Factors associated with job performance amongst engineers in Bigen-Africa in Mahikeng and Pretoria

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DECLARATION

I, **KITSO KING MOLAWA**, hereby declare that this mini dissertation titled "F***actors associated with job performance amongst engineers in Bigen-Africa in Mahikeng and Pretoria***" is my own work, hence all the references used or cited have been acknowledge through a complete referencing.

KITSO KING MOLAWA DATE

12/04/2017

DEDICATION

I am dedicating this work to my sons, Oratile, Olerato and Kitso (jnr.). I am indebted to them for putting up with my reclusive behaviour during the study. Their love and encouragement given without hesitation, has enabled me to complete this work. I thank them sincerely, and love them with all my heart.

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I acknowledge and thank the Bigen Africa Services and their staff, who took the time to complete the questionnaire.

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ABSTRACT

This study examined **factors associated with job performance amongst engineers in Bigen Africa in Mahikeng and Pretoria.** This study pertains to only the two branch offices (i.e. Mahikeng and Pretoria) of Bigen Africa. The entire building environment professionals, the permanent and contracted employees of these companies were considered as the relevant respondents for this study. There are 38 males and 12 females employees that were given questionnaires to complete. However, 48 were valid whilst the other two were discarded.

All these employees were considered as respondents for this study. As Begin-Africa is the leading engineering firm in SA as it is, large in market share in size and infrastructure development, the employment in these firms is spread over different places in the sub-Saharan region; hence it was felt that the firm could be considered for an in-depth analysis. This study relied upon the primary data collected by administering the questionnaire method and the completed questionnaires were edited and codified. The researcher only used the quantitative method for this study. The information was processed in to a master table. Various tables, incorporated in this study, were prepared on the basis of this master table.

This study made known to the researcher that the job performance of engineers is strongly associated with job satisfaction and these two variables are coherent. The study further established that the educational level is significantly related to job performance among engineers. The study has also revealed that job performance increases as the working experience increases. Finally, the study showed that job satisfaction increases as the working experience increases.

Key words: Employee performance, physical working environment, working conditions of engineers

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LIST OF ABBREVIATIONS

BAS	Bigen Africa Services
BAPMS	Bigen Africa Performance Management System
CBE	Council of Built Environment
CEO	Chief Executive Officer
CPSA	Career Planet: South Africa
ECSA	Engineering Council of South Africa
NESS	National Engineering Skills Survey

CHAPTER 1

INTRODUCTION

This research was established on certain theories on factors associated with job performance amongst engineers. This section of the study describes the work environment within which job performance has been visualised for this research and describes the working conditions of engineers.

1.1 Background on Bigen Africa

Bigen Africa Services (BAS) has a total network of 16 offices across South Africa and also has other offices in African countries. BAS's notable growth since its formation in 1971 is revealed by its smarter corporate approach – interlocking world class, best-practice development finance, engineering and management consulting expertise to customise advanced, value-driven solutions for their customers in the public and private sectors alike.

BAS's internal abilities and strategic partnerships permit it to assimilate the whole value chain in the infrastructure process – from feasibility studies through project preparation, management and implementation to development finance and on-going asset management. This tactic produces cost effective, sustainable projects and sets it apart from other engineering companies.

BAS describes itself as a firm that is socially responsible, and committed to all aspects of the King III Report on Global Compliance. The firm claims to have modified itself into the country's favourite infrastructure developer, always bettering the lives of ordinary communities by relevant, viable infrastructure growth provision. Furthermore, the firm suggests that it is has best financial practices and an on-going attention on "triple bottom -line", with emphasis on the social impact of all ventures undertaken, whilst adhering to global all time good practices.

The firm continues and defines itself as a well organised firm and a viable growing service provider that is able to give its customers the edge of not only prepared infrastructure on site, but viable projects in the manner of their broader socio-economic surroundings. The firm's extensive knowledge of infrastructural services helps customers to be competitive enterprises, whilst contributing in a good way to economic growth, both locally and throughout Africa.

The firm also embarks on broad-based black economic empowerment and, since it is socially responsible, the firm upholds the government's mandate to address previous economic issues and involves the wide role of black people in the wealth to address viable growth for all South

Africans. The firm's reputation can be well recognised by the many awards since its humble beginnings in 1971 – recognised as viable growth, professional management, business excellence, a top-ten firm to work for and best managed companies (Bigen Africa, 2015).

Bigen Africa (2014) reported the following as strategic issues facing the organisation:
Just like any other organisation in South Africa, BAS has to manage strategic as well as reputational risks. The organisation is a professional service provider; therefore there will always be risks of service failure, and professional, legal and contractual risks the organisation will have to deal with on a daily basis. The concentration risk due to turbulent markets will always have to be well managed. South Africa's young democracy puts pressure on organisations to deal with transformation as best as they could. The organisation further states that it faces credit, solvency and liquidity risks. South Africa has a world-class and progressive legal framework and as such BAS always has to deal with issues around governance and compliance risks on a daily basis. To also stay on the market the organisation faces business continuity risks including, inter alia human capital risk.

1.2 Work environment

The work environment is a place where a duty is accomplished. When it comes to a location of a work place, the work environment includes the physical place as well as the immediate environments of the workplace, such as a construction site or office buildings. According to Helmy (2015:6), the work environment has a very important role in improving employee performance and enhancing employee performance. This is true because people working in a safe and sound environment are likely to remain dedicated to their work.

Furthermore, according to Hameed and Amajad (cited by Helmy, 2015:5), a good work environment leads to better outcomes and increased employee performance. If the general staff is satisfied with their job environment that will definitely result in their performing better, which increases their productivity (Farooqi, 2014:8).

According to Naseem, Sikander, Hameed and Kahn (2012:143), in spite of the significance of a positive work environment, many organisations neglect this important issue, because it needs time as well as money; thus these organisations end up having an unattractive, boring and unproductive workplace. The physical environment, also known as the external environment includes office design, involving factors such as temperature, light, noise, furniture and spatial arrangement (Bakotic & Babic, 2013:207).

The spatial layout is tremendously vital in enhancing employ's satisfaction of working in the facilities provided to accomplish the task; a primary aspect for the improvement in employee performance (Vischer 2007:178). Helmy (2015:6) suggests that the organisational work

environment suggestively controls the level of worker performance as well as motivation towards work. The researcher further indicates that each office has unexpected spatial provisions and furniture as well as diverse lighting, heating and noise levels; furthermore the design of the environment should enhance the outcome of jobs and motivate the employees who are going to work in office.

According to Naseem *et al.* (2012:143) temperature, light, noise, furniture, air quality, comfort and communication and stress-free environment all affects the level of innovation, error rate, team collaboration, employee performance, speed of work and creativity.

Noise in many instances disturbs employees during their occupied time. Noise can be as a result of construction projects or from simultaneous co-worker talks. In this situation it will be difficult for employees to concentrate on their work (Helmy, 2015:6).

1.3 Working conditions of engineers

The following are working conditions of engineers according to GoStudy (2016):

Many managerial or directorial positions are held by engineers, from overseer of a construction site to a city engineer or technical director. These engineers may manage the work of surveyors, draughtsman, technicians and other workers and may also perform research and lecturing tasks or serve as consultants for engineering construction or architectural firms. Some might work in design, construction, research and teaching. The work environment of engineers may therefore range from quiet offices to remote areas in construction sites. Sometimes these engineers may have to travel from place to place to work on different construction projects. The actual work setting depends on the specialty chosen and on the size, location and financial resources of the employer.

Engineering graduates typically begin work under the close supervision of experienced engineers and are gradually given more tasks as they gain experience. Some engineers with experience and additional education move into administration or management. Many high-level executives in industry began their careers in engineering.

GoStudy (2016) further indicates that many engineers have to deal with demanding aspects, and spend time from site to site, occasionally having to work long hours. There are also long periods of groundwork and study compulsory to register as a professional civil engineer, and having to continue with life-long learning through your career to keep up with the latest technological advances in your field.

For this study the researcher included all technical staff, ranging from professionally registered engineers, technologists, technicians and draught persons. The one name that the researcher used to indicate these technical staff for the purpose of this study is engineers.

1.4 Employee performance

According to Abushaiba and Zainuddin (2012:184), the current business environment is branded by fundamental changes due to technological developments, increase in competition, and the developments of customers' needs. Current studies in the management accounting systems have found that the formulation of a clear competitive strategy is necessary; it must be supported by a suitable organisational structure and management accounting system, as well as information systems to advance a competitive advantage and guarantee high performance.

According to Boachie-Mensah and Dogbe (2011:270), linking pay to job performance is one thing that employers increasingly seek to achieve. Aral, Brynjolfsson and Wu (2012:913) assert that jobs with performance-related pay attract workers of higher ability and induce workers to provide greater effort. Successful incentive systems rely on the ability to monitor and manage employee performance accurately to appropriately reward those who excel.

DeNisi and Pritchard (2006:253) describes performance appraisal as a distinct, formal, organisationally authorised event, usually not occurring more often than once or twice a year, which has clearly stated performance dimensions and/or criteria that are used in the evaluation process. Furthermore, Victor III, St. Onge and Marcoux (2004:146) argue that organisations increasingly understanding performance management as a key system that can endorse and sustain initiatives such as speed to market, business procedures renewal, and quality management, whilst they also indicate that by aligning performance expectations, feedback and reward systems to people's requirements, performance management may foster employee behaviours that are consistent with emerging business opportunities and the need for strategic operational effectiveness.

Furthermore, DeNisi and Pritchard (2006:253) indicate that an evaluation process, in that measurable scores are frequently assigned based on the judged level of the employee's job performance on the scopes or criteria used, should be implemented, and the scores should be shared with the employee being evaluated. Extent issues are important for the performance appraisal process, as are issues of rater (or assessor) motivation, so that effective appraisal systems are those where the raters have the ability to quantify employee performance and the motivation to assign the most accurate ratings. (DeNisi & Pritchard 2006:254).

According to Graham (2004:7), performance management includes aligning the work of each employee with the organisational strategic plan so that the employee's efforts are attentive on

behaviours, products/services and processes that contribute to the success of the organisation as a whole. Performance management is a systematic approach for the transfer of work and expectations, supporting and allowing employee efforts, providing assessment and feedback, and following through with suitable recognition and/or corrective action (Graham 2004:7).

A performance management system that arranges work efforts with the organisation's strategic plan and guarantees employees are adhering to the plan, is the best way to circumvent wasted resources, including the inefficient and ineffective use of employee effort, time and talent. (Graham 2004:8).

There is effect on job performance due to the working environment. Poor job performance can be due to the lack of management in taking care of the environment employees are working under on a daily basis. It is important therefore, for management to create good conducive working environment to enhance the job performance of employees.

1.5 Statement of problem

In this study job performance is defined as how well an employee carries out/performs daily tasks as required by the employer. Job performance is dependent on many factors as implemented and documented in the policy of Begin Africa. According to the Begin Africa recruitment policy, the company shall always attempt to recruit, select, appoint and retain the best available employees in order to promote professional and administrative excellence. According to Bigen Africa (2013), the report indicated the organisation handles the issue of employee performance as follows:
Performance management remains a key people management tool at BAS. During financial year 2013 the performance management system was adopted and revised in the 2014 financial year with a new performance agreement template being introduced, accommodating flexibility in the setting and measurement of individual performance objectives within a matrix structure. Performance is measured in both delivery [performance rating] and behaviour [peer review]. Consolidated performance scores serve as critical inputs into the Future-Integrated Talent Process. Once the employee achieves outstanding performance he/she is rewarded accordingly, using the short-term incentive scheme of the Group.

Furthermore, BAS indicates that it is dependent on its staff, so, as a firm that provides professional services and guidance to customers, it continuously needs extensive knowledge and expertise. BAS knows that the significance of its employees is the real base [and capital] of its future competitive edge. Accordingly, BAS people will continue to produce both multi-skilled and expert [specialised] individuals in support of the future growth of the organisation. Human capital procedures are maintained by the Human Capital Division, guided and overseen by the

Head of Strategy, Policy and Planning. Thereafter draft procedures are tabled for discussion and enforced [after suitable amendment] by the Human Capital Management Committee.

Accordingly, performance management is executed in the firm by using the BAPMS level. This level incorporates all performance plans in the firm and this in turn makes it possible for a more accurate calculation of staff performance scores as agreed objectives by each staff. Performance initiatives are arranged in such a way that they fit with the strategic goals and financial objectives of BAS. Performance reviews are done twice annually and the final score acts as an employee's performance over the financial year. The performance score informs the career development framework, annual reviews of guaranteed remuneration and the short-term incentive scheme of BAS.

BAS employs over 500 people across the African continent. These are professionals across the various built environment disciplines, from graduates to associate principals, principals, managing principals and the executive (Bigen Africa, 2014:27).

Performance Management is an on-going process whereby the harvests of employees are measured and controlled in order to advance organisational effectiveness and reward employees accordingly (Khan & Ukpere, 2014:661).

In this regard Khan and Ukpere (2014) write that usually performance reviews are done on a quarterly basis (every three months) and the review entails a basic overview of performance for the period, between manager and employee. This process forms part of a chain, which aids in determining whether employee performance requires development, is acceptable or outstanding (Khan & Ukpere, 2014:661). Interim reviews and appraisals are allowed as frequently as possible to assist managers in managing performance successfully and allow employees the opportunity for continued development (Noe *et al.*, as cited by Khan & Ukpere, 2014:661).

However, at Bigen Africa performance reviews are conducted twice annually. Once the employee achieves outstanding performance he/she is rewarded accordingly using the short-term incentive scheme of BAS.

According to Nienaber and Oosthuizen (2010:41), in South Africa there is a shortage of built environment skills, and as such the government has realised the importance of engineering skills and has launched some initiatives to correct the problem. One such initiative was the creation of the Joint Initiative for Priority Skills Acquisition (JIPSA), which identified five high-priority skills, of which engineering was one.

The working environment has implications for engineers and associated issues of job performance and job satisfaction. Bigen Africa has a pool of employees with different socio-

economic, educational and racial backgrounds. These characteristics affect job satisfaction and performance. Based on the description above, the following research question emanated from the study.

- What are the personal characteristics of engineers in Bigen Africa?
- What factors determine job performance amongst engineers in Bigen Africa?
- What factors determine job satisfaction amongst engineers in Bigen Africa?
- Are there organisational constraints to job performance amongst engineers in Bigen Africa?

1.6 Objectives of the study

The main objective of this study is to determine **factors associated with job performance amongst engineers in Bigen Africa in Mahikeng and Pretoria.** Specific objectives are to:

- determine personal characteristics of engineers in Bigen Africa
- determine job performance amongst engineers in Bigen Africa
- determine job satisfaction amongst engineers in Bigen Africa
- ascertain organisational constraints to job performance amongst engineers in Bigen Africa.

1.7 Ethical considerations

The researcher did adhere to the rules of research as set out by the "Research Regulatory committee (RERC) and the "Research Ethics Committees" (REC) of the North-West University. The most ethical issue that was dealt with was the ethical treatment of participants. For this reason, all participants were informed about the benefits of the study and participants' rights and protection, and their consent was obtained by fully disclosing the procedures and requesting their permission to continue.

After receiving permission from the REC, the researcher wrote a letter to Bigen Africa in Mahikeng to obtain access to continue the study, upon which a verbal consent was given by Ms. K Soden. The researcher then provided the participants with appropriate information about the study, and made sure that they knew what was expected of them and that they were competent to provide the required information (Strode, Slack, Wassenaar & Singh, 2007). This was done by either firstly introducing the study verbally or emailing a participant sheet explaining the study, depending on what was practically feasible. Before the questionnaire was

handed out the researcher also reiterated what the study was about and what was expected from them and also answered any questions they had. The researcher also informed them that participation in the study was voluntary and that they were free to withdraw at any stage (Cohen, Manion & Morrison, 2007).

Initially the study would have been conducted at the Mahikeng branch office only; however, due to the low number of participants in this office, the Pretoria office was also engaged. The researcher obtained the necessary authorisation to conduct the study in the Mahikeng office. The researcher later decided to conduct the research on engineers in Pretoria. This was then communicated to the Mahikeng branch office. They accepted this change and also indicated that the researcher was still free to interview some of their engineers, should he wish to do so. In the end the researcher also interviewed engineers from the Mahikeng and Pretoria offices.

As interviewing cannot guarantee anonymity, the researcher assured the participants that the information they provided would be kept confidential (Babbie, 2005). He indicated to them that none of their personal identifiable details would be included in any of the research reports and that, if there was information that could potentially be used to identify them, this information would either be removed or changed. To further ensure confidentiality, the researcher indicated that the information would be safely and securely stored and that access to it would be limited.

1.8 Trustworthiness of the research

The researcher tested the first ten questionnaires from the first ten respondents that answered the questionnaire to ensure that no double meaning or misinterpretation was present in the questions. The questionnaires were distributed in the way that the researcher was going to follow for the rest of the survey. All questions were clear and straightforward and no alterations were made in the process.

1.9 Layout of chapters

The intention of the study was to investigate and positively add value towards an improved understanding of factors associated with job performance amongst engineers in Bigen Africa in Mahikeng and Pretoria.

The **first chapter** of this study uncovers the introduction which rivets the background to the study and why the study was necessary, and also covers the research goal objective, and sub-objectives.

Chapter 2 deals with the literature review which endeavours to describe job performance and working conditions of engineers and also to give the perspective of other factors associated with job performance amongst st engineers.

Chapter 3 will provide the research methodology in which the methods, research design, data collection strategy and measuring instrument that will be used, is explained.

Chapter 4 will contain the findings and an analysis of the results with discussions and interpretations.

Finally, in **Chapter 5** recommendations will be made with the necessary action plan and conclusion to this research.

1.10 Chapter summary

In Chapter 1 the scientific orientation to the study was discussed. This included the background to the study, a description of work environment and working conditions of engineers, the research objectives. Furthermore, employee performance was described, the problem statement, objective of this study, and the hypothesis were stated, and strategies employed to ensure quality and ethics were dealt with. The chapter ended with the chapter layout.

The next chapter is a review of literature on the sub-objectives and the main themes emanating from past research in relation to the factors associated with the job performance amongst engineers in Bigen Africa in Mahikeng and Pretoria.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This study intended to investigate published research related to certain theories on factors associated with job performance. Literature review involved gaining some general background and application of theory to the research goal objective from which informed conclusions and recommendations could be made. This section of the study report provides a theoretical explanation of the relationship amongst variables of interest. According to Cooper and Schindler (2011:654), when compiling a literature review the researcher should highlight major results and conclusions of previous research, the pertinent data and tendencies from preceding studies, specifically approaches or strategies that could be repeated or be circumvented.

When concluding the Literature Review chapter, Cooper and Schindler (2011:655) suggests that the researcher should end chapter 2 by mentioning in brief the significance of the review and inferring them in relation to the research objectives. This will in turn enable the researcher to refine the goal objective of the study.

Firstly, this part of the study report covers literature on the historical background of factors associated with job performance. Secondly, a general overview of the purpose and value of job performance is discussed. Subsequently, a literature review on what performance appraisal entails, correlates of job performance, and lastly peculiar job environment of engineers is outlined. The challenges and problems encountered are re-assessed, followed by a review of the main themes emanating from past research in relation to factors associated with job performance.

It should however be noted that there is an immense contribution by schools of thought on the subject of factors associated with performance. Thus, the literature review will focus only on the material providing solutions that are being studied and is closely related to the objective of the study.

2.2 Job performance conceptualised

According to Hosain (2015:1), the highest effectiveness and efficiency of a firm does not depend on its financial resources or using the newest technology, rather it is determined by the degree to which it is using its dedicated, motivated and efficient employees. Again, he also mentions that it is also depends on the number of its satisfied employees who will continue to

provide their valuable services to the same organisation. He continues by saying that the success of a corporate firm lies in how efficiently it is using its quality and talented employees with optimum satisfaction.

This section of the study intends to define what job performance and its goals and objectives are. Viswesvaran and Ones (2000:216) indicate that job performance is concentrated in the workplace and arguments to the way persons achieve in their jobs. Viswesvaran and Ones (2000:216) describe job performance as "ascendable actions, behavior and results that employees engage in or bring about that are related with and contribute to organisational goals". This means a worker's production can be observed from diverse extents; those that are essential are focused to the firms' objectives. On the other hand, Mawoli and Babandako (2011:2) also describe job performance as linked to the degree to which an employee staff member is gifted to achieve the task allocated to him or her and how the proficient task contributes to the realisation of the organisational goal.

Motowidlo (2003) asserted that job performance is the total predictable value to the organisation of separate behaviours that an individual carries out over a standard period of time. According to Campbell (cited by Mawoli & Babandako, 2011:3), performance is behaviour exhibited or to some degree done by the worker. Motowidlo, Borman and Schmidt (1997) described job performance as the combined worth to the organisation of the separate interactive incidents which an employee performs over a standard interval of time.

Mawoli and Babandako (2011:3) further suggested that job performance is usually not only a combined concept; it is a multi-faceted concept containing many conducts. Thus, Campbell (cited by Mawoli & Babandako 2011:3) projected an eight-factor classical of performance founded on *factor analytic* research that tries to show extents of job performance present (to a greater or lesser extent) across all jobs:

Task-specific behaviours contain behaviours that an employee assumes in a workplace – essential practical responsibilities that separate tasks from each other, whereas non-task-specific behaviour are those behaviours which an employee is obligatory to undertake that do not relate only to a particular job. The researchers further proposed that black and white and verbal communiqué errands state actions where the employee is assessed, based not on the content of a communication essentially, but on the proficiency with which they bring the communication. Employees are required to make official and casual oral and written presentations to various audiences in many different jobs in the work force.

Furthermore, they asserted that an employee's performance can also be measured in relations of determination, either day to day, or when there are unusual conditions. This factor imitates

the degree to which people obligate themselves to job tasks. The performance might also comprise an aspect of individual discipline: Individuals would be expected to be in decent upright with the law, not misuse liquor, etc.

On the proposed list by these researchers they mentioned that in work situations where tasks are work closely or are highly co-dependent, performance might comprise the grade to which the other staff members aid individuals. Sometimes this might contain stand-in as a decent character, coaching, giving guidance or serving to maintain individual objectives. Many jobs also have a supervisory or leadership component. A single staff member will be trusted to undertake numerous things outlined under the previous factor and in addition will be responsible for meeting out rewards and punishment. These features of performance occur in a face-to-face manner.

Finally, Campbell (cited by Mawoli & Babandako, 2011:3) proposed that executive as well as managerial performance entails those features of a job that serve the individual or organisation but do not contain direct supervision. A managerial task would be setting an organisational objective or reacting to outside incentives to support a individual in attaining its objectives. In addition, a manager might be responsible for monitoring organisational sources.

2.3 Performance appraisal

Performance appraisal entails a process where the manager focuses his attention to evaluate the tasks achieved by an individual. It is a discreet process of assessing how good or bad the employee has carried on with his/her tasks in those areas agreed upon. According to Heywood, Jirjahn and Struewing (2016:2), performance appraisals measure individual worker performance and base this on combinations of objective and subjective evaluation. Such appraisals are used to provide feedback to employees, in making job assignments, in decisive training needs, and in the distribution of both short and long-term rewards, including, but not limited to, annual bonuses and promotion.

The reason why performance appraisals are carried out by organisations differs from one organisation to the other. However, scholars agree that performance appraisals are mainly performed to motivate employees to keep on contributing to the success of the organisation. Moreover, performance appraisals are often used in the private sector to provide incentives by tying workers' pay to the appraisals (Giardini and Kabst, cited by Heywood *et al.*, 2016).

Again, Heywood *et al.* (2016:6) say that on the one hand, performance appraisals can be integrated closely to the on-going compensation systems of firms. For example, they claim that annual bonuses may be based on appraisals. They further suggest that, on the other hand, performance appraisals may be used to provide long-term incentives and to improve the

functioning of the internal labour market of the firm and that this can include the determination of promotions to jobs with greater responsibility and greater earnings.

According to Chopra (2015), the process of performance appraisal should clearly define objectives of appraisal and outline job expectations and also design an appraisal program. The researcher continued by indicating that the process should appraise the performance and conduct performance Interviews. Last but not least, it should use data for appropriate purposes and identify opportunity variables.

Furthermore, Chopra (2015) suggested that the above process can be achieved by using social and/or physical processes and human and computer assistance. The following sub-section looks into different types of appraisal techniques used by organisations across the globe.

2.3.1 Performance appraisal techniques

According to Aggarwal and Thakur (2013), two sets of actions are used in performance assessment: Objective measures, which are directly computable, and Particular actions, which are not directly computable. Furthermore, Aggarwal and Thakur (2013) indicate that performance appraisal can be broadly classified into two categories: traditional methods and modern methods. Scholars seem to agree that traditional methods have been used earlier compared to than the modern methods. The following are performance appraisal Traditional Methods which most scholars seem to agree when measuring performance;

2.3.1.1 Ranking method

Dessler *et al.* (cited by Aggarwal & Thakur, 2013) indicated that the ranking method places employees from greatest to poorest on a particular trait, choosing highest, then bottom, until all are ranked. According to Sing and Vadivelu (2016), this method of appraisal ranks employees from the best performing to the weakest performing. They however argue that this method always enforces rivalry and competition amongst employees and discourages team work.

2.3.1.2 Graphic rating scales

A Graphic rating scale is basically a scale that inclines a number of traits and a range of performanceS for each (Aggarwal & Thakur, 2013). According to Sing and Vadivelu (2016), A graphic rating scale uses the following three BASIC scales in rating the employees: The first one is the 'below expectations' range for poor and unsatisfactory performance. The scale range normally provided for this category is between 0,1 and 3. The second is 'meet expectations for average performance and the scale range will be 4 to 7. The last one is the 'role model for outstanding performance', which is between 8 and 10.

There is however a problem with this method, as there is no clear definition for the rating scale. What is perceived as superior performance as opposed to poor performance lies solely within the superior's discretion (Sing & Vadivelu, 2016).

2.3.1.3 Critical incident method

According to Sing and Vadivelu (2016), this method requires identifying critical job requirements which are vital for the success of a job. They further indicate that this critical incident represents the outstanding (positive) or poor (negative) behaviour of employees on the occupation, for instance, for customer service personnel the following incidents could be identified as customer complaints/ appraisals – polite, punctual and enthusiastic in solving problems as well as turn-over time – very prompt within 10 minutes

2.3.1.4 Narrative essays

The evaluator inscribes a clarification about worker's strong point and flaw points, preceding performance, positional and proposal for his/her development at the end of evaluation time. (Aggarwal & Thakur, 2013). According to Sing and Vadivelu (2016), the disadvantage of this method is subject to inseparability of biasness by the evaluator and highly subjective. Furthermore, they suggests that, in order for the superior to use this method, he/ she must be well versed in all areas, including job knowledge and potential of employee. He/ she must further have knowledge of employees' understanding of the policies, objectives and programs, of the organisation, as well as the employees' relationship with co-workers and managers, and also understand employees' overall preparation, organising and controlling ability as well as attitudes and perceptions of employees in general.

2.3.1.5 Management by objectives (MBO)

According to Hoffmann-Burdzińska and Flak (2016), the author who popularised the idea of MBO was an American guru of management, Drucker. This idea includes three building blocks: object formulation, execution process and performance feedback (Jacobs, Kafry and Zedeck, as cited by Sing and Vadivelu, 2016).

Hoffmann-Burdzińska and Flak (2016) suggest that every employee contributes specific resources and should use them to achieve a common goal. They continue to argue that this is a direction that the efforts of all people in organisations should follow. Their contributions have to match each other so that the result is the whole – without gaps, clashes and needless doubling of people's efforts (Hoffmann-Burdzińska and Flak, 2016).

Furthermore, Hoffmann-Burdzińska and Flak (2016) argue that the philosophy of MBO adapted by organisations is based on two general assumptions. The first one is that managers' behaviour and actions are more important than their personalities. The last one is that behaviour should be defined by results of set goals.

The success of the approach depends on three variables (Ross, cited by Hoffmann-Burdzińska and Flak, 2016), which are: feedback agreed amongst employees in an organisation, support of top executives in the area introduced and consequently implementing the MBO. The last variable is that managers' attitude should be goal-oriented.

2.3.1.6 Behaviourally anchored rating scale (BARS)

According to Sing and Vadivelu (2016), BARS was presented and introduced by Smith and Kendall in 1963 with the consideration of scholars being anxious with the subject of consistency and validity of performance assessments. According to Aggarwal and Thakur (2013), when using BARS the rater will act as observer and not be a judge. They further suggested that BARS helps the rater to pay attention to precise the necessary and unwanted events of work conduct, which can aid as examples in debating a rating.

2.3.1.7 360 degree feedback

According to Aggarwal and Thakur (2013), 360 degree feedback is a popular performance appraisal technique that involves evaluation input from multiple levels within the firm as well as external sources. According to Hosain (2016), traditionally, a performance analysis of an employee was mainly done form one feedback source – his/her immediate supervisor. 360 degree feedback is a relatively new concept that involves a variety of sources such as peers, clients, subordinates, supervisors and even self-rating (self-evaluation) (Hosain, 2016).

Hosain (2016) further indicates that a number of companies have used or are using 360 degree feedback for their performance appraisals and have derived a lot of benefits while others cannot.

Aggarwal and Thakur (2013) have identified the disadvantages with the 360 degree feedback performance appraisal method. Firstly, the method is time-consuming and very costly. The method is also sensitive to organisation and national culture. The 360 degree method could harm the self-confidence of staff members if the feedback is brutal. The method is also difficult to implement.

2.3.1.8 Summary

According to Chopra (2015), performance evaluation is a procedure which includes gaining the data about the employees and then analysing the evidence found to evaluate the performance of employees in an organisation. A satisfactory performance appraisal is very crucial for the success of any organisation. According to Chopra, without a satisfactory, balanced and fair performance appraisal method an organisation will not be able to succeed in today's competitive world.

From the above information as reviewed, the research can now realise that there are many performance appraisal techniques available to be used. The type of the technique employed by an organisation will depend on the firm size and other factors such as the users of the results and more.

2.4 Correlates of job performance

The intention of this section of the literature review is to understand factors that have a mutual relationship or connection with job performance. There has been extensive research performed by scholars to try and understand factors associated with job performance outcomes. Amongst factors that have been studied are the following: personality traits, job experience, job satisfaction and organisational constraints.

The factors listed above are by no means exclusive, as there are many other factors which have a mutual relationship with job performance. The researcher will only try to understand those that are listed above for the purpose of this study.

2.4.1 Personality traits

As has already been discovered above, job performance is defined by scholars as a set of more than one kind of behaviour, thus the researcher intends to understand how a pattern of collective behaviour or characteristics of an individual correlates to job performance. Psychology studies use the term 'Big Five' to describe personality traits in most studies. The aspects are as follows: openness, conscientiousness, extraversion, agreeableness and neuroticism.

2.4.1.1 Openness

According to Huang, Ryan, Zabel and Palmer (2014) openness to knowledge has been labelled as a readiness to develop imaginative answers to difficulties and pursue out change. In the study done by Judge and Zapata (2015) they suggest that openness/ job performance correlation was more optimistic for jobs which highlighted independence in finishing work, and which had strong innovation/creativity requirements.

2.4.1.2 Conscientiousness

Conscientiousness is related with lasting development and objective determined that can benefit an employee's achievement in a particular work environment (Huang *et al.*, 2014). Conscientiousness is a range of concepts that defines a person to be dissimilar to others because they can be self-controlled, accountable to others, meticulous, arranged, and abiding to rules (Roberts, Lejuez, Krueger, Richards and Hill, 2014:1). Judge and Zapata (2015) in their study also discovered that there was a stronger positive relationship of conscientiousness to job performance in professions requiring individuality and jobs requiring strong attention to detail.

2.4.1.3 Extraversion

Extraversion is an attribute related with acting friendly, outgoing, self-confident, chatty and being lively (Barrick & Mount, 1991). According to a study by Huang *et al* (2013), extraversion and job performance correlation was more positive in jobs which necessitated social skills.

2.4.1.4 Agreeableness

Barrick and Mount (1991) suggest that agreeableness is an attribute mostly related with a dimension of being polite, supple, gullible, pleasant, cooperative, forgiving, soft-hearted and tolerant. Judge and Zapata (2015) in their study discovered that agreeableness/job performance was strongly correlated with jobs that need social skills and that comprise handling unfriendly or irritated people.

2.4.1.5 Neuroticism

Neuroticism is related with the predisposition to match or avoid the attendance of likely hazard (Nettle, cited by Huang *et al*, 2013). According to Huang *et al* (2013), in the current work station, the trials employees face and manage are not ones where firms would need them to avoid but some want characters to use accessible resources to accomplish the change.

2.4.2 Job experience

In a study to investigate the connection of job tenure to job performance by Ng and Feldman (2013) the researchers' results suggested that, contrary to shared opinions, job tenure is mainly unrelated to job performance. The researchers argue that the main cause is that, as job tenure increases, workers are expected to become more bored and less motivated at work. They further suggest that the study indicated that experts' devotion is taken away to the importance of rekindling the job motivation of long-tenured employees.

Again, Bertolino, Truxillo and Fraccaroli (2013) investigated how older and younger employees are perceived in relation to the Big Five personality and undertaking and related performance. Founded on the intergroup bias spectacle, the writers also observed whether the respondent's age would adjust these properties. The researchers findings were as they predicted; older and younger workers were seeming inversely in terms of definite Big Five personality factors and organisational citizenship behaviour. These seeming differences, according to Bertolino *et al.* (2013), usually imitated actual age-related alterations on these variables. The researchers however realised that respondents' age moderated numerous of these effects, such as that respondents' perceptions favoured their own age group.

In another study, Kunze, Boehm and Bruch (2013) researched relation between an increasingly aging workforce, and their resilience to change. Their main purpose was to test the 'common belief' that older workers are more resilient to change. The main purpose of the paper was to investigate the age/resistance to change association, bearing in mind tenure and occupational status. According to Kunze *et al.* (2013), contrary to common stereotypes, employee age is negatively related to resistance to change.

In his article "Does age have an effect on the performance at workplace?" Mumtaz investigated whether age does have an impact on job performance. Muntaz (2010) mentioned that there are different viewpoints. Some viewpoints are that age does in fact have a negative impact on job performance.

According to Mumtaz (2010), age is also negativity associated with old (aged) workers evidently deterring the hiring of old workers. Absenteeism of old employees may affect performance at workplace, due to poor health associated with aging and a longer recovery period that old workers needed when injured.

Mumtaz (2010) further indicated that age also affects positively to the performance of employees at the workplace, because an old worker has more additional experience than employees who are younger and less mature. An old worker conveys helpful talents at work like good and better verdict. An old employee is normally committed to do quality of work and have a lower absenteeism rate than employees who have less experience or are younger.

2.4.3 Job satisfaction

Locke (cited by Brown & Peterson, 1993) describes job satisfaction as "an enjoyable or constructive emotional state ensuing from the appraisal of one's job or job experiences." He distinguished job satisfaction from morale by observing that job satisfaction is linked to individual relatively than a group referent and a sequential orientation toward the past and current slightly than headed for the future. Again Churchill and Walker (cited by Brown &

Peterson, 1993) defined the theoretical domain of the job satisfaction concept as "all characteristics of the job itself and the work environment which salesmen find satisfying, fulfilling, and satisfying, or frustrating and unsatisfying."

In a study of a meta-analysis linking traits from the 5-factor model of personality to general job satisfaction by Mount. (2002) applying the model as an organising framework, 334 correlations from 163 independent samples were classified according to the model. Researchers noticed that Neuroticism appeared as the toughest and most reliable correlate of job satisfaction. They also established that it was the Big Five trait that has been studied most often in relation to job satisfaction. Conscientiousness showed the second strongest correlation with job satisfaction, followed by the other two traits – Agreeableness and Openness to Experience– showed comparatively weak correlations with job satisfaction. Finally Openness to Experience displayed a small and highly adjustable correlation with job satisfaction.

In a study done by Zakaria, Hussin, Noordin, Sawal and Zakaria (2011) to explore the association between employees' insight on transparency, equality, controllability and the recompense values of reward practice and employees' performances at TOYOTA 3S Centre SP Selatan Otomobil Sdn Bhd, Kedah in 2009. The researchers established a multifaceted relation between reward practice and worker's job performance i.e. not only the economic rewards but employer's appraisal rewards are also desired for better employee job performance (Imran, Arif, Cheema, Azeem, 2014).

According to Bernadine (cited by Imran *et al.*, 2014), the fringe reimbursements and recompense mentioned to financial returns whereas the concrete benefits are those that an employee received as the section of employer and employee relationship. They argue that these benefits are openly related to job satisfaction which affects the employee job commitment and job performance.

Quartey and Attiogbe (2013) studied the connection between recompense packages and job performance in the Ghana Police Service. They used an exploratory and quantitative research design, a multi-stage sampling procedure was used to select 200 police personnel from the Ghana Police Service. Their study displayed that a decent quantity of recompense packages were occasionally received by the personnel.

The results of this specific study according to the researchers indicated that personnel were somehow satisfied with some of their recompense packages. They also argue that equitable and holistic recompense packages are more likely to attract, develop, motivate and retain qualified and competent personnel and further increase job performance and employee productivity in the Ghana Polices Service.

2.4.4 Organisational constraints

According to Rana and Pandya (2016), the output of workers is is resolute to increase exceedingly by the environment of the workplace. Rana and Pandya (2016) indicate that the work environment includes all the aspects which act and respond on the body and mind of an employee. The researchers argue that besides organisational thinking, the physical, mental and social environment have an emotional impact on the job satisfaction of the employees of a firm, which can lead to better effectiveness and increased productivity. The major purpose is to generate an environment which guarantees the ultimate ease of effort and eliminates all the causes of frustration, anxiety and worry (Rana & Pandya, 2016).

According to Desson and Clouthier (2010), organisational culture – the "personality" of an organisation that guides how employees reflect and act on the job – is vital to the standards, principles, inter-personal behaviours and approaches to stakeholders that regulate how the firm does its job. Culture is a key influence, not only in attaining organisational objectives, but in enticing and keeping needed employees, generating a positive public image and building humble relationships with stakeholders (Desson & Clouthier, 2010).

The work culture can associate the social relation at workplace and also preserve the affiliation between colleagues, supervisors and the organisation. It defines the neighbouring circumstances in which workers are working together (Rana & Pandya, 2016). A satisfied, happy and hardworking employee is the biggest asset of any organisation, and effective human resource management and a healthy work environment or culture affects not only the performance of the employee and th organisation, but also the growth and development of the entire economy (Rana & Pandya, 2016).

2.5 Concept of pay performance in Bigen Africa

Management performance takes the form of a procedure by which the outputs of staff members are controlled and measured so that the effectiveness of the firm is improved and that staff members are rewarded as deserved (Khan & Ukpere, 2014:661). Khan and Ukpere (2014) further wrote that performance appraisals are usually done every three months and that the appraisal involves a straightforward indication of production for the past period, between the supervisor and the staff member. The procedure takes place in a way that will assist in identifying whether the staff member needs to improve certain skills (Khan & Ukpere, 2014:661). Short-term appraisals are permissible as regularly as probable to support managers in handling performance positively and permit staff members the opportunity for constant development (Noe *et al.,* as cited by Khan & Ukpere, 2014:661).

However, at BAS, performance reviews are conducted twice per year. Once the employee achieves outstanding performance he/she is rewarded accordingly, using the short-term incentive scheme of the Group. According to Oosthuizen and Nienaber (2010:41), the lack of engineering services in South Africa has resulted in the government having to implement programmes such as JIPSA, which recognised five essential skills, of which engineering was one. Henceforth qualified employees with engineering qualifications should be rewarded accordingly before deciding to work abroad.

2.6 Peculiar job environment of engineers

Built environment professionals such as engineers in South Africa are required to register with ECSA (2005). According to Segment 20 of the CBE Act (43 of 2000), the Council needs to exactly classify work which engineers should carry out.

Furthermore, according to ECSA (2005), engineering work is work which, in terms of the proposed regulations and with respect to Table 2-1, includes carrying out work of several features (column 1), lists the type of work (column 2), entails roles that can be performed (column 3) and minimum levels of competencies (column 4).

Table 2-1: What constitutes engineering work.

Source: ECSA (2005)

1	2	3	4
Characteristics	**Types of work**	**Functions**	**Competencies**
Involves one or more of the following: • investigate and explain problems and design solutions; • application of knowledge and engineering technology, based on mathematics, basic sciences and engineering sciences, information technology as well as specialist and contextual knowledge; • management of engineering works; • addressing the impacts of engineering work; or • exercising judgment and taking responsibility for engineering work.	Falls within the scope of the following: • transportation engineering, civil works and structural works • mechanical systems • works for the harnessing of energy, electrical power systems and electronic systems • process systems and mining processes or activities • treatment of any substances, building services and lightning protection measures • overseeing ECSA-accredited programmes at the exit level and mentoring of candidate engineering practitioners.	Requires in its performance any of the following: • design • planning • investigating, advising, costing, reporting and auditing • improvement or optimisation • management, procurement and maintenance • implementation, application of the results of research and development and management of risk • communication of the impacts and outcomes, education, training and mentoring of engineering personnel.	Requires in its performance minimum competencies relating to the: • description, examination and analysis of engineering problems • design or development of solutions to engineering problems • conduct of engineering activities in an ethical manner.

The organisation under investigation has built environment professionals who are registered with ECSA and candidates registered professionals that are in the processes of registering with the Council. Different professionals, such as civil, structural, mechanical and electrical engineers are employed by Bigen Africa. The researcher focused on the peculiar working environment of mostly civil engineers. The study was done just in one organisation; the researcher assumed that the organisation had projects whereby the scope of the works overlaps the necessary skills needed, and as such an environment of one profession was assumed to be similar to the other professions. A very low number of town planners were also part of the study since they were working closely with civil engineers.

According to Career Planet: South Africa (CPSA, 2016), civil engineering is a term used to describe a large variety of activities which encompass the manufacturing and construction of things which include: the designing, planning, maintenance/servicing and management of usually very large projects/developments and so forth. Civil Engineers are extremely skilled and can be found working on buildings, harbours, bridges, water supplies, roads, airports, sewerage systems, tunnels, dams, large scale housing developments, land reclamation, amongst others. (CPSA, 2016).

Furthermore, CPSA (2016) argues that, depending on the type of work, civil engineers may work anywhere – from quiet modern offices to remote areas in rugged terrain. The latter option may require lots of traveling from one site to another.

Young civil engineers usually work under the supervision of an experienced engineer and will be gradually given more responsibilities as they gain experience (CPSA, 2016).

A civil engineer, according to CPSA (2016), is involved in meeting with clients, government officials, architects, urban planners, environmentalists and so forth. He/ she works with a team – planning and designing the project, and also manages the project and the workforce. The professional in many cases travels between sites and makes sure everything is going according to plan. Civil engineers deal with unforeseen problems and have to make quick decisions due to problems/issues arising on construction sites. Some of the tasks that the civil engineer handles involve the provision of services and managing and repairing sites/roads/dams and more. Another task that civil engineers perform is keeping other officials updated with construction progress on site. CPSA (2016) further indicates that the civil engineer reads impact studies, plans, and other documentation and keeps up to date with local and national building regulations. One of the critical tasks is constantly managing safety issues on site.

The information above, as noted from both ECSA and CPSA, gives the researcher the understanding of the peculiar environment that engineers are faced with on a day-to-day basis.

The job performance section on the questionnaire was informed by the tasks performed by civil engineers on a daily basis as captured from the relevant sources.

2.7 Chapter summary

Literature to address the four sub-objectives under investigation was reviewed in this chapter. What the literature review seemed to suggest was that organisations seem to be facing issues such as retaining employees on a daily basis in general. It is essential that organisations understand the purpose and value, the responsibilities and requirements of factors associated with job performance as well. The problems encountered with factors associated with job performance should be addressed in order to enhance the performance of each and every employee within the organisation. This will in turn assist the organisation to achieve its strategic goals. In addition, such understanding may help to address the apparent dissatisfaction which maybe expressed by employees.

CHAPTER 3

RESEARCH METHODOLOGY3.1 Introduction

In the previous chapter a detailed literature review was discussed which provided an answer to the identified research problems. This current chapter attempt to unveil the methods and design that is applicable in the study. This will include a step- by-step process ranging from the designing of the study to all the methods used during data collection and analysis. The other main discussion will be on the study area, the population of the study, sampling procedure and sample size, research ethics, delimitations and the instrument(s) used in this research.

3.2 Study area

Established in 1971, the main activities at the branches of Bigen Africa include infrastructure development operating in the health, education, agriculture, water and sanitation, property, energy, road, rail and mining sectors. The study was conducted in the Mahikeng and Pretoria offices only. The researcher initially wanted to conduct the study in the Mahikeng and Rustenburg areas; however, due to two reasons this was not possible. The first reason was that the total number of engineers in these two offices was very low and the second reason being that the researcher struggled to contact the Rustenburg office.

"Bigen Africa is constantly identifying changing industry needs and adapting to meet them, to position itself as the thought-leading multinational infrastructure development consultancy with core capabilities in engineering, management consulting and development finance," says Dr Snowy Khoza, CEO (Bigen, 2014).

3.3 Population of study

A total number of 50 sets of questionnaires were distributed to the respondents in this study. All respondents for this study are built environment employees who are employed by Bigen Africa in the Mahikeng and Pretoria offices. However two of the questionnaires returned were discarded because those particular respondents were supporting staff and not technical staff. The population of the study included engineers, technologists, technicians, artisans as well as any supervisors who had the background study in any engineering field and more specifically in civil engineering. The research population that was studied included all technical employees, whether or not they participated in the process. This enabled the researcher to generalise the findings from the study.

3.4 Sampling procedure and sample size

This study pertained to the Bigen Africa in Mahikeng and Pretoria. Initially the study was intended to only do the survey in Mahikeng and Rustenburg; however, there were not enough respondents for the study to generate credible results. The Pretoria office formed part of the study due to the low number of engineers in Mahikeng and Rustenburg. Rustenburg could not be contacted easily and the office was never included in the study. Technical staff who are employed on different types of employment contract formed part of the study. There were in total 38 male and 12 female employees that were given questionnaires to complete. However, the two female respondents questionnaire were discarded, since they were part of supporting staff and not engineers.

All these employees were considered as respondents for this study. As Begin Africa is the leading engineering firm in SA as it is, large in market share in size and infrastructure development, the employment in this firm is spread over different places in the sub-Saharan region, and hence it was felt that the firm could be considered for an in-depth analysis. This study relied upon the primary data collected by administering the questionnaire method and the completed questionnaires were edited and codified. The researcher only used the quantitative method for this study. The information was processed in to a master table. Various tables, incorporated in this study, were prepared on the basis of this master table.

3.5 Data collection

The primary instrument used for data collection for this study was the questionnaire. The questionnaire method is commonly used, as it is cost-effective, saves time and data can be collected at short notice. Questionnaires can be used to measure demographic variables and to assess employees' preferences. In order to construct questionnaires that would result in a reliable and valid measurement, the questions in this study were divided into four parts so that they could be easily understood, specific and as clear as possible to the respondents.

Data were collected using a structured questionnaire as mentioned above, which was made up of four sections, namely personal characteristics, job performance, job satisfaction and organisational constraints. The part "A" on personal characteristics elicited information on variables such as age, gender, marital status, educational level, job tenure, work experience, job category, job position, salary grade, studying for higher degrees, number of supervisees, membership of professional bodies, areas of specialisation, type of employment, religion, and number of dependents. In part "B" the job performance level amongst the respondents was tested based on daily tasks that civil engineers are involved with. A total number of 15 questions based on job performance were selected and the respondents were requested to answer the

questions confidentially. The 15 items anchored on the 5-point Likert-type scale of Not role (1), Occasionally (2), Fairly regularly (3), Most regularly (4), Regularly (5). More variation was employed by the researcher on job performance questionnaire since the study not only included engineers but also technologist and technicians. The scale on job satisfaction which was part "C" of the questionnaire consisted of 35 items anchored on the 5-point Likert-type scale of Not satisfied (1), Least satisfied (2), Fairly satisfied (3), Almost satisfied (4), Most satisfied (5). These scores were reversed for negative statements. The maximum score on the job satisfaction scale is 175, with 35 being the minimum.

The Likert scale was used to measure and evaluate the respondents' answers in Part "D". The choices of responses for each of the statement designed in Part D was constructed using the 5-point Likert scale to measure the impact of an organisational constraint incidence occurring in the job performance of the respondents. The type of rating scale used was 'Agreement' of the incidence occurring or not, and if the incidence was occurring, the respondent indicated the impact it had on his/ her job performance.

3.6 Data analysis

After obtaining data the first step was coding the data. This involved allocating numbers to the participants' responses. After the allocation of numbers data were then entered into databases. During this step the researcher decided how to code non-respondents. There were only two non-responsive participants. The non-responsive participants were support staff and were not supposed to complete the questionnaire in the first place.

3.7 Editing data

After coding and keying the data the researcher edited the data accordingly. Data was checked for inconsistency, illogical and illegal data and omissions. As an example outliers were expected to be part of illogical data collected. Outliers were discarded, as this was going to lead to incorrect analysis.

Simple tools of data analysis such as frequency distributions, percentages, and analysis of variance were used, since the data collected were descriptive. They were several variables involved in the study. The researcher needed to know how any one variable affected the other. The relationship between any two variables was analysed and interpreted, hence the researcher used these tools of data analysis.

3.8 Research ethics

The researcher will always adhere to the rules of research as set out by the "Research Regulatory committee (RERC) and the "Research Ethics Committees" (REC) of the North-West University. The most ethical issue to be dealt with was the ethical treatment of participants. For this reason all participants were informed about the benefits of the study, participants' rights and protection and their consent was obtained by fully disclosing the procedures and requesting their permission to continue (Cooper & Schindler, 2006:117).

The researcher will always protect the anonymity of each and every respondent that took part in the survey. The identification of the participants will be restricted for access in order to protect all respondents that took part in the study.

3.8 Delimitations

In most cases the researcher will find out data is missing when attempting to answer and analysing data. In this study list-wise deletion was used. According to Cooper and Schindler (2006:455), with list-wise deletion all cases with missing values are deleted from the sample census if they have missing values on any variables in the analysis. The list-wise method is the most appropriate when data are missing at random.

Participants may also wrongly interpret some of the questions raised, which in turn will result in the answering what was not asked. Hence the list-wise deletion will become helpful to enable the researcher to scrutinise and peruse the data received. The researcher based his study in Bigen Africa in Mahikeng and Pretoria. The study was limited on analysing the built environment professionals' traits, job experience and organisational constraints. Organisations differ as far as their constraints are concerned. Also Bigen Africa has other branches around South Africa and across the African continent, and the leadership style could result in different findings. Therefore the findings of this study were not be generalised.

3.9 Chapter summary

The steps that were followed during the process of data collection included the questionnaires completed by participants covering their perceptions, of which contents were covered in the literature review, statistical data were collected and analysed, trends and patterns were analysed to look out for any problematic areas, and these were addressed inferences were made from the summarised results in order to understand factors associated with performance amongst respondents.

This chapter dealt with and justified the research methodology the researcher used for this study. The research methods were specified and the reasons for choosing them over other possible existing ones were discussed. This section of the study described the research design strategy and how it was followed in order to draw inferences to come up with findings as initially intended for this study.

The following chapter deals with the presentation of the collected data as well as the interpretation thereof.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter represents the result of the study from the statistical analysis conducted on the collected data. The first part of this chapter will present the personal characteristics of the respondents of this research. The validity of measurement was determined by analysing the results attained from the reliability analysis, factor analysis and descriptive analysis on the measurement. The final part of this chapter focuses on the results of the correlation testing and hypotheses testing.

4.2 personal characteristics

From Table 4-1 below the results on age shows that 27,1% of BAS employees were between 31 and 35 years of age. According to the Department of Labour (DOL, 2009) the average age for engineers is still considered as young compared to that of managerial level staff. The researcher felt that BAS has the capability of attracting younger and energetic engineers, whereas 6,3% were in the age range of 56 to 65. There is wide belief that there is a major shortage of older and experienced professionals in South Africa in general DOL (2009). Also according to the DOL (2009), the greatest population density of engineers and technologists occurs between the age 35 and 39 – more than half (55,7%). The report indicated that a major shortage of older and experienced professionals is noticed – only 13,01% of engineers and technologists are in the age category 50–60+ according to the report.

The results on gender of employees shows 79,2% were males and about 20,8% were females. Males are more dominant in built environment activities than females. The observation concerning gender at BAS was that the built environment is generally dominated by males rather than females. Bowen, Edwards, and Lingard (2013) reported that the majority of the engineers (82%) are male.

The results further showed that most respondents (47,9%) had either a BTech or other degree in engineering, while. 6,3% had a post-graduate degree. The observation concerning the education level was that the average built environment professional had a BTech or other degree in engineering. ECSA (2013) reported that the majority of engineers (61,1%) had a university degree in engineering as a first qualification.

The result further showed that 37,5% of respondents have had a job tenure at BAS of between 1 and 5 years, while only 4,2% had stayed at BAS for more than 26 years. The observation

concerning job tenure at BAS was that the younger engineers are more in number compared to the older engineers. In a study amongst engineers working in a South African consulting company, Gruber (cited by Marais, 2013) found that respondents were more likely to stay at the company when they were motivated at work, satisfied, aligned with the corporate culture and value system, adequately remunerated, able to enjoy sound relationships with superiors, could learn in a learning organisation, were challenged at work, autonomous and able to satisfy higher-order needs outside their work life.

Many of the respondents (25%) had between 6 and 10 years' work experience, whereas 12,5% of employees had more than 20 years' work experience. This is an indication that BAS had more young to middle age engineers than older experienced engineers. In a study done by RAE (2012), Lawless was cited indicating that a severe shortage of engineers was identified in both private and public sectors. In the private sector over 80% of consulting practices were found to be seeking experienced engineers.

The majority of respondents (50%) earn more than R400 000, whereas 4,2% of the employees earn less than R100 000 per annum. The table shows the distribution of staff members studying for higher degrees, while 89,6% of the respondents were not studying for higher degrees. This shows that the employees were not seeking to update their qualifications. About 50% of respondents had membership of professional bodies and one of the respondents was a member of four professional bodies. According to DOL (2009), registration with the professional body is not compulsory as is the case with other professions such as medical doctors or psychologists. This simply means that the number of engineering professionals registered with professional bodies does not compare to the number employed according to official labour market statistics.

All respondents (100%) were involved in the built environment. This means that they were professional technical staff members. All engineers employed by BAS were carrying out work which involved professional technical work. DOL (2009) showed that almost 90% of the respondents who were qualified in the engineering field were working as engineers, technologists and technicians.

The study showed that 50% of respondents earned more than R400 000, and only 4,2% earned below R100 000. The observation concerning salary grade at BAS was that the staff members that earned less than R100 000 were draughtsman and had only matric as the highest qualification. According to DOL (2009), the attraction and retention of scarce and critical skills is still the single biggest driver of a remuneration policy in private, public and state-owned enterprises and the shortage of engineering professionals is impelling organisations to consider higher salaries.

About 89,6% of respondents were not studying further, with only 10,4% currently studying further. The finding indicated that most of the engineers were satisfied with either the BTech or engineering qualification they possess. The results of the NESS that was done by ECSA (2014) revealed that almost 42% of the respondents obtained an additional or postgraduate qualification in engineering after their first engineering qualification.

While 35,4% respondents were at the level of a project manager, only 2,1% were senior design engineers. The observation is that most of the engineers are hired to implement engineering solutions rather than designing. The NESS done by ECSA (2014) highlighted that the main engineering functions in which qualified persons were involved are: construction management (5,3%), contract management (5,8%), project management (12,6%), and site supervision (4,8%).

While 60,4% respondents had between 1 and 6 supervisee, only 8,3% had between 6 and 10 supervisees. The observation was that most of the staff of the respondents were project managers and this could mean that they worked with outside clients and had less need of having a support staff under them.

While 50,0% respondents were not members of any professional bodies, 2,1% were members of three different professional bodies. The reason for this could be that, before a professional person qualifies to join any professional body, he or she must have a certain number of years of work experience after obtaining the necessary qualification. According to DOL (2008), registration with the professional body is not compulsory as is the case with other professions such as medical doctors or psychologists. This simply means that the number of engineering professionals registered with professional bodies does not compare to the number employed according to official labour market statistics.

While 89,6% respondents were civil engineers, only 2,1% were town planners. The observation made was that most of the respondents were in the field of civil engineering and that BAS' main business was in infrastructure development. The results of the NESS that was done by ECSA (2014) indicated that the high percentage of civil engineers can be ascribed to the fact there are often statutory and company requirements to register with professional bodies in that discipline.

While 93,8% respondents were permanently employed by BAS, only 6,3% had fixed-term contracts. This gives an indication that most South African engineering firms prefer to have permanent contracts with staff members in order to ensure them of job security. The results of the NESS that was done by ECSA (2014) illustrated that 79% of the respondents were permanently employed, while 11% worked on a contract basis. This survey has shown that there was a secure state of employment in the engineering and related industry in South Africa.

It was also found that most respondents were Christians (91,7%), as compared to other religions, One respondent indicated that he was Hindu, while other respondents did not indicate their religion, but only marked Other.

Table 4-1: Personal characteristics.

Variable	Frequency	Percentages
Age		
< 25 years	5	10,4
25–30 years	11	22,9
31–35 years	13	27,1
36–45 years	12	25,0
46–55 years	4	8,3
56–65 years	3	6,3
Gender		
Female	10	20,8
Male	38	79,2
Educational level		
Matric	4	8,3
Diploma	18	37,5
BTech/Other degree	23	47,9
Post-graduate degree	3	6,3
Job tenure at Bigen Africa Services (years)		
1–5	18	37,5
6–10	17	35,4
11–15	9	18,8
16–20	2	4,1

21–25	0	0
26–30	2	4,2
Work experience		
< 5 years	9	18,8
6–10 years	12	25,0
11–15 years	12	25,0
16–20 years	9	18,8
> 20	6	12,5
Job category		
Technical staff	48	100
Job position		
Project director	13	27,1
Project manager	17	35,4
Senior design engineer	1	2,1
Design engineer	5	10,4
Draughtsman	7	14,6
Engineer's representative	5	10,4
Salary grade		
Below R100 000 per annum	2	4,2
R101 000–R200 000 per annum	3	6,3
R201 000–R250 000 per annum	4	8,3
R251 000–R300 000 per annum	2	4,2
R301 000–R400 000 per annum	13	27,1
Above R400 000	24	50
Studying for higher degree		

Yes	5	10,4
No	43	89,6
Number of supervisees at work		
None	15	31,3
1–5	29	60,4
6–10	4	8,3
Membership of professional bodies		
None	24	50
ECSA	12	25
ECSA and SAICE	11	22,9
ECSA, SAICE and WISA	1	2,1
Area or specialisation		
Civil engineering	43	89,6
Town planning	1	2,1
Asset management	4	8,3
Type of employment		
Permanent	45	93,8
Temporary	0	0
Fixed-term contract	3	6,3
Religion		
Christian	44	91,7
Muslim	0	
Other	4	8,4

4.3 Job performance of engineers at BAS

At BAS engineers carry out varying task. It was found in the table below that 60,5% of the respondents performed the task of maintaining project schedule by monitoring project progress, on a regular basis, while 39,5% of the respondents were not performing this task. Thwala, Ajagbe, Enegbuma and Bilau (2012) suggested that project performance can be measured and evaluated using a large number of performance indicators that could be related to various dimensions (groups) such as time cost, quality, client satisfaction, client changes, business performance, health and safety.

About 60,4% of the respondents performed the task of controlling project costs by monitoring expenditures and managing contractor contracts on a regular basis, while 39,6% of the respondents were not performing this task. This indicates that most of the respondents were project managers at BAS and this is in line with the previous analysis. A study undertaken by Gewanlal and Bekker (2015) examined how the project managers physically contributed to the success of the project by their involvement and decision-making on a daily basis. The researchers found that management of cost, time and quality parameters played a major role in influencing this group. The factors 'involvement in project' and 'ability to determine cost/time trade-offs on project' were the two most important factors in this group.

About 60,4% of the respondents performed the task of preparing project status reports by collecting, analysing, and summarising information and trends on a regular basis, while 39,6% of the respondents were not performing this task. This indicates that most of the respondents were project managers at BAS, as preparing project status reports is one of the most crucial task a project manager has to perform on a regular basis. A study by Burger, Verster and Zulch (2015) in which they analysed the importance of technical knowledge for effective communication in order to collect and distribute information, for performance reporting and managing stakeholders proved that technical knowledge was very important for a project manager to facilitate project communication.

Table 4-2: Job performance of engineers at BAS.

Variables	Not my role	Occasion -ally	Fairly regular	Regularly	Most regular
Completes engineering projects by organising and controlling project elements	11(22,9)	5 (10,4)	11 (22,9)	12 (25)	9 (18,8)
Develops project objectives by reviewing project proposals and plans by discussing with clients	9 (18,8)	9 (18,8)	12 (25,0)	7 (14,6)	11 (22,8)
Determines project responsibilities by identifying project phases and activities; assigns junior staff members to phases and activities	9 (18,8)	9 (18,8)	9 (18,8)	8 (16,5)	13 (27,1)
Reviews bids from contractors and makes recommendations to clients	11 (22,9)	11 (22,9)	11 (22,9}	7 (14,6)	8 (16,7)
Determines project specifications by studying structure needed by clients requirements and performance standards	6 (12,5)	7 (14,6)	15 (31,2)	14 (29,2)	6 (12,5)
Completes feasibility studies and prepares cost estimates	7 (14,6)	12 (25,0)	12 (25,0)	11 (22,9)	6 (12.5)
Confirms structure performance by conducting necessary tests to find out specification conformance	8 (16,6)	11 (22,9)	14 (29,2)	12 (25,0)	3 (6.3)
Determines project schedule by studying project plan and specifications; calculates time requirements; and sequences project activities	3 (6,2)	5 (10,4)	13 (27,1)	21 (43,8)	6 (12.5)
Maintaining project schedule by monitoring project progress	0 (0,0)	2 (4,2)	17 (35,3)	15 (31,2)	14(29,2)
Controls project costs by monitoring expenditures; manages contractor contracts	3 (6,2)	7 (14,6)	9 (18,8)	18 (37,5)	11 (22,9)
Prepares project status reports by collecting, analysing, and summarising information and trends	1 (2,1)	5 (10,4)	13 (27,1)	16 (33,3)	13 (27,1)
Maintains safe and clean working environment by enforcing procedures, rules, and regulations	5 (10,4)	6 (12,5)	15 (31,3)	14 (29,2)	8 (16,8)
Prepares engineering documents including structural drawings, contract proposals, material lists, reinforcements, and structural specifications for a wide variety of projects	4 (8,3)	15 (31,3)	14 (29,2)	10 (20,8)	5 (10,4)

Reviews and checks structural designs, calculations, contractors' shop drawings, and engineering drawings for construction, repair and maintenance projects	8 (16,7)	17 (35,4)	9 (18,8)	9 (18,8)	5 (10,4)
Selects and uses computer software to develop engineering and mathematical analysis of design problems	5 (10,5)	13 (27,1)	16 (33,3)	10 (20,8)	4 (8,3)

Table 4-3: Distribution of engineers' job satisfaction.

Items	**Not satisfied**	**Least satisfied**	**Fairly satisfied**	**Almost satisfied**	**Most Satisfied**
	1	**2**	**3**	**4**	**5**
Pressure on improved performance	0 (0,0)	4 (8,3)	22 (45,8)	18 (37,6)	4 (8,3)
Infrastructure for work	0 (0,0)	2 (4,2)	15 (31,3)	26 (54,2)	5 (10,4)
Working hours	0 (0,0)	3 (6,3)	20 (41,7)	15 (31,3)	10 (20,8)
Academic advancement	0 (0,0)	7 (14,6)	31 (64,6)	9 (18,8)	1 (2,1)
Professional advancement	0 (0,0)	8 (16,7)	26 (54,2)	13 (27,1)	1 (2,1)
Relationship with manager	0 (0,0)	2 (4,2)	17 (35,4)	21 (43,8)	8 (16,7)
Relationship with subordinates	0 (0,0)	1 (2,1)	13 (27,1)	24 (50,0)	10 (20,8)
Appraisal system	0 (0,0)	11 (22,9)	34 (70,8)	3 (6,3)	0 (0,0)
Reward system	1 (2,1)	18 (37,5)	25 (52,1)	4 (8,3)	0 (0,0)
Salary	1 (2,1)	8 (16,7)	27 (56,3)	11 (22,9)	1 (2,1)
Company policies	1 (2,1)	9 (18,8)	30 (62,5)	6 (12,5)	2 (4,2)
Morale within organisation	2 (4,2)	16 (33,3)	20 (41,7)	9 (18,8)	1 (2,1)
Bonuses	4 (8,3)	4 (8,3)	26 (54,2)	3 (6,3)	1 (2,1)
Workload	0 (0,0)	2 (4,2)	35 (72,9)	9 (18,8)	2 (4,2)
Job status/promotion	4 (8,3)	11 (22,9)	23 (47,9)	8 (16,7)	2 (4,2)
Administrative issues	0 (0,0)	10 (20,8)	26 (54,2)	12 (25,0)	0 (0,0)

Vacation leave	0 (0,0)	4 (8,3)	17 (35,4)	21 (43,8)	6 (12,5)
Group scheme	0 (0,0)	1 (2,1)	25 (52,1)	17 (35,4)	5 (10,4)
Medical aid	1 (2,1)	5 (10,4)	18 (37,5)	19 (39,6)	5 (10,4)
Loan schemes	1 (2,1)	1 (2,1)	24 (50,0)	18 (6,3)	0 (0,0)
Working conditions	0 (0,0)	0 (0,0)	22 (45,8)	20 (41,7)	6 (12,5)
Work equipment (resources)	0 (0,0)	0 (0,0)	22 (45,8)	21 (43,8)	5 (10,4)
Response to challenges	1 (2,1)	1 (2,1)	17 (35,4)	25 (52,1)	4 (8,3)
Budget	1 (2,1)	0 (0,0)	30 (62,5)	15 (31,3)	2 (4,2)
General operations	1 (2,1)	0 (0,0)	23 (47,9)	21 (43,8)	3 (6,3)
Office accommodation	1 (2,1)	1 (2,1)	20 (41,7)	21 (43,8)	5 (10,4)
Conflicting orders	1 (2,1)	2 (4,2)	20 (41,7)	20 (41,7)	5 (10,4)
Promotions	3 (6,3)	20 (41,7)	12 (25,0)	10 (20,8)	3 (6,3)
Sick leave	1 (2,1)	2 (4,2)	22 (45,8)	16 (33,3)	7 (14,6)
Qualification for job	3 (6,3)	7 (14,6)	22 (45,8)	14 (29,2)	2 (4,2)
In-service training	4 (8,3)	11 (22,9)	25 (52,1)	6 (12,5)	2 (4,2)
Job security	2 (4,2)	0 (0,0)	23 (47,9)	17 (35,4)	6 (12,5)
Job specialisation	1 (2,1)	2 (4,2)	20 (40,7)	17 (35,4)	8 (16,7)
Flexibility and initiative	1 (2,1)	5 (10,4)	14 (29,2)	19 (39,6)	9 (18,8)
Relationship amongst technical staff and supporting staff	1 (2,1)	0 (0,0)	15 (31,3)	26 (54,2)	6 (12,5)

4.4 Distribution of engineers' job satisfaction

The Table 4-3 above shows the extent of job satisfaction of the respondents. The scale was made of 37 items covering work, work environment, reward system, working conditions and relationship with co-workers. Employees indicated their satisfaction with the items on the scale using a 5-point scale of Not satisfied, Least satisfied, Fairly satisfied, Almost satisfied, Most satisfied. The respondents were satisfied with their relationship with subordinates (70,8%) and

support staff (66,7%), the infrastructure for work (64,8%) and the relationship with manager (60,5%). It is important to note that many items had a low percentage in the non-satisfaction category, which agrees with the satisfaction category. The degree and proportion of non-satisfaction on many of the items on the scale was lower than the number of items respondents were satisfied with. Prominent amongst this were job promotion (48%) the reward system (37,5%), the morale within staff (37,5%) and in-service training (31,2%).

The observation concerning infrastructure for work at BAS was that the company is dedicated to provide whatever infrastructure is needed for staff to carry out tasks. This is in contrast with Naseem *et al.* (2012:143), where the researchers indicated that in spite of the significance of the work environment, many organisations neglect this important issue of a good work environment because it needs time as well as money to provide proper infrastructure; thus these organisations end up having an unattractive boring and unproductive workplace.

The observation concerning the relationship with subordinates at BAS could be that most engineers were employed as project managers and most of the time they were on construction sites. Rana and Pandya (2016) suggest that the work culture can implicate the social relation at the workplace and also maintain the relationship between colleague, supervisor and the organisation. It describes the neighbouring circumstances in which employees are working together.

While 39,6% of respondents were least satisfied with the reward system, about 8,3% were satisfied. This is an indication that BAS current reward system does not go well with a certain slight slide towards a significant number of engineers, although this is not a very high number. The researchers Imran, Arif, Cheema and Azeem (2014) found a complex relation between reward practice and employees' job performance, i.e. not only the monetary rewards, but the employer's appraisal rewards are also needed for better employee job performance

About 37,5% of respondents were least satisfied with the morale within the organisation, while only 20,9% were satisfied. The observation concerning morale within the organisation at BAS was that project managers did not spend more time in the office but rather outside. They could be involved in on-site activities more than what is happening in the actual base. Locke (cited by Brown & Peterson, 1993) defined job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences". He differentiated between job satisfaction and morale by noting that satisfaction has an individual rather than a group referent and a temporal orientation toward the past and present rather than toward the future.

While 48% of the respondents were least satisfied with the promotions within BAS, only 27,1% were satisfied. The observation concerning promotions at BAS could be that most engineers

could spend a certain number of years employed as project managers before they could be promoted to project director level. Heywood *et al.* (2016:6) state that, on the one hand, performance appraisals can be integrated closely to the on-going compensation systems of firms. For example, they claim that annual bonuses may be based on appraisals. On the other hand, they further suggest that performance appraisals may be used to provide long-term incentives and to improve the functioning of the internal labour market of the firm; that this might include the determination of promotions to jobs with greater responsibility and greater earnings.

The study showed that 39,6% of respondents were highly satisfied with the relationship amongst technical staff and supporting staff. Only 2,1% were least satisfied. This is an indication that engineers at BAS were happy with the overall support they received from management since the above analysis also gave an indication that the engineers had all the infrastructure they needed to complete tasks. Rana and Pandya (2016) indicate that a satisfied, happy and hardworking employee is the biggest asset of any organisation, and that an efficient human resource management and healthy work environment or culture affect not only the performance of employee and organisation; these also affect the growth and development of the entire economy.

4.5 Organisational Constraints

The following Table 4-4 below shows the negative impact of organisational constraints on the job performance of engineers. The choices of responses for each of the statement designed in Part D was constructed using the 5-point Likert scale to measure the impact of an organisational constraint incidence occurring in the job performance of the respondents. The type of rating scale used was 'Agreement' of the incidence occurring or not, and if the incidence occurred, the respondent indicated the impact it had on his/ her job performance.

About 95,8% indicated that they had not developed physical symptoms from work that warranted a doctor's attention. The study showed that 93,7% of respondents indicated that BAS did provide them with functional equipment to enable them to complete tasks. It was also revealed that 89,6% of respondents did receive positive feedback from their supervisors. About 47,9% of respondents gave an indication that time given by the supervisor to complete tasks was not adequate; this, however, did not have a very high negative impact on job performance.

The observation concerning respondents that have not developed physical symptoms from work that warranted a doctor's attention at BAS could have been due to safety procedures the company has in place. According to Rana and Pandya (2016), the productivity of employees is determined highly by the environment in which they work. The researchers indicate that work environment involves all the aspects which act and react on the body and mind of an employee.

The observation concerning BAS providing engineers with functional equipment further indicated that engineers were really supported by all means to carry out tasks. This is in agreement with Wiklund and Shepherd (cited by Lonial & Carter, 2015), who indicated that companies use their physical, human, and organisational assets to develop long-term competitive advantages and, in turn, achieve superior company performance

Table 4-4: Organisational constraints.

	Incidence		**Severity of constraints**					
Variables	**Yes**	**No**	**Very high**	**High**	**Medium**	**Low**	**Very low**	**Non response**
The company fails to provide the necessary information to enable me to complete my tasks	7 (14,6)	41 (85,4)	0 (0,0)	4 (8.3)	2(4,2)	1 (2,1)	0 (0,0)	41 (85,4)
The company does not provide me with functional equipment to enable me to complete my tasks	3 (6,2)	45 (93,8)	0 (0,0)	0 (0,0)	2 (4,2)	1 (2,1)	0 (0,0)	45 (93,7)
There are interruptions from co-workers when performing tasks	17 (35,4)	31 (64,6)	0 (0,0)	3 (6,3)	9 (18,8)	4 (8,3)	1 (2,1)	31 (64,5)
There are disagreements between co-workers when working in a team	10 (20,8)	38 (79,2)	0 (0,0)	0 (0,0)	6 (12,5)	2 (4,2)	2 (4,2)	38 (79,2)
The time given by the supervisor to complete tasks is not adequate	23 (47,9)	25 (52,1)	2 (4,2)	14 (29,2)	5 (10,4)	1 (2,1)	1 (2,1)	25 (52,0)

I have developed physical symptoms from work that warranted a doctor's attention	2 (4,2)	46 (95,8)	0 (0,0)	1 (2,1)	0 (0,0)	2 (4,2)	0 (0,0)	45 (93,7)
There are unforeseen problems on site that I must handle	15 (31,3)	33 (68,8)	2 (4,2)	3 (6,2)	8 (16,7)	1 (2,1)	0 (0,0)	34 (70,8)
Travelling between sites rather than working in the office	11 (22.9)	37 (77.1)	0 (0,0)	4 (8,3)	5 (10,4)	1 (2,1)	0 (0,0)	38 (79,2)
I am not clear about my duties and responsibilities	5 (10.4)	43 (89.6)	0 (0,0)	0 (0,0)	2 (4,2)	5 (10,4)	0 (0,0)	41 (85,4)
I do not receive positive feedback from my supervisor	5 (10.4)	43 (89.6)	0 (0,0)	0 (0,0)	1 (2,1)	2 (4,2)	0 (0,0)	45 (93,7)

4.6 Regression Analysis

Relationship between socio-economic characteristics and job satisfaction

The results of the multiple regression analysis showing the relationship between socio-economic characteristics and job satisfaction amongst engineers are presented in Table 6. The independent variables were significantly related to job satisfaction ($F = 8,54$, $p< 0,05$). Also, the R-value of 0,85 showed that there was a strong correlation between the independent variable and the job satisfaction of engineers. The results further predicted 69% of the variation in job satisfaction of respondents. Significant determinants: work experience ($t = 3,41$) and area of specialisation ($t = 2,05$). This implies that, as work experience increased the job satisfaction also increased. Furthermore, there is correlation between area of specialisation and job satisfaction.

Table 4-5: Multiple regression analysis of determinants of job satisfaction amongst engineers.

Model	Unstandardised coefficients		Standardised coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	2,506	14,183		0,177	0,861
Job satisfaction	0,258	0,097	0,326	2,667	0,011
Organisational constraints	0,110	0,311	0,040	0,352	0,727
Marital status	-0.418	1,087	-0,043	-0,384	0,703
Educational level	2,432	1,886	0,167	1,290	0,205
Job tenure at Bigen	-0,08	0,342	-0,168	-0,900	0,374
Work experience	5,444	1,592	0,652	3,419**	0,002
Membership of professional bodies	1,618	1,677	0,131	0,965	0,341
Area of specialisation	-1.594	0,777	-0,219	-2,053**	0,047
Type of employment	0,479	2,317	0,022	0,207	0,837
Religion	-4,250	1,993	-0,202	-2,132	0,040
R	0,835				
R Square	0,698				
F	8,540				
Sig. (P)	0,000				

4.7 ANOVA Analysis

In Table 4-6: One-way analysis of variance results show the educational level linkage amongst engineers at BAS in Mahikeng and Pretoria, The F-value for linkage (F = 6,10, p < 0,05) shows that there was a significant difference in job performance amongst respondents with matric, with post-graduate having the highest mean of 46,67, and the respondents with matric having the lowest mean of 33,25. This indicates that the job performance increased as the educational level increased.

Table 4-6: One-way ANOVA showing job performance differences amongst respondents with matric, diploma, post-graduate and degree/BTech at BAS in Mahikeng and Pretoria.

LINKAGE	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	EDUCATION	N	MEAN
Between groups	1624.18	3	541.39	6.10	.00	Matric	4	33.25[a]
						Diploma	18	44.00[a]
						Post-graduate	3	46.67[b]
Within groups	3903.07	44	88.71			Degree/BTech	23	52.57[b]
TOTAL	5527.25	47						

In Table 4-7: One-way analysis of variance results show the work experience linkage amongst engineers at BAS in Mahikeng and Pretoria, the F value for linkage = 11.20, p < 0.05) shows that there is a significant difference in job performance amongst respondents with less than 5 years' work experience and more than 20 years having the highest mean of 59.00 and the respondents with less than 5 years' work experience having the lowest mean of 35.11. This means that the job performance increases as the work experience increases.

Table 4-7: One-way ANOVA showing job performance differences amongst respondents with work experience of less than 5 years, between 6 and 10 years, 11 and 15 years, 16 and 20 years and finally more than 20 years at BAS in Mahikeng and Pretoria.

LINKAGE	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	WORK EXPERIENCE (YEARS)	N	MEAN
Between groups	2819,89	4	704,97	11,20	0,00	< 5 years	4	35,11[a]
						6–10 years	18	43,33[b]
						11–15 years	3	49,92[b]
Within groups	2707,36	43	62,96			16–20 years	23	53,89[c]
						> 20 years		59,00[c]
TOTAL	5527,25	47						

In Table 4-8: One-way analysis of variance results show the work experience amongst engineers at BAS in Mahikeng and Pretoria, the F-value for linkage ($F = 3.86$, $p < 0.05$) shows that there was a significant difference in job satisfaction amongst respondents with less than 5 years' work experience, with more than 20 years having the highest mean of 128,83 and the respondents with less than 5 years' work experience having the lowest mean of 105.22. This indicates that the job satisfaction increased as the work experience increased.

Table 4-8: One-way ANOVA showing job satisfaction differences amongst respondents with work experience of less than 5 years, between 6 and 10 years, 16 and 20 years, 11 and 15 years and finally more than 20 years at BAS in Mahikeng and Pretoria.

LINKAGE	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	WORK EXPERIENCE (YEARS)	N	MEAN
Between groups	1624,18	4	580,95	3,86	0,01	< 5 years	9	105,22[a]
						6–10 years	12	114,17[a]
						16–20 years	9	117,89[b]
Within groups	3903,07	43	150,51			11–15 years	12	120,42[c]
						> 20 years	6	128,83[c]
TOTAL	5527,25	47						

4.8 Chapter summary

In this chapter, the researcher presented, analysed and interpreted the findings from the questionnaire. Also the researcher identified and discussed four most important themes regarding the job performance amongst engineers. From the analysis of the questionnaires, the researcher managed to identify possible factors associated with job performance amongst engineers at BAS.

The researcher then concluded and made recommendations in the subsequent chapter. In the same chapter, the researcher focused on the conclusions and recommendations of the study.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

The remaining task of the research is to make recommendations and conclusions on the identified problem areas surrounding the performance of engineers at BAS. In general, the major finding of the research study is that it makes known to the researcher that the job performance of engineers is strongly associated with job satisfaction and these two variables are coherent. Recommendations will be made based on findings from the previous chapter and the discussions on the literature review.

5.2 Recommendations

The results predicted that there is a 69% variation in job satisfaction of respondents. Significant determinants are work experience and area of specialisation. It implies that, as work experience increases, the job satisfaction of engineers also increases and that there is a correlation between job specialisation and job satisfaction.

GoStudy (2016) indicates that many engineers have to continue with education throughout their career to keep up with the latest technological advances in their field. The study revealed that the job performance increases as the educational level increases. The researcher therefore recommends that management at BAS should strive to encourage engineers to obtain an additional or postgraduate qualification in engineering after their first engineering degree or diploma.

According to CPSA (2016), young civil engineers usually work under the supervision of an experienced engineer and will be gradually given more responsibilities as they gain experience. This study showed that job performance increases as the work experience increases. The researcher therefore recommends that management at BAS should create a work environment where older and experienced engineers are mentors to younger engineers in order to enhance job performance.

Locke (cited by Brown & Peterson, 1993) asserted that job satisfaction is "a pleasurable or constructive emotional state resulting from the appraisal of one's job or job experiences." The study showed that job satisfaction increases as the work experience increases. The researcher therefore recommends that BAS should continue to perform performance appraisal and give

positive feedback to employees, as this can enhance job satisfaction, which will ultimately lead to better performance.

5.3 Summary and conclusions

This study analysed factors associated with job performance amongst engineers at BAS. The researcher conducted a literature review in order to provide a general background and an application theory to the research problem. Quantitative data was gathered using a questionnaire to capture respondents' perceptions, the contents of which were determined by the literature review.

After the questionnaire had been analysed and the most problematic areas were identified, the researcher made recommendations on the most important themes the study revealed. The study revealed that the job performance increases as the educational level increases, that job performance increases as the work experience increases and that job satisfaction increases as the work experience increases.

This study made known to the researcher that the job performance of engineers is strongly associated with job satisfaction and these two variables are coherent. A recommendation is that BAS should in the near future look into the current reward system because it is linked to motivation factors that are internal to job satisfaction of employees. Similarly, the study further established that the educational level is significantly related to job performance amongst engineers. The researcher therefore recommends that BAS should look into continuously encouraging engineers to obtain an additional or a postgraduate qualification in engineering after their first engineering degree because this factor is linked to job performance of employees.

The study also revealed that job performance increases as the work experience increases. The recommendation is that management at BAS should create a working environment where older and experienced engineers are mentors to younger engineers in order to enhance job performance.

Finally, the study showed that job satisfaction increases as the work experience increases. the recommendation in this regard is that the company should continue to perform performance appraisals and give positive feedback to employees, as this can enhance job satisfaction which will ultimately lead to better performance.

The purpose of this study was to help BAS understand the factors associated with job performance amongst engineers, technologists and technicians. In conducting the research, to identify empirical rationale that can affect job performance at BAS positively, recommendations

were made. The results from this investigation about factors associated with job performance were found that are important information for organisational development and future research. The application of this insight gained will be the responsibility of the managers in the company.

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ANNEXURES

FACTORS ASSOCIATED WITH JOB PERFORMANCE QUESTIONNAIRE

PART A – PERSONAL CHARACTERISTICS

Please note: The information that you supply in this questionnaire is confidential, therefore, be assured that it will be treated as such. Remember that the value of this study depends on your being completely honest in answering the questionnaire. You will not be identified with or by your answer.

Instructions: *Please complete the biographical data section below, by ticking the appropriate box next to your answer or by filing in your answer where required do to so. Please answer all the questions.* ***Note: You will not be identified with or by your response.***

1. Age

< 25 years ☐

25 - 30 years ☐

31 - 35 years ☐

36 - 45 years ☐

46 - 55 years ☐

56 - 65 years ☐

> 65 ☐

2. Gender

Female ☐ Male ☐

3. Marital Status

Single ☐

Married ☐

Cohabiting ☐

Divorced ☐

Widow ☐

4. Educational level

- Matric ☐
- Diploma ☐
- Degree/B-Tech ☐
- Post-Graduate Degree ☐
- Masters ☐
- PhD ☐

5. Job Tenure at Bigen Africa Services.....(Years)

6. Working Experience

- < 5 years ☐
- 6 - 10 years ☐
- 11 - 15 years ☐
- 16 - 20 years ☐
- > 20 ☐

7. Job category

- Technical Staff ☐
- Supporting Staff ☐

8. Job Position

- Project Director ☐
- Project Manager ☐
- Senior Design Engineer ☐
- Design Engineer ☐
- Draughtsman ☐
- Engineer's Representative ☐

Other (specify).....

9. **Salary grade**

Below R100 000 per annum	☐
R101 000 – R200 000 per annum	☐
R201 000 – R250 000 per annum	☐
R251 000 – R300 000 per annum	☐
R301 000 – R400 000 per annum	☐
Above R400 000	☐

10. Studying for higher degree

Yes	☐
No	☐

11. Number of supervisees at work.....

12. Membership of professional bodies.....

13. Area or specialization.....

14. Type of employment

Permanent	☐
Temporary	☐
Fixed-term contract	☐

16. Religion

Christian	☐
Muslim	☐

Other (specify).....

17. Number of dependents .....

PART B – Job Performance

Directions: Please indicate from the following your perception about how often you perform the following tasks.

No:	Items	Not role	Occasionally	Fairly Regularly	Regularly	Most Regular
		1	2	3	4	5
1	Completes engineering projects by organizing and controlling project elements					
2	Develops project objectives by reviewing project proposals and plans by discussing with clients					
3	Determining project responsibilities by identifying project phases and activities; assigning junior staff to phases and activities					
4	Reviewing bids from contractors and making recommendations to clients					
5	Determining project specifications by studying structure needed by clients requirements, and performance standards					
6	Completing feasibility studies and preparing cost estimates.					
7	Confirms structure performance by conducting necessary tests to find out specification conformance					

8	Determining project schedule by studying project plan and specifications; calculating time requirements; and sequencing project activities					
9	Maintaining project schedule by monitoring project progress					
10	Controls project costs by monitoring expenditures; managing contractor contracts					
11	Prepares project status reports by collecting, analyzing, and summarizing information and trends					
12	Maintains safe and clean working environment by enforcing procedures, rules, and regulations					
13	Preparing engineering documents including structural drawings, contract proposals, material lists, reinforcements, and structural specifications for a wide variety of projects					
14	Reviewing and checking structural designs, calculations, contractors' shop drawings, and engineering drawings for construction, repair, and maintenance projects.					
15	Selecting and using computer software to develop engineering and mathematical analysis of design problems					

PART C: JOB SATISFACTION

Directions: Please indicate from the following items the degree of satisfaction or dissatisfaction about your job and its related characteristics.

No:	Items	Not satisfied	Least satisfied	Fairly satisfied	Almost satisfied	Most Satisfied
		1	2	3	4	5
1	Pressure on improved performance					
2	Infrastructure for work					
3	Working hours					
4	Academic advancement					
5	Professional advancement					
6	Relationship with manager					
7	Relationship with subordinates					
8	Appraisal system					
9	Reward system					
10	Salary					
11	Company policies					
12	Morale within organization					
13	Bonuses					
14	Workload					
15	Job status/promotion					
16	Administrative issues					
17	Vacation leave					

18	Group scheme					
19	Medical aid					
20	Loan schemes					
21	Working conditions					
22	Work equipment (resources)					
23	Response to challenges					
24	Budget					
25	General operations					
26	Office accommodation					
27	Conflicting orders					
28	Promotions					
29	Sick leave					
30	Qualification for job					
31	In-service training					
32	Job security					
33	Job specialization					
34	Flexibility and initiative					
35	Relationship among technical staff and supporting staff					

PART E – Organizational constraints

Directions: The following statements concern your perception about how organizational constraints relates to job performance. Your task is to indicate whether the constraint exists or not by answering Yes or No. If the constraint exists indicate as well to what degree does it negatively affect your performance by selecting 1 = Very High or 5 = Very low. Take your time and consider each statement carefully

No:	Items	Yes	No	Very High	High	Medium	Low	Very Low
				1	2	3	4	5
1	The company fails to provide the necessary information to enable me to complete my tasks							
2	The company does not provide me with functional equipment/s to enable me to complete my tasks							
3	There are interruptions from coworkers when performing tasks							
4	There are disagreements between coworkers when working in a team							
5	The time given by the supervisor to complete tasks is not adequate							
6	I Have developed physical symptoms from work that warranted a doctor's attention							
7	There are unforeseen problems on site that I must handle							
8	Travelling between sites rather than working in the office							
9	I am not clear about my duties and responsibilities							

10	I do not receive positive feedback from my supervisor							