The impact of human performance programmes in the maintenance department at a power station

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ABSTRACT

Lethabo Power Station has implemented a number of human performance programmes, and these programmes are meant to prevent human errors before they occur. The applicability, effectiveness and benefits of these programmes are, however, not as illustrative.

This study aims at defining, analysing and proving the impact of these human performance programmes and suggesting the effective implementation thereof.

Although human performance enhancement is applicable throughout the Lethabo Power Station departments, this study is only concerned with the maintenance department.

A quantitative research method was applied, where employees from the maintenance department at the power station, were requested to voluntarily participate in the answering of the questionnaire. The questionnaire is divided into four sections, which are the biographical information, management aspects, employee aspects, and processes and procedures.

A minimum of 165 participants of the total number of the maintenance department employees, which is 271, will be requested to participate. This figure constitutes 61% of the total maintenance employees; this is the percentage that the Statistical Consultation Service of the NWU has recommended for an acceptable representation of the population.

The literature review will be conducted with the purpose of an in-depth understanding with regard to this topic.

Key words: Human performance, management aspects, employee aspects, processes and procedures.

DECLARATION

I, Ramekwa Andries Molefe, student number 24035025, hereby declare that the work concerned with this mini-dissertation, titled **'The impact of human performance enhancement programmes in the maintenance department at a power station'** is my own work; all sources that I quoted and used have been referenced as an acknowledgement.

No part of or the entire mini-dissertation has been submitted previously for an examination or a degree at any institution or university.

I also obtained ethics approval for this research study from the North-West University.

Signed

Date: 2018-11-26

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ABBREVIATIONS

Abbreviation	Meaning
GM	General Manager
PSM	Power Station Manager
HR	Human Resources
UCLF	Unplanned Capability Loss Factor
OPEX	Operating Expenditure
OEM	Original Equipment Manufacture
SWP	Safe Work Procedure
TRA	Task Risk Assessment
PTW	Permit To Work
IBI	Integrated Business Improvement
HRD	Human Resources Development
HRM	Human Resources Management
PA	Performance Appraisal
OPS	Operating
PSR	Plant Safety Regulations
EAL	Eskom Academy of Learning
KPA	Key Performance Area
KPI	Key Performance Indicator
IDP	Individual Development Plan
LTB	Lethabo
DCC	Document Control Centre
SPSS	Statistical Package for Social Sciences
ANOVA	Analysis of variance
KMO	Kaiser-Meyer-Olkin

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CHAPTER 1: NATURE AND SCOPE OF THE STUDY

1.1 Introduction

Human elements play an inevitable role in maintenance activities and these are affected by a number of different interacting factors, such as organisational, environmental, job factors up to and including personal characteristics, which come up with an inherent variability to the reliability concerned, assessment of the impact of these factors is critical for the estimation of human reliability in maintenance, in each maintenance, probable risk or safety, human reliability acts as an efficient aspect for the assessment of implications to a number of aspects with regard to human performance (Aju Kumar *et al.*, 2015:169).

This study explores the impact of human resource performance enhancement programmes in the maintenance department at a power station. In maintenance, human beings relate mostly with a number of psychological aspects such as behaviour, attitude and emotions that need to be managed in product development; human errors are likely to occur depending on specific conditions and the effects thereof, the tasks in maintenance, are unique and the human actions occur within a dynamic context (Aju Kumar *et al.*, 2015:170).

It is, therefore, every organisation's responsibility to enhance the job performance of the employees, and certainly the implementation of training and development is one of the major steps that most companies need to achieve. As it is evident that employees are a crucial resource, it is important to optimise the contribution of employees to the company's aims and goals as a means of sustaining effective performance. This, therefore, calls for managers to ensure an adequate supply of staff who are technically and socially competent and capable of career development into specialist departments or management positions. Colville and Millner (2011:35) recognise that "a trap that organisations can fall into is not recognising that the implementation of performance management is a change process, too often, organisations just look over the fence to what others are doing and do the same". They argue that this practice is reasonable, but it needs to be coupled with an understanding of how the process will 'deliver organisational strategy and vision'. In order to achieve this, they argue that HR needs to have an awareness of the 'current state' and the 'desired state' of the organisation and its processes.

It is also important not ignore the prevailing evidence of growth of knowledge in the business corporate world in the last decade. This growth has not only been brought about by improvements in technology or a combination of factors of production, but increased efforts towards development of organisational human resources.

1.2 Problem statement

Most undesired events at the power station are as a result of human errors, and these events lead to issues such as loss in capability, environmental non-compliance, units' trips, plant and equipment damages, personnel injuries and high cost implications.

The problem that the station is facing is loss of capability due to errors in maintenance decision-making and the execution thereof.

Even though the power station and Eskom provide training opportunities for the employees, there is less focus with regard to the power station's performance and efficiency; maintenance errors and mistakes are borne from faulty maintenance execution, improper or outdated procedures and errors in decision-making as well as inadequate management support. This study seeks to identify, assess and address the impact of human performance deficiencies in the maintenance department, which lead to the power station not performing to its maximum capabilities, and how to address them.

1.3 Objectives of the study

1.3.1 Primary objective

The main objective of this research proposal is to identify human performance deficiencies in the maintenance department at the power station, and to draw up recommendations to minimise or eliminate these deficiencies.

1.3.2 Secondary objectives

1. This study will investigate the effects of human competencies related to the power station's performance with the focus on the maintenance department.

2. It will also investigate the root causes of human performance deficiencies in the maintenance department at the power station.

3. To suggest how these human performance deficiencies can be addressed to enable maximum performance of the power station.

4. To develop the employees' understanding of the importance of work team culture, the power station's culture and the maintenance culture towards the employees' performance and how this can improve their performance.

1.4 Research questions

1.4.1 Main question

How can human performance deficiencies, in the maintenance department, which impact maximum performance of a power station, be identified, assessed and addressed?

1.4.2 Secondary questions:

- Which human performance competencies are necessary for the maintenance of a power station?
- Which human performance deficiencies in the maintenance department lead to under-performance and failure at a power station and how can they be assessed?
- How can human performance deficiencies in the maintenance department be addressed to enable maximum performance of a power station?

1.5 Contribution and benefits of the study

- Human capital, as the most important asset of the power station, as opposed to the production plant, technology and equipment, needs to be effectively utilised for the maximisation of the station's performance; therefore, this study will focus on the human capital.
- The identified human performance deficiencies, the recommendations and the implementation thereof will be shared with management, human resources practitioners, training coordinators as well as employees themselves for the enhancement of their performance and therefore the improvement of the station's performance.
- Management of the power station will acquire a better understanding of the current human performance deficiencies status from both themselves and their employees that cause the inadequate performance of the station from the point of view of human performance factors, and may use the findings and recommendations that will be highlighted from this study to assist in the improvement of those human factors.
- The power station's management will use this study in developing the station's strategic goals and objectives for the future of the station.

- This study also highlights the role of employees' human performance impact in reaching the station's strategic plan with regard to the failures of achieving the strategic objectives of the power station.

- With the rate at which the world is changing, this study will serve as a base within which management can deal with the challenges related to these changes.

- This research proposal is concerned with the human performance enhancement at the maintenance department at Lethabo Power Station and not any other site.

- Scope of the study

This study falls within the category of human resource development (HRD). The subject matter is concerned with human errors, the impact thereof on the performance of the power station, and how human performance enhancement can limit or eliminate these errors.

The study is done on the maintenance department within the Lethabo power station, as it is one of the key technical departments at the station, together with the Engineering and Operating departments. The maintenance department's main function is to perform routine maintenance and service of plant and equipment as per the maintenance strategy, as well as repairs to plant and equipment failures.

1.6 Research methodology

1.6.1 Literature/theoretical study

A literature review is a scholarly review of the research and the main ideas in a focussed and goal-directed way of prior work in an area of interest (Bryman *et al.*, 2014:379).

Literature review caters four main functions which are as follows: Firstly is the demonstration of the underlying assumptions with regards to the research question; secondly the knowledgeability of the researcher with regards to the related research, as well as the intellectual traditions around and supportive of the study is demonstrated; thirdly it demonstrates that the gaps from previous research has been identified by the researcher and that the proposed research will occupy the demonstrated need; fourthly the literature review refines and re-defines the study questions by placing those questions in larger empirical traditions (Marshall & Rossman, 2014:43).

Employee engagement may provide the key to understanding how effective human resource management practices may lead to increased individual and organisational performance;

however, the empirical and conceptual links between employee engagement and human resource management as well as between performance and engagement are not well established (Albrecht *et al.*, 2015:4).

Individual, group or organisation performance is usually defined in terms of the tasks to be completed or goals needed to be achieved (Franco-Santos *et al.*, 2013).

The high capacity demand of electricity supply in South Africa and the Southern African region, coupled with the fact that Eskom's Lethabo Power Station is the lowest cost electricity production station, has put this power station under tremendous demand to operate at its maximum technical capability as per the station's design.

As a result, the station has to ensure that its main asset, the employees, are performing to their maximum outputs, minimising errors, and performing their duties without jeopardising human, environmental and equipment safety and wellbeing. Management has to ensure the achievement of this aspect through human performance enhancement programmes.

Productivity growth drivers are divided into a pair of explanations, which are: the availability and capability of resources in the economy, and the magnitude with which these resources are utilized in production of companies (Dolman *et al.*, 2012:6).

1.6.2 Empirical study

Empirical research refers to making planned observations; observations are made by following careful plans; engagement is made in a systematically thoughtful process that is termed research; the five plans that need to be undergone are as follows: planning to observe, who to observe, how to observe, when to observe and lastly how to analyse the data collected and the interpretation thereof (Patten, 2016:3). The collected data is called empirical evidence, which thereafter is subjected to quantitative or qualitative analysis.

Quantitative and qualitative researches differs in a number of ways, a wide range of methods, such as focus groups, case studies and interviews are used in qualitative research to collect narrative data and for gaining the understanding of a topic, as well as generating theory, it is based on interpretivist, which is the philosophical concept that states that there is multiple realities and truths as opposed to just one, there may be something in existence depending on a point of view or a perspective taken, which by collecting words may bring its understanding (Claydon, 2015:43).

Quantitative research is deductive and explanatory with numerical data being collected for a test of a theory, while qualitative research is inductive and exploratory, with the collection of narrative data for the generation of themes that may be used in the development of a theory. A pragmatist approach to research is taken by many researchers such that the method that they use in their research is dependent on the research question. These questions are either qualitative or quantitative, and some research questions are best answered by with words and some with numbers (Claydon, 2015:43).

Quantitative research is a distinctive research design entailing numerical data collection, taking into consideration the relationship between research and theory as deductive, an approach of natural science is preferred in particular positivism, as well as the adoption of an objectivist conception of social reality (Bryman *et al.*, 2014:31).

Qualitative research is the collection and analysis of primarily non-numerical data such as words, pictures and actions, and it is mainly based on induction, informed by constructionism and interpretivism, even though this type of research does not always subscribe to all these positions (Bryman *et al.*, 2014:41).

Quantitative research is concerned with concepts and their measurement, while most qualitative research is focused on developing concepts, rather than developing measures (Bryman *et al.*, 2014:43).

This study adopted the quantitative research as opposed to qualitative research as the latter is concerned with generating theories rather than testing them (Bryman *et al.*, 2014:31). This study seeks to test the impacts of human performance enhancement programmes in the maintenance department at the power station.

The researcher in this study seeks to create a sample that is representative of the population that is being studied in order to be able to generalise his findings beyond the context of his research (Bryman *et al.*, 2014:39); therefore, the choice of a quantitative study.

Questionnaires with relevant data to this study are distributed to different employees in the maintenance department at a power station to identify and analyse the causes of the human performance deficiencies in the maintenance department.

Human errors have a negative impact on the performance of the power station; this can be in the form of electricity generation capacity loss, costly and time consuming consequences, and in some cases different classes of injuries and/or fatalities.

The empirical study is based on the research design, research approach, statistical analysis, participation by employees and management, measuring instruments and sampling.

1.7 Description of overall research design

A research design provides the structure or framework that guides the use of a research method and the analysis of the collected data, while the research method is a technique for collecting such data (Bryman *et al.*, 2014:100).

This study will be a quantitative research study, as questionnaires and equipment will be used to collect numerical data, and therefore all aspects of this will be designed before collecting the data and what this study is searching for.

This study will have a cross-sectional design, which means that it will involve data collection at a single point in time and on more than one case (Bryman *et al.*, 2014:106). Different groups of employees with different variables of interests who share some characteristics such as ethnicity, education, service duration with the power station, and socioeconomic status will be involved. This is in order to acquire data at different levels. It will also be based on the observations that will take place in these groups at a specific timeframe.

1.8 Population/sampling

This study will focus on maintenance department employees at different levels of employment positions, with different roles and responsibilities, different life backgrounds and different education levels. The idea is to get as much in-depth information from broad areas of different levels of understanding, and this will enhance the efficiency to the outcome of this study. To enable the researcher to generalise his findings to the whole population, there is a need for a sample that reflects the population accurately, i.e. the employees in the maintenance department (Bryman *et al.*, 2014:168).

The aim is also to gather vast responses in terms of the experienced and inexperienced individuals within the maintenance department at the power station. These individuals will be issued with questionnaires that they will be requested to complete. The anonymity of individuals will be guaranteed as no names are required; this is in order for them to answer as honestly and realistically as possible. These participants will, through the questionnaires, assist in identifying the human performance advancement factors concerned with the performance of the power station as far as maintenance is concerned.

The decision regarding the sample size is dependent on several considerations, including cost and time – no definite answer exists, and therefore, invariably, a compromise has to be made between the constraints of cost and time, the necessity for precision, and other considerations (Bryman *et al.*, 2014:176). Out of a total number of all 271 maintenance department employees, 165 from different work levels will be randomly sampled.

Sampling will be from employees on the floor, supervisors and line managers from the maintenance department, who will be requested to complete the questionnaires. The gender base will be applied accordingly as male and female employees will be involved.

The unit of analysis will be based on the maintenance department employees at Lethabo Power Station only, and not from the public domain or any other institution. This unit of analysis is most relevant as the population sample are the individuals concerned with the day-to-day maintenance activities that result in the performance of the power station; therefore, data that will be gathered will be the most appropriate for this study.

nother unit of analysis may be appropriate, which is sampling from another power station; however, it may not be feasible to rely on such a unit of analysis as work conditions, cultures and practices may differ from one station to the next.

1.9 Data collection

To collect data, questionnaires will be used that are designed following the different previous examples. Current processes governing the organisation are on the system and will be drawn and used as reference that guide the human resource development within the power station.

Questionnaires will be hand delivered to employees without access to computers. The rest of the questionnaires will be e-mailed to participants at various levels within the maintenance department at the station. After participants have completed their questionnaires, questionnaires will be collected from them; the e-mailed ones will be sent back via e-mail.

The outcome of this survey will be available only to the researcher and the NWU staff concerned, and will be used for the purpose of this study.

1.10 Data analysis

The different factors and their specific impacts on different employees will be analysed in order to assess the degree of influence that these factors have on the different employees.

In the end, the holistic information will be used to make appropriate conclusions and recommendations.

This study shall be analysed using the Statistical Package for Social Sciences (SPSS).

1.11 Assessing and demonstrating the quality and rigour of the proposed research design

Research project and finding evaluators normally adopt certain trustworthiness criteria that are agreed upon in literature as related to a specific research approach, such as quantitative, qualitative or mixed-method research. Every research approach utilises its own evaluation criteria, different to others, for assurance of the rigour of the inquiry; this is due to the different methodology and philosophical assumptions that guide each approach (Anney, 2014:272).

The reliability assessment of study findings needs researchers and health professionals' judgements about the soundness of the research relative to the appropriateness and application of the integrity of the final conclusion and the methods undertaken (Noble & Smith, 2015:34).

Certain researchers believe that certain dimensions are in general better suited to certain kinds of research compared to others. They argue that reliability and validity are better suited to quantitative research and they are inappropriate for qualitative research. A distinction is made between relevance and rigour, and researchers should produce research that is relevant and rigorous, and this is called consumable research (Mårtensson *et al.*, 2016:595).

Rigour in research methods has an intention to guarantee the validity, reliability and trustworthiness of the study results, and also that the published work can be evaluated and replicated. This is regardless of whether the research is quantitative or qualitative (McKechnie *et al.*, 2016:3).

1.12 Trustworthiness of quantitative research

The trustworthiness of the quantitative research depends on the following criteria: How much can it be depended on? How credible is the information on the specific research? Can it be transferred and how much of the findings can be confirmed from the research? (Bryman *et al.*, 2014:44).

The quality criteria used for quantitative research are validity and reliability (Bryman *et al.*, 2014:46), and this approach has been seen by most researchers to be trustworthy.

1.13 Research ethics

The ethical requirements have been attached in the annexures as a priority requirement for this study. A high consideration of ethics is a primary requirement as the research may involve employees in terms of engagements such as questionnaires, observations and interviews. There needs to be a fair amount of consultation with all concerned, beginning with permission requests from the Power Station Manager, Middle and line Managers, as well as the employees involved.

The permission granted to perform this study at the power station includes the use of Eskom Lethabo documentation, which is confidential and is controlled through DCC. These include training manuals, procedures, directives and process documents.

All participants in this study will do so voluntarily, and reserve the right to withdraw their participation at any time they wish to. This information will be shared with the participants prior to any activity taking place.

1.14 Limitations of the study

- This study will be focused on the Lethabo power station maintenance department only; it does not include other power stations, business units or Eskom sites.
- Data will be acquired through the distribution and collection of questionnaires to a sample size within the station; no visitors or external individuals, groups or parties will be sampled.
- As this study and all its contents and activities are focused only on Lethabo, the conclusions and recommendations may only be limited to Lethabo, and not all of Eskom's other power stations.

1.15 Layout of the study

Chapter 1: This is the introduction chapter where the background of this study, the objectives, problems, questions, design of this research as well as the ethical aspects are discussed.

Chapter 2: This chapter focuses on the in-depth literature of this research topic, previous and current research done on this topic and its relation to the status quo at the station.

Chapter 3: This chapter deals with the research design, the instrument that is used for data collection, the population sample and the procedures used for data analysis.

Chapter 4: This chapter deals with the collection of data, its analysis, interpretation and discussion.

Chapter 5: This is the conclusion chapter in which findings of this research are concluded and compared to any other findings related to these. Recommendations are made for improvement and benefit as well as suggestions for future research.

1.16 Summary

This chapter covered the overall introduction and the need for the research, and includes the following aspects: The problem statement, objectives of the study, research question, contribution and benefits of the study, scope of the study, research methodology, description of overall research design, population/sampling, data collection, data analysis, assessing and demonstrating the quality and rigour of the proposed research design, trustworthiness of quantitative research, research, ethics, limitations of the study and the layout of the study.

The next chapter, Chapter 2, will deal with an in-depth literature review of the impact of human performance enhancement programmes in the maintenance department at a power station.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A literature review is the selection of available published and unpublished documents on the topic; these documents contain data, ideas, evidence and information written in the fulfilment of certain aims or in the expression of certain opinions on the nature of the topic, the methods used in its investigation as well as the effective analysis of these documents, relative to the studies being proposed (Hart, 2018:13).

As per Christmals and Gross (2017:7), an integrative literature review is a non-experimental layout in which the researchers equitably summarise, critique and draw conclusions regarding the subject matter through a systematic categorisation, search and thematic analysis of past quantitative and qualitative studies conducted on the subject.

Hart (2018:1) is of the view that a review of literature is vital due to its absence that hinders the acquirement of understanding of one's topic, research that was done on it, what has already been conducted on it, key issues, main criticisms and key theories applicable to it.

This chapter focuses on the in-depth literature concerned with the impact of human performance enhancement programmes in the maintenance department, previous and current research done on this topic, and its relation to the status quo at a power station.

2.2 Human performance

The conceptual framework

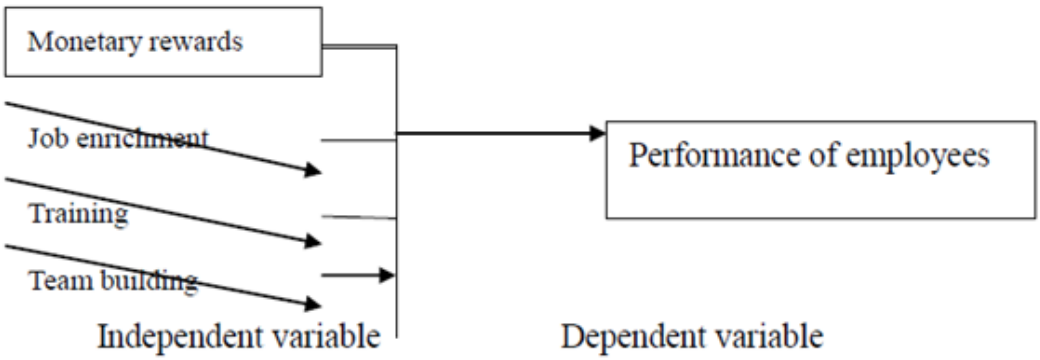

Figure 2-1: The conceptual framework-performance

Source: Adapted from Omolo (2015:92)

In figure 2-1 above, performance is the dependant variable, where the independent variables are training, quality of working life programmes, team building, job enrichment and monetary

rewards. The framework therefore confirms the fact that performance is dependent on the independent variables (Omolo, 2015:92).

According to Sheikhalishahi *et al.* (2016:227), human performance in the maintenance occupation in organisations forms a critical factor that contributes to the performance of this department

Performance is to keep up the plans while focusing on the results. The performance of an organisation or an individual is heavily dependent on a collective of all practices, design features and policies of the organisation even though performance evaluation is in the centre of performance management (Anitha, 2014:309). Contrary to the above, Ahmad *et al.* (2014:86) note that performance is the result of work done in an efficient manner with a considerable organisational obligation without the interruption of any organisational goals or laws.

Kiruja and Mukuru (2018:73) state that employee performance is a function of motivation and ability, where ability comprises training as well as the skills necessary for the performance of tasks. However, Iqbal *et al.* (2015:2) argue that employee performance includes the efficiency and effectiveness in doing work, meeting deadlines, execution of defined duties and employee competencies.

2.3 Drivers of human performance

In the performance of human reliability analysis, human error probability is decreased or increased by drivers, including training, procedures, experience and workload. It is of utmost importance to have knowledge of the kinds of drivers to be considered and how much they affect human error probability (Kim *et al.*, 2016:464). Contrary to the above, Prange and Pinho (2017:7) argue that personal drivers involve experience embedded in an organisation's processes, skills and complex structured knowledge patterns. They note that if an optimal mix of personal drivers is adequately reconfigured and deployed, they can be a source of innovation that influences international performance.

One of the implications for the execution of a service orientation strategy is the necessity to develop a facilitative climate for extracting or leveraging treasures from the investment that an organisation makes in the motivation and development of its employees (Aryee *et al.*, 2016:16).

In their interpretation, Aryee *et al.* (2016:16) state that the cross-level effect of overall service orientation and combined human capital on individual-level service quality concerning the

correlations of frontline employees who enable work-unit-normative anticipation and the conveyance of implied knowledge concerned with service delivery, as a result organisations, are expected to generate internal arrangements, such as social atmosphere for support and trust to advance normative expectations as well as knowledge and information sharing, with regard to service climate or delivery as an offering of a motivational initiator for service orientation.

2.3.1 Training

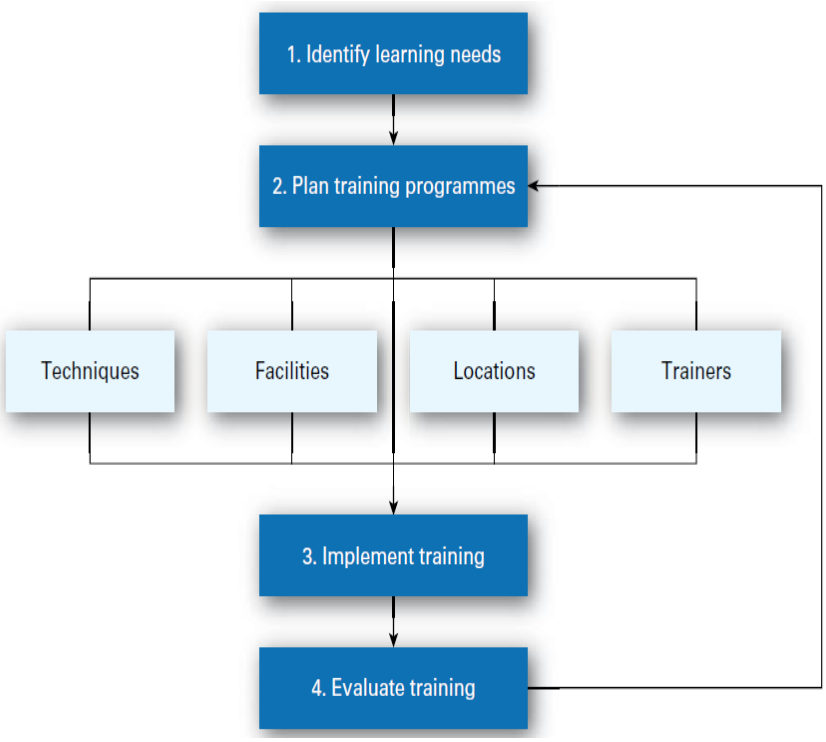

Figure 2-2: Systematic training model

Source: Armstrong and Taylor (2014:310)

Training is supposed to be systematic in such a way that it is specifically planned, designed and implemented to achieve specified needs. It should be presented by individuals whith expertise in terms of the specific training; the impact of the concerned training should be properly evaluated (Armstrong & Taylor, 2014:309). They further went on to suggest that this concept is a four-stage model consisting of training needs identification, the relevant sort of training required for the satisfaction of these needs, the utilisation of adequately qualified trainers for the implementation of this training, and the monitoring and evaluation of the effectiveness of the training.

Training is the attainment of needed competencies, skills and knowledge to perform a task, by means of teaching (Kum *et al.*, 2014:79). However, Omolo (2015:99) argued that people

can be taught to increase their level of motivation, indicating to them the manner to dissect challenges and tasks as well as a lessened feeling of intimidation from work roles.

Omolo (2015:99) believes that it can be demonstrated to people on how to cope in the workplace and this can directly guide enhanced motivation, and that managers can realise the opportunity in sponsoring the further training of employees at the cost to the organisation, which will result in motivating and preserving employees.

Training has increasingly become a vital aspect of modern organisations' success; competition among organisations is often based on their capabilities that are the core sets of expertise and knowledge giving them a competitive edge over their competitors (Makgopa, 2015:8).

Makgopa (2015:8) went on to suggest that training plays a pivotal role in strengthening and nurturing an organisation's competencies, and therefore it has become organ of the backbone of an organisation's strategic management. She adds that rapid changes in technologies require that employees hone their abilities, skills and knowledge through continuous learning.

The study conducted by Kim (2014b:13) has revealed that workplace learning is a process that involves the pursuit of improvement and change in the workplace performance through acquiring skills, knowledge and attitudes, such that appropriate interventions are instituted, such that if an opportunity or a problem is discovered from the learning to performance process, to either seize the opportunity or solve the problem.

Employee development strategies that link with the organisation's economic, environmental and social objectives, enhance social change capabilities and create a lasting industry advantage (Jackson, 2014:25).

As described by Oyedele and Aluko (2018:297), training and development are of late personnel efficiency's indispensable ingredient. It has, in modern days, become increasingly important due to complexity in jobs that is borne from rapid development in technology and science.

The expectation is that employees who undergo training aligned with organisational or their individual goals will become more efficient in the performance of their tasks (Kum *et al.*, 2014:75). They went on to suggest that organisations are supposed to notice the positive effects of training on the performance of employees, and should consider the development of employees as a focused investment in strengthening workers

Kum *et al.* (2014:75) maintain that it is important for development plans to include 'train-the-trainer', which is training employees to be able to train other employee on a certain skill.

The main determinant of employee productivity, according to (Beltrán-Martín & Bou-Llusar, 2018:101), is the employee's work-related competencies and skills; employee ability is related primarily to performance through job knowledge, in such a way that high-ability employees has a tendency of demonstrating higher performance as they are able to better acquire and apply job-relevant knowledge than their counterparts with lower levels ability.

2.3.2 Procedures

The study conducted by Antonovsky *et al.* (2014:20) has revealed that procedures are a specific model of organisational knowledge transfer and communication that supports the failure or success of maintenance activities. They went on to suggest that repeated association of failures, with the effectiveness of communication, accessibility of task-related information and the quality of procedures, has demonstrated the importance of elevating the attention that organisations devote to communication between maintenance staff and other members of the organisation.

The occurrence of accidents caused by over speed protection equipment and maintenance activities are a cause of concern in the industry; however, human error and risk-based inspection procedures in the fossil fuel plants should be taken into consideration when inspection procedures are conducted (Noroozi *et al.*, 2014:131)

Kaur (2014:49) believes that setting specific standards, clear guidelines and procedures in the format of policies initiates a framework for dealing with violations of such standards. Actions that rely on poorly defined procedures, general standards and organisations with improper documentation, lead to subjective violations and misinterpretation, resulting in dissatisfaction and resignation of employees.

2.3.3 Workload

As per Raza *et al.* (2017:702), workload is the amount of work that an employee has to complete within a set period of time. Today's heavy workloads lead to increased stress levels in the workplace. They went on and noted that workload is related to other types of negative results, including fatigue, gastrointestinal problems, headache and anxiety. Contrary to the above (Schiff & Leip, 2018:4) argue that the successful achievement of task expectations needs an environment where the relationship between subordinates and their supervisors is sound, quality of supervision is good and trust levels are high.

Research conducted by Schiff and Leip (2018:4) has revealed that equity, fairness and consistency in employee relations added to confidence in the processes of decision-making and largely trust in the decision-maker also. They went on to suggest that job aspects such as role conflict, job knowledge, job identity and job variety have a tendency of having a large-scale influence on the work environment.

2.3.4 Processes

As described by Mostafa *et al.* (2015:434), the maintenance process is aimed at serving the production facilities to ensure high productivity, and that this process comprises planned and unplanned activities executed to keep physical assets to the acceptable operational state. They went on to suggest that the focus of this process is to increase the value of safety, reliability, quality and availability of equipment, building or production plant in economic costs.

Poor reliability in maintenance activities can lead to minor issue such as delayed production, or to severe consequences such as loss of lives (Antonovsky *et al.*, 2014:3). They went on to suggest that significant accidents are frequently attributed to collapse in maintenance processes, and that attempts to enhance maintenance processes for operational reliability are normally aimed at technical aspects.

Antonovsky *et al.* (2014:3) maintains that the role of human factors in technical failures is increasingly noted by both organisational and technical specialists; these human factors include deficient learning mechanisms, poor maintenance procedures and inexperience.

Problem-solving in maintenance is dependent on correctly establishing the source of a fault, making a decision on the most efficient way of correction, and the effective application of the solution (Antonovsky *et al.*, 2014:20). They went on and noted that these cognitive processes are needed for effective corrective maintenance and failure of any of these results in an unresolved fault.

The results of the study conducted by Antonovsky *et al.* (2014:22) indicate that, at the organisational level, management policy and procedure may influence or even specify problem-solving processes; this might advance or hinder these processes. The methodical problem-solving practice, similar to safety behaviour, can be consciously established among workers.

2.3.5 Skills

People skills are the effective ability to handle interactions or interact with people ranging from motivating, caring up to communicating with them (Borghans *et al.*, 2014:1). They went on to suggest that the diffusion of innovative work practices and information and communication technologies caused acceleration, and thereafter a deceleration in the demand for people.

From history, technical skills, also termed hard skills, were the only skills needed for career employment; however, today's workplace indicates that technical skills are not sufficient to sustain employment for individuals in cases where companies are cutting and right-sizing positions (Robles, 2012:453).

Robles (2012:453) notes that current and future leaders are enforcing soft skills development; this is because soft skills are a crucial productive performance in the current workplace. Furthermore, while technical skills form part of numerous excellent educational curricula, soft skills require further attention in the university curricula for early learning by students about the importance of soft skills, before embarking on a business career.

In the definition of hard skills, (Robles, 2012:456) states that it is the ability coming from an individual's aptitude, practice and knowledge to have competent excellence in performance, to do something well, and a trade, craft or work that necessitates manual dexterity or special training for individual competence and experience. Hard skills are achievements such as knowledge, work experience, a level of expertise and education; examples are reading, writing, use of software programs and typing.

Soft skills are defined as desirable qualities suitable for certain forms of employment independent from acquired knowledge. These include positive flexible attitude, being able to deal with people and common sense (Robles, 2012:456). Soft skills are behaviours, attitudes and character traits; they are nontechnical, intangible and personality-specific skills.

According to Deming (2017:33), skilled workers are better at synthesising and analysing information, and better at communication, and therefore people skills and problem-solving ability are regarded as possible complements to computerisation, especially of the work.

2.3.6 Knowledge

As per Tong *et al.* (2015:22), knowledge is an understanding based on belief and experience that encompasses explicit and implicit restrictions embedded upon operations, relationships

and objects, along with specific or general heuristics with inferred procedures engaged in the condition being modelled.

According to the study conducted by (Dong *et al.*, 2017:441), ideas, on the one hand, are ultimately provided by individuals, and therefore it is helpful for leaders to develop peoples skills and knowledge needed for creativity. On the other hand, research related to the above has revealed that team creativity is more than individual parts added together, and needs the exchange of knowledge between team members.

An open communication framework for knowledge sharing among various organisational members may affect the extent to which domain skills encourage individual creativity, and therefore team knowledge sharing, as it indicates open communication in groups, may possess a cross-level influence on the relationship between creativity and individual skill development (Dong *et al.*, 2017:444).

Dong *et al.* (2017:444) are of the opinion that when sharing knowledge, members of the teams get exposed to multiple alternatives and a number of different viewpoints, which may inspire members of the teams. They went on to suggest that individuals' knowledge pool may be extended and their different thinking may be triggered and enhanced, and this indicates that sharing affords team members valuable information, and knowledge shared in the discussions can be an inspiration for the development of new strategies and insights for solving problems.

Tong *et al.* (2015:20) define knowledge sharing as activities concerned with transferring or disseminating knowledge among organisations, groups or individuals, where individuals exchange their explicit and tacit knowledge and form new knowledge. They went on to suggest that the success of knowledge-driven work depends on creating new knowledge and sharing of useful existing knowledge via the interaction of explicit and tacit knowledge.

2.4 Factors of human performance

2.4.1 Employee wellbeing

The wellbeing of individual employees in the workplace is more than just a view that they are not ill; the affective wellbeing is measured by the employee's sense of professional functioning, as well as feeling psychologically and physically healthy and happy (Zheng *et al.*, 2016:503). They further mention that stronger desires for professional perfection and personal development often derive distresses and the growth needs that are not met damage a happy and healthy state of mind among individuals.

2.4.2 Feedback

Feedback is a containment of information accessible to employees in their employment environment indicating how correct their behaviour is for the achievement of various goals. Employees seek all information, including peer information; such information provides a focused employee with information about their performance and how to perform effectively (Gong *et al.*, 2017:1235). They went on to suggest that because peer performance information is a valuable resource for assisting the focal employee to achieve their goals, such information may be regarded as a form of feedback, especially when sought by such an employee.

2.4.3 Employee engagement

A study conducted by Bedarkar and Pandita (2014:108) has revealed that employee engagement is the state in which individuals are intellectually and emotionally committed to a group or the organisation, as measured primarily by three behaviours, which are as follows:

- Employees speaking positively to others, inside and out, about their organisation.
- Employees displaying an intense desire to be members of the organisation.
- Employees who engage in and exert additional effort in behaviour for the contribution to the success of the business.

When defining employee engagement, (Bedarkar & Pandita, 2014:108) note that it is the ability of a leader to capture the hearts, souls and heads of their employees instilling passion for excellence and an intrinsic desire. As a result, engaged employees strive for the success of their organisation as they feel spiritually, socially and emotionally connected to its vision, mission and purpose.

According to Anitha (2014:308), employee engagement is the level of involvement and commitment an employee possesses with regard to their organisation and its values, maintaining that engaged employees are aware of their responsibilities and motivate their colleagues for the success of the business goals.

In addition, Anitha (2014:308) states that engaged employees go beyond their call of duty for an excellent performance of their roles, and also that, in engagement, people express and employ themselves cognitively, emotionally and physically during the performance of their roles. On the other hand, Bedarkar and Pandita (2014:107) explain employee engagement

as being pivotal to the performance of the business, where engaged employees serve as the backbone of a work environment that is good, and employees are industrious, accountable and ethical in their conduct.

Engaged employees, as explained by (Popli & Rizvi, 2016:967), display numerous behaviours of potential organisational benefit, including proactive problem-solving, knowledge sharing, speaking highly about the organisation, staying late to complete tasks, going the extra mile, assisting colleagues, putting in extra hours, participation in organisational dialogue, collaboration, offering creativity, profitability, performance, enhanced safety, productivity, satisfaction and customer loyalty. Mone and London (2018:4), on the contrary, state that an engaged employee is a person who feels passionate, involved, empowered and committed, demonstrating such feelings in his or her work behaviour.

Organisations know how important it is to motivate and engage its people to perform; this phenomenon has gained prominence over the years, but a common issue that organisations have recognised less is that employees seek engagement in the work so that they feel that they are positively contributing in a way larger than themselves (Bedarkar & Pandita, 2014:107)

In continuation, Bedarkar and Pandita (2014:107) note that one of organisations' business leaders, CEO's and HR practitioners' toughest challenges is ensuring that when employees check in daily, they do so emotionally and mentally, as much as they do physically, it means that these leaders need to ensure that truthfully their employees are engaged.

Bedarkar and Pandita (2014:107) argue that employee engagement is a critical business driver nowadays, as it practically affects an employee's productivity, morale and reason for their retention in the organisation. Their view is that engaged employees are used as tools of strategic competence by their organisations, adding that highly engaged employees consistently set new standards and outperform in their duties.

The model and measure of engagement, as stated by (Mone & London, 2018:4), contain six facets presenting their associated attitudes and behaviours in totality, and include the following aspects:

- Empowerment – being provided with the necessary resources to effectively perform one's duties, and occupying a well-structured job.

- Commitment – long-term career commitment to an organisation, and working consistently with a high level of energy and focus.

- Meaningfulness – understanding one's contribution to organisational success, and finding meaningfulness in one's work.

- Manager support – manager giving recognition on jobs well done and work-related training, such that you feel valued for your contribution.

- Involvement – energised for one's best performance and being engaged.

- Loyalty – having pride for being under the employment of one's organisation as well as having the intention to remain with one's company for long.

2.4.4 Leadership

Leadership, as noted by Iqbal *et al.* (2015:2), is a process with which executives influence, guide and direct the work and behaviour of people towards accomplishing specific goals in a said situation, and it is also a manager's ability to induce the employees to work with both zeal and confidence. They define leadership as one's capacity to influence a group attainment of the goal.

2.4.5 Work-life balance

Work-life balance initiatives allude to a number of modifications in systems of work for acquiring a healthy balance between the personal life and work life of employees; this balance affords employees a method of accommodating requirements of both personal and work activities important for their social and personal well-being (Parakandi & Behery, 2016:1371).

In their argument, Parakandi and Behery (2016:1371) state that, across the globe, all work-life balance initiatives are aimed primarily at assisting employees to achieve a self-defined, self-determined state of well-being that allows them to set goals and objectives for effective management of multiple tasks at home, within the community and in the workplace, in a responsible manner.

Consistent with the recent theories, Haar *et al.* (2014:362) conceptualise work-life balance as an individual's perceptions of the balance of his or her roles; this conceptualisation of subjectively gauging balance by individuals between their lives and their work is in contrast with the views that are prevailing, considering balance as being equivalent to high role enrichment, to low role conflict, or to an equal division of attention and time among a number of roles composing an individual's life system.

Work-life balance has become an issue of importance in the workplace as it exhibits positive results such as work engagement, increased company productivity, organisational commitment, job satisfaction, organisational citizenship behaviour, low turnover and in-role performance (Kim, 2014a:38). He emphasises that the management of work-life balance has tended to be one of the most critical strategies of management for ensuring organisational and employees' performance improvement.

Boundary theory states that individuals create and manage psychological, temporal and physical boundaries, between private and work life domains and associated roles, such as being a parent or an employee, to achieve work-life balance (Michel *et al.*, 2014:735).

Boundaries are made along a continuum, from integration to segmentation, such that integration promotes private and work-life interaction, whereas segmentation separates the domains (Michel *et al.*, 2014:735). In addition, they state that the more individuals integrate the domains, the more permeable the domain boundaries are, such that physically individuals may be present in a domain, but behaviourally and psychologically engaged in their roles in another domain; this has a tendency of allowing easy transition between domains, and it increases chances of undesired cross-domain elements that will interfere with the present role demands.

Another view is of Thriveni and Rama (2018:226), who state that, in today's life, women are seen working in most types of professions, almost all, where they demonstrate no gender difference in the work space; instead, many organisations mention that women play a major role in the upliftment of the organisation, and that women make their presence felt in different walks of life, which is a positive development. They also note that for every woman, on the other hand, one more background to manage exists, being personal and home life.

With the increasing demand at workplaces lately, (Thriveni & Rama, 2018:226) argue that the interface between personal and work life assumed significance and more attention is demanded. Argue that job demands such as emotional demands, work pressure and workload, are linked with negative results such as absenteeism.

According to van Woerkom *et al.* (2016:5), job demands may be of a quantitative form, for example workload refers to the amount of work that needs to be completed in a given time. Others may be of a qualitative form, for example emotional demands refer to emotionally challenging circumstances, events or situations at work. The prevalence of specific kinds of job demands is dependent on the occupational context.

2.4.6 Culture

Culture is an organisation's foundation for defining the behaviour of employees (Owoyemi & Ekwoaba, 2014:169). They went on to argue that culture influences employees' motivation and patterns of behaviour on a great scale in an organisation that involves rooted shared values, assumptions and beliefs

As per the culture theory, according (Hahn *et al.*, 2015:169), the reality of culture is constructed through individuals' social interactions within society; the organisation theory application in relation to social culture theory resulted in the organisational culture concept, which is difficult to measure, but plays an important role in the success of a business.

Hahn *et al.* (2015:169) further maintain that the culture of an organisation is composed of behaviours, symbols, assumptions and widely shared values, and dictates the way in which tasks are performed in the organisation.

Employee work culture largely determines the organisational development, and concludes the organisation's effectiveness (Dhakal, 2016:43). He further notes that culture is the arrangement of a number of different attributes expressing and differentiating an organisation from others.

Dhakal (2016:43) further provides an indication of a correlation between employee work culture and organisational performance, and defines culture as the thinking of minds collectively creating the difference between a member of a group from the other.

Workplace culture encompasses the psychological empowerment of employees, puts their focus on few activities that are key, and measures which ones are linking to individual and organisational objectives (Cravens *et al.*, 2015:7).

The study conducted by Cravens *et al.* (2015:7) has revealed that workplace culture is even more critical, as employees possess limited means for the demonstration of their achievements. This view is argued by Owoyemi and Ekwoaba (2014:169) who state that organisational culture serves as a key that gives an organisation a shared sense of meaning, which develops over time as beliefs, values and actions serving as a guide to the behaviour of employees.

Noting Cravens *et al.* (2015:3), workplace culture takes into consideration the employee's perception with regard to the organisation's transparency about what it is that employees should do to achieve goals, and that the freedom to do so is provided.

Given the intense competition related to today's business, individual employees' creativity is a factor essential for the enhancement of the organisation's performance and competitiveness, and therefore structures that enhance creativity and organisational cultures are of paramount importance (Hahn *et al.*, 2015:167).

The performance of employees assists in the achievement of organisational goals, and its measurement should be in relation to the organisational culture that has an influence on employees' decisions and behaviour (Owoyemi & Ekwoaba, 2014:170).

In their study, Owoyemi and Ekwoaba (2014:170) note that the strong organisational culture builds more confidence for employee commitment; these are tools to motivate and control employees, and consequently the enhancement of their performance.

Organisational culture brings about higher morale, higher commitment, effective performance and productivity (Owoyemi & Ekwoaba, 2014:170). It also empowers employees with job satisfaction and a sense of ownership that, in turn, gives them commitment, good performance and the removal of conflicts.

Owoyemi and Ekwoaba (2014:170) went on to suggest that organisational culture is associated with participation and trust through team work that assists in the encouragement of employees for compliance to the norms and traditions of the organisation.

Strong organisational culture, warns Owoyemi and Ekwoaba (2014:175), is ambiguous; as positive as it is, it may lead to mind closure, as well as reduction and restriction of autonomy; when it is strong, it may serve similarly to a two-edged sword cutting both employees and management; its encouragement should be on the basis of either that it is an asset or a liability. If it could increase productivity and performance, it should be encouraged; otherwise it should not, for it will bear undesirable outcomes.

2.4.7 Reward and recognition

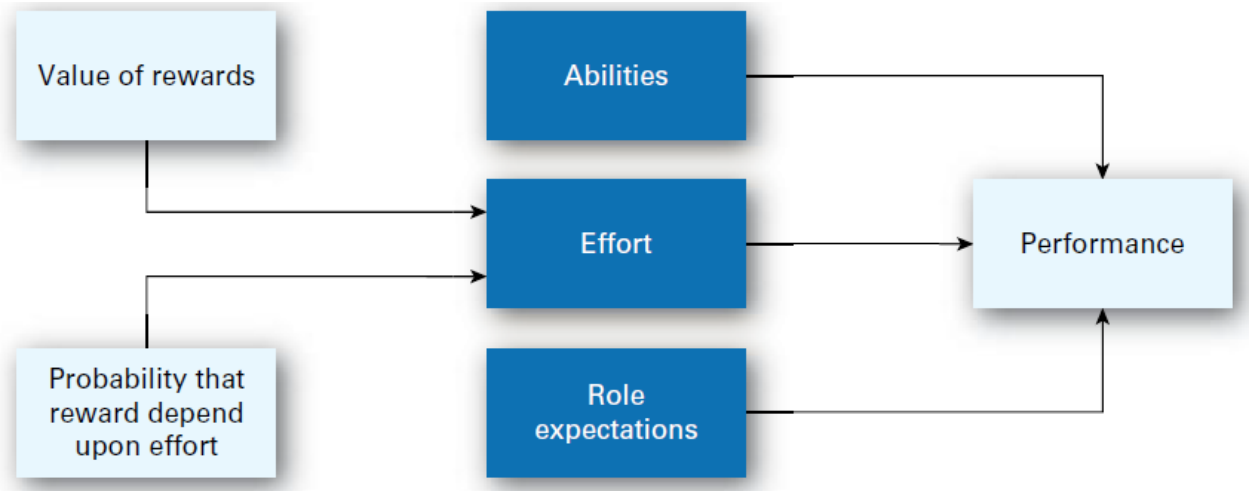

Figure 2-3: How reward policies influence performance through engagement

Source: Armstrong and Taylor (2014:200)

Appropriate reward processes and practices, be it in the form of non-financial, financial or in combination, can assist in improving and building employee engagement, a badly executed or designed rewards system can be a hindrance (Armstrong & Taylor, 2014:199).

Rewarding employees is the main constituent of human resource management. With reference to a number of motivation theories, including Lawler's Discrepancy Theory (1971), Adams's Equity Theory (1965) and Vroom's Expectancy Theory (1964), a demonstration is evident that rewards, and the satisfaction that accompanies them, are a stimulation of desirable employee attitudes and behaviours and depress undesired ones (De Gieter & Hofmans, 2015:200).

In addition, De Gieter and Hofmans (2015:201) describe reward management as being the process of designing and applying strategies for rewarding employees fairly with the aim of motivating, attracting and retaining employees known to be of assistance in facilitating the achievement of organisational goals.

According to Zeb *et al.* (2014:279), recognition is the sensation awarded to an individual for being an organisation's valued person; it is non-monetary and monetary rewards communicated in workplaces or offered in public domains regarding the accomplishment or the success of an individual.

Zeb *et al.* (2014:279) went on to suggest that reward and recognition are different as per the following descriptions:

- Reward is an intangible or a tangible incentive awarded to employees for success or the accomplishment of a goal, and it comes in the form of flowers, monetary bonuses, gift certificates, and promotions.

- Recognition is described as the acknowledgement of an employee in public for his or her contribution to the organisation.

2.4.8 Motivation

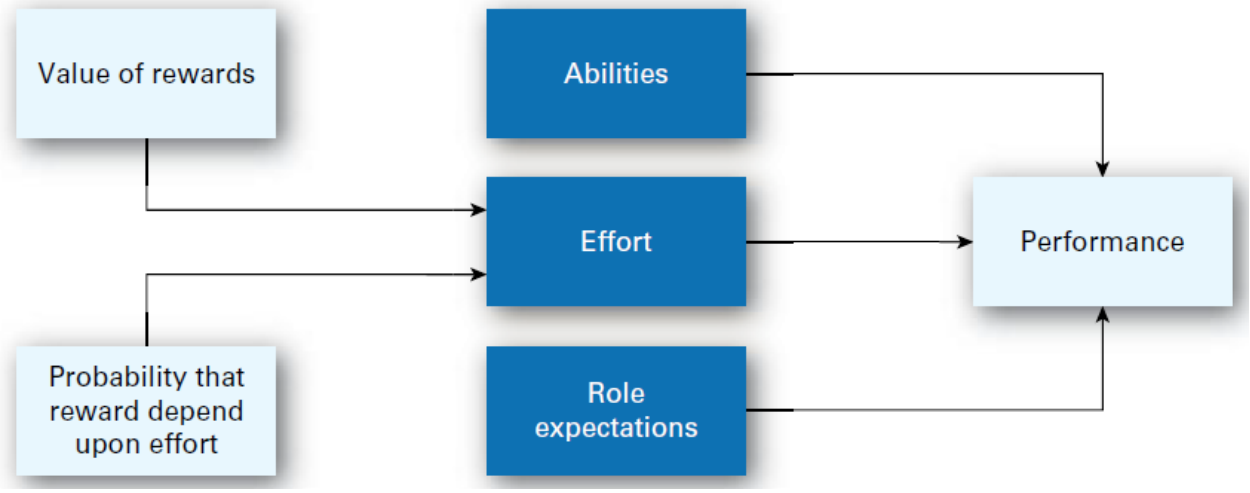

Figure 2-4: Motivation model (Porter and Lawler, 1968)

Source: Armstrong and Taylor (2014:175)

According to Armstrong and Taylor (2014:174), the effort that people apply to their work is determined by two factors, the first being how much the individual values the rewards in terms of the satisfaction of their needs for social esteem, security, self-actualisation and autonomy; the second being the individual perception of the probability that rewards are dependent on effort; meaning the individuals' expectations with regard to the relationships between reward and effort. Consequently, the bigger the value of the rewards and the higher the probabilities of obtaining each of the rewards are dependent on the effort put in.

Motivation can be extrinsic and intrinsic, as described by (Kiruja & Mukuru, 2018:77), where extrinsic motivation is concerned with the behaviour that is guided by acquiring external rewards, for instance positive feedback, money, praise as well as the absence of punishment, while intrinsic motivation is the motivation to execute a certain activity for the pleasure of accomplishing that specific activity, the factors thereof being growth, recognition, achievement and interesting work.

Employers should afford employees time to socialise as this serves as motivation for most employees. Company social get-togethers and picnics may be of assistance where most employees are motivated fundamentally by social needs (Omolo, 2015:100).

Motivation is significant to any successful organisation in sustaining the continuity of the work in a vigorous manner and to assist organisations to survive (Omolo, 2015:88). She further went on and explained that motivating employees guides in broadening their expertise to meet the demands of the organisation, and therefore managers should engage their staff, and identify their individual needs and align them with the organisation's needs.

According to Kiruja and Mukuru (2018:73), the comprehensive success of any institute in the achievement of its strategic objectives is totally reliant on the level of its employees' performance. This employee performance plays a role of motivation and ability, where ability comprises training, skills and resources needed for task performance, and motivation is expressed as an inner strength that propels an individual to perform towards something.

Kiruja and Mukuru (2018:73) further went on to state that employee performance culminates in a motivated work force with an urge for elevated quality, drive, commitment, quantity and productivity.

Human resources are the utmost important asset amid other resources, and private and public organisations need efficient and effective human resources because this is the resource that develops, operates and generates other resources of the organisation; however, the human resource needs proper motivation to perform efficiently and effectively (Zeb *et al.*, 2014:279).

Zeb *et al.* (2014:279) further described motivation as the eagerness to accomplish specific unmet needs, the willingness to apply more effort for a task, an activity or a job; and that motivation steers to job satisfaction that ultimately leads to better performance, the ultimatum for every organisation is therefore ensuring that their employees are distinctly motivated, and that the motivation level of employees is coupled with a credible system of rewards and recognition.

2.4.9 Role clarity

Role clarity is the understanding of one's job, responsibilities and expectations. For the effective regulation of behaviour, an accurate and clear understanding of employees' roles must be in existence; lack of clarity may lead to fruitless efforts and unfulfilled role expectations (Gong *et al.*, 2017:1249).

Gong *et al.* (2017:1249) went on to argue that due to role expectations being individual employee specific, self-focused and no other-focused feedback is expected, and should be directly relevant to the role clarity of the focal employee.

In their statement, Gong *et al.* (2017:1249) maintain that employees clarify their roles when they interact with their colleagues and supervisors, when they fulfil their expected roles, and when they obtain feedback. The effects of feedback on role clarity are positive; however, the effects thereof differ substantially from positive to negative.

2.5 Maintenance

Rizvi *et al.* (2018:24) define maintenance as the pattern and a repeated process of keeping a specific machine or its quality in its standard operational state for the delivery of its anticipated service or performance without creating any waste of time in case of breakdown or accidental damage.

Another definition of maintenance provided by (Rizvi *et al.*, 2018:24) is the servicing and care by staff with the aim of maintaining facilities and equipment in an allowable operational state by allowing for systematic detection, inspection and correction of initial failures before they happen or expand into major defects.

Mostafa *et al.* (2015:434) are of the view that maintenance has turned a significant subscriber towards the achievement of strategic objectives of organisations in the present time competitive markets.

The study conducted by Reason and Hobbs (2017:2) has revealed that proportions of human performance challenges attached to activities related to maintenance exceeded by far activities related to other kinds of human performance; three out of four studies show that maintenance errors account for more than fifty percent of all the root causes of possible serious events.

Reason and Hobbs (2017:2) went on to suggest that maintenance errors are present in the principal causes of a number of major accidents in technologies at a wide range, resulting in continuing and large financial losses. Contrary to the above, Sheikhalishahi *et al.* (2016:232) argue that maintainability from the equipment and organisation design phase should be taken into account, as this will reduce maintenance probability of human error, fatigue and work injuries, workload and downtime, and will improve employee satisfaction and the workplace environment.

Fifty six percent of forced outages at coal-fired power stations happen in less than a week after maintenance or planned shutdowns; maintenance errors over and above endangering lives and assets, they also are extremely poor for the business; however, these errors continue to occur in remarkably similar manners (Reason & Hobbs, 2017:3).

In their argument, Reason and Hobbs (2017:3) state that away from being entirely predictable occurrences, maintenance misfortunes mostly fall into well-defined groups, shaped mostly by task and situation factors common to maintenance activities. The fact that these errors are not perpetrated by a few incompetent or careless individuals is evident from the manner that different employees in distinct kinds of maintenance organisations, often very good people in supreme organisations, continue making the same mistakes.

According to the study conducted by (Reason & Hobbs, 2017:3), one of the fundamental principles of error management states that the best people can potentially make the worst mistakes, and that there are certain work pressures and situations that direct people into the similar kinds of mistakes regardless of who is executing the task. These error tricks imply that the issue is primarily with error-inducing and error-provoking conditions as opposed to error-prone people.

The maintenance error challenge is manageable in the same manner that any other well-defined business risk is managed (Reason & Hobbs, 2017:4). They went on to suggest that because most maintenance errors happen are recurrent and recognisable, limited resources can be aimed at the achievement of the topmost remedial effect. It should, however, be emphasised that no one best method exists to contain and limit error

According to Shanmugam and Paul Robert (2015:479), governments impose detailed standards through regulatory processes including certification, licensing and setting of minimum performance levels for professionals and organisations. The regulatory framework is aimed at minimising the risk of mistakes in maintenance operations.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research study as per empirical research methods, methodology and designs. An introduction to the target population involved is made; and data collection and analysis procedures, as well as the instrumentation applied are discussed.

The designed questionnaires' details are discussed, including brief biographical information of participants. Ethical considerations concerned with this study are discussed in detail, as well as the challenges encountered during data collection.

3.2 Research methodology

According to Choy (2014:99), designing the study needs decision-making based on the type of samples to select the manner with which to measure relevant factors and the research techniques to be used, such as questionnaires or experiments. Quantitative methods allude to standardised questionnaires distributed to individuals who are identified through different forms of sampling, random sampling in particular.

The methodology applied in this study is quantitative in nature, rather than the qualitative approach that warrants the evaluation of study objectives. The nature of the data concerned with this study is directed toward the selection of the approach. To gather data for this research, cross-section design with the use of questionnaires was found to be the most appropriate.

3.3 Description of overall research design

The design of quantitative research is usually treated relative to procedures, measuring and sampling activities for causal inference. These activities are often described as though that they permit, for the production of a population phenomenon or a representation, whose correspondence can be estimated or tested (Zyphur & Pierides, 2017:7).

Quantitative research was described as a distinctive research approach that entails the collection of numerical data, regards the relationship between theory and research as deductive, prefers a natural science approach in general (and positivism in particular), and adopts an objectivist conception of social reality (Bryman *et al.*, 2014:31). This study will be a quantitative research as questionnaires and equipment will be used to collect numerical

data; all aspects of this will be designed before collecting the data and that what this study is looking for is known.

This study will also be cross-sectional in nature, in that different groups of employees with different variables of interest and who share some characteristics such as ethnicity, education, and service duration within the maintenance department at the power station, including socioeconomic status will be studied.

The research will be conducted as per this study for the maintenance department at the power station and questionnaires will be used to gather employees' perceptions at different levels of this department.

3.4 Structure of the research instrument – Questionnaire

The questionnaire is divided into four sections, viz. Biographical information, Section A: Management aspects, Section B: Employees aspects and section C: Processes and Procedures. These sections are discussed as follows:

3.4.1 Biographical information

This section consists of four questions related to the individual participants; these are age, years of service in the power station, participant's occupation and lastly the educational background. This information will assist in analysing data as per participants' characteristics.

3.4.2 Management aspects

This section consists of 19 questions related to the participants' perception with regard to management of the power station, in particular the maintenance department management. This information will uncover the role that management plays in the performance of maintenance employees.

3.4.3 Employees aspects

This section has 34 questions, and involves how individual employees perceive themselves relative to their work in the maintenance department at the power station. It includes their views on their own level of capabilities, skills and development as far as their roles within their department is concerned. This information will assist in identifying and administering the development programmes needed to enhance the performance of these employees in the maintenance department

3.4.4 Processes and procedures

This section consists of ten questions that have to do with processes and procedures. It provides the employees' perceptions with regard to the relevance and applicability of the current processes and procedures, and whether they are perceived to be acceptable or not. This will help with knowledge as to how the department's, as well as the power station's processes and procedures relate to the performance of the employees and how to improve on them where needed.

3.5 Population sampling

This study is focused on employees at different levels of employment positions, with different roles and responsibilities, different work-life backgrounds according to their years of employment service, and with different educational backgrounds in the maintenance department at Lethabo Power Station. This unit of analysis is most relevant given the fact that the participants are the individuals concerned with the day-to-day activities in the maintenance department, influencing the department and eventually the performance of the power station, and therefore data that will be gathered will be the most appropriate for this study.

Another unit of analysis could have been beneficial to this study, which is sampling from maintenance departments from other power stations; however, the results may not be a true reflection and would not be relied on, and as such, units of analysis' work conditions, cultures and practices differ from one power station to the other.

Out of a total number of all 271 maintenance department employees, 180 questionnaires were handed out of which 169 were returned; this was against the recommended target of 165 samples. Sampling was from different sections within maintenance department at various work levels.

3.6 Data collection

To collect data, questionnaires were used that have been designed following the different previous examples. Questionnaires were hand delivered to individual employees at various levels and sections within the maintenance department at a power station.

The completed questionnaires were collected after one week from the day they were distributed; however, some were still not filled in as yet and the researcher had to go back

twice or three times to the different participants at different maintenance department sections.

3.7 Data analysis

As per Martinez *et al.* (2017:3), exploratory data analysis is numerical, counting or graphical detective work; it is a philosophy of data analysis used by the researcher to examine data without preconceived ideas for discovering the message that the data is giving with regard to the phenomena being studied. This is in contrast with their definition of confirmatory data analysis that is concerned with estimation, confidence intervals and statistical hypothesis testing; it is quasi-judicial or judicial in character.

Large amounts of qualitative data can be transferred by graphs; even for small datasets, there are a number of relationships and patterns that are easier to recognise in graphical exhibits than any other data analysis method (Chambers, 2017:1). Contrary to the above, Peck *et al.* (2015:6) argue that one of the most functional ways to start an initial exploration of information is by utilising techniques that end in a graphical representation of the data and that this may quickly reveal the features of the variable being examined.

According to Riff *et al.* (2014:3), a quantitative content analysis research method is a systematic task of communication content to categories as per rules, and the analysis of relations involving the categories utilising statistical methods.

In this study, a program known as the Statistical Package for Social Sciences (SPSS) was utilised. Cronbach's alpha coefficients were calculated to measure the reliability of the questionnaire used. The minimum acceptable Cronbach's alpha value is 0.7 for reliability measures.

3.8 Research ethics

Wallace and Sheldon (2015:268) note that ethics in practice are related to the daily ethical issues emerging in undergoing research at an individual or local level, where the procedural elements regarding justice, merit and integrity, beneficence and respect emphasising truly informed consent, can mitigate the risk in the daily conduct of research if sincerely reflected on.

Contrary to the above, Zyphur and Pierides (2017:2) argue that using, evaluating and practising quantitative research need hard work, handling each quantitative research act on its own conditions and contextualising it relative to the ethical issues embodied in it.

Ethical concern for the research topic is merely insufficient in terms of institutional regulation compliance and avoidance of suffering by individual participants. It requires explicit positive engagement with the participant, and the overall subject of management research should obtain due ethical consideration (Greenwood, 2016:507).

A high consideration of ethics is a primary requirement as the research will involve employees in terms of engagements in the form of questionnaires. There needs to be a fair amount of consultation with all concerned, starting with permission requests from the Power Station Manager, departmental manager and line managers, as well as the employee participants involved, including permission to use any of documentation that may be necessary as part of this study.

All participants in this study will be involved voluntarily, and reserve the right to withdraw their participation any time they wish to. This information was shared with the participants prior to the commencement of questionnaire completion.

The anonymity of participants was explained in further reassuring the participants that the questionnaires are meant only for academic reasons and for the purpose of this study, added that no identification is required and there will be no victimisation of any sort on the side of the participants.

3.9 Validity and reliability of collected data

According to Heale and Twycross (2015:66), validity is the magnitude to which a concept is precisely measured in quantitative research, whereas reliability, also known as the accuracy of an instrument, refers to the extent to which a study instrument invariably releases the same outcomes when applied in the same conditions on repeated occasions. However, the study conducted by Noble and Smith (2015:34) has revealed that quantitative researchers apply statistical methods to construct the validity and the reliability of the research discoveries.

3.10 Challenges encountered

Some of the challenges encountered by the researcher included reluctance of employees to participate in the survey; this was from a point of view of employees being scared to fill in and put their signatures on any documents, mostly as per the instruction from labour movements; however, the researcher managed to explain the anonymity and confidentiality of the questionnaires.

Another challenge was participants who mentioned that they do not have time to fill in the questionnaires; the researcher provided them with a one-week long duration to complete the questionnaire.

A challenge that the researcher had was having to go back over and over to collect the questionnaires where some people were just not willing to participate, as well as getting hold of participants at times; however, the researcher persevered.

3.11 Summary

This chapter comprehensively discussed the research methodology processes and steps applied in data collection in line with the primary and secondary objectives of this study.

The tools, methods and criteria used in assisting the researcher to undergo proper and valid study analysis were discussed; these included description of the research design, structure of the research instrument, population characteristics, data collection and analysis, and challenges encountered.

The two crucial aspects to this study were also discussed, which are the research ethics, and the validity and reliability of collected data.

The next chapter, Chapter 4, will deal with the research results, where the completed questionnaires are statistically analysed, comprehended and discussed. This will then lead the researcher into Chapter 5, where findings, recommendations and conclusions will be drawn.

CHAPTER 4: RESEARCH RESULTS

4.1 Introduction

This chapter focuses on the discussions with regard to research results presentations. Data obtained from participants will also be analysed; this is done with the use of the statistical analysis services with the purpose of proper scientific analysis, as well as to overcome possible errors and have an enhanced realisation of findings, interpretations and discussions.

The variable is the primary factor for determining which statistical test is to be used, specifically referring to the type or scale of variables, being either quantitative or categorical, as well as the number of dependent and independent variables, of which both influence the form of the study question being posed (Mertler & Reinhart, 2016:13). They went on to suggest that two decision-making tools are provided to facilitate the identification process, such that the reader may choose the one most suitable.

4.2 Participants' biographical information

As discussed in Chapter 3, the designed questionnaires' details are discussed, including the brief biographical information of participants; ethical considerations concerned with this study are discussed in detail, as well as the challenges encountered during data collection.

The questionnaire, was used to operationalise the variable, it was structured into four sections as follows: Biographical information, management aspects, employee's aspects, and processes and procedures.

4.2.1 Age group

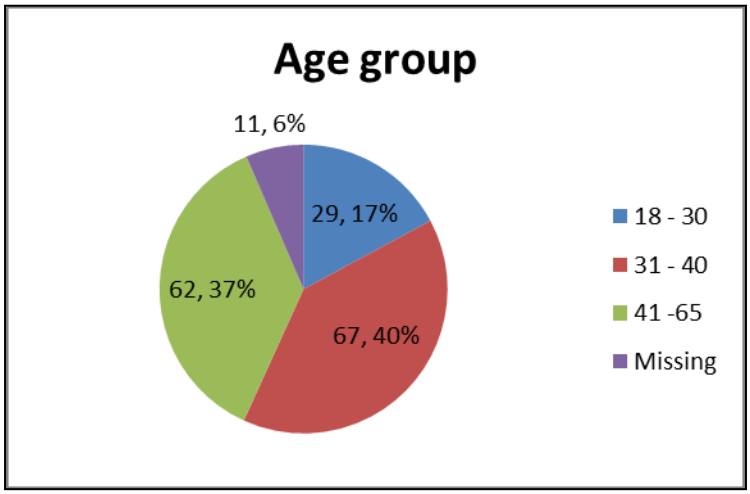

Figure 4-1: Age group

Source: Question 1.1 of biographical

According to Figure 4-1, 40% of the study population were aged 31 to 40 years, which indicates that just less than half of the maintenance department workforce is at middle age. The department needs to bring in more young employees to complement the staff. There were 67 participants who were 31 to 40 years old, 62 participants who were aged 41 to 65 years, 29 participants were aged 18 to 31 years, and 11 participants did not include their age.

4.2.2 Years of service

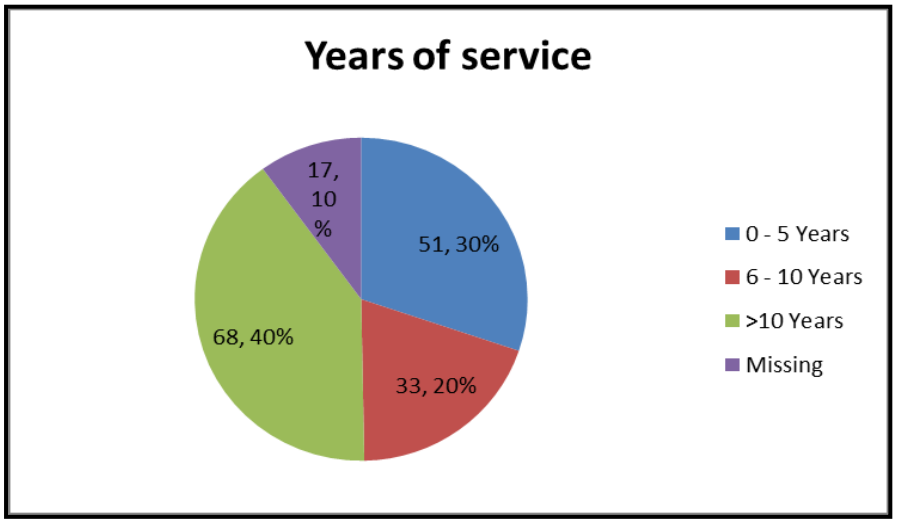

Figure 4-2: Years of service

Source: Question 1.2 of biographical information

According to Figure 4-2, 40% of participants, which is slightly below half, have more than 10 years of service with the power station, indicating a well-experienced workforce. There were 68 participants with a service longer than 10 years, 33 participants with a service of six to 10 years, 51 participants with a service of zero to five years, and 17 participants did not include their information.

4.2.3 Participants' occupation

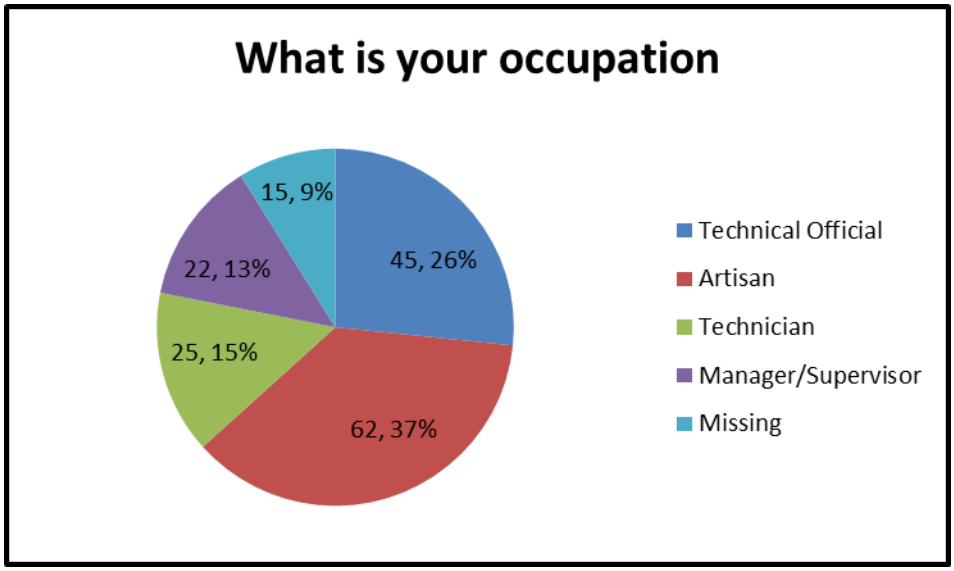

Figure 4-3: Occupation

Source: Question 1.3 of biographical information

As per Figure 4-3 above, the highest number of participants, at 37%, was artisans, which is a fairly low-skilled level for the power station. The occupations of participants who took part in this survey were as follows: 62 were artisans, 45 were technical officials, 25 were technicians, 22 were managers and supervisors, and 15 participants did not respond to this question.

4.2.4 Educational background

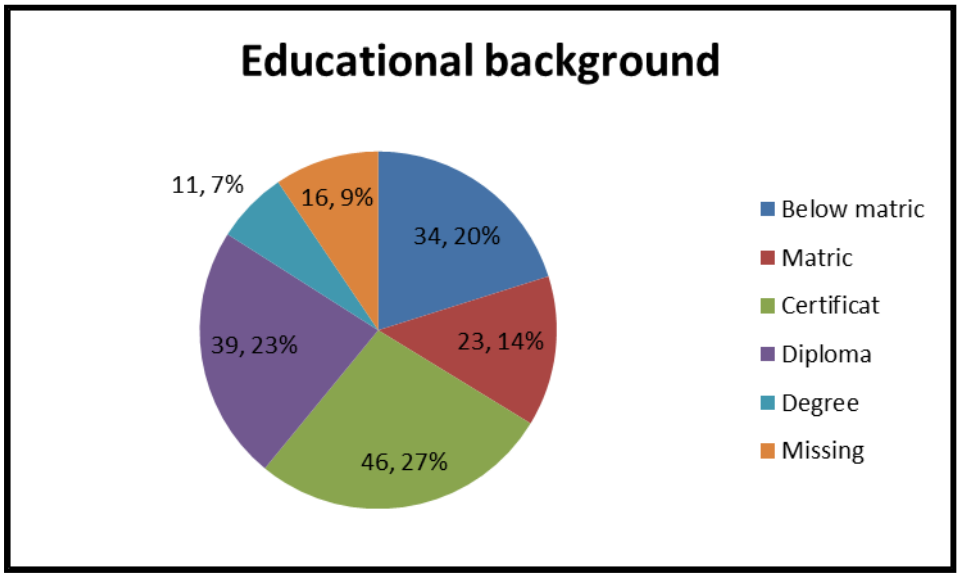

Figure 4-4: Educational background

Source: Question 1.4 of biographical information

According to Figure 4-4 above, almost half of the participants, at 46%, had certificates; there were 46 participants who had certificates, 39 participants had diplomas, 34 participants were below matric, 23 participants had matric, and 16 participants did not respond to this question. The high number of certificated participants indicates that there is a need for the maintenance department to enhance the education level of their employees.

SECTION A: ANALYSIS

Factor analysis

We run factor analysis in order to reduce the large number of variables describing a complex concept to a few interpretable latent variables called factors, where we gather fewer interpretable factors explaining maximum amount of variability in the data

4.3 Correlation matrix for section A (Management aspects)

The analysis of correlation between management aspects and employee's performance was conducted using the Kaiser-Meyer-Olkin (KMO) and Bartlett's test. The KMO measures the sampling adequacy, which determines whether the responses provided with the sample are adequate or not. The value of this measure of sampling varies from 0 to 1, where a value of 0.5 is minimum and is barely accepted; values between 0.7 to 0.8 are acceptable; and 0.9 and above are highly acceptable, indicating the strength of the correlation.

- Results obtained

Table 4-1: Correlation matrix for section A

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin measure of sampling adequacy.		0.925
Bartlett's test of sphericity	Approx. chi-square	1691.083
	df	171
	Sig.	0.000

Correlation matrix[a]
Determinant = 1.565E-5
Source: Section A of questionnaire from statistical analysis

- Analysis of results

Referring to Table 4-1 above, a pc analysis was done with Oblimin rotation and the KMO figure obtained was 0.93, which is above 0.9 and therefore highly acceptable. This result shows a strong correlation between management aspects and employee performance.

4.4 Scree plot analysis for section A (Management aspects)

A scree plot indicates the eigenvalues along the y-axis and the number of factors on the x-axis. At the point where the curve makes an elbow, shows the number of factors that should be applied by the analysis. A cut-off (elbow) of an eigenvalue greater or equals to 1 would give the number of factors to be drawn.

Analysis was conducted using scree plot, to determine the number of factors that can be drawn for reducing information for section A.

- Results obtained

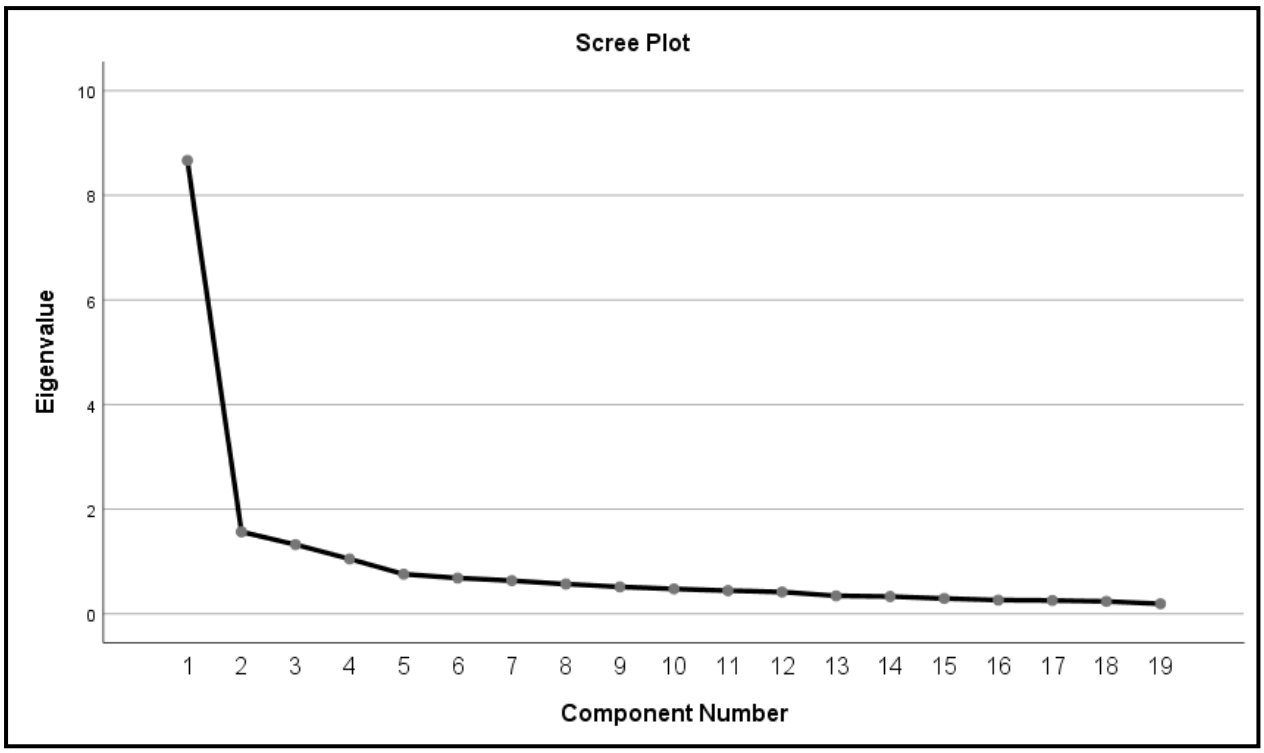

Figure 4-5: Scree plot of section A

Source: Section A of questionnaire from statistical analysis

- Analysis of results

From Figure 4-5 above, the scree plot indicates that one factor is sufficient to reduce the information on section A (Management aspects).

4.5 Reliability statistics for management aspects

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools for management aspects were reliable and acceptable or not.

- Results obtained

Table 4-2: Reliability statistics for management aspects

Cronbach's alpha	Cronbach's alpha based on standardised Items	N of items
0.93	0.929	19

Source: Section A of questionnaire from statistical analysis

- **Analysis of results**

Reliability and internal consistency rate from 0 to 1; the value obtained from Table 4-2 above for reliability of training is a Cronbach's alpha 0.93, which is close to 1, indicating that this factor can be highly relied on.

4.6 Management aspects analysis

This section uses four-point Likert scale to assess the perceived importance.

The participant's responding to management aspects on Section A of the questionnaire are rated from 1, being strongly disagree, 2 being disagree, 3 being agree, and 4 being strongly disagree. This section measured 19 items.

- **Results obtained**

Table 4-3: Management aspects analysis using four Likert scale

No.	Variables	Strongly disagree	Disagree	Agree	Strongly agree
1.1	My immediate supervisor is supportive of my skills development	7.9%	20.6%	54.5%	17.0%
1.2	Management provides training platforms for employees to enhance their skills	10.8%	22.9%	49.4%	16.9%
1.3	Management is well equipped with knowledge to deal with situational leadership	8.5%	37.8%	41.5%	12.2%
1.4	Management is aware of the causes of the poor performance by maintenance employees	10.3%	33.3%	40.6%	15.8%
1.5	Management supports personal development	10.2%	34.3%	42.8%	12.7%
1.6	Sufficient funding is made available for employees to undergo training	9.7%	40.0%	37.0%	13.3%
1.7	Does management provide development feedback on regular basis?	12.0%	45.2%	30.7%	12.0%
1.8	Does management provide individual support where needed?	8.4%	39.5%	47.9%	4.2%
1.9	Management takes note of employees' personal needs	9.6%	45.2%	38.0%	7.2%
1.10	Management gives compliments on goals well achieved	13.2%	35.3%	42.5%	9.0%
1.11	Management promotes a culture of continuous learning	9.6%	37.3%	42.8%	10.2%
1.12	Employees are motivated by my management to improve their skills	13.9%	39.2%	38.6%	8.4%
1.13	Management displays good leadership in managing poor performance by the employees	14.5%	37.3%	41.6%	6.6%
1.14	The leadership norms of this	9.6%	43.1%	40.7%	6.6%

No.	Variables	Strongly disagree	Disagree	Agree	Strongly agree
	organisation help employees to grow.				
1.15	My supervisor discusses employees' development with individuals	10.2%	37.7%	40.1%	12.0%
1.16	Management sets clear development goals	13.5%	35.6%	42.3%	8.6%
1.17	Maintenance employees are aware of poor performance	7.2%	28.3%	49.4%	15.1%
1.18	My work environment is conducive for asking for help	5.4%	24.0%	59.9%	10.8%
1.19	My supervisor encourages me to enhance my performance	5.5%	23.6%	55.2%	15.8%

Source: Section A questionnaire (2018)

- **Analysis of results**

According to Table 4-3 above, participants selected variables with percentage above fifty percent agree with management aspects on the following variables, my work environment is conducive for asking for help, my supervisor encourages me to enhance my performance and my immediate supervisor is supportive of my skills development with percentage values of 59.9%, 55.2% and 54.5% respectively.

4.6.1 Descriptive Statistics on Management aspects analysis

The descriptive statistics was utilized as a method to analyse the mean and standard deviation for management aspects variables, where it is inappropriate to use raw data.

- **Results obtained**

Table 4-4: Management aspects using mean and standard deviation analysis

No.	Variables	Mean	Standard deviation
1.1	My immediate supervisor is supportive of my skills development	2.81	0.811
1.2	Management provides training platforms for employees to enhance their skills	2.72	0.871
1.3	Management is well equipped with knowledge to deal with situational leadership	2.57	0.814
1.4	Management is aware of the causes of the poor performance by maintenance employees	2.62	0.873
1.5	Management supports personal development	2.58	0.840
1.6	Sufficient funding is made available for employees to undergo training	2.66	1.734
1.7	Does management provide development feedback on regular basis?	2.43	0.855

No.	Variables	Mean	Standard deviation
1.8	Does management provide individual support where needed?	2.48	0.710
1.9	Management takes note of employees' personal needs	2.43	0.765
1.10	Management gives compliments on goals well achieved	2.47	0.835
1.11	Management promotes a culture of continuous learning	2.54	0.806
1.12	Employees are motivated by my management to improve their skills	2.42	0.832
1.13	Management displays good leadership in managing poor performance by the employees	2.40	0.816
1.14	The leadership norms of this organisation help employees to grow.	2.44	0.757
1.15	My supervisor discusses employees' development with individuals	2.54	0.834
1.16	Management sets clear development goals	2.46	0.833
1.17	Maintenance employees are aware of poor performance	2.72	0.806
1.18	My work environment is conducive for asking for help	2.76	0.713
1.19	My supervisor encourages me to enhance my performance	2.81	0.762
	Total	2.57	0.856

- **Analysis of results**

The results from Table 4-4 above have given the following results:

- The average is 2.57, indicating that participants are fairly divided between agreeing and disagreeing with the listed management aspects. The average standard deviation is 0.86, and this value is between 0.8 and 0.9 and therefore it is highly reliable.

- The participants agreed most with these two variables: **my immediate supervisor is supportive of my skills development** and **my supervisor encourages me to enhance my performance,** with both mean values of 2.81, respectively, as their major preferred choice.

- The least agreed on items for participants were the following variables: **Employees are motivated by management to improve their skills** and **management displays good leadership in managing poor performance by the employees** with mean values of 2.42 and 2.40, respectively.

SECTION B: ANALYSIS

4.7 Employee aspects analysis

4.8 Reliability statistics for three employee aspects factors

4.8.1 Reliability statistics of employee aspects

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools for employee aspects were reliable and acceptable or not.

- **Results obtained**

Table 4-5: Cronbach's alpha coefficient for self-determination and self-confidence

Cronbach's alpha	Cronbach's alpha based on standardised items	N of items
0.928	0.929	20

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

Reliability and internal consistency rate from 0 to 1; the value obtained, from Table 4-5 above, for the reliability for self-determination and self-confidence is a Cronbach's alpha of 0.93, which is very close to 1, indicating that this factor can be highly relied on.

4.8.2 Reliability statistics of opportunities

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools for opportunities were reliable and acceptable or not.

- **Results obtained**

Table 4-6: Cronbach's alpha coefficients for opportunities

Cronbach's alpha	Cronbach's alpha based on standardised items	N of items
0.825	0.823	8

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

Reliability and internal consistency rate from 0 to 1; the value obtained, from Table4-6 above, for reliability of opportunities is a Cronbach's alpha of 0.83, which is close to 1, indicating that this factor can be relied on.

4.8.3 Reliability statistics of training

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools for training were reliable and acceptable or not.

- **Results obtained**

Table 4-7: Cronbach's alpha coefficients for training

Cronbach's alpha	Cronbach's alpha based on standardised items	N of items
0.819	0.818	6

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

Reliability and internal consistency rate from 0 to 1; the value obtained from Table 4-7 above for reliability on training is a Cronbach's alpha 0.82, which is close to 1, indicating that this factor can be relied on.

4.9 Correlation matrix for section B (Employee's aspects)

The analysis of correlation between management aspects and employee's performance was conducted using the Kaiser-Meyer-Olkin (KMO) and Bartlett's test. The KMO measures the sampling adequacy, which determines whether the responses provided with the sample are adequate or not. The value of this measure of sampling varies from 0 to 1, where a value of 0.5 is minimum and is barely accepted; values between 0.7 to 0.8 are acceptable; and 0.9 and above are highly acceptable, indicating the strength of the correlation.

- **Results obtained**

Table 4-8: Correlation matrix for section B

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		**0.880**
Bartlett's test of sphericity	Bartlett's test of sphericity	3139.749
	df	561
	Sig.	0.000

Determinant = 5.974E-10

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

Referring to table 4-8 above, a pc analysis was done with Oblimin rotation and the KMO figure obtained was 0.88, which is below 0.9 and therefore acceptable. This results show a strong correlation between employee's aspects and employee's performance.

4.10 Total variance explained statistical analysis for section B

This metric is the total amount of variability of the original variables explained by each factor solution, and indicates the amount of factors that can be extracted from a number of variables.

- **Results obtained**

Table 4-9: Total variance explained for section B

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	11.633	34.215	34.215	11.633	34.215	34.215	10.380
2	3.339	9.820	44.034	3.339	9.820	44.034	6.939
3	1.745	5.134	49.168	1.745	5.134	49.168	3.924
4	1.633	4.802	53.970				
5	1.386	4.076	58.046				
6	1.167	3.432	61.478				
7	1.115	3.280	64.758				
8	1.071	3.150	67.908				
9	0.904	2.660	70.568				
10	0.809	2.379	72.947				
11	0.772	2.270	75.217				
12	0.733	2.155	77.373				
13	0.682	2.007	79.379				
14	0.619	1.820	81.199				
15	0.602	1.770	82.969				
16	0.595	1.749	84.718				
17	0.527	1.551	86.269				
18	0.447	1.315	87.584				
19	0.419	1.231	88.815				
20	0.387	1.137	89.952				
21	0.379	1.114	91.066				
22	0.339	0.996	92.062				
23	0.333	0.980	93.042				
24	0.319	0.938	93.980				
25	0.284	0.835	94.815				
26	0.276	0.812	95.627				
27	0.260	0.765	96.391				
28	0.242	0.712	97.104				
29	0.202	0.593	97.697				
30	0.194	0.571	98.268				
31	0.181	0.532	98.801				

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
32	0.158	0.466	99.266				
33	0.130	0.383	99.650				
34	0.119	0.350	100.000				

Extraction method: Principal component analysis

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

From Table 4-9 above, three factors were extracted, which explain 49.2% of the total variance.

4.11 Scree plot for section B (Employee's aspects)

A scree Plot indicates the eigenvalues along the y-axis and the number of factors on the x-axis. At the point where the curve makes an elbow, shows the number of factors that should be applied by the analysis. A cut-off (elbow) of an eigenvalue greater or equals to 1 would give the number of factors to be drawn.

Analysis was conducted using Scree Plot to determine the number of factors that can be drawn for reducing information for section B.

- **Results obtained**

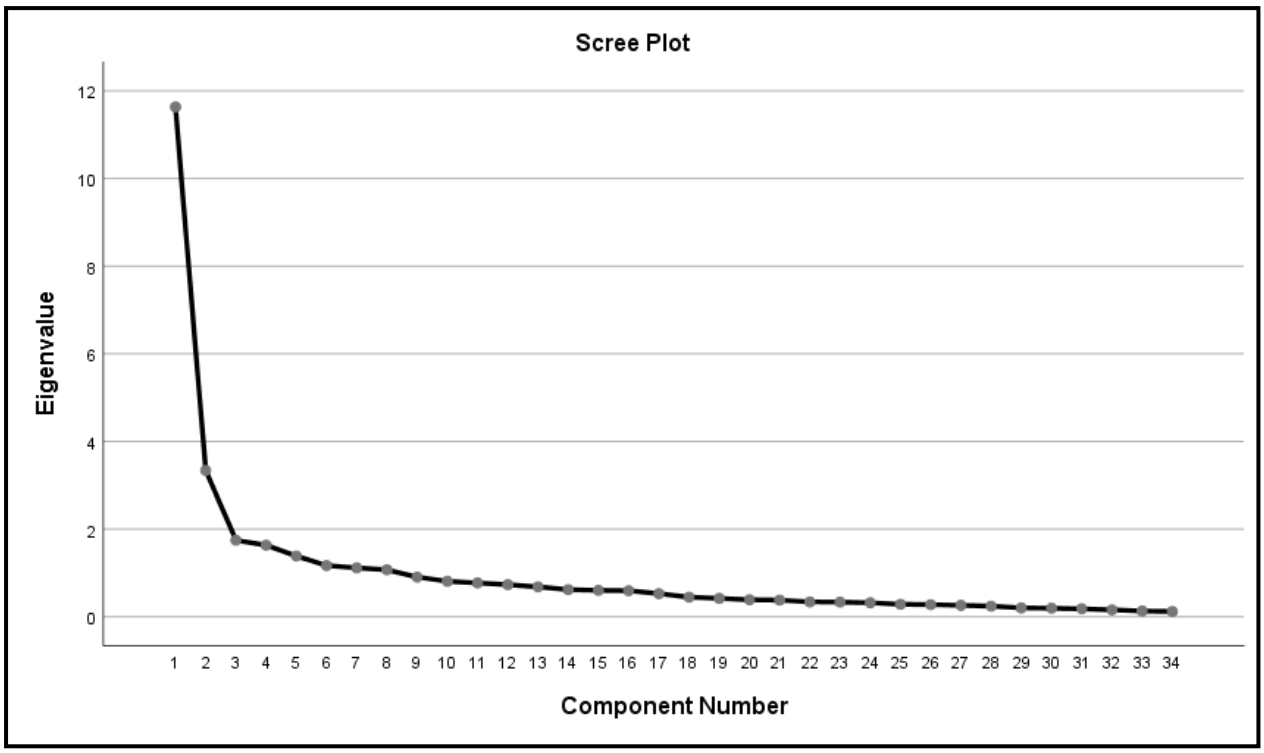

Figure 4-6: Scree plot of section B

Source: Section B of questionnaire from statistical analysis

- **Analysis of results**

From Figure 4-6 above, the scree plot indicates that approximately three factors are needed to reduce the information.

4.12 Pattern matrix for section B

Pattern matrix is the estimated coefficient of a particular rotation that interprets the correlation between factors that may have substantial association, and could be grouped together.

- **Results obtained**

Table 4-10: Pattern matrix for section B

		Component		
	Questions, key words as in the questionnaire	1	2	3
B1.52	I believe in my capabilities	0.828		0.432
B1.30	I believe I am talented	0.816		
B1.31	I can make the difference in the world I am living in	0.803		
B1.49	I believe I can change to be a better person	0.803		
B1.50	I set myself achievable goals	0.779		

		Component		
	Questions, key words as in the questionnaire	1	2	3
B1.53	I am clear about where I am going in life	0.762		0.399
B1.48	I am highly committed towards my development	0.748		
B1.29	I am not afraid of failure, I would rather try	0.718		
B1.51	I give my personal development a high priority	0.684		0.355
B1.47	I am keen to learn	0.682		
B1.40	I spend time thinking about my development	0.583		
B1.41	Skills enhancement is the responsibility of everyone	0.579		
B1.23	My personal performance can be enhanced	0.539		
B1.24	I am familiar with my current training needs	0.530		
B1.45	I am responsible for my own development	0.504		
B1.21	I am aware of the maintenance goals in the power station	0.446		
B1.28	I celebrate my achievements	0.391	0.354	
B1.42	I have the information that I need to do a good job.	0.351	0.304	
B1.20	Employees are aware of their shortcomings regarding their skills to perform their duties satisfactory	0.332		
B1.43	The opportunity for promotion exists in this organisation.		0.761	
B1.36	My job offers me the opportunity to grow as a person.		0.720	-0.301
B1.44	The structure of my work unit is well designed		0.719	
B1.46	My job offers me the opportunity to grow as a person.		0.701	
B1.26	I am aware of the maintenance goals in the power station		0.611	
B1.38	Training schedules are communicated well with the organisation		0.535	-0.358
B1.25	I am familiar with the training process that is followed at the power station		0.513	
B1.22	My job outputs are clear to me and are achievable	0.325	0.394	
B1.27	Training is offered by qualified presenters		0.376	
B1.34	The organisation has sufficient training facilities			-0.601
B1.35	Training courses modules are understandable and make sense			-0.582
B1.33	I am aware of the training modules available for my development	0.308		-0.549
B1.32	I am learning new skills everyday	0.433		-0.483
B1.37	I am familiar with my current training needs		0.309	-0.388
B1.39	Courses are presented in an understandable medium of instruction		0.331	-0.341

Source: Section B of questionnaire from statistical analysis

Column 1: Self-determination/self-confidence
Column 2: Opportunities
Column 3: Training

- **Analysis of results**

The results from Table 10 above indicate that variables with values ranging from 0.33 to 0.83 could be grouped together to a factor called self-determination and self-confidence; variables with values ranging from 0.38 to 0.76 excluding the value 0.39 could be grouped together to a factor called opportunities; and variables ranging from -0.34 to -0.60 could also be grouped together to a factor called training.

4.13 Employee aspects analysis

Section B, uses four-point Likert scale to assess the perceived importance.

The participant's on responding to employee aspects on Section A of the questionnaire is rated from 1 being strongly disagree, 2 being disagree, 3 being agree, and 4 being strongly disagree. This section measured 34 items.

- **Results obtained**

Table 4-11: Employees aspects analysis

		Strongly disagree	Disagree	Agree	Strongly agree
1.20	Employees are aware of their shortcomings regarding their skills to perform their duties satisfactory	4.2%	23.5%	65.1%	7.2%
1.21	I am aware of the maintenance goals in the power station	2.4%	16.1%	57.1%	24.4%
1.22	My job outputs are clear to me and are achievable	2.4%	15.4%	56.2%	26.0%
1.23	My personal performance can be enhanced	1.8%	7.2%	62.3%	28.7%
1.24	I am familiar with my current training needs	4.8%	12.5%	54.8%	28.0%
1.25	I am familiar with the training process that is followed at the power station	3.0%	25.6%	54.2%	17.3%
1.26	I am aware of the maintenance goals in the power station	5.4%	12.5%	63.1%	19.0%
1.27	Training is offered by qualified presenters	3.6%	16.3%	60.8%	19.3%
1.28	I celebrate my achievements	4.8%	15.5%	48.8%	31.0%
1.29	I am not afraid of failure, I would rather try	2.4%	6.5%	49.4%	41.7%
1.30	I believe I am talented	1.8%	6.0%	47.6%	44.6%
1.31	I can make the difference in the world that I am living in	1.8%	11.3%	42.9%	44.0%
1.32	I am learning new skills everyday	6.0%	18.6%	44.9%	30.5%
1.33	I am aware of the training modules available for my development	8.3%	30.8%	46.2%	14.8%
1.34	The organisation has sufficient	7.1%	33.9%	47.0%	11.9%

		Strongly disagree	Disagree	Agree	Strongly agree
	training facilities				
1.35	Training courses modules are understandable and make sense	4.1%	24.9%	59.2%	11.8%
1.36	My job offers me the opportunity to grow as a person.	7.7%	22.0%	53.0%	17.3%
1.37	I am familiar with my current training needs	4.9%	18.3%	59.1%	17.7%
1.38	Training schedules are communicated well with the organisation	7.2%	34.7%	47.3%	10.8%
1.39	Courses are presented in an understandable medium of instruction	2.4%	25.0%	58.3%	14.3%
1.40	I spend time thinking about my development	6.5%	17.3%	51.8%	24.4%
1.41	Skills enhancement is the responsibility of everyone	3.0%	16.7%	48.8%	31.5%
1.42	I have the information that I need to do a good job.	7.1%	15.5%	54.8%	22.6%
1.43	The opportunity for promotion exists in this organisation.	15.6%	34.1%	38.9%	11.4%
1.44	The structure of my work unit is well designed	6.0%	28.1%	53.3%	12.6%
1.45	I am responsible for my own development	2.4%	15.5%	48.8%	33.3%
1.46	My job offers me the opportunity to grow as a person.	7.2%	15.7%	56.0%	21.1%
1.47	I am keen to learn	0.6%	8.3%	45.2%	45.8%
1.48	I am highly committed towards my development	2.4%	6.6%	51.5%	39.5%
1.49	I believe I can change to be a better person	1.2%	3.6%	43.5%	51.8%
1.50	I set myself achievable goals	1.8%	5.4%	55.4%	37.3%
1.51	I give my personal development a high priority	1.8%	7.8%	52.4%	38.0%
1.52	I believe in my capabilities	1.8%	2.4%	45.2%	50.6%
1.53	I am clear about where I am going in life	3.0%	4.8%	40.6%	51.5%

Source: Section B questionnaire (2018)

- **Analysis of results**

According to table 4-11 above, participants selected variables with percentage above sixty percent agree with employee's aspects on the following variables, my Employees are aware of their shortcomings regarding their skills to perform their duties satisfactory, I am aware of the maintenance goals in the power station, My personal performance can be enhanced,

and Training is offered by qualified presenters, with the percentage values of 65.1%, 63.1%, 62.3% and 60.8% respectively.

4.13.1 Descriptive Statistics on employee's aspects analysis

The descriptive statistics was utilized as a method to analyse the mean and standard deviation for employee's aspects variables, where it is inappropriate to use raw data.

- **Results obtained**

Table 4-12: Employee's aspects analysis using mean and standard deviation

		Mean	Standard Deviation
1.20	Employees are aware of their shortcomings regarding their skills to perform their duties satisfactory	2.75	0.646
1.21	I am aware of the maintenance goals in the power station	3.04	0.708
1.22	My job outputs are clear to me and are achievable	3.06	0.713
1.23	My personal performance can be enhanced	3.18	0.633
1.24	I am familiar with my current training needs	3.06	0.772
1.25	I am familiar with the training process that is followed at the power station	2.86	0.728
1.26	I am aware of the maintenance goals in the power station	2.96	0.729
1.27	Training is offered by qualified presenters	2.96	0.708
1.28	I celebrate my achievements	3.06	0.809
1.29	I am not afraid of failure, I would rather try	3.30	0.699
1.30	I believe I am talented	3.35	0.677
1.31	I can make the difference in the world that I am living in	3.29	0.737
1.32	I am learning new skills everyday	3.00	0.857
1.33	I am aware of the training modules available for my development	2.67	0.828
1.34	The organisation has sufficient training facilities	2.64	0.785

		Mean	Standard Deviation
1.35	Training courses modules are understandable and make sense	2.79	0.700
1.36	My job offers me the opportunity to grow as a person.	2.80	0.816
1.37	I am familiar with my current training needs	2.90	0.740
1.38	Training schedules are communicated well with the organisation	2.62	0.774
1.39	Courses are presented in an understandable medium of instruction	2.85	0.683
1.40	I spend time thinking about my development	2.94	0.824
1.41	Skills enhancement is the responsibility of everyone	3.09	0.773
1.42	I have the information that I need to do a good job.	3.11	2.459
1.43	The opportunity for promotion exists in this organisation.	2.46	0.890
1.44	The structure of my work unit is well designed	2.72	0.758
1.45	I am responsible for my own development	3.13	0.755
1.46	My job offers me the opportunity to grow as a person.	2.91	0.808
1.47	I am keen to learn	3.36	0.660
1.48	I am highly committed towards my development	3.28	0.693
1.49	I believe I can change to be a better person	3.46	0.627
1.50	I set myself achievable goals	3.28	0.650
1.51	I give my personal development a high priority	3.27	0.680
1.52	I believe in my capabilities	3.45	0.637
1.53	I am clear about where I am going in life	3.41	0.723
	Total	3.03	0.784

Source: Section B questionnaire (2018)

- **Analysis of results**

Table 4-12 above has yielded the following results:

- Average is 3.03, indicating that most participants agree and some strongly agree with the listed employee aspects. The standard deviation is 0.78; this value is between 0.7 and 0.79, indicating reliable results.

- The majority of participants chose these three mean values, which are 3.41, 3.45 and 3.46 with variables stating **I am clear about where I am going in life**, **I believe in my capabilities**, and **I believe I can change to be a better person,** respectively, as their major preferred choices.

- The least popular choice for participants were the following mean values: 2.46, 2.62 and 2.64, with variables **stating the opportunity for promotion exists in this organisation**, **training schedules are communicated well with the organisation,** and **the organisation has sufficient training facilities, respectively.**

SECTION C: ANALYSIS

Processes and procedures of statistical analysis

4.14 Correlation matrix for section C

The analysis of correlation between management aspects and employee's performance was conducted using the Kaiser-Meyer-Olkin (KMO) and Bartlett's test. The KMO measures the sampling adequacy, which determines whether the responses provided with the sample are adequate or not. The value of this measure of sampling varies from 0 to 1, where a value of 0.5 is minimum and is barely accepted; values between 0.7 to 0.8 are acceptable; and 0.9 and above are highly acceptable, indicating the strength of the correlation.

- **Results obtained**

Table 4-13: Correlation matrix for section C

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy.		0.848
Bartlett's test of sphericity	Approx. chi-square	712.473
	df	45
	Sig.	0.000

a. Determinant = .011

Source: Section C of questionnaire from statistical analysis

- **Analysis of results**

Referring to Table 4-13 above, a pc analysis was done with Oblimin rotation and the KMO figure obtained was 0.85, which is just below 0.9 and therefore acceptable. This results show a strong correlation between processes and procedures and employee's performance

4.15 Scree plot statistical analysis for section C (Processes and procedures)

A scree Plot indicates the eigenvalues along the y-axis and the number of factors on the x-axis. At the point where the curve makes an elbow, shows the number of factors that should be applied by the analysis. A cut-off (elbow) of an eigenvalue greater or equals to 1 would give the number of factors to be drawn.

Analysis was conducted using Scree Plot to determine the number of factors that can be drawn for reducing information for section C.

- **Results obtained**

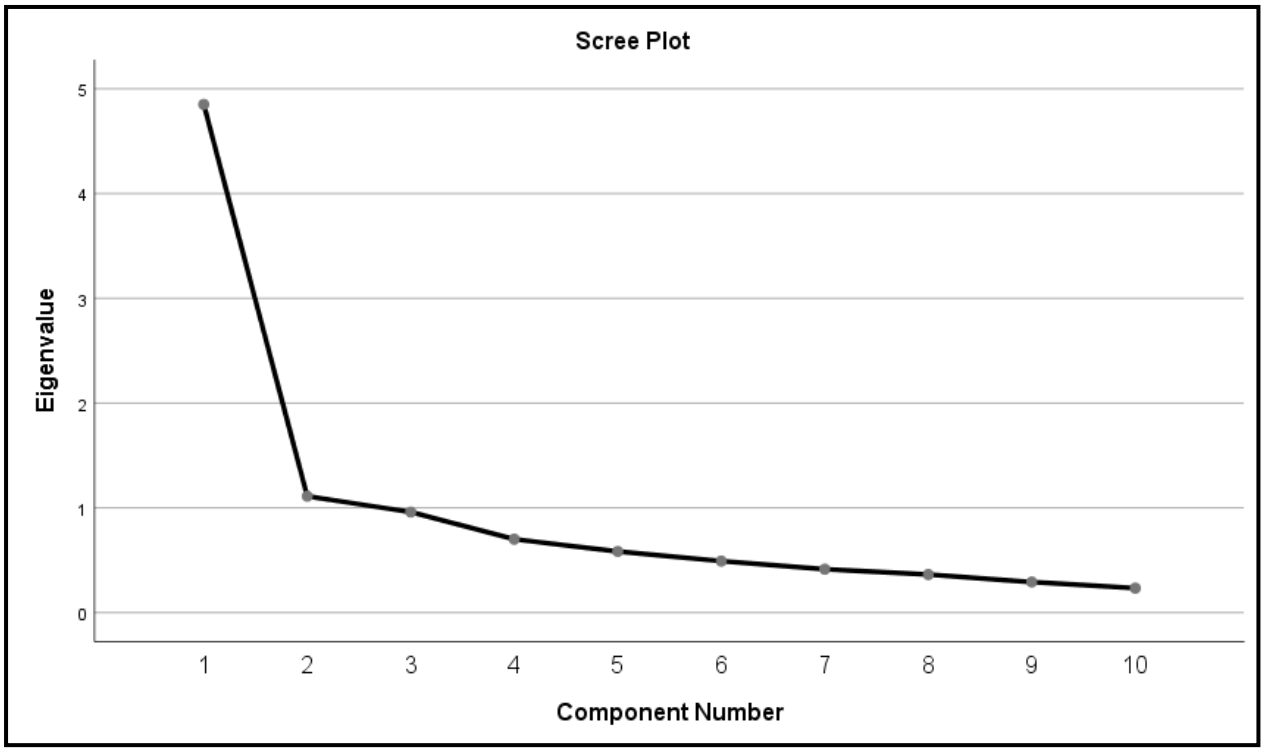

Figure 4-7: Scree plot of section C

Source: Section C of questionnaire from statistical analysis

- **Analysis of results**

Looking at the graph from Figure 4-7 above, the scree plot shows that one factor is sufficient to reduce the information.

4.16 Reliability statistics of processes and procedures

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools for processes and procedures were reliable and acceptable or not.

- **Results obtained**

Table 4-14: Cronbach's alpha coefficients for processes and procedures

Cronbach's alpha	Cronbach's alpha based on standardised items	N of items
0.89	0.887	10

Source: Section C of questionnaire from statistical analysis

- **Analysis of results**

Reliability and internal consistency rate from 0 to 1; the results from Table 4-14 above show the value obtained for reliability for processes and procedures being a Cronbach's alpha 0.89 that is close to 1, indicating that this factor can be satisfactorily relied on.

4.17 Processes and procedures analysis

Section C, used four-point Likert scale to assess the perceived importance.

The participant's on responding to management aspects on Section A of the questionnaire is rated from 1 being strongly disagree, 2 being disagree, 3 being agree, and 4 being strongly disagree. This section measured 10 items.

- **Analysis of results**

Table 4-15: Processes and procedures analysis

		Strongly disagree	Disagree	Agree	Strongly agree
1.54	There are policies to govern how training to be performed at the power station	6.0%	19.3%	60.8%	13.9%
1.55	My job offers me the opportunity to grow as a person	6.6%	18.1%	55.4%	19.9%
1.56	Training manuals are clear and understandable	4.2%	20.6%	61.8%	13.3%
1.57	On job training is taking place for new employees to improve their competencies	7.2%	19.8%	54.5%	18.6%
1.58	Training needs analysis is conducted with employees on regular basis	10.3%	31.5%	49.1%	9.1%
1.59	Skills gap analysis is conducted on regular basis	14.5%	39.4%	37.0%	9.1%
1.60	I am familiar with the training process	8.5%	22.6%	56.7%	12.2%

		Strongly disagree	Disagree	Agree	Strongly agree
	that is followed at the power station				
1.61	Bursaries are provided for the employees who want to further their studies	7.2%	22.3%	54.8%	15.7%
1.62	Does the individual development plan (IDP) fully support individuals needs for development?	13.3%	30.1%	48.8%	7.8%
1.63	Is employee engagement programme of benefit to the employees?	13.3%	28.5%	49.7%	8.5%
	Total				

Source: Section C questionnaire (2018)

- **Analysis of results**

According to table 15 above, participants selected variables with percentage above sixty percent agree with processes and procedures on the following variables, my training manuals are clear and understandable, and there are policies to govern how training to be performed at the power station, with the percentage values of 61.8% and 60.8% respectively.

4.17.1 Descriptive statistics on processes and procedures analysis

The descriptive statistics was utilized as a method to analyse the mean and standard deviation for processes and procedures variables, where it is inappropriate to use raw data.

- **Results obtained**

Table 4-16: Processes and procedures analysis using mean and standard deviation

		Mean	Standard deviation
1.54	There are policies to govern how training to be performed at the power station	2.83	0.738
1.55	My job offers me the opportunity to grow as a person	2.89	0.797
1.56	Training manuals are clear and understandable	2.84	0.698
1.57	On job training is taking place for new employees to improve their competencies	2.84	0.806
1.58	Training needs analysis is conducted with employees on regular basis	2.57	0.798
1.59	Skills gap analysis is conducted on regular basis	2.41	0.847

		Mean	Standard deviation
1.60	I am familiar with the training process that is followed at the power station	2.73	0.786
1.61	Bursaries are provided for the employees who want to further their studies	2.79	0.792
1.62	Does the individual development plan (IDP) fully support individuals needs for development?	2.51	0.822
1.63	Is employee engagement programme of benefit to the employees?	2.53	0.830
	Total	2.41	.791

Source: Section C questionnaire (2018)

- **Analysis of results**

As per Table 4-16 above, results were as follows:

- he average is 2.41, indicating that most participants are fairly disagreeing with the listed processes and procedures. The standard deviation is 0.86; this value is between 0.8 and 0.9, and therefore the statistics are highly reliable.

- The majority of participants chose these three mean values of 2.89 and two of 2.84, with variables stating **that my job offers me the opportunity to grow as a person**, **training manuals are clear and understandable** and **on job training is taking place for new employees to improve their competencies**, respectively, as their major preferred choices.

- The least popular choices for participants were the mean values of 2.41 and 2.51, with variables stating that **skills gap analysis is conducted on regular basis** and **does the individual development plan (IDP) fully support individuals' needs for development,** respectively.

4.18 Descriptive statistics and combined reliability statistics of factors A, B, and C

A reliability analysis was conducted with the calculation of Cronbach's alpha to determine if the measurement tools of the descriptive and combined reliability of factors A, B and C statistics were reliable and acceptable or not.

- **Results obtained**

Table 4-17: Cronbach's alpha coefficients for factors A, B and C

	Cronbach's alpha	Minimum	Maximum	Mean	Std. deviation
A_Management_aspects	0.93	1.05	3.79	2.5653	0.54208
B_Self_conf_determination	0.93	1.00	4.00	3.1829	0.46321
B_Opportunities	0.83	1.00	4.00	2.7841	0.51754
B_Training	0.82	1.00	4.00	2.8074	0.55350
C_Proccesses_Procedures	0.89	1.00	4.00	2.6957	0.54960
Valid N (listwise)					

Source: Section A, B, C of questionnaire from statistical analysis

- **Analysis of results**

As per table 4-17 above, all Cronbach Alpha coefficients were as follows:

- Management aspects = 0.93.
- Self-determination and self-confidence = 0.93.
- Opportunities = 0.83.
- Training = 0.82.
- Processes and procedures = 0.89.

All above Cronbach's Alpha coefficients were above 0.80; these results are a confirmation that the items of all these tests have relatively high internal consistency.

THE ASSOCIATION OF BIOGRAPHICAL DATA WITH THE TOPIC

4.19 Statistical analysis of correlation

Does the biographical information have an influence on the topic? For ordered biographical data, we use Spearman's rank order correlation to determine the association of variables.

The Strength of relationships according to correlation value

Value of r	Strength of relationship
-1.0 to -0.5 or 1.0 to 0.5	Strong
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.3 to -0.1 or 0.1 to 0.3	Weak
-0.1 to 0.1	None or very weak

Source: Adapted from Turkmen (2013:1011).

- **Results obtained**

Table 4-18: Spearman's order correlation

		Age group	Years of service	Educational background
A_Management_aspects	Correlation coefficient	.182*	0.135	-0.013
	Sig. (2-tailed)	0.023	0.100	0.874
	N	156	150	151
B_Self_conf_determination	Correlation coefficient	-.211**	-0.154	.353**
	Sig. (2-tailed)	0.008	0.057	0.000
	N	158	152	153
B_Opportunities	Correlation coefficient	0.007	0.012	0.114
	Sig. (2-tailed)	0.935	0.887	0.161
	N	158	152	153
B_Training	Correlation coefficient	-0.150	-0.093	.387**
	Sig. (2-tailed)	0.060	0.254	0.000
	N	158	152	153
C_Proccesses_Procedures	Correlation coefficient	0.143	.162*	0.092
	Sig. (2-tailed)	0.075	0.048	0.260
	N	156	150	151

Source: Sections A, B, C of questionnaire from statistical analysis

- **Analysis of results**

Table 4-18 (Spearman's order correlation) has provided the following results:

- Management aspects indicate a correlation coefficient value of 0.18 which means there is a weak relationship with age group variables.
- On self-confidence and self-determination factors, the correlation coefficient values of -0.21 and -0.15 for age group and years of service respectively were obtained which indicates small relationships.
- On educational background a value of 0.39 was obtained confirming a moderate relationship.
- On processes and procedures the correlation coefficients of 0.14 and 0.16 for age group and years of service were obtained respectively which interpret that both has weak relationship.
- The higher the age is the more the participants agree with management aspects as well as processes and procedures. However the higher the age the less they agree with self-confidence and self-determination, and training.
- As for more years of experience, the participants are negative with regard to self-confidence and self-determination, but positive towards processes and procedures On the other hand educated participants correlate with self-confidence and self-determination, as well as training.

4.20 Statistical analysis of variance (ANOVA)

Analysis of variance is conducted for the five factors which are management aspects, self-confidence and self-determination, opportunities, training, processes and procedures by occupation.

- **Results obtained**

Table 4-19: ANOVA analysis

		Sum of squares	df	Mean square	F	Sig.
A_Management_aspects	Between Groups	3.786	3	1.262	4.769	0.003
	Within groups	39.160	148	0.265		
	Total	42.946	151			

		Sum of squares	df	Mean square	F	Sig.
B_Self_conf_determination	Between groups	2.757	3	0.919	4.505	0.005
	Within groups	30.604	150	0.204		
	Total	33.361	153			
B_Opportunities	Between groups	1.688	3	0.563	2.254	0.084
	Within groups	37.436	150	0.250		
	Total	39.124	153			
B_Training	Between groups	4.212	3	1.404	4.968	0.003
	Within groups	42.386	150	0.283		
	Total	46.598	153			
C_Proccesses_Procedures	Between groups	2.977	3	0.992	3.385	0.020
	Within groups	43.387	148	0.293		
	Total	46.364	151			

Source: Questionnaire from statistical analysis

- **Analysis of results**

Table 4-19 above, has yielded the following results:

- For management aspects, there was statistical significant difference as p is less than 0.05 with a value of 0.003.
- For self-determination and self-confidence, there was statistical significant difference as p is less than 0.05 with a value of 0.005.
- For opportunities, there was no statistical significant difference as p is greater than 0.05 with a value of 0.084.
- For training, there was statistical significant difference as p is less than 0.05 with a value of 0.003.
- Processes and procedures had statistical significant difference as p is less than 0.05 with a value of 0.020.

4.21 Comparisons of statistical analyses

With data imported into the SPSS program, it provided the descriptive statistical means, the Cohen's effect size and the standard deviation for every subscale score of the instrument. The effect size indicates where the difference is.

- **Results obtained**

Table 4-20: Descriptive table

		N	Mean	Std. deviation	ANOVA p-value	Effect sizes		3 with
						1 with	2 with	
A_Management_aspects	1 Strongly disagree	45	2.72	0.50				
	2 Disagree	61	2.40	0.58		0.56		
	3 Agree	24	2.65	0.40		0.16	0.43	
	4 Strongly agree	22	2.76	0.46		0.07	0.62	0.24
	Total	152	2.58	0.53				
B_Self_conf_determination	1 Strongly disagree	45	2.99	0.53				
	2 Disagree	62	3.15	0.48		0.29		
	3 Agree	25	3.34	0.29		0.65	0.40	
	4 Strongly agree	22	3.34	0.33		0.65	0.40	0.00
	Total	154	3.16	0.47				
B_Opportunities	1 Strongly disagree	45	2.81	0.52				
	2 Disagree	62	2.68	0.53		0.24		
	3 Agree	25	2.95	0.41		0.27	0.50	
	4 Strongly agree	22	2.90	0.44		0.18	0.42	0.10
	Total	154	2.79	0.51				
B_Training	1 Strongly disagree	45	2.59	0.58				
	2 Disagree	62	2.74	0.57		0.25		
	3 Agree	25	3.00	0.38		0.70	0.46	
	4 Strongly agree	22	3.02	0.46		0.74	0.50	0.05
	Total	154	2.78	0.55				
C_Proccesses_Procedures	1 Strongly disagree	44	2.69	0.58				
	2 Disagree	62	2.56	0.62		0.21		
	3 Agree	25	2.82	0.32		0.21	0.41	
	4 Strongly agree	21	2.97	0.40		0.47	0.65	0.37
	Total	152	2.70	0.55				

Scale: Effective size of 0.2 small; 0.5 medium; 0.8 large

Source: Questionnaire from statistical analysis

- **Analysis of results**

Note: 1 is compared with 2, 3 and 4; 2 is compared with 3 and 4; and 3 is compared with 4.

From the information gathered in Table 4-20 above, the following observations were made:

- Artisans have lower means for management aspects, which indicates that they do not agree with management aspects as much as the rest of the participants do.

- Regarding self-confidence and self-determination, technicians and managers agreed more than technical officials and artisans did.
- Concerning opportunities, artisans think they have fewer opportunities compared to technicians and managers.
- As for training, technicians and managers think that training is more important than artisans do.
- Processes and procedures are where managers think it is more important than the others; artisans think it is less important than technicians.

4.22 Correlations between factors

Correlations exist between management aspects, employee aspects, and processes and procedures.

The Strength of relationships according to correlation value

Value of r	Strength of relationship
-1.0 to -0.5 or 1.0 to 0.5	Strong
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.3 to -0.1 or 0.1 to 0.3	Weak
-0.1 to 0.1	None or very weak

Source: Adapted from Turkmen (2013:1011).

- **Results obtained**

Table 4-21: Correlations between aspects analysis

			A_Management_aspects	B_Self_conf_determination	B_Opportunities	B_Training	C_Proccesses_Procedures
	A_Management_aspects	Correlation coefficient	1.000	.278**	.676**	.428**	.689**
		Sig. (2-tailed)		0.000	0.000	0.000	0.000
		N	167	167	167	167	165
	B_Self_conf_det	Correl	.278**	1.000	.546**	.640**	.403**

			A_Management_aspects	B_Self_conf_determination	B_Opportunities	B_Training	C_Proccesses_Procedures
	ermination	ation coefficient					
		Sig. (2-tailed)	0.000		0.000	0.000	0.000
		N	167	169	169	169	167
	B_Opportunities	Correlation coefficient	.676**	.546**	1.000	.625**	.702**
		Sig. (2-tailed)	0.000	0.000		0.000	0.000
		N	167	169	169	169	167
	B_Training	Correlation coefficient	.428**	.640**	.625**	1.000	.469**
		Sig. (2-tailed)	0.000	0.000	0.000		0.000
		N	167	169	169	169	167
	C_Proccesses_Procedures	Correlation coefficient	.689**	.403**	.702**	.469**	1.000
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	
		N	165	167	167	167	167

Source: Questionnaire from statistical analysis

- Analysis of results

The results from table4- 21 above, showed the following correlation relationships:

- For management aspects, there is an indication of a weak relationship with self-confidence and self-determination with r = 0.28.
- For opportunities, the indication is of a strong relationship with self-confidence and self-determination where r = 0.55.
- Processes and procedures shows a moderate relationship with self-confidence and self-determination with r = 0.40.
- Management aspects indicates a strong relationship with opportunities where r = 0.68.
- Self-confidence and self-determination gives an indication of a strong relationship with opportunities with a coefficient value r = 0.55.
- Training indicates a strong relationship with opportunities with r = 0.63.

- Processes and procedures shows a strong relationship with opportunities at a value r = 0.70.
- Management aspects indicates a moderate relationship with training with r = 0.43.
- Self-confidence and self-determination gives an indication of a strong relationship with training where r = 0.64.
- Opportunities has an indication of a strong relationship with training with the value r = 0.63.
- Processes and procedures shows a moderate relationship with training where r = 0.45.
- Management aspects indicates a strong relationship with processes and procedures where r = 0.69
- Self-confidence and self-determination gives an indication of a moderate relationship with processes and procedures where r = 0.40.
- Opportunities has an indication of a strong relationship with processes and procedures with the value r = 0.70.
- Training indicates a moderate relationship with processes and procedures with r = 0.47.

4.23 Summary

In this chapter, statistics from the respondents' returned questionnaires were statistically analysed and interpreted using the Statistical Package for Social Sciences (SPSS).

Participants from the maintenance department's biographical information, i.e. their age group, years of service, occupation and educational background, were analysed.

Three main aspects from the questionnaire, namely the management aspects, the employee aspects and the processes and procedures, were individually analysed.

Factor analysis on the three main aspects was conducted; this involved the correlation matrix, total variance explained, scree plot analysis, component matrix, pattern matrix, reliability statistics, and the association of biographical data with the topic and comparison statistical analysis.

The following chapter will discuss the findings, conclusions and recommendations, and will suggest research for further study on this topic.

CHAPTER 5: DISCUSSION, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on the overall discussions, purposes, processes and findings dealt with from Chapter 1 up to Chapter 4. Conclusions and recommendations are also drawn including the suggestion for future research on this topic.

5.2 Discussion

Chapter 1 kick started the study by elaborating on the following aspects:

- Background of the study in the form of an overall introduction to this study and its purpose.
- The problem statement outlines the reason that calls for this study topic, which is to eliminate or minimise the undesired events caused by the maintenance activities at the power station.
- Primary and secondary objectives of the study are identified and discussed at this level.
- The main and secondary questions are also asked in order to align the study with the objectives.
- The contribution and benefits of the study, towards the power station, management and employees are highlighted.
- The scope and layout that this mini-dissertation follows are also outlined.

Chapter 2 dealt intensively with a literature review regarding this study; the topic was broken down into aspects, including the following:

- Drivers of human performance: This is where aspects such as training, procedures, work load, processes, skills, and knowledge were discussed.
- Factors of human performance, where aspects such as employee wellbeing, feedback, employee engagement, leadership, work-life balance, culture, rewards and recognition, motivation, and role clarity were elaborated on.

- This chapter closed with literature discussion regarding maintenance.

Chapter 3 discussed the research methodology involved with this study and covered the following issues:

- The research design, which is quantitative research, was described.
- The research instrument, which is the designed questionnaire and its structure, was discussed.
- The study population, in the form of the characteristics of the sample participants, was also highlighted.
- Data collection process was outlined in detail.
- Data analysis methods, processes and procedures were mentioned.
- The research ethics that were followed in this study were discussed.
- The validity and reliability of the collected data were deliberated on.
- The challenges encountered by the researcher during the study were also discussed.

Chapter 4 was involved with the research results, where statistical analysis was performed with the use of different matrixes, measures, graphs and figures analysing aspects included in the questionnaires. These aspects were (A) management aspects, (B) employee aspects, and (C) processes and procedures. These were outlined as follows:

- Participants' biographical information, which included their age group, years of service, occupation, and their educational background.
- Factor analysis was conducted for the three (A, B and C) aspects with the use of the following tools: correlation matrix, scree plot, and reliability statistics using Cronbach's alpha coefficients, pattern matrix, and descriptive statistics. The association of biographical data with the topic was also analysed using Spearman's order correlation; analysis of variances (ANOVA) was conducted, and comparisons of statistical analyses, as well as correlations between factors were also measured.

5.3 Research objectives

Chapter 1 outlined the objectives of this study as follows:

The main objective of this research proposal is to identify human performance deficiencies in the maintenance department at the power station, and to draw up recommendations to minimise or eliminate these deficiencies.

Secondary objectives were as follows:

1. This study will investigate the effects of human competencies related to the power station's performance with the focus being on the maintenance department.

2. It will also investigate the root causes of human performance deficiencies in the maintenance department at the power station.

3. To suggest how these human performance deficiencies can be addressed to enable maximum performance of the power station.

4. To develop the employees' understanding of the importance of a work team culture, the power station's culture and the maintenance culture towards the employees' performance and how this can improve their performance.

5.4 Findings as per research objective

5.4.1 The effects of human competencies related to the station's performance focus being on the maintenance department

5.4.2 Management aspects

Results were drawn from Table 4-4, question 1.15, regarding the participants' responses with regard to management aspects, and revealed that participants are divided about the issue. In the research, 37.7% of participants disagree and 40.1% agree with the fact that the supervisors discuss the employees' development with individuals. There is a 2.4% difference between the participants. This division is a concern as it indicates some sense of inconsistency within the maintenance department; as such, management has to find ways to improve communication with staff and the management of processes within the department

5.4.2.1 Skills development

Results from Table 4-5, question 1.20, indicate that participants' responses with regard to the employees' aspects have revealed that 65.1% of participants agree that employees are aware of their shortcomings regarding their skills to perform their duties satisfactorily. The result of this indicator is that management can focus on the improvement of job-specific skills and development processes.

Results found in Table 4-15 regarding the participants' responses with regard to processes and procedures have revealed the following:

1. Question 1.57 has revealed that 54.5% agree that on-the-job training is taking place for new employees to improve their competencies. This is positive and is supposed to show good effects on the human competencies; management needs to look at a tool to measure the effectiveness of this training.

2. Question 1.59 has revealed that participants are divided in that 39.4% disagree and 37.0% agree with the fact that skills gap analysis is conducted on a regular basis. There is a 2.4% difference to the response hereof. This division needs to be addressed as this variable is crucial for the identification of skills that would have positive effects on human competencies.

5.4.3 The root causes human performance deficiencies in the maintenance department at the station

Results from Table 4-3, i.e. participants' responses with regard to management aspects, have revealed the following:

1. Question 1.4 has revealed that 40% of participants agree that management is aware of the causes of poor performance by maintenance employees. The communication regarding causes of poor performance to management is not working, and it must be improved with a feedback process.

2. Question 1.6 has revealed that 60% of participants disagree with the fact that sufficient funding is made available for employees to undergo training; a lack of or no training of maintenance employees is directly linked to possible poor performance. It might be that budget cuts are due to the organisation not performing well in its entirety; however, it is crucial for training to be undergone by employees in order to deal with

performance deficiencies. Employees should also be consulted regarding the training processes, and communication should be enhanced.

3. Question 1.13 has revealed that participants are divided in that 37.3% disagree and 41.6% agree with the fact that management displays good leadership in managing poor performance by the employees; there is a 4.3% difference between participants regarding this. This uncertainty paints a bad picture, as a clear set of performance management processes is supposed to be in place, unless it is there, but not used consistently.

Results found from Table 11, question 1.26, regarding participants responses with regard to employee aspects, have revealed that 63.1% agree that they are aware of the maintenance goals in the power station. This is one of the highest percentage figures of these findings, and employees are bound to perform well when they are aware of the departmental goals; therefore, management needs to improve on communication, as this is a communication problem.

5.4.4 How these human performance deficiencies can be addressed to enable maximum performance of the power station

Results found from Table 4-3, question 1.16, regarding participants' responses with regard to management aspects, have revealed that participants are divided in that 35.6% disagree and 42.3% agree with the fact that management sets clear development goals; there is a 6.7% difference to the participants' perception of this, which raises a concern as the development goals were to be clearly stated within the organisation.

Results found from Table 4-16, i.e. participants' responses with regard to processes and procedures, have revealed the following:

1. Question 1.54 has revealed that 60.8% agree that there are policies to govern how training is to be performed at the power station. This indicates the presence of these processes and procedures; however, management has to improve on the communication and implementation of these processes and procedures.

2. Question 1.55 has revealed that 60.8% agree that their job offers them the opportunity to grow. This is a positive aspect that management has to engage in through monitoring and evaluation in order to assist in addressing the human performance deficiencies.

3. Question 1.56 has revealed that 61.8% agree that training manuals are clear and understandable. This is also positive and management has to ensure that employees are afforded the opportunity to attend training in order to uplift the employees' skills with these manuals; this can be achieved through structured training schedules.

4. Question 1.58 has revealed that 49.1% agree that training needs analysis is conducted with employees on regular basis; this is positive and has to be kept up; however, there are also 31.5% who disagree with this variable, which is a significant amount, which needs attention. The gaps that are identified through this process should be attended to.

5.4.5 To develop employee understanding of the importance of work team culture, the power station's culture and the maintenance culture towards the employees' performance and how this can improve their performance

Results found from Table 4-4, i.e. participants' responses with regard to management aspects, have revealed the following:

1. Question 1.11 has revealed that participants are divided such that 37% disagree and 42% agree with the fact that management promotes a culture of continuous improvement; there is a small difference of 4% regarding their perception, and therefore management needs to review the current continuous business improvement process, called integrated business improvement (IBI).

2. Question 1.14 has revealed that participants are divided such that 43.1% disagree and 40.7% agree with the fact that leadership norms of the organisation help employees to grow; there is a small difference of 2.4% regarding their perceptions, and management has to improve on communication in this regard; this should be in the form of continuous feedback.

3. Question 1.18 has revealed that 59.9% of participants agree with the fact that their work environment is conducive for asking for help. A good work team culture that management needs to nurture and enhance can be achieved through the implementation of a good communication policy and procedure, or a review of the existing one.

5.5 Main findings from research objectives

From the discussion of research findings above, the following may be drawn as the main findings:

1. There are divisions regarding a number of variables on aspects; this does not only bear elements of inconsistencies, but also brings about uncertainty on employees on exactly what needs to be done. This immensely influences the performance of the employees in the maintenance department. Having a sense of processes and procedures being present within the organisation, management needs to improve on the communication of these processes.

2. The percentages, whether agreeing or disagreeing, do not measure to satisfactorily high percentages; percentages turn out to be distributed between the four measures. This is an indication of the non-existence of standard or uniform practices within the department; there is a sense that what is practised in one maintenance section differs from the practices in the sister sections, and therefore a division in perceptions. Management needs to draw up uniform practice processes to be followed by all sections and subsections within the station.

3. Even where the participants agree largely with a variable, there seems to be no evidence of the effective application of these variables. This is an indication that the current processes, procedures and practices are not effectively implemented. Management needs to undergo a survey to evaluate the current shop floor status of related processes, procedures and practices and the degree with which they are applied; recommendations should be made.

5.6 Recommendations

Based on the observations related to this study, in particular the research findings, the researcher make the following recommendations to the power station management:

- Due to the high level of divisions in the participant's responses, there is a high degree of inconsistent practices in the sections within the maintenance department. Management needs to investigate the different practices applied within the different sections in the maintenance department, and how these are applied. Recommendations are to be implemented, monitored and continuously improved.

- Management is to identify employees' shortcomings, analyse them and draw up appropriate remedial recommendations, and an implementation plan. An HR practitioner or a professional consultant may be utilised for this intervention.

- Just over half of the participants, at 54.5% to be specific, agree that on-the-job training is taking place for new employees to improve their competencies. Management needs to draw up a tool and measure the effectiveness of this training; shortfalls to be addressed. Training coordinators may be used for this activity.

- Management to make sufficient funding available for training; the training budget shortfalls should be assessed and corrected, and employees should be afforded the opportunity to attend training. A finance section in conjunction with training may be utilised for this assessment.

- There is an approximately 50/50 percentage in participants' perception of the question of management displaying good leadership in managing poor performance and in the promotion of a culture of continuous improvement. This percentage figure is supposed to be very high in favour of management. Management should undergo an introspection assessment to identify the shortfall and address it accordingly. This requires HR intervention.

- Management to measure, monitor and enhance employees' growth and development; remedial actions to be instituted where needed. The emphasis should be on the level of communication between management and employees. An HR practitioner can be utilised to facilitate this process.

5.7 Limitations of the study

As indicated in Chapter 1, the following are the limitations of this research:

- This study was focused on the Lethabo power station's maintenance department only; it does not include other power stations, business units or Eskom sites.

- Data were acquired through the distribution and collection of questionnaires to the maintenance department employees within the station; no visitors or external individuals, groups or parties were sampled.

- As this study and all its contents and activities are focused only on Lethabo's maintenance department, the conclusions and recommendations may only be limited to Lethabo, and not all of Eskom's other power stations.

5.8 Conclusions

The research results show a strong relationship between management aspects and employees' performance. Given the research in this study, it has become evident that maintenance department employees form an integral part of the power station; their daily activities may result in a maximum productive operation on the one hand, or their activities may result in minor, major and even catastrophic failures if not properly executed.

The vast difference of opinions from respondents poses a threat to the sustainability of the maintenance activities. Same goals, views and understanding on the overall operations, processes and procedures, with regard to the power station are of paramount importance, especially for the efficient and effective execution of the maintenance tasks.

Research undergone in this study has shown the importance of employee competence within this department, and therefore the criticality of effective training of the maintenance department employees.

Furthermore, the research undergone in this study has also highlighted some very crucial elements with regard to human performance enhancement; some of those were procedures, processes, skills, knowledge, employee engagement, leadership, work-life balance, culture, motivation and role clarity.

5.9 Suggestions for further study

1. Further research may be conducted on human performance enhancement at other departments at the power station, such as operations, engineering, risk and assurance, services and human resources departments.

2. Further research on performance enhancement may be conducted for all departments of the power station combined, meaning research on this topic for the entire power station.

3. Research on this topic may also be conducted on some or all of the Eskom fossil power stations within the Republic of South Africa.

4. Research can be conducted to look at the effects of possible retrenchments towards human performance.

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ANNEXURE 1: QUESTIONNAIRE

Title: The Impact of Human Performance Enhancement Programmes in the Maintenance Department at a Power Station.

Dear participant

Thank you for sparing your precious time to complete this questionnaire. The questionnaire will assist me; the researcher in evaluating the impact of human performance programmes in the maintenance department at a power station. It would be greatly appreciated if you kindly complete the following questions as honest as possible.

Please note that the information being asked is purely for academic purposes, and the survey is completely anonymous and confidential. Your responses are combined with those of many other participants and are summarized in a report to further protect your anonymity. The completed questionnaire will be kept strictly confidential by the researcher and NWU.

Your participation in this survey is highly appreciated.

Should you need any clarity, please feel free to contact my study supervisor:

Dr Jos Viljoen at jos@vodamail.co.za or on 0825732705

Kind Regards

R.A Molefe

MBA – Student

Student number: 24035025

084 620 6612

molefera@eskom.co.za

Biographical information

(1) 1.1 Age group	**(2) (1) 18-30**	**(3) (2) 31-40**		**(4) (3) 41 -65**			
(5) 1.2 Years of service in this power station	**(6) (1) 0-5 Years**	**(7) (2) 6-10 years**		**(8) (3) >10 Years**			
(9) 1.3 What is your occupation?	**(10) (1) Technical Official**	**(11) (2) Artisan**	**(12) (3) Technician (13)**	**(14) (4) Manager/Supervisor/ other**			
(15) 1.4 Educational background?	**(16) (1) (17) Below Matric**	**(18) (2) Matric**	**(19) (3) Certificate**	**(20) (4) Diploma**	**(21) (5) Degree**		

SECTION A: MANAGEMENT ASPECTS

Please rate the following aspects as follows:

1	Strongly disagree
2	Disagree
3	Agree
4	Strongly agree

(Please indicate by making an **X** in the relevant column)

A		**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
1.1	My immediate supervisor is supportive of my skills development	1	2	3	4
1.2	Management provide training platform for employees to enhance their skills	1	2	3	4
1.3	Management is well equipped with knowledge to deal with situational leadership	1	2	3	4
1.4	Management is aware of the causes of the poor performance by maintenance employees	1	2	3	4
1.5	Management supports personal development	1	2	3	4
1.6	Sufficient funding is made available for employees to undergo training	1	2	3	4
1.7	Does management provide development feedback on regular basis	1	2	3	4
1.8	Does management provide individual support where needed	1	2	3	4
1.9	Management takes note of employees personal needs	1	2	3	4
1.10	Management gives compliments on	1	2	3	4

A		**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
	goals well achieved				
1.11	Management promotes a culture of continuous learning	1	2	3	4
1.12	Employees are motivated by my management to improve their skills	1	2	3	4
1.13	Management displays good leadership in managing poor performance by the employees	1	2	3	4
1.14	The leadership norms of this organisation help employees to grow.	1	2	3	4
1.15	My supervisor discuss employees development with individuals	1	2	3	4
1.16	Management sets clear development goals	1	2	3	4
1.17	Maintenance employees are aware of poor performance	1	2	3	4
1.18	My work environment is conducive for asking for help	1	2	3	4
1.19	My supervisor encourages me to enhance my performance	1	2	3	4

SECTION B: EMPLOYEES ASPECTS

Please rate the following aspects as follows:

1	Strongly disagree
2	Disagree
3	Agree
4	Strongly agree

(Please indicate by making an **X** in the relevant column)

B		**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
1.20	Employees are aware of their shortcomings regarding their skills to perform their duties satisfactory	1	2	3	4
1.21	I am aware of the maintenance goals in the power station	1	2	3	4
1.22	My job outputs are clear to me and are achievable	1	2	3	4
1.23	My personal performance can be enhanced	1	2	3	4
1.24	I am familiar with my current training needs	1	2	3	4
1.25	I am familiar with the training process that is followed at the power station	1	2	3	4
1.26	I am aware of the maintenance goals in	1	2	3	4

B		**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
	the power station				
1.27	Training is offered by qualified presenters	1	2	3	4
1.28	I celebrate my achievements	1	2	3	4
1.29	I am not afraid of failure, I'd rather try	1	2	3	4
1.30	I believe I'm talented	1	2	3	4
1.31	I can make the difference in the world that I'm living in	1	2	3	4
1.32	I am learning new skills everyday	1	2	3	4
1.33	I am aware of the training modules available for my development	1	2	3	4
1.34	The organisation has sufficient training facilities	1	2	3	4
1.35	Training courses modules are understandable and make sense	1	2	3	4
1.36	My job offers me the opportunity to grow as a person.	1	2	3	4
1.37	I am familiar with my current training needs	1	2	3	4
1.38	Training schedules are communicated well with the organisation	1	2	3	4
1.39	Courses are presented in an understandable medium of instruction	1	2	3	4
1.40	I spend time thinking about my development	1	2	3	4
1.41	Skills enhancement is the responsibility of everyone	1	2	3	4
1.42	I have the information that I need to do a good job.	1	2	3	4
1.43	The opportunity for promotion exists in this organisation.	1	2	3	4
1.44	The structure of my work unit is well designed	1	2	3	4
1.45	I am responsible for my own development	1	2	3	4
1.46	My job offers me the opportunity to grow as a person.	1	2	3	4
1.47	I am keen to learn	1	2	3	4
1.48	I am highly committed towards my development	1	2	3	4
1.49	I believe I can change to be a better person	1	2	3	4
1.50	I set myself achievable goals	1	2	3	4
1.51	I give my personal development a high priority	1	2	3	4
1.52	I believe in my capabilities	1	2	3	4
1.53	I am clear about where I'm going in life	1	2	3	4

SECTION C: PROCESSES AND PROCEDURES

Please rate the following aspects as follows:

1	Strongly disagree
2	Disagree
3	Agree
4	Strongly agree

C		**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
1.54	There are policies to govern how training to be performed at the power station	1	2	3	4
1.55	My job offers me the opportunity to grow as a person	1	2	3	4
1.56	Training manuals are clear and understandable	1	2	3	4
1.57	On job training is taking place for new employees to improve their competencies	1	2	3	4
1.58	Training needs analysis is conducted with employees on regular basis	1	2	3	4
1.59	Skills gap analysis is conducted on regular basis	1	2	3	4
1.60	I am familiar with the training process that is followed at the power station	1	2	3	4
1.61	Bursaries are provided for the employees who want to further their studies	1	2	3	4
1.62	Does the Individual Development Plan (IDP) fully support individuals needs for development	1	2	3	4
1.63	Is Employee Engagement Programme of benefit to the employees	1	2	3	4

ANNEXURE 2: STATISTICAL SERVICES CONFIRMATION

Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: http://www.nwu.ac.za

Statistical Consultation Services
Tel: +27 18 285 2016
Fax: +27 0 87 231 5294
Email: suria.ellis@nwu.ac.za

12 November 2018

Re: Thesis, Mr RA Molefe, student number 24035025

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

SM Ellis

Prof SM Ellis (Pr. Sci. Nat)
Associate Professor: Statistical Consultation Services

ANNEXURE 3: LANGUAGE EDITING CONFIRMATION

To whom it may concern

Cecile van Zyl
Language editing and translation
Cell: 072 389 3450
Email: Cecile.vanZyl@nwu.ac.za

17 November 2018

Dear Mr / Ms

Re: Language editing of mini-dissertation: The impact of human performance enhancement programmes in the maintenance department at a power station

I hereby declare that I language edited the above-mentioned mini-dissertation by Mr RA Molefe (student number: 24035025).

Please feel free to contact me should you have any enquiries.

Kind regards

Cecile van Zyl

Language practitioner

BA (PU for CHE); BA honours (NWU); MA (NWU)
SATI number: 1002391

ANNEXURE 4: PERMISSION LETTER

2018-04-20

The Manager

Lethabo Power Station

Private Bag X 415

Vereeniging

1930

Sir

I hereby request permission to perform a research study at Lethabo Power Station as part of fulfillment for the Degree Master of Business Administration at North West University (NWU)

My research title is Human Performance Enhancement in a Maintenance Department at a Power Station

This research title has been seen and approved by my study Supervisor Dr. Jos Viljoen.

The outcome to this study will be made available on completion and approval by the university and will benefit the power station.

Kind Regards

R A Molefe

Student number: 24035025

Permission: Granted/~~Not Granted~~

Mr. T A Conradie

General Manager

2018-04-20

L Mounakgotla

2018-04-20