision-making process”.

Table 4.7 Perceptions regarding how human resource models help to improve workers perceptions, response and adaptation to technological change.

Perceptions		Levels of agreement (%)									
		Skilled Workers					Unskilled Workers				
		1	2	3	4	5	1	2	3	4	5
62	A model that is easy to understand was used to introduce technology at the workplace		60	23.3	16.7		6.7	56.7	23.3	13.3	
63	The procedures used for making technological change decisions were fair.		53.3	26.7	20		6.7	46.7	26.7	20	
64	The company really cares about my well-being.		43.3	16.7	40		10	43.3	16.7	30	
65	I trust top management.	6.7	63.3	13.3	16.7		13.3	63.3	6.7	16.7	
66	Reasons provided by top management for making technological changes were convincing		53.3	46.7				60		40	
67	There has been a two-way communication in technological change decision-making process.	10	63.3		26.7			80		20	
68	I figured out how to cope with the change with the least effort possible		73.3		26.7		6.7	70		23.3	
69	Decision-making procedures related to technological change have been applied consistently.		36.7	6.7	56.7			33.3	10	56.7	

70	In general, I believe the company's motives and intentions are good.		53.3	13.3	33.3			56.7	16.7	26.7	
71	I felt a sense of ownership for this company.		56.7		43.3			60		40	
72	The management did a great job of planning the technological change		66.7	10	23.3		6.7	60	10	23.3	
73	Introduction of new technology is a tiresome process		16.7		73.3	10		20		56.7	23.3
74	I was fast to adapt to the new elements introduced by technological change		70		30		6.7	66.7		26.7	
75	I agree with top management that we need to make technological change from time to time.		66.7	10	23.3		10	60	10	20	
76	New administrative practices complicated my job	3.3	76.7		20		6.7	66.7		26.7	
77	Introduction of technology ensured rapid communication for the success of the company	26.7	50		23.3		20	60		20	
78	I was unhappy with how the technological change was introduced.		20		80			16.7		76.7	6.7

Key: Levels of agreement were based on a Likert-scale ranging from **1:** Strongly disagree, **2:** disagree, **3:** Not sure **4:** agree, **5:** Strongly agree.

4.10 Mean ranks of Perceptions regarding how human resource models help to improve workers perceptions, response and adaptation to technological change.

As shown in Table 4.8, there were no statistically significant differences ($P > 0.05$) in the perceptions of skilled and unskilled workers. Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same and that human resource models help to improve response and adaptation of workers to technological change.

Table 4.8 Mean ranks of Perceptions regarding how human resource models help to improve workers perceptions, response and adaptation to technological change.

	Perception(N=60)	Mean Ranks		Level of Significance
		Skilled	Unskilled	
1	A model that is easy to understand was used to introduce technology at the workplace	31.72	29.28	0.543
2	The procedures used for making technological change decisions were fair.	31.03	29.97	0.797
3	The company really cares about my well-being.	32.90	28.10	0.254
4	I trust top management.	31.97	29.03	0.449
5	Reasons provided by top management for making technological changes were convincing	31.50	29.50	0.605
6	There has been a two-way communication in technological change decision-making process.	30.30	30.70	0.910

7	I figured out how to cope with the change with the least effort possible	31.73	29.27	0.486
8	Decision-making procedures related to technological change have been applied consistently.	30.28	30.72	0.913
9	In general, I believe the company's motives and intentions are good.	31.30	29.70	0.692
10	I felt a sense of ownership for this company.	31.00	30.00	0.795
11	The management did a great job of planning the technological change	31.17	29.83	0.730
12	Introduction of new technology is a tiresome process	29.28	31.72	0.523
13	I was fast to adapt to the new elements introduced by technological change	31.70	29.30	0.512
14	I agree with top management that we need to make technological change from time to time.	32.05	28.95	0.423
15	New administrative practices complicated my job	29.93	31.07	0.749
16	Introduction of technology ensured rapid communication for the success of the company	30.10	30.90	0.844
17	I was unhappy with how the technological change was introduced.	29.20	31.80	0.421

Note: **N** refers to the number of workers who took part in the study

4.4 Summary of the Results Chapter

The results showed that out of 78 perceptions of skilled and unskilled workers, only 4 perceptions had statistically significant differences, whilst 74 perceptions had no statistically significant differences. The 4 perceptions which had statistically significant differences are; "I felt confident that I could adjust to the change", "I know I am very capable of keeping up with new techniques and knowledge required for my job", "I am very confident at learning and developing new skills relevant for my job" and "I learned about the technological change to increase my job security". Therefore, 95% of the perceptions had no statistically significant differences ($P>0.05$), whilst a mere 5% of the perceptions had statistical significant differences ($P<0.05$). Consequently, it can be summed up that the results showed that skilled and unskilled workers perceptions were the same because there were no statistical significant differences ($P>0.05$). Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same, workers resist the introduction of technology and that human resource models help to improve response and adaptation of workers to technological change

CHAPTER 5

DISCUSSION

5.1 Introduction

The purpose of this study was to investigate the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines. This study sought to develop a description and understanding of the perceptions of skilled and unskilled workers regarding the introduction of technology at the workplace in Chiadzwa Diamond mines. In this Chapter, discussion of results, recommendations and conclusions drawn from the study on workers perceptions regarding introduction of technology at Chiadzwa Diamond Mines are presented. The findings are discussed in line with the study's three hypothesis that are: Skilled and unskilled workers' perceptions are the same, Workers resist the introduction of technology and Human Resource Models help to improve response and adaptation of workers to technological change. The discussion is anchored on the findings presented in the previous chapter. The researcher describes the findings and also links it with the reviewed literature.

5.2 Discussion of Study Findings

As presented in Chapter 4, this study found out that skilled and unskilled workers' perceptions regarding the introduction of technology are the same. There were no statistically significant differences (P>0.05) on the perceptions of skilled and unskilled workers. Workers resist the introduction of technology. Furthermore, this study found out that both skilled and unskilled workers resist the introduction of technology at Chiadzwa Diamond Mines. Moreover, this study found out that Human Resource Models help to improve response and adaptation of workers to technological change. These findings of the study are critiqued and lucubrated in detail in the proceeding sub headings below.

5.2.1 Skilled and Unskilled Workers Perceptions

In the present study, the results revealed that skilled and unskilled workers perceptions are the same (P>0.05). This is evidenced by 95% of perceptions which had no statistical significant differences. It reflects that introduction of technology at the workplace affects both skilled and unskilled workers in the same way. Both skilled and unskilled workers agree (53%, 47%) that they "did not want to accept the change". In addition, 13% of unskilled workers strongly agree that they "did not want to accept the change". This supports the assertion those in times of technological change both skilled and unskilled workers are gripped by fear of the unknown (Mabin, Forgeson and Green, 2001). Amidst, technological changes, workers do not know what is going on and what the future is likely to hold. This makes it possible that workers may have a dark image of the unknown consequences of a change. Fear is often considered as a factor that triggers workers resistance to change (Kotter and Cohen, 2002).Uneasiness is expected from most people when the status quo shifts because people need time to adjust to changes. Besides, change is usually inconvenient even if such change is expected to influence a situation from bad to good. It is in human nature to resist change even when it represents growth and development.

Although, 95% of perceptions between skilled and unskilled workers were the same, to a lesser extent 5 % were not the same. The four perceptions that were statistically significant different are, "I felt confident that I could adjust to the change", "I know I am very capable of keeping up with new techniques and knowledge required for my job", "I am very confident at learning and developing new skills relevant for my job" and "I learned about the technological change to increase my job security". All these perceptions are closely related to educational background, further learning and training or acquiring new skills to keep up with the new technology. These factors are derived from a great chasm that exist between skilled and unskilled workers education backgrounds.

As shown in Figure 2, the highest qualification of unskilled workers is Advanced Level with 13% workers, Ordinary Level with 27% and the lowest qualification was Grade 7 certificate with 10%. No unskilled workers had a Bachelors Degree or a Diploma. This is directly in contrast to skilled workers, where by 33 % were Bachelor's degree holders and 17 % were post graduate certificate holders. Pitting skilled and unskilled workers together against the vast stretches of the unknown of introduction of the new technology, skilled workers are inherently better skilled and may have higher confidence level than their counterparts. The difference is that skilled workers are more educated and are experts in their fields unlike unskilled workers who are shoved in any direction at the work floor that new technology deems fit.

This anchors the assertion by Islam and Swierczek (2001) that notes that unskilled workers cannot adapt to new technologies easily. They are often unable to operate machines because of less knowledge and low skills because technological change demands newer skills, higher work ability and knowledge about new processes (King 1997, Sochnlein, 1998). This is in contrast to skilled workers such as computer programmers who have higher level of skills (Dunkerley, 1996, Golzen, 1996). Nevertheless, it can be critically argued that unskilled workers do not necessarily need any skill or training because introduction of technology comes with breakdown of complex tasks into simple tasks, for example unskilled mine workers may spend their entire work life just pressing a button to load rubber in an X-Ray Transmography machine (XRT). Neither does it require a high skill nor a degree to press a button. This view supports Nelson (1992) who notes that introduction of technology enables minute division of labour, repetition of simple movement and predetermined methods of work. Consequently, unskilled workers do not necessarily need high skill to undertake these tasks. Nonetheless, despite pointing out that, it still remains plausible to assert that lack of educational qualifications and skills disadvantages unskilled workers when introduction of technology take place at the work place.

However, it seems to be a paradox that no worker is safe in the backwash of introduction of technology, whether skilled or unskilled. Introduction of technology is gobbling up jobs that were traditional untouchable since time immemorial. According to Taboola (2013) a wide range of jobs that used to be skilled, secure and irreducibly human are now becoming casualties of technological change. Sectors that used to be immune to productivity increases such as education, health care and social media, technology is reducing the demand and value of skilled workers for example a single data analyst and software can replace many quantitative researchers for example, Twitter, the social-media giant, is valued at 9 billion US dollars but employs only 400 people worldwide (Taboola, 2013). Nevertheless, skilled workers derive their confidence from the skills that they have acquired before and it makes everything easy for them to adjust to introduction of technology unlike unskilled workers who do not have any skill to fall back on or to stem from. In summation, this study noted that skilled workers are more confident than unskilled workers because of differences in skills, education levels and ability to acquire new training to keep up pace with introduction of new technology.

5.2.2 Factors that leads to resistance and support of introduction of technology at the workplace

This study found out that they are a plethora of factors that leads to workers resistance of introduction of technology at the workplace. Workers support or resist introduction of technology based on how it threatens or benefit them. Both skilled and unskilled workers disagreed on the following perceptions, "Technological change enhanced my position in the company", "I feel this technological change granted me more power and status in the organisation". These two perceptions are related to how introduction of technology benefits or threatens workers' power, status and positions at the workplace. As shown in Table 4.5, 57% of both skilled and unskilled workers disagreed with the statement that, I feel this technological change granted me more power and status in the organisation disagreeing. This indicates that workers resistance or supporting of introduction of technology hinges on how it benefits or threatens workers'' position, status and power. If introduction of technology benefit workers through enhancing their position, power and status, workers support it.

However, if introduction of technology threatens and upheavals the status quo for worse, then workers resist it. This supports the assertion by Fasolo and Davis-LaMastro (1990) that workers strong feelings of reduction in power might lead to resistance to technological change. Workers may perceive and feel that reduction in power amounts to maltreatment by the company. Therefore, this exhibits that threats and benefits that introduction of technology offers leads to resistance or support of introduction of technology. Furthermore, Chreim (2006) opined that prior to introduction of technology, one of first aspect that workers do is to consider whether their own individual skills and competencies match the new challenge. As a result they weigh the probability of success or failure in their new given tasks and roles. Therefore, workers resist introduction of technology when it threatens their power, status and positions and vis a vis support it when it benefits through enhancing their status quo. In this study workers resisted introduction of technology because it threatens them through reduction in power, status and position in the company

Another factor that makes workers to resist or support introduction of technology it is participation in technological change effort. As shown in Table 4.5, 60% and 63 % skilled and unskilled workers disagreed with the perception that "I was allowed to participate in decisions making regarding this technological change". This shows that workers do not take part in technological change initiates which therefore triggers resistance. According to Lines (2004) participating also involves the right to veto decision that concern technological change plan. Therefore, it means workers become part of the technological change plan from start to finish and it prevents any possibility of making unpopular decision making in the change plan. Participation by workers in technologies change initiatives is associated with more positive views of the change, reduced resistance, and improved goal achievement (Chreim, 2006). However, little active participation means resistance to change through the loss of comfort and privileges, the interests of the individual versus the company and the possible loss of jobs (Lines 2004). Therefore, in this study workers resist introduction of technology because the company does not give them opportunities to participate in technological change initiatives.

5.2.3 Negative Effects of Introduction of Technology

- **Redundancy**

This study found out that worker resist introduction of technology because they are afraid that they will lose their jobs. Both skilled and unskilled workers agreed with the following perceptions; "I worried that I might lose my job as a result of electronic machines introduced", "New technology generates fear because there is a sense of loss of control and competency", "I am certain about my job security in this company" and "I learned about the technological change to increase my job security". All these statements are linked to grave concern about job security amidst introduction of technology. As illustrated by Table 4.3, 60% and 20% of skilled workers, respectively agreed and strongly agreed to the perception that, "I worried that I might lose my job as a result of electronic machines introduced". In a similar trend, 50% and 30% of unskilled workers, respectively agreed and strongly agreed to the above statement. Worth noting is that there is a high unemployment rate in Zimbabwe. To those workers who are fortunate to be employed, they do not want any risks or threats to their jobs. This job insecurity that triggers resistance is activated by the efficiency and effectiveness that come with the introduction of new machines. Workers whether skilled or unskilled are intelligent and smart but inherently their weakness is that they are made of flesh and blood. This is unlike machines which exercise highest degree of sophistication and precision which is beyond the reach of workers.

This supports the notion by Taboola (2013) that workers become redundant because machines and devices become more advanced, powerful and capable of efficiently performing tasks more than workers. On the one hand, physical work of humans is replaced by mechanisation; on the other hand, sensory and intellectual capabilities or work tasks are replaced by automated devices or computers (Chen, Cheng and Zhang, 1999). Consequently, machines take up the work done by workers leading to loss of jobs in the industry for the workers. However, the reason why skilled and unskilled workers prevail in holding on to their jobs it is because they have the ability to adopt and acquire new skills by means of education (Goldin and Katz, 2009). Having noted that, still there is no guarantee of workers jobs because introduction of new technology is moving at a breath taking pace which is become challenging to keep up with (Brynjolfsson and McAfee, 2011). In summation, workers resist introduction of technology at the workplace because they are afraid to lose their jobs.

- **Specialisation**

This study found out that introduction of technology leads to specialisation and simplification of tasks which impacts negatively on workers through alienation, deskilling, monotony and poor job satisfaction. Both skilled and unskilled workers agreed with the following perceptions; "New machines do not complicate the way I do my work", "The wide use of technology generate lack of satisfaction in me", "Introduction of new technology made my work easier", "I feel this change gives me a greater sense of control in doing my job" and "I like being highly involved in the production process than making use of new machines". Table 4.5, shows that 68% of both skilled and unskilled workers agree that in their work area they work, "according to a strictly laid down procedure". This shows that introduction of technology make use of scientific management principles.

In a similar trend, 68% of both skilled and unskilled workers agree with the statement that "The wide use of technology generate lack of satisfaction in me". All these statements are linked to specialisation and simplification of tasks that comes with the introduction of technology. This shows that although, specialisation simplifies tasks and make work easier it leads to less satisfaction by workers which may lead to alienation, deskilling and monotony. According to Parasuraman, (2000) introduction of technology results in physical and cognitive skill degradation and substituting of skills through the simplification of tasks. Furthermore, specialisation leads to alienation of workers. Alienation is a condition in which man becomes isolated and cut off from the product of his work after having given up his desire for self-expression and control over his own fate at work (Marx, 1997). This leads to loneliness, meaningless, isolation and apartness which in turn is associated with anxiety. All these effects lead to estrangement in respect to both personal and social identities (Deery and Plowman, 1991).

Workers would lose touch with their environment and relationships with people around them. Furthermore, alienation is linked to various conditions such as dissatisfaction at work, cynicism, burnout and depersonalisation, work stress and alcohol use (Frone, 1999), powerlessness and a lack of control (Kanungo, 1992) and emotional labour (Ashforth and Humphrey, 1993). All these factors makes workers to have a miserable work life. However, lets it not be forgotten that specialisation makes takes easy, simple and also reduce the workload by increasing the support of physical and cognitive work tasks (Wickens, 2004). To be pragmatic, in the case of not introducing technology at the work, the highest level of technological capability would have been harder to achieve (Satchell, 1998). Therefore, there is need to strike a balance between specialisation and giving workers a platform of expressing their craft and creativeness to strive to self-actualise. Nonetheless, this study found out and maintains that specialisation and simplification of tasks impacts negatively on workers through deskilling, alienation and monotony.

- **Job Satisfaction**

This study found out that introduction of technology leads to poor job satisfaction of workers. Both skilled and unskilled workers disagreed with the following perceptions; "I was satisfied with my working conditions before new technological changes than after", I feel this technological change granted me more power and status in the organisation", "I am satisfied with the opportunities for advancement in this company", "When someone praises this company", "I feel like a personal compliment", "I take pride in doing my job as well as I can", "The change made me lose prestige relative to my colleagues" and "Technological change enhanced my position in the company". All these perceptions are linked to workers' job satisfaction. As shown in Table 4.5, 87% and 70% of skilled and unskilled workers agreed with the following perception, "I was satisfied with my working conditions before new technological changes than after".

This indicates that workers are not satisfied with the introduction of technology at the work place. Given that they are not satisfied, this study seek to probe their dissatisfaction through asking this perception; "I feel this change gives me a greater sense of control in doing my job". Interestingly, 53% and 63% of skilled and unskilled workers disagreed that with the statement that; "I feel this change gives me a greater sense of control in doing my job". Therefore, it shows that the bone of contention to their dissatisfaction is lack of greater sense of control. This shows that introduction of technology brought lack of four core components of job satisfaction identified by Hackman and Lawler (1971) that are; variety, autonomy, task identity and feedback. These four dimensions showed a strong positive correlation with job satisfaction.

Therefore, workers are not satisfied by their jobs because introduction of technology led to loss of autonomy, variety, task identity and feedback.

- **Poor Communication and Use of Human Resource Models**

This study found out that there is poor communication and use of human resource models in the introduction of technology at the workplace. As shown by Table 4.7, 63% and 80 % of both skilled and unskilled workers disagreed that, 'There has been a two-way communication in technological change decision-making process". This shows that management impose introduction of technology at the workplace without proper consultation with workers. Imposition of technology at the workplace is mostly motivated by the benefit associated with introduction of technology such as increase of production and realisation of profits. However, although the mining companies benefits, it is at the expense of workers whose views are trumped upon yet they are the forebears of the introduction of technology. Therefore, there is need for a two way communication between management and workers when introduction of technology takes place at the workplace.

Consequently, lack of a two way communication leads to resistance by workers because workers are not able to express their opinions, feelings and frustrations that introduction of technology brings. Msweli-Mbanga and Potwana (1991) opined that receiving information and the ability to express opinions and involvement in decision making built a positive attitude within individuals involved. This is manifested through responding favourably to two way communications like attending meetings, providing input, working harder and accepting possible disruption of relationships with colleagues. Furthermore, good communication is contagious to workers within themselves. They can be the torch bearers of introduction of technology if they participate in decision making, feedback and if benefits of introduction of technology are well spelt out. Workers they can influence each other to resist or support introduction. As shown in Table, 4.5, 57% and 50% of skilled and unskilled workers respectively disagree with the perception that "My colleagues supported technological change". Therefore, workers can influence each other to either support or resist introduction of technology. In this study, workers influenced each other to resist introduction of technology, one of the reasons being that there was no two way communication between the management and the workers.

In addition, both skilled and unskilled workers disagreed with the following perceptions, "A model that is easy to understand was used to introduce technology at the workplace", "and "The management did a great job of planning the technological change". All these perceptions are linked to use of human resource models when new technology is introduced.As deduced by Table 4. 7, 60% and 57% of skilled and unskilled workers disagreed with the perception that, "A model that is easy to understand was used to introduce technology at the workplace". Therefore, it shows that management implement new technology without making proper planning and use of Human Resource models. Human Resource models are of great importance because they help to improve workers perceptions, response and adaptation to technological change. This study suggest that mining companies need to adopt models such as Diffusion of Innovations Model by Roger's (1995), The Theory of Reasoned Action (TRA) by Ajzen and Fishbein (2009) and The Technology Acceptance Model (TAM) by Davis (Rogers, 2005) when introducing technology at the workplace. According to Diffusion of Innovations Model by Rogers, innovators are the first to adopt the innovation; these are people that seek out and embrace change. Rogers (1995) characterised the early adopters as deliberate and the late majority as sceptical. The laggards are the last in a social system to adopt an innovation; at this point the rate of adoption drops back. This evidences that Human resource Models enables management to consult, reach out and know how introduction of technology affects workers and how best they can be help them to adjust to it.

5.2.4 Positive Effects of Introduction of Technology

- **Workers Safety**

This study found out that introduction of technology improves workers safety from the hostile environment and dangerous machines. Both skilled and unskilled workers agreed with the following perceptions; "Technology creates a much better working environment", "New technology resulted in additional work" and "Technological change brought massive work to do". All these perceptions are interconnected to the safety of workers at the workplace. As illustrated by Table 4.5, 73% and 70% of skilled and unskilled workers agrees to the perception that, "Technology creates a much better working environment". Mining is one of the most dangerous and deadly sector. The mining industry is marred by many fateful accidents and workers safety is a major concern. However, fortunately introduction of technology improves workers' safety and creates a better environment. In these modern days, facilities such as air condition workplaces and offices are now a common site at mining companies. This creates a better working environment for workers since many mines are located in hostile environments and remote places. This view supports Parasuraman, (2000) who noted that introduction of technology decreasing human workload and improving worker's performance and worker safety when it is properly designed. Introduction of technology reduce the workload by increasing the support of physical and cognitive work tasks (Wickens, 2004). Workers do not need to go dip underground to dig diamond and bring it to the surface but simple automated machines do the job. In summation, this study found out one of the most major undisputed benefits of introduction of technology is that it improves workers environment and safety at the workplace.

- **Production increase and profits**

This study found out that introduction of technology increase production and profits of the companies. Both skilled and unskilled workers agreed with the following perception, "Technological change results in increased production and huge profits". As shown by Table 4.1, 77% and 70% of skilled and unskilled workers agreed with the perception that, "Technological change results in increased production and huge profits". Introduction of technology enables the use of machines which are more efficient and effective which results increased production and profits. According to Apple (1990) efficiency is the proportional relationships between the quality and quantity of inputs and the quality and quantity of outputs produced through standardisation of procedures. Therefore, efficiency is associated with achievement of objectives that are realised through the use of minimal resources. Efficiency is realised through remote controlled and automated equipment which operates in a more predictable, controlled and precise manner (Fisher and Schnittger, 2012). This eliminates a range of inefficiencies, such as unnecessary movements to place equipment in precisely the right position. Efficiency leads to increase of production and realisation of huge profits by mining companies. Therefore, companies benefit a lot from introduction of technology through increase in production. However, whether huge profits that companies realise culminate into remuneration increase to workers is veiled in obscurity and it is a prerogative of the management. In summation, introduction of technology enables increase in production and leads to increase in companies' profits.

5.2.5 Summary of the Discussion of Results

In this chapter, the results of the study were discussed. Skilled and unskilled workers perceptions regarding the introduction of technology are the same at Chiadzwa Diamonds Mines. Both skilled and unskilled workers resist the introduction of technology at the workplace because of negative effects that are associated with it. However, to a lesser extent there are positive effects of introduction of technology that are increase in production, profits and safety. In summation, skilled and unskilled workers resist introduction of technology because of the negative effects that are associated with it.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

In this chapter, conclusions drawn from the study are given. Recommendations on techniques that ensure workers' qualities of work life are suggested and ways that reduce resistance of introduction of technology at Chiadzwa Diamonds Mine are made. The main aim of this study was to determine the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines

6.2. Summary of the Study

The main objective of this study was to determine the perceptions of workers regarding the introduction of technology at Chiadzwa Diamond Mines. This study tested the following statistical hypothesis equation: H_0: $P > 0, 05$ and H_1: $P < 0, 05$. The first hypothesis was; the perceptions of skilled and unskilled workers regarding the introduction of technology are the same and the second hypothesis was; workers resist the introduction of technology at Chiadzwa Diamond Mines. The results showed that skilled and unskilled workers perceptions were the same because there were no statistical significant differences ($P>0.05$). Therefore, this study retains the null hypothesis that skilled and unskilled workers' perceptions are the same, workers resist the introduction of technology and that human resource models help to improve response and adaptation of workers to technological change.

The hallmark of discussion of results was that both skilled and unskilled workers resist the introduction of technology at the workplace because of negative effects that are associated with it. The negative effects, among others, were, job insecurity, poor job satisfaction and specialisation which leads to alienation, deskilling and monotony. In addition, poor use of Human Resource Models and lack of two way communication between management and workers leads to resistance of introduction of technology. However, on the other side of the coin, there are positive effects of introduction of technology that are increase in production, profits and safety. Nevertheless, these positives benefits management more than the workers. Conclusively, skilled and unskilled workers resist introduction of technology because of the negative effects that are associated with it.

6.3 Limitations of the Study

The direct focus of the study was only on the mining industry and it is not representative of all other industries. Therefore, it raises concerns about limited generalisability. However, it was curtailed by the fact that the study was conducted at three different companies at Chiadzwa Diamond fields, namely; Mbada Diamonds, Diamond Mining Company and Anjin.Moreover, the study focused only on Mbada Diamonds, Diamond Mining Company and Anjin mine, female and male workers including those in management. The results of this research are therefore limited by its small sample size. Nevertheless, the results may demonstrate the need for future research to focus on the perceptions of workers towards the introduction of technology at the workplace in general. Future studies would benefit from use of additional factors, effects and perceptions of workers regarding the introduction of technology in organisations.

6.4. Conclusions of the Study

The study showed that workers hold negative perceptions regarding the introduction of technology at the workplace. These negative perceptions triggers the resistance of introduction of technology at the work place because of detrimental effects that are associated with it such as, redundancy, poor job satisfaction, poor communication and specialisation which leads to alienation, deskilling and monotony. Harmful behaviours such as anxiety, stress, fear of the unknown, uncertainty and insecurity are also associated with it. All these negative effects and behaviours culminates into dehumanisation effects such powerlessness, loneliness, meaninglessness and isolation at the workplace which make workers to lead a miserable work life. However, on the other side of the coin, there are positive effects that come with introduction of technology that are increase in production, profits and safety. Nevertheless, these positive effects such as increase in profits benefits management more than the workers. Juxtaposing the negatives and positives that introduction of technology brought leads to the conclusion that workers bear the brunt whilst management get the best out of introduction of technology. Therefore, amidst the introduction of technology, there is a dire need to strike a balance between positives and negatives. This enables a win-win situation to prevail whereby workers realise the quality work life whilst management surpass its goals. Conclusively, skilled and unskilled workers resist introduction of technology because of the negative effects that are associated with it and this study recommends the use of Human resource Models to enable the positive inculcation of introduction of technology by workers.

6.5 Recommendations

Based upon the literature review and the empirical investigation, various recommendations for introduction of technology at the workplace are proposed. These will help to reduce resistance of introduction of technology at the workplace, at the same time ensure a quality of work life of workers. Basically the negative effects of introduction of technology impacts badly on workers quality of work life which in turn triggers resistance. Therefore, there is need to strike a balance between introduction of technology and painstaking look into workers quality of work life, worker's needs and aspirations.

This study recommends that management should make use of technological adoption models such as Diffusion of Innovations Model by Roger's (1995), The Theory of Reasoned Action (TRA) by Ajzen and Fishbein (2009) and The Technology Acceptance Model (TAM) when introducing technology at the workplace. Human Resource models are of great importance because they help to improve workers perceptions, response and adaptation to technological change. They give a detail blueprint of how implementation of technology is going to take place.

This study also recommends that management should build supportive work relationships and effective two way communication between the workers and management. Positive communication ingrains positive perceptions and attitudes towards technological change for the success of the change programmes. Workers should be well informed about all the technological change process that will take place on implementation. Clear communication must be a priority in any technological change process. Management should desist from abrupt imposition of introduction of technology to workers because it can meet with stiff resistance. Therefore, the management must ensure good administration, relationships as well as good communication of technological change at the workplace.

Management need to erect workers committee that are merely responsible for looking into how technology affects the welfare of workers. These workers committees would provide checks and balances on how introduction of technology affects the quality of work life of workers and also ensures that management goals are met. This provides a win-win situation between management and workers, in that management realises its goal and workers realise a quality work life. There is a dire need to provide continuous support especially in the form of training and education especially to unskilled workers. This is because, most of the unskilled workers indicated that sometimes when technological change comes their way they become confused because they will be lacking the necessary skills to enable them to adjust to the new way of doing things. Therefore, to build positive perceptions and attitudes towards change as well as to facilitate success in terms of change, both skilled and unskilled workers should be given necessary training.

6.6 Conclusion

The study showed that workers hold negative perceptions regarding the introduction of technology at the workplace. These negative perceptions triggers the resistance of introduction of technology at the work place because of detrimental effects that are associated with it such as, redundancy, poor job satisfaction, poor communication and specialisation which leads to alienation, deskilling and monotony. Harmful behaviours such as anxiety, stress, fear of the unknown, uncertainty and insecurity are also associated with it. All these negative effects and behaviours culminates into dehumanisation effects such powerlessness, loneliness, meaninglessness and isolation at the workplace which make workers to lead a miserable work life. However, on the other side of the coin, there are positive effects that come with introduction of technology that are increase in production, profits and safety. Nevertheless, these positive effects such as increase in profits benefits management more than the workers. Juxtaposing the negatives and positives that introduction of technology brought leads to the conclusion that workers bear the brunt whilst management get the best out of introduction of technology. Therefore, amidst the introduction of technology, there is a dire need to strike a balance between positives and negatives. This enables a win-win situation to prevail whereby workers realise the quality work life whilst management surpass its goals. Conclusively, skilled and unskilled workers resist introduction of technology because of the negative effects that are associated with it and this study recommends the use of Human resource Models to enable the positive inculcation of introduction of technology by workers.

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APPENDIX A: TIME TABLE SCHEDULE

TIME FRAME	ACTIVITIES
April 2013	Structuring and discovering of a research topic
May 2013	Submission of the first research proposal
June 2013 to September 2013	Rectification of research proposal
October 2013	Research proposal presentation
November 2013	Literature reviewing
March 2013	Continuation of literature reviewing
April	Field work- data collection and analysis
June 2014	Chapter 4- developing research findings
August 2014	Chapter 5- developing analysis on the research findings

September 2014	Recommendations and conclusion
Novamber 2014	Editing Final proof reading and editing of thesis Duplicating and binding copies of the thesis
December 2014	Submission of thesis

APPENDIX B: BUDGET

Item	Description	Quantity	Unit price	Total cost (R)
5.1 Assistance	Stipends for 2 research assistants @ R 150 per day for 15 days	2	R150 x 15 days x 2 assistants	4500.00
5.2 Printing	5 Bond paper @ R200 each	5	R 200 x 5	1000.00
	Language editing of 200 pages @ R35 per page	200	R35 x 200 pages	7000.00
	Printing of 5 final copies with 200 pages @ R1 per page	5	R1 x 200 pages x 5 copies	1000.00
	Spiral binding of 5 copies @ R50 per copy	5	R50 x 5 copies	250.00
	Final binding of 5 copies @ R410 per copy	5	R410 x 5 copies	2050.00

5.3 Travelling Expenses	2 research assistants and the researcher's trip from University of Venda to Chiadzwa @ R3,25/km x 1200km x 3	3	R 3,25/km x 1200km x 3	11700.00
5.4Subsistence	Accommodation at a lodge (bed and breakfast) for 3 people @ R500 for 15 days	3	R500 x 15 days x 3 people	22500.00
Grand Total				50000.00

APPENDIX C: PERMISSION TO CONDUCT RESEARCH

SCHOOL OF HUMAN AND SOCIAL SCIENCES

To : PERSONNEL MANAGEMENT
MBADA DIAMONDS MINE
CHIAZWA, MUTARE
ZIMBABWE
26 November 2013

Dear Sir/Madam

REQUEST FOR STUDY PERMISSION

I write to request for your permission for the bearer Mr. Leo Chimeri (student no. 11595188) to carry out a study in your company. The bearer is a registered master's student in the School of Human and Social Sciences, Sociology department, University of Venda, South Africa. The study title is ***Worker's Perception Regarding the Introduction of Technology in the Mining Industry: A case study of Mbada Diamond Mine, Zimbabwe.***

Kindly give the student all necessary assistance and any information obtained would be treated in strict confidentiality and for academic purpose only.

Dr. Zikhali, SPT
Supervisor

University of Venda

UNIVERSITY OF VENDA
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"A quality driven, financial sustainable, rural-based comprehensive University"

APPENDIX D: ETHICAL CLEARANCE

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Mr LM Chimeri

Student No:
11595188

PROJECT TITLE: Workers' perception regarding the Introduction of Technology in the Mining Industry: A Case Study of Mbada Diamonds Mine in Zimbabwe.

PROJECT NO: SHSS/14/SOC/01/2907

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Dr SPT Zikhali	University of Venda	Supervisor
Dr M Makalu	University of Venda	Co-Supervisor
Mr LM Chimeri	University of Venda	Investigator - Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: July 2014
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: ....
Name of the Chairperson of the Committee: Prof. G.E. Ekosse

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950), LIMPOPO PROVINCE), SOUTH AFRICA
TELEPHONE (015) 962 8816/8313 FAX (015) 962 9060
"A quality driven financially sustainable, rural-based Comprehensive University"

APPENDIX E:INFORMED CONSENT

My name is Leo Munyaradzi Chimeri. I am a student at the University of Venda registered for the Master of Arts (MA) programme within the Sociology Department in the School of Human and Social Sciences. The research I am conducting focuses on ***Worker's perceptions regarding the introduction of technology at Chiadzwa Diamond Mines***. I am requesting you to participate in this study. Any information you will provide will be treated as confidential and thus will not be divulged to any other person. Please note that your participation is strictly voluntary, implying that you can opt to pull out any time should for any reason whatsoever you feel uncomfortable.

Signature of Researcher ______________________________ **Date**____________________

I…………………………………have read and understood the contents of this invitation to participate in this study. l hereby confirm my voluntary consent to participate in the research.

Respondent signature _________________________ **Date** ____________________

APPENDIX E: CONFIRMATION BY LANGUAGE EDITOR

Proofreading and Editing Report

This letter serves to confirm that I, Dr I.Ndlovu of the English Department, University of Venda, have proofread and edited the Masters Dissertation titled, "Workers' Perceptions regarding the introduction of technology at Chiadzwa Diamond mines in Zimbabwe" by Chimeri Leo (11595188), a dissertation to be submitted to the Department of Sociology in the School of Human and Social Sciences, University of Venda.

I carefully read through the proposal, focusing on proofreading and minor editorial issues. I have made recommendations which can be accepted or rejected using the Microsoft Word Track Changes function.

Yours sincerely

....

Dr Isaac Ndlovu, PHD
Lecturer: English Department
University of Venda
Private Bag X5050
Thohoyandou, 0950
South Africa
Tel:+27 15 963 8305
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APPENDIX F: QUESTIONNAIRE

Please be so kind to provide general information about yourself.

Section A: Demographic information

Please be so kind to provide general information about yourself.

Instructions: Please tick the appropriate response

1. How old are you?

[1] 20-30 [2] 31-40 [3] 41-50 [4] 51-60 [5] 61-65

2. What is your sex?

[1] Male [2] Female

3. What is the name of the company you are working for ?

[1] Mbada Diamonds [2] Diamond Mining Company [3] Anjin

4. What position to you hold in the company ?

[1] Skilled Worker [2] Unskilled Worker

5. What is your highest level of education?

[1] Grade 7 certificate

[2] Ordinary Level

[3] Advanced Level

[4] Bachelors Degree

[5] Post-graduate

6. Which ethnic group do you belong to?

[1] Black

[2] Coloured

[3] White

[4] Asian

7. Nationality

[1] Zimbabwean [2] SADC country [3] African country [4] Western country

[5] Asian country [6] Others

Section B: Perspectives on support for technological changes

Instruction: Indicate the extent to which you agree with the following statements, Use the scale below, Mark with an X where appropriate.

Strongly disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**
1	2	3	4	5

No	**Perspective**	**1**	**2**	**3**	**4**	**5**
1	Technological change got my full support					
2	I really understood the need for undertaking technological change.					
3	I certainly complied with technological change.					
4	My colleagues supported technological change					
5	I felt confident that I could adjust to the change.					
6	I liked the technological change from the start.					
7	I encouraged my colleagues to adjust to technological change.					
8	I experimented with the technological change as soon as I could.					
9	Introduction of new technology increased productivity in the company					
10	Introduction of new technology increased morale					
11	Technological change results in increased production and huge profits					
12	Technological change is necessary for the company to succeed and remain competitive					

Section C: Perspectives on resistance for technological changes

No	Perspective	1	2	3	4	5
13	I did not want to accept the change.					
14	I felt angry about technological change.					
15	I gradually liked the technological change.					
16	Technological change confused me.					
17	I felt that management ignored our concerns about the technological change.					
18	I felt that there was too little time for me to adjust to the technological change.					
19	I was concerned that my job performance might drop because of the change.					
20	I worried that I might lose my job as a result of electronic machines introduced					
21	The technological change made me doubt my ability.					
22	The change made me lose prestige relative to my colleagues.					
23	I complained about the technological change with my colleagues					
24	I have figured out unintended ways to use the technological change that no one had anticipated.					
25	Technological change led to less emotional interaction with other workers					

Section D: Perspectives on work life and environment

No	Perspective	1	2	3	4	5
26	Technological change enhanced my position in the company					
27	I tried to think of ways of doing my job effectively.					
28	I know I am very capable of keeping up with new techniques and					

	knowledge required for my job.					
29	I was satisfied with my working conditions before new technological changes than after					
30	New machines complicate the way I do my work					
31	Changing the way I do my work gives me confusion					
32	New technology resulted in additional work load					
33	The use of new machines generates chaos in the workplace					
34	I like being highly involved in the production process than making use of new machines					
35	I am satisfied with the opportunities for advancement in this company.					
36	New technology generates fear because there is a sense of loss of control and competency.					
37	I was allowed to participate in decisions making regarding this technological change.					
38	I feel this technological change granted me more power and status in the organisation.					
39	I am certain about my job security in this company.					
40	I am certain about what my responsibilities will be 12 months from now					
41	I am still afraid of some aspects of technological change.					
42	When someone praises this company, I feel like a personal compliment					
43	I am satisfied with ways in which I can express my creativity on my job					
44	The company values my contribution to its wellbeing.					
45	I feel technological change takes me backwards in the rank					
46	I am certain about what my future career picture looks like in this company.					
47	I really have no chance of giving my opinions on technological change to decision-makers.					
48	Technological change gives me more power to do my job.					
49	I take pride in doing my job as well as I can.					

50	I am very confident at learning and developing new skills relevant for my job.					
51	I feel this change gives me a greater sense of control in doing my job.					
52	The new technology was very compatible with my job.					
53	I learned about the technological change to increase my job security.					
54	I have learned ways to make my job easier with the technological change.					
55	I modified the change to make it fit my work.					
56	Technology creates a much better working environment.					
57	The wide use of technology generate lack of satisfaction in me					
58	Technological change brought massive work to do					
59	Introduction of new technology made my work easier					
60	In my work area we work strictly according to laid down procedure					
61	In my work area there is flexibility to change work practises whenever it is necessary					

Section E: Perspectives on how human resource models help to improve workers perceptions, response and adaptation to technological change.

No	Perspective	1	2	3	4	5
62	A model that is easy to understand was used to introduce technology at the workplace					
63	The procedures used for making technological change decisions were fair.					
64	The company really cares about my well-being.					
65	I trust top management.					
66	Reasons provided by top management for making technological changes were convincing					
67	There has been a two-way communication in technological change decision-making process.					

68	I figured out how to cope with the change with the least effort possible					
69	Decision-making procedures related to technological change have been applied consistently.					
70	In general, I believe the company's motives and intentions are good.					
71	I felt a sense of ownership for this company.					
72	The management did a great job of planning the technological change					
73	Introduction of new technology is a tiresome process					
74	I was fast to adapt to the new elements introduced by technological change					
75	I agree with top management that we need to make technological change from time to time.					
76	New administrative practices complicated my job					
77	Introduction of technology ensured rapid communication for the success of the company					
78	I was unhappy with how the technological change was introduced.					

Thank you for taking time to complete this questionnaire