

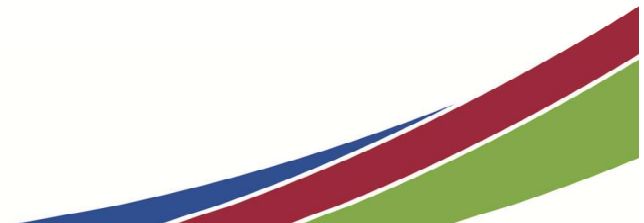
An evaluation of the job characteristics of an international engineering company

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Mini-dissertation submitted in partial fulfilment of the
requirements for the degree *Magister in Business
Administration* at the Potchefstroom Campus of the North-West
University

Supervisor: Ms MM Heyns

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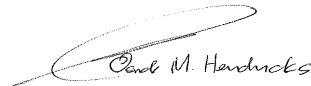


DECLARATION

I, **OSRICK MORNE HENDRICKS**, herewith declare that the mini-dissertation entitled **An evaluation of the job characteristics of an international engineering company**, which I herewith submit to the North-West University, Potchefstroom Campus, in compliance / partial compliance with the requirements set for the **MASTER OF BUSINESS ADMINISTRATION** degree, is my own work, has been language edited and has not already been submitted to any other university.

I understand and accept that the copies that are submitted for examination are the property of the University.

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ABSTRACT

One of the most widely used job design approaches is the job characteristic model (JCM) that was developed by Hackman and Oldham in 1976. This research therefore adopts a quantitative research approach, making use of the JCM to evaluate employee's perception of the importance of their core job characteristics at the South African operation of an international company. Knowledge of the aforementioned can assist management to improve the jobs of employees and hence their performance. The main finding of this research was that employees scored task significance as the most important job characteristic and job feedback as the least important. They also perceived their jobs to have high motivational potential. It seems clear that the company provides an environment that is conducive to high personal and work outcomes for employees. Management should, however, also attempt to advise employees more frequently about their performance. The research contributes to the existing body of knowledge by providing a benchmark for the results of applying the JCM in the South African engineering industry.

Key words: job design, job characteristic model, core job characteristics, motivational potential, critical psychological states, job diagnostic survey.

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CHAPTER 1

NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

The primary objective of any company is to create value for its shareholders. Value is created by a company when it utilizes productive assets, such as human, physical and capital resources to achieve a shared purpose (Carton, 2004:3). Furthermore the value a company creates for its shareholders is a measure of the performance of the same company (Carton, 2004:2). It follows that the manner in which a company uses its resources invariably affects its performance and hence the value it creates. As a result shareholders will only invest in a company as long as the perceived value created is higher than what was initially invested. Although companies utilize various resources it is argued that it is the employees of a company that create value and hence wealth for its shareholders (Van Wyk, 2011:2; Thompson *et al.*, 2012:87). In today's fiercely competitive environment companies can benefit by focusing on maximizing the efforts and output of their human capital.

Van Wyk (2011:3) argues that no company can succeed without having a motivated workforce as motivated employees are a critical resource that can affect a company's performance and competitiveness. Thompson *et al.* (2012:87) identify several principal aspects required to manage and execute a strategic process of a company. One of the key aspects identified is the need to motivate employees and tying rewards to achieving performance objectives. It is clear that for a company to perform it needs a workforce and for a workforce to perform, it needs motivation. Organisational leaders should concern themselves with the questions: How motivated is our workforce? Which theories of motivation should be applied to ensure maximized performance?

McShane and Von Glinow (2010:34) state that employees' performance behaviour can best be understood and predicted by considering variables, such as motivation, ability,

role perception and situational factors. By addressing these variables, amongst other things, a company can achieve a more consistent performance.

In considering contextual factors, for example, McShane and Von Glinow emphasize that different jobs have different effects on work efficiency and employee motivation. They further stress the importance for companies to strike the correct balance in order for work to be performed efficiently whilst keeping employees motivated. Job design, which is the process of assigning tasks to a job, can assist with addressing the balance of work efficiency and employee motivation (McShane & Von Glinow, 2010:177). The job characteristic model, which is a job design model, can be used to assist with motivating employees. According to Hackman and Oldham (1976: 256), five job characteristics have been identified by the model, which affects three psychological states of employees. The core job characteristics are *skill variety*, *task identity*, *task significance*, *autonomy* and *job feedback*. The three psychological states are *meaningfulness*, *responsibility* and *knowledge of result* (McShane & Von Glinow, 2010:178). These three psychological states affect employees' work motivation (Slocum Jr. & Hellriegel, 2011:170). Skill variety, task identity and task significance affect how employees experience meaningfulness in their jobs. Autonomy contributes to how accountable employees feel in respect of their own work, whilst feedback from managers affects the knowledge employees have of their efforts (McShane & Von Glinow, 2010:178).

The aim of this study is to evaluate the levels of the core job characteristics of the South African operation of an international engineering company.

Chapter 1 presents the background to the study, as well as the problem statement. The objective, scope, research methodology and limitation of the study are also discussed. The chapter concludes by presenting the rest of the layout of the document.

1.2 BACKGROUND

Carton (2004:2) defines a company's performance as the extent to which a company's financial state changes. Carton (2004:2) alludes to the fact that a company's financial state is as a consequence of management's decisions and the employees who execute these decisions. A company utilizes productive assets (including human capital) made available by shareholders to achieve a desired purpose. Measuring the performance of a company is essentially defined by the perceived value it creates for its shareholders (Carton, 2004:3). Solomon *et al.* (2012:304) suggest that maximizing a company's performance can be achieved by optimizing employee output or by increasing the capability of machines. Although companies utilize various resources to achieve a desired goal Van Wyk (2011:3) argues that a company cannot be successful without having a motivated workforce. From the above it is clear there is a relationship between a company's performance and human resources.

Employee motivation can be defined as the forces that affect an individual's direction, intensity, and persistence of voluntary behaviour (McShane & Von Glinow, 2010:34). It is goal directed, does not happen by chance and has an element of persistence (McShane & Von Glinow, 2010:132). Van Wyk (2011:3) suggests that the motivation levels of employees are a reflection of the overall impression of a company and that no company can compete without a motivated workforce.

In view of the aforementioned it can be concluded that motivation is a highly relevant issue for companies wishing to achieve a high level of performance. Employee motivational levels in essence can affect a company's performance, which in turn affects the value created by the company. This can threaten the existence of a company as shareholders/investors will only provide resources as long as the perceived value created by the company is higher than that which was initially invested. Job design, which involves task allocation to a job, can address not only employee motivation but also employee efficiency. The aim of job design is to strike a balance so that work is performed efficiently whilst keeping employees motivated and engaged (McShane & Von Glinow, 2010:175).

For the purpose of this study employees' perception regarding their core job characteristics will be evaluated for the South African operation of an international engineering company.

1.3 PROBLEM STATEMENT

To weather the current economic conditions companies have amongst other things, to embark on various cost-saving exercises. The South African operation of an international engineering company is no exception and also has to implement cost-savings measures. Some cost-saving exercises implemented affected employees directly, particularly when the remuneration structure was changed. Employees were further affected when certain fringe benefits were done away with. It is to be expected that these cost-saving exercises contributed directly to higher than usual employee turnover. In most instances employees who resigned were not replaced; consequently the remaining employees had a higher workload.

Employees started complaining unofficially about their work environment. There is no recognizable motivational system in place to manage employees' performance and efficiency. It would appear that the motivational levels of employees have been affected due to their inherent work environment. This situation presents a potential risk to the company and needs to be addressed since it is the employees that create perceived value for the shareholders/investors. De-motivated employees will inherently affect the quality of the value created and can affect investors' perceptions and hence the company's resources. For this reason this research study will endeavour to evaluate the motivational levels of employees of an international engineering company by evaluating their core job characteristics.

1.4 OBJECTIVES OF THE STUDY

1.4.1 Primary Objective

The primary objective of the study is to evaluate employee perceptions of the importance of the core job characteristics of an international engineering company.

1.4.2 Secondary Objectives

- to conduct a literature study on the subject matter of the job characteristic model and motivation,
- to conduct a survey by using a questionnaire; to determine employee perception of the core job characteristics,
- to evaluate the motivational potential of employees, and
- to determine the employees' critical psychological states.

1.5 SCOPE OF THE STUDY

The scope of this study will be limited to organizational behaviour and will focus on the aspect of employee motivation. The South African operation of an international engineering company will be considered for this study. The scope will further be limited to applying the job characteristic model, a job design model, to evaluate the core job characteristics of employees at the company's Longmeadow facilities, located in Johannesburg, South Africa. The Longmeadow facilities accommodate approximately 1 509 employees consisting of factory and office employees. These are further made up of permanent and temporary employees. For the purpose of this study only permanent employees will be considered at the Longmeadow facilities and more specifically employees working in the Power Products department.

1.6 RESEARCH METHODOLOGY

1.6.1 Literature Review

Organizational behaviour theory relating to employee motivation and job design practices will be considered for this study and in particular theory relating to Hackman and Oldham's job characteristics model. McShane and Von Glinow (2010:177) suggest that the main objective of this model is to correlate the motivational aspects of a job to the impact it has on individuals and their companies. A literature review will be conducted relating to these subject matters. The literature review will consider topics, such as motivation, job design and more specifically the job characteristic model.

The application of the job characteristic model is well researched for various industries and various countries. Numerous sources have been consulted to review the extent to which the study was previously conducted and which relates to the subject matter (Millette & Gagne, 2008; Chu & Lai: 2011; Kuok & Ho, 2010). The study conducted by Rusconi (2005) presents the closest fit to the study to be undertaken. Although Rusconi's (2005) work extends to graduate actuaries and engineers in South Africa this study will be limited to employees of the South African operations of an international engineering company. This type of study has also not previously been conducted on employees of the engineering company in question.

A number of different sources with reference to organizational behaviour, particularly relating to job design and characteristics, will be reviewed. These sources will consist of but will not be limited to journals, textbooks, white papers, academic dissertations and theses and Internet search engines.

1.6.2 Empirical Study

1.6.2.1 Research Design

To measure the employee motivation of a company one will have to embark on conducting research. Research can be done using the positivist/quantitative approach or the anti-positivist/qualitative approach (Welman *et al.*, 2011:6). Qualitative research entails defining the research in terms of the study of observable human behaviour whilst quantitative research is focused on the experiencing of human behaviour (Welman *et al.*, 2011:8). For the purpose of this study the quantitative research methodologies, which will also be the research design for this study will be employed.

1.6.2.2 The Measuring Instrument

The aim of the study is to evaluate employee perception of core job characteristics. The core job characteristics are *skill variety*, *task identity*, *task significance*, *autonomy* and *job feedback* (McShane & Von Glinow, 2010:175). Slocum Jr. and Hellriegel (2011:170) present a questionnaire that is able to measure these parameters. The questionnaire consists of 15 statements, which are aimed at measuring the level of each of the core

job characteristics of participants. Participants will be required to indicate the extent to which they agree with each statement by scoring each question on a 5-point Likert scale, where 1 correlates to “disagree strongly” and 5 to “agree strongly”.

1.6.2.3 Study Population

Employees of the South African operation of an international engineering company will be considered for this study and more specifically employees located at the company's Longmeadow facilities. The Longmeadow facilities accommodate approximately 1 509 employees working either in the factory or offices in various positions. The employees hold various positions (executives, managers, project managers, project engineers, proposal engineers, design engineers, financial controllers, human resource practitioners and marketing managers) and have various educational backgrounds (from matric certificates through to master's degrees). The sample group is also made up of different ethnicities with the majority of the workforce being black.

1.6.2.4 Statistical Analysis

Data will be collected by means of a questionnaire and will be subjected to statistical analysis. The questionnaire together with a covering letter will be handed out in person to the respective employees from the selected sample group. The completed questionnaires will be collected in person and will be delivered to the North-West University's Statistical department for analysis. The data from the questionnaire will measure the different levels of the core job characteristics. The motivational potential scores of employees will also be evaluated from the data. Apart from the aforementioned the effect of different demographical variables, such as age, gender, race, qualifications, working experience, and position will also be considered in order to find out what influence these variables may have on employees' perception of core job characteristics.

1.6.2.5 Ethical Aspects

Ethics should be considered when doing research when 1) participants are recruited, 2) during intervention and 3) when results are released (Welman *et al*, 2011:181).

Welman *et al.* (2011:201) also identify four ethical considerations that research studies should have in respect of participants and these are 1) to request informed consent, 2) to assure participants of privacy, 3) to protect participants from harm and 4) to advise participants of the researcher's involvement in the research. As far as the participants are concerned, the ethical considerations listed above will be adhered to at all times.

1.7 LIMITATIONS OF THE STUDY

The study will be limited to Organisational Behaviour theory by evaluating employee perceptions of their core job characteristics. This study will be performed within the South African operation of an international engineering company.

The following issues may also further limit the study:

- The job characteristic model
- The instrument
- The employees' willingness to complete the questionnaire
- The quality of the responses from the participants

1.8 LAYOUT OF THE STUDY

The layout for this document will consist of the chapters as indicated below:

Chapter 1: Introduction

Chapter 2: Literature survey

Chapter 3: Empirical investigation

Chapter 4: Discussion of Results

Chapter 5: Conclusions and recommendations

References

Appendices

CHAPTER 2

LITERATURE SURVEY

2.1 INTRODUCTION

An employee at any company engages in task activities to produce a product or render a service, which is aimed at creating value for the company and its shareholders. These activities in general constitute a job, which complements other jobs to achieve company objectives (Quick & Nelson, 2009:454). However, different jobs have different effects on employees and inherently influence work efficiency (McShane & Von Glinow, 2010:175). Bhatti *et al.* (2012:56) suggest that for maximum performance employers should motivate and satisfy employees at work. However, it is a difficult endeavour to strike the correct balance in order for employees to perform their jobs efficiently whilst being motivated, satisfied and engaged (McShane & Von Glinow, 2010:175). Therefore employers will do well to design jobs in such a way that employees will be willing and motivated to perform their task activities. Hackman and Oldham (1976:250) state that job redesign can be used as a strategy to try and improve both productivity and the quality of the employees' work experience. In this way job design can be utilized to achieve the required balance between a job and employees.

A literature review follows, which considers the organizational behaviour subject matter of job design. A number of different sources were consulted to research the subject matter. These sources included journals, textbooks, white papers, academic dissertations and theses, and Internet searches on engines, such as Google scholar. This chapter starts with a review of what job design is and presents the benefits of a well-designed job. A discussion of the different job design approaches follows with specific attention paid to the job characteristic model and its subsidiaries.

2.2 JOB DESIGN AND ITS BENEFITS

A company can be modelled by the open-systems perspective as depicted in Figure 2-1 below. This open-systems perspective describes multiple subsystems that a company utilizes to transform inputs (i.e. raw material, equipment, etc.) to various outputs (products, services, etc.).

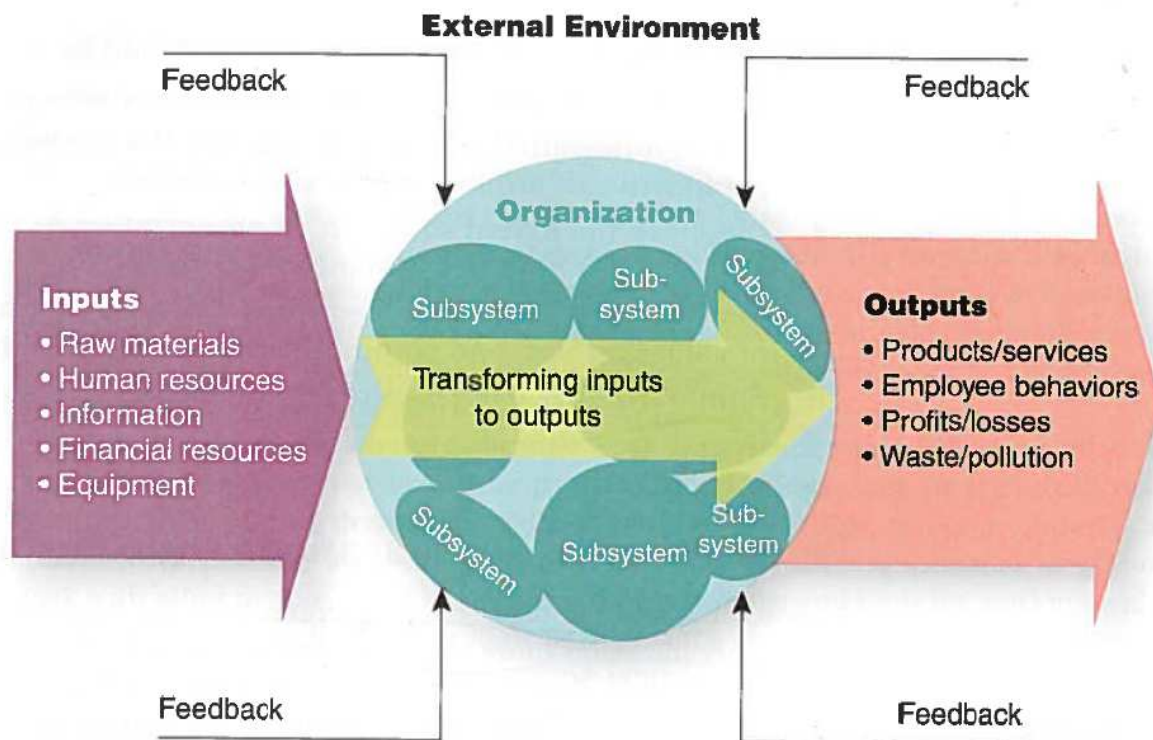


Figure 2-1: Open-systems perspective of an organization

Source: McShane and Von Glinow (2010:8)

Job design primarily concerns itself with designing the transformation component of the open-system. This is achieved by considering the human and company factors that may affect the company's output and transformation processes (Bailey, s.a.). Job design is further described as an exercise of allocating tasks required to complete a job, as well as determining how it will complement and support other jobs (McShane & Von Glinow, 2010:175; Bhatti *et al.*, 2012:54). McShane and Von Glinow (2010:175) postulate that there is a relationship between employee motivation and work efficiency. This relationship is not easily definable since different jobs may have different effects on employees as far as their work efficiency is concerned. An employer who can balance the relationship between employee motivation and work efficiency will clearly have a competitive advantage over its rivals. The benefit of having motivated employees is further illustrated by Hays and Hill (2001:335). They postulate that service (or product) quality is affected by employee motivation. They further suggest that a company that

renders a superior quality service (or product) will have a competitive advantage and that this quality service/product is a predictor of market share and profitability.

Employers can benefit by designing a job in such a way that employees are more motivated, satisfied and efficient at work. It follows that employee motivation can have a direct impact on the market share and profitability of a company. This is the heart of what job design seeks to accomplish; that is to build a better job such that employees are more motivated, satisfied and efficient. This is further illustrated by the example of Chrysler Corp who outsourced the manufacturing of their minivan to Magna Steyr. It was found that Chrysler's employees assembled the same minivan much faster than employees at Magna Steyr. This was realized due to the fact that Chrysler employed a job design approach called job specialization. Job specialization allowed Chrysler to increase work efficiency by narrowing down the subset of tasks employees had to engage in (McShane & Von Glinow, 2010:176). The impact of job design is further illustrated by an American industrial engineer, Fredrick Taylor, who coupled high levels of job specialization with the standardization of task to formulate an approach called scientific management. The implementation and effect of scientific management in education, government, non-profit organizations, culture, and architecture is clearly illustrated by Guillen (1997:682).

These early forms of job design also had negative effects on employees with consequences, such as high employee turnover, absenteeism, and lack of motivation being prevalent (McShane & Von Glinow, 2010:177). Different theories pertaining to job designs were developed, such as the motivator-hygiene theory, job enlargement, job enrichment, the job characteristic model, etc. All of these theories are aimed at improving work efficiency whilst motivating and satisfying employees. The section that follows presents some of the more popular job design theories that are in practice in the world of work. Special consideration is given to the job characteristic model, which forms the theme subject matter for this dissertation.

2.3 JOB DESIGN APPROACHES

2.3.1 Job Specialization

Job specialization involves assigning fewer task activities to different employees. The total activities of all the employees ordinarily produce the product or service that the company offers to capture customer value (McShane & Von Glinow, 2010:177). These task activities are completed in a short period of time and hence improve employee job efficiency. Efficiency is further improved since employers spend less on training resources as employees are engaged in fewer activities that require less “brain power”. Since employees only do few tasks they tend to become more proficient and tend to reduce the time required to perform their tasks. Peri & Sparber (2007:2) suggest that job specialization also protects less-educated employees against the negative wage consequence in an event of high immigration flows into a country. In essence job specialization benefits both the employee and the employer.

Gino and Staats (2010:1) state that companies benefit from job specialization because it sustains operational productivity by virtue of completing repetitive tasks. This notion is also supported by Cellier and Eyrolle (1992:26) who allude to the fact that employee productivity increases due to the repetition of the same task activities, as well as limiting the cost of activity change over. Argote and Miron-Spektor (2010:7) also postulate that employee productivity can further be ascribed to several reasons, such as knowledge of specialized tools used in task activities, knowledge about customers, steps involved in executing task activities, and scheduling and set-up cost. However, this form of job design comes at a cost. The key consideration here is the impact specialization has on employees. Gino and Staats (2010:21) discuss some of the effects that job specialization has on employees who are engaged in the same activities in a company. The key side effect that job specialization has on these employees is a drop in motivational levels due to boredom. This invariably will affect the performance of employees and hence the productivity of a company.

2.3.2 Scientific Management

Frederick Winslow Taylor, an industrial engineer, introduced the principles of scientific management in the early 1900s (McShane & Von Glinow, 2010:176). The aim of scientific management is to combine a high level of job specialization with the standardization of task to achieve the optimal efficiency. Lawrence (2001:20) alludes to the fact that scientific management also seeks to simplify jobs whilst assuming that 1) employee efficiency increases, 2) skill requirements are reduced and 3) management control over the entire process increases. This notion is further supported by Quick and Nelson (2009:480) who suggest that simplification of job design, to the extent that employees do not have to think to perform their jobs, also forms the basis of scientific management. Each task activity is further scientifically specified by engineers and managers in order for workers to execute their duties without any thought. Figure 2-2 below graphically illustrates the concept of scientific management.



Figure 2-2: A graphical illustration of the scientific management process

Source: John Cook (2009)

This approach managed to simplify the task activities in such a way that it allowed for a diverse workforce, such as different races and ethnicities, to perform well working

together. Lawrence (2001:20) emphasizes that employee motivation is also increased due to higher economic reward realized due to higher employee efficiency. Scientific management essentially allowed a company to utilize employees more efficiently with benefits, such as lower labour costs, as well as simplified administrative control. This concept further supports globalization perfectly, which led to production efficiency and hence higher profits (Quick & Nelson, 2009:480). However, scientific management is not without problems. Quick and Nelson (2009:480) suggest that this approach creates boring and under-stimulating jobs, which undermines human and employee intelligence and capacity. McShane and Von Glinow (2010:176) recognize that this approach of job specialization and standardized task activities invariably affects employees' attitudes and motivation levels negatively. They also identify the consequences of scientific management, such as absenteeism, high employee turnover, and reduced work quality. Lawrence (2001:20) suggests that scientific management may not improve employee productivity.

2.3.3 Job Enlargement

Job enlargement is a job design approach, which increases the number of activities to the existing job of an employee through horizontal loading (McShane & Von Glinow, 2010:180; Quick & Nelson, 2009:480). This is done to mitigate the inherent limitations of overspecialized jobs, which can result in employee boredom and a drop in motivational levels. This situation can invariably affect a company's profitability since there is a link between profitability and employee motivation. The aim of this job design approach is to increase skill variety by assigning more task activities to an employee (Nawaz & Raza, 2011:269). Figure 2-3 below illustrates job enlargement in practice. It shows how a video journalist, through job enlargement practices, can be optimized to perform the tasks of three different employees by acquiring the necessary abilities and skill sets.

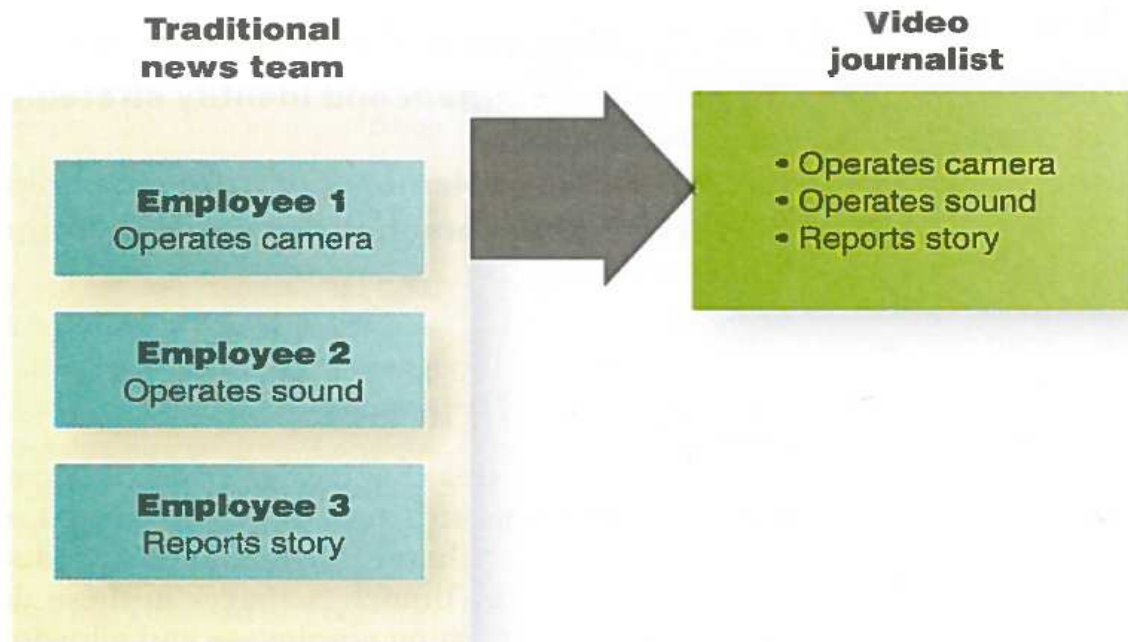


Figure 2-3: Illustration of Job enlargement in practice.

Source: McShane and Von Glinow (2010:181)

Quick and Nelson (2009:480) also highlight the benefits that job enlargement offers by presenting the impact it had during World War II. During World War II job enlargement increased product quality, at the same time reducing the idle time of soldiers and machines. Nawaz & Raza (2011:269) suggest that employers can utilize this approach to either keep employees' motivation in check or to address a business need where there is a lack of resources. They further suggest that job enlargement can either have a positive or negative effect on employees. Employees can be motivated when employers compensate them for the extra workload, whereas they can develop a negative attitude when not compensated for the same. Nawaz & Raza (2011:269) add that job enlargement can also decrease employee motivation as a result of increased job loading and a decrease in social interaction.

2.3.4 Job Rotation

According to Quick and Nelson (2009:480), job rotation is a form of job enlargement that allows employees to engage in different specialized jobs as a function of time. Essentially job rotation practices allow an employee to move from one job to another.

Job rotation can benefit employees who gain valuable experience, which can advance their careers in terms of promotions and salary increases. This produces a more satisfied and motivated employee who is much more efficient and productive to the benefit of the company. Job rotation also offers the company a benefit because it has crossed-trained employees, which allows the company to operate at its optimal level of production. MacLeod and Kennedy (1993:2) identify several advantages and disadvantage that job rotation offers.

The advantages identified are as follows:

- Employee boredom is minimized,
- Employee job-related stress is minimized,
- Employees show a greater sense of innovation,
- Production levels are improved,
- Employees tend to be absent from work far less, and
- Employee resignation is reduced.

The disadvantages identified are as follows:

- Older employees may not want to learn other jobs and this may result in dissatisfied employees,
- Training employees on other jobs may present a problem since other employees may be uncooperative in transferring skills or making equipment available for training,
- The practicality of having more than one job per employee may not be possible,
- Compensating employees for additional tasks may present a problem for the company's profitability, and
- A mismatch between employees and the different jobs may cause production delays or demoralized employees.

Job design via job rotation can benefit both the employer and the employee. The employee benefits by acquiring more skills that may contribute directly to career growth and economic growth whilst the employer benefits from having flexible employees.

Rotations can affect employee psychology by increasing motivation and satisfaction and this can lead to higher productivity at work. The employees' motivational level is indicative of the profitability of a company and job rotation can therefore increase a company's profitability.

2.3.5 Job Enrichment

Job enrichment is aimed at improving employee job satisfaction through increasing the motivational factors of a job (Quick & Nelson, 2009:481). This job design approach builds on the motivational components of the motivator-hygiene theory by allowing employees to fulfil their growth and esteem needs (Lawrence, 2001:21). In essence job enrichment seeks to enhance the job by giving employees more control and the responsibility of how they want to execute their jobs (Lunenburg, 2011:1). McShane and Von Glinow (2010:181) suggest that this scenario could be achieved by allowing employees to engage in the scheduling, coordinating and planning of their task activities. In this way employees are given more responsibility for their own jobs, via vertical loading, and can invariably produce higher quality work (Quick & Nelson, 2009:481; McShane & Von Glinow, 2010:181). Job enrichment also aims to manage the human side of a company.

A weakness of job enrichment is that it tends to ignore the fact that employees are different. Implementing this design approach is not a trivial matter since it causes an initial drop in performance due to the anticipated changes. Supervisors may also experience resistance from employees due to the additional responsibilities placed on employees. McShane and Von Glinow (2010:181) also recognize that the additional responsibilities may increase employee stress levels. Mione (s.a.) further identifies additional problems when implementing job enrichment. These are:

- The perception of the implementation cost being too great,
- Long term commitment of resources not being guaranteed and
- Job classification changes due to changes of responsibilities.

. McShane and Von Glinow (2010:181) identify a few benefits when job enrichment is implemented. These benefits include:

- Increase levels of employee performances
- Employee job satisfaction,
- Improved employee motivation,
- Lower employee turnover, and
- Less absenteeism.

This design approach focuses on the good qualities of a job itself as a form of motivation and satisfaction to employees. The next section presents the two-factor theory, which considers both the motivator and hygiene components of a job.

2.3.6 Herzberg's two-factor Theory

Herzberg's two-factor theory is described as occurring along two dimensions, which are job satisfaction and job dissatisfaction (Slocum & Hellriegel, 2011:169). These two dimensions are different from one another as satisfying factors differ from dissatisfying factors. Figure 2-4 graphically depicts the two dimensions relating to motivators and hygiene factors.

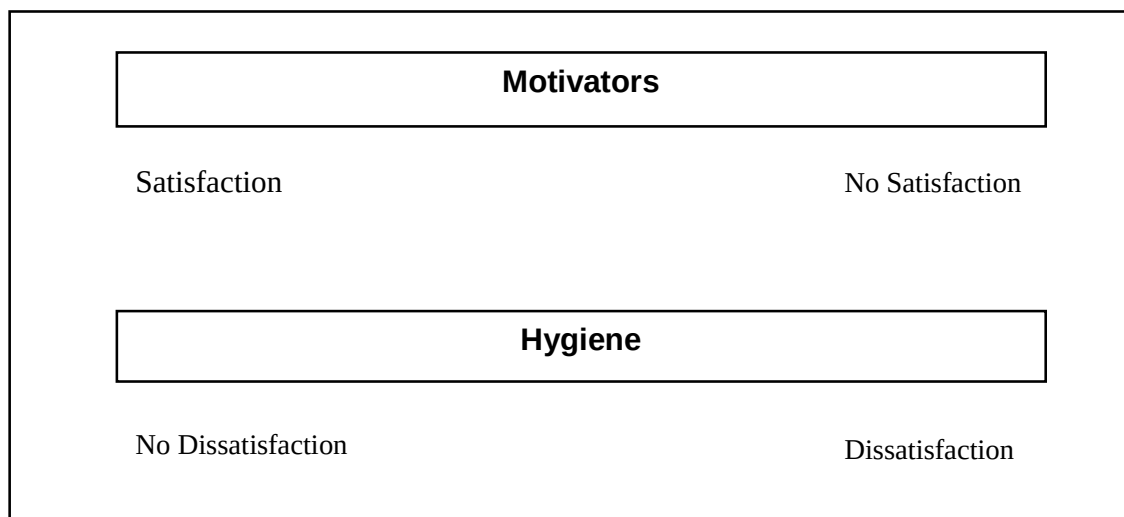


Figure 2-4: Herzberg's motivator and hygiene two-factor theory

Lawrence (2001:22) proposes that an employee's positive experience and satisfaction with the associated job occur as a result of intrinsic factors related to the job. These are factors, such as the job itself, career growth, and achievement. On the other hand an employee's negative association with the job is as a result of extrinsic factors associated with the job, such as salary and interpersonal relations. Figure 2-5 below depicts a graphical illustration of some of the variables that affect motivators and hygiene factors.

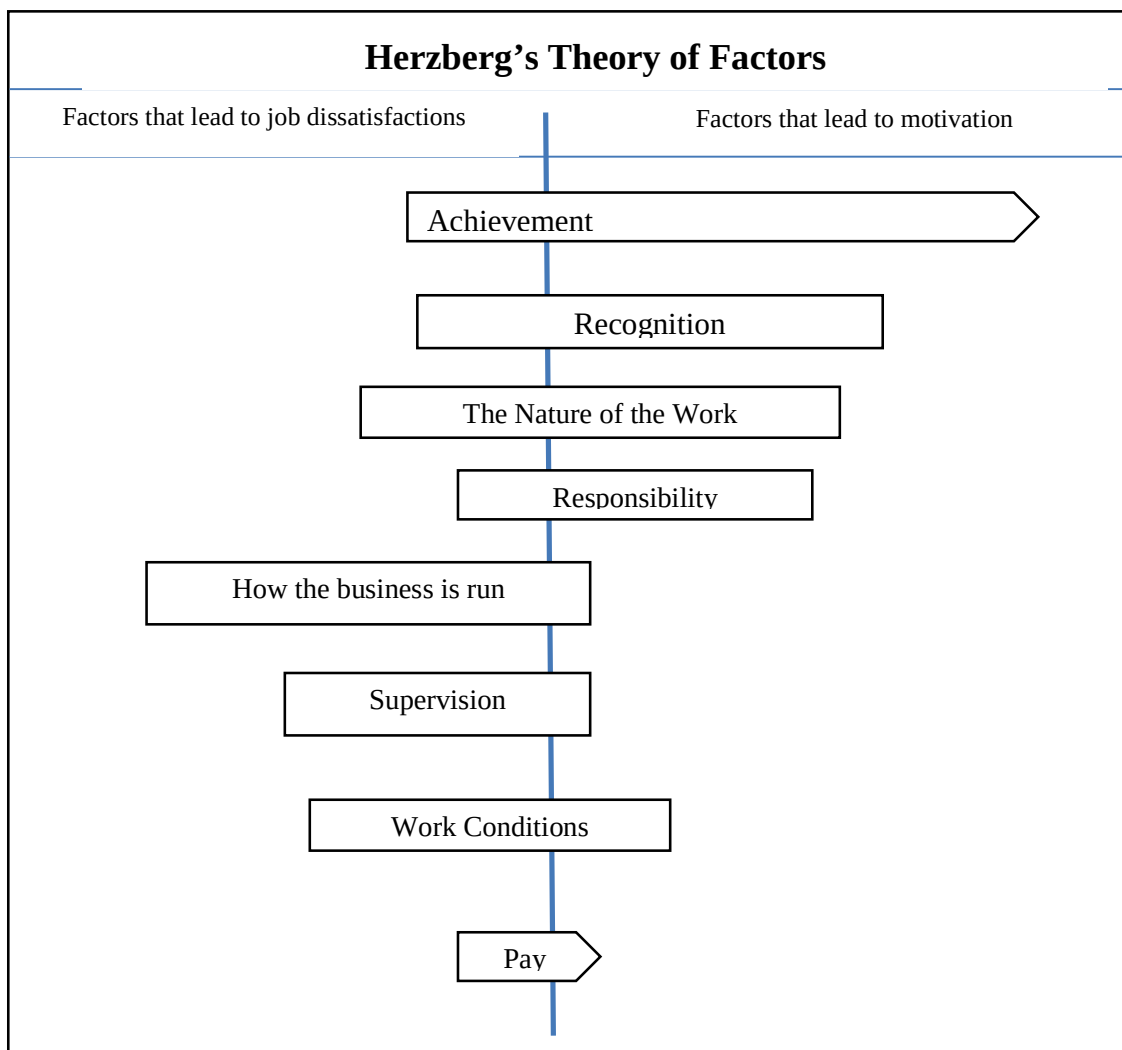


Figure 2-5: Motivator and hygiene factors

Source: (Anon, s.a.)

Slocum and Hellriegel (2011:170) discuss as an example Save Mart Supermarkets, who rewarded their employees with cars for outstanding customer services. This initiative utilized hygiene factors as basis of motivation. Only characteristics associated with the job itself tend to motivate employees whilst hygiene factors prevent dissatisfaction (McShane & Von Glinow, 2010:177). The employee job motivation and satisfaction is proportionate to the degree with which motivators are designed in the job. The same is also true for the hygiene factors with respect to dissatisfaction. The two-factor theory further also manages to differentiate between employees' physical and psychological needs. The job characteristic model (JCM) is borne from the motivator-hygiene theory, which was developed by Herzberg in 1950's. This approach will be discussed next.

2.3.7 The Job Characteristic Model (JCM)

This is one of the most widely studied approaches to job design (De Varo *et al.*, 2007: 986; Sprigg *et al.*, 2003: 2; Zare *et al.*, 2010: 1225). Essentially this job design approach seeks to exploit the motivational potential that the job itself can afford the employees whilst limiting the use of hygiene factors (Slocum & Hellriegel, 2011:170). The job should therefore have characteristics that will create high levels of work motivation, performance and satisfaction (Lawrence, 2001:5). Figure 2-6 graphically depicts an overview of the job characteristic model as developed by Hackman and Oldham (1976:256).

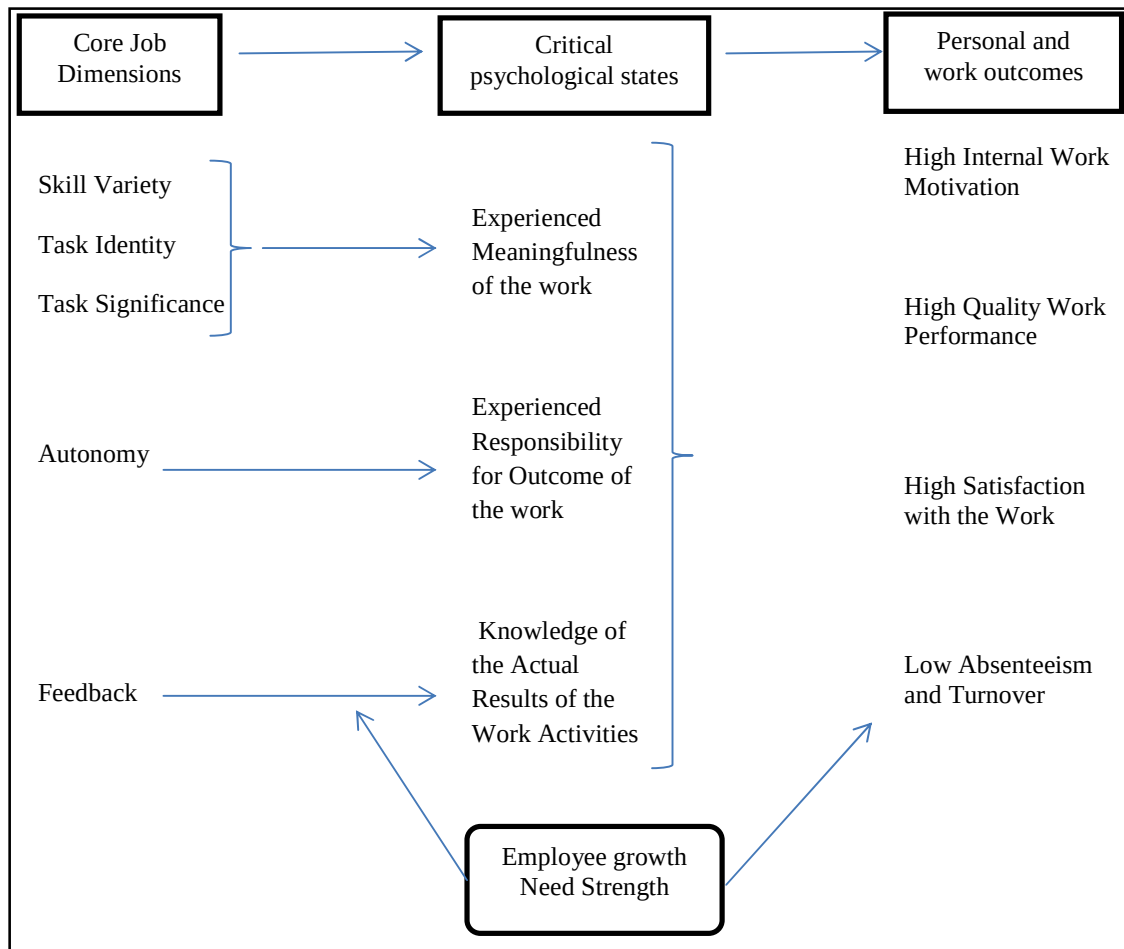


Figure 2-6: The Job Characteristic Model.

Source: Hackman and Oldham (1976:256)

This model stresses the interaction of employees and specific attributes of the job. It is in essence a person-job fit model and not a universal job design model (Quick & Nelson, 2009:482). Moore (1999:15) suggests that job design can be used for analysing a job. This inherently implies that the job characteristic model, which is a most widely used job design approach, can also be used for analyzing a job. This analysis can assist with the redesign of a job to achieve optimal company performance via motivated employees.

As can be seen from Figure 2-6 above the job characteristic model identifies five core characteristics, which stimulate three psychological states. The three psychological

states that foster employee effectiveness, motivation and job satisfaction are listed below (Slocum & Hellriegel, 2011:172).

1. An employee must believe that the job he or she performs is important (meaningfulness),
2. An employee must feel that he/she is personally accountable for the work he or she performs (responsibility), and
3. An employee must have knowledge of the impact of the work that he or she performed (knowledge of results).

These psychological states are internal to the employee and can therefore not be influenced by the job itself (Lawrence, 2001:6). Lawrence (2001:6) indicates that the psychological states could be created and enhanced via the five job characteristics as identified by Hackman and Oldham (1976:257). The five job characteristics are:

1. Skill Variety,
2. Task Identity,
3. Task significance,
4. Autonomy, and
5. Job feedback.

The model suggests that striking the correct balance between the characteristics and the psychological states will not only benefit the company but the employee as well. The company experiences higher productivity and employee effectiveness whilst the employee experiences high internal work motivation and job satisfaction. Hackman and Oldham (1976:257) propose that skill variety, task identity and task significance adds up to bring about the psychological state of “meaningfulness”. They also indicate that the “responsibility” psychological state is influenced by autonomy whilst the “knowledge of result” psychological state is affected by job feedback. The job characteristic model is aimed at the redesign of a job to create a higher motivational potential. The purpose of the redesign is effectively to improve the internal job motivation of an employee by addressing these three psychological states. The degree to which these have been met by a job could be measured by using the Motivating Potential Score that is linked to the

core job characteristics (Hackman & Oldham, 1976:258). See sub-section 2.3.7.4 for a discussion on this matter.

The variables that constitute the job characteristic model (i.e. job characteristics, psychological states and outcomes) will be discussed in the next sub-sections that follow. The Motivational Potential Score that a job offers, as well as the Job Diagnostic Survey instrument are also discussed.

2.3.7.1 Core Characteristics

According to McShane and Von Glinow (2010:177) the five core job characteristics are defined as indicated below:

1. *Skill variety*: refers to the degree of skills and talents that are required by an employee to finish various work activities.
2. *Task Identity*: refers to the degree to which a job requires completion as a whole or an identifiable piece of work.
3. *Task Significance*: refers to the degree of impact a job has on a company or community as a whole.
4. *Autonomy*: refers to the level of freedom, independence and discretion a job gives an employee to schedule his/her work, as well as determining the procedures required for completing the work.
5. *Job Feedback*: refers to the direct and clear information from a job communicated to employees in respect of how well they have performed their jobs.

2.3.7.2 Psychological States

The three psychological states are defined by Hackman and Oldham (1976:256) as follows:

1. *Meaningfulness*: this is the belief an employee has that his/her work is important or worthwhile.
2. *Responsibility*: this refers to the degree to which employees feel personally accountable and responsible for the outcome of their work.
3. *Knowledge of results*: refers to the degree to which individuals know and understand how effective they are performing the job.

Hackman and Oldham (1976:255) further postulate that it is important to have all three psychological states present for any job. These three states are created and enhanced through the five core job characteristics, which can influence the employee's internal motivation.

2.3.7.3 Outcomes

The job characteristic model includes a number of outcome variables as depicted by Figure 2-6. The outcome variables can be categorized as the desirable personal outcomes and work outcomes. The personal outcomes, which are experienced by the employee, as depicted by Figure 2-6, are (Oldham & Hackman, 1976:256):

- High internal work motivation,
- Personal growth, and
- Job satisfaction.

The work outcomes are:

- Effective performance,
- Quality of work performance,
- Absenteeism, and
- Employee turnover.

Hackman and Oldham (1976:259) recognize that these variables will be positive for a job with high Motivational Potential Scores whilst it is expected to be lower for jobs with

low Motivational Potential Scores. The concept of Motivational Potential Scores is further discussed in the next sub-section.

2.3.7.4 Motivational Potential Score (MPS)

According to Quick and Nelson (2009:483), there is an interaction between the five core job characteristics. This interaction of the core characteristics affects the overall job enrichment that an employee experiences. Hackman and Oldham (1976:258) state that this job enrichment experience, and hence internal work motivation, will be the highest when the following conditions have been met:

1. The job must have at least one of either skill variety, task identity or task significance as high;
2. The autonomy of the job should be high; and
3. The job should provide the employee with a high degree of feedback with respect to his/ her performance.

Having high levels of these core job characteristics will create an environment that will foster the three critical psychological states. These aforementioned conditions will further provide a high degree of motivational levels that will be experienced by the employee (Quick & Nelson, 2009:171; Lawrence, 2001:9). Lawrence (2001:7) further proposes that a job's motivating potential can be determined by computing the Motivational Potential Score. The Motivational Potential Score (MPS) can be calculated by the formula below.

$$MPS = \frac{Skill\ variety + Task\ Identity + Task\ Significance}{3} \times Autonomy \times Feedback$$

The Motivational Potential Score can therefore allow an employer to diagnose a job in order to determine whether it offers enough employee motivation. The Motivational Potential Score can be determined by utilizing a Job Diagnostic Survey (Lawrence, 2001:7; Quick & Nelson, 2009:485). The Job Diagnostic Survey will be discussed

briefly in the next sub-section. It can be seen, from the MPS equation, that if there is no autonomy or feedback the MPS score will be zero whilst the other core job characteristics do not have the same impact. The formula therefore suggests that the level of personal responsibility an employee feels, with respect to his or her job, as well as the degree of feedback provided on how the respective employee performs at his/her job has a significant impact on the motivational potential of the job.

2.3.7.5 Job Diagnosis Survey (JDS)

Hackman and Oldham (1976:259) tested their job characteristic model by administering a survey questionnaire on six hundred and eighty employees occupying various positions in seven different companies. The instrument that was used for collecting primary data is called the Job Diagnostic Survey (JDS) and is purposefully designed to measure the variables associated with the job characteristic model as depicted in Figure 2-6 above. According to Lawrence (2001:9), the Job Diagnostic Survey is used for determining the motivational potential of a job by evaluating the core job characteristics. The Job Diagnostic Survey consists of several statements or questions, which require participants to respond, by selecting on a Likert scale, how much they agree or disagree with a statement or question. These statements or questions are drafted in such a way that they are linked to the core job characteristics. Performing statistical analysis on completed questionnaires from participants allows a company to determine the overall motivational potential of a job via the MPS formula as described above.

2.3.8 Alternative Approaches

Apart from some of the traditional job design approaches discussed in this chapter several other alternative job design theories have emerged over the years. This was as a result of the limitation that exists when utilizing these traditional job design approaches (Quick & Nelson, 2009:486). These alternative job design approaches include social information processing, ergonomics and interdisciplinary framework, international perspective, and health and wellness approaches. Whereas the traditional approaches focused on the objective core job characteristics the alternative approaches focused on matters, such as interpersonal aspects of job design, cultural values and

economic systems, technology, and social issues. At the heart of the alternative approaches is the benevolence toward both employees and the environment.

2.4 SUMMARY

A company performs optimally when employees are motivated and satisfied with their jobs. It therefore follows that the level of employee motivation can affect a company's performance and ultimately its profitability. Hence employers will do well to ensure that employees' motivational levels are monitored and kept at the correct levels. A company can diagnose and manage employee motivation by applying a job design approach. The application of a job design approach will allow companies to diagnose and improve employee work efficiency whilst ensuring that employees are motivated, satisfied and engaged. Thus the outputs benefit both the company and the employees. Several job design approaches, such as job specialization, scientific management, job enlargement, job rotation, motivator-hygiene theory, and job characteristic model can be implemented to diagnose and improve employee motivation levels at a company.

The most widely studied job design approach is the job characteristic model. This approach seeks to exploit the motivational factors of the job itself whilst limiting the use of hygiene factors to motivate employees. Employees are motivated via three psychological states that are created and enhanced by five core job characteristics. In practice a survey questionnaire, called the Job Diagnostic Survey, is used for collecting data, which is used to statistically determine the motivational potential score of a job. Although the implementation of a job design approach can have a positive impact on a company's performance it can also have negative effects.

CHAPTER 3

EMPIRICAL INVESTIGATION

3.1 INTRODUCTION

A literature review pertaining to job design and its benefits was conducted in the previous chapter. Various approaches to job design, such as job specialization, scientific management, and job enlargement were explored. Particular attention was paid to the core job characteristics model, which was developed and tested by Hackman and Oldham (1976). The core job characteristics model is one of the most widely studied approaches and seeks to motivate employees by exploiting the motivational potential of a job as opposed to using hygiene factors, such as salary, bonuses, etc. This study therefore focuses on the application of the core job characteristic model in the South African operations of an international engineering company.

This chapter of the research will discuss the research approach used for investigating the research objective as set out in Chapter 1. The instrument, data collection method, population and analysis are discussed.

3.2 RESEARCH APPROACH

Data can be collected for research by either using a quantitative approach or a qualitative approach (Welman *et al.*, 2010:6). A quantitative approach seeks to evaluate data, which is made up of numbers whilst a qualitative approach considers subjective data that is produced by the minds of participants (Welman *et al.*, 2010:8). The quantitative approach also seeks to understand the subjects' view points by way of controlling the situation and using inferential methods whilst the qualitative approach seeks to do so by using unstructured interviewing and observation processes (Welman *et al.*, 2010:9). Table 3.1 below presents details of the features of each of these approaches.

Table 3.1 Comparison of features of research approaches

Source: McDonald & Headlam (s.a.)

	Quantitative	Qualitative
Aim	The aim is to count things in an attempt to explain what is observed.	The aim is a complete, detailed description of what is observed.
Purpose	Generalisability, prediction, causal explanations	Contextualisation, interpretation, understanding perspectives
Tools	Researcher uses tools, such as surveys, to collect numerical data.	Researcher is the data gathering instrument.
Data collection	Structured	Unstructured
Output	Data is in the form of numbers and statistics.	Data is in the form of words, pictures or objects.
Sample	Usually a large number of cases representing the population of interest. Randomly selected respondents	Usually a small number of non-representative cases. Respondents selected on their experience.
Objective/ Subjective	Objective – seeks precise measurement & analysis	Subjective - individuals' interpretation of events is important
Researcher role	Researcher tends to remain objectively separated from the subject matter.	Researcher tends to become subjectively immersed in the subject matter.
Analysis	Statistical	Interpretive

For the purpose of this research, as discussed in Chapter 1 (section 1.6.2), a quantitative research approach was used for collecting data. This approach also allowed the researcher to use an already tested instrument that was used and presented by Slocum and Hellriegel (2011:170). The collected data is objective in nature and consists of numbers and warrants the use of a quantitative approach. A non-experimental approach (questionnaire) was used for determining relationships amongst different variables, such as core job characteristics, age, and race. This characteristic further invariably makes the design correlational by nature (Welman *et al.*, 2010:94).

3.3 POPULATION

This research is aimed at evaluating employee perception of the importance of the core job characteristics at an international engineering company. Although the company has

offices spread across South Africa the research was focused on employees working at the Longmeadow facilities located in Modderfontein, Johannesburg, South Africa. The international engineering company employs approximately 1 509 employees who consist of both factory and office workers. The selected population (employees at the Longmeadow facilities) is made up of employees with different demographical characteristics, such as male and female, different ages, different levels of employment, different educational levels, different races, and from different departments. Employees across different divisions and types of employment contracts (i.e. both permanent and temporary) were selected as the sample from the population.

Convenience sampling was used to collect data from the population. Two hundred (200) questionnaires were printed and handed out, in person, to respondents. Questionnaires were handed out in a haphazard manner to respondents that were easily accessible until the required sample size was reached (Welman *et al.*, 2010:60). Members from the sample were given a few days to complete the questionnaires where after these were again collected in person. From the two hundred (200) respondents one hundred and fifty one (151) completed the questionnaire resulting in a response rate of 75.5%.

3.4 MEASURING INSTRUMENT

The questionnaire that has been used is the revised Job Diagnostic Survey (JDS) that was employed by Slocum and Hellriegel (2011:170). This JDS is the primary means of collecting data from a sample of the population in question. The primary objective of the questionnaire is to measure the core job characteristics of the jobs of employees at the South African operations of an international engineering company; more specifically employees located at the Longmeadow facilities. The questionnaire consists of the following sections: 1) introduction section, 2) the demographic profile section and 3) fifteen (15) statements that measure the core job characteristics and hence the motivational potential score of the respective jobs. The questionnaire can be viewed in Appendix A.

As discussed in Chapter 1 (section 1.6.1) the closest comparable work to this intended research is that conducted by Rusconi (2005). Rusconi (2005:87) used an instrument that was used and proven by Boonzaier (2001) for reliability and validity. There is no evidence suggesting that the instrument used by Slocum and Hellriegel (2011:170) was ever used and tested in South Africa and in particular in an engineering company. The reliability and validity of the instrument used was calculated and is presented and discussed in Chapter 4.

A printed version of the questionnaire was distributed to the sample from the population and collected in person. Conditional approval to conduct the research was granted by the Chief Executive Officer (CEO). The questionnaire complies with the guidelines for research ethics as stipulated by the North-West University.

3.4.1 Section 1: Introduction

The introduction section briefs respondents regarding the purpose of the research. The research is aimed for use for academic purposes by evaluating employees' perceptions of the motivational potential of their jobs. The respondents are informed regarding what is required of them to complete the questionnaire and they are assured of the confidentiality of the research. This section also provides basic information about the researcher.

3.4.2 Section 2: Demographic Profile

This section requires respondents to complete their demographical profile. This section was also designed in order to ensure that respondents complete the questionnaire anonymously. Information, such as gender, age, race, and job title makes up the different variables for the demographical profile. This allows the researcher to evaluate different relationships with reference to the motivational potential of employees' jobs. The relevance of this section is illustrated in greater detail when the results are presented and discussed in Chapter 4.

3.4.3 Section 3: Measuring Job Enrichment via JDS

This section consists of fifteen (15) statements making up the JDS as presented by Slocum and Hellriegel (2011:170). A respondent agrees or disagrees with each statement pertaining to his/her job by giving it a score on a Likert scale of five (5); where “5” is equivalent to “strongly agree” and “1” is equivalent to “strongly disagree”. These fifteen statements can then be grouped into five (5) categories (or variables), which measure the five core job characteristics of 1) skill variety, 2) task significance, 3) task identity, 4) autonomy and 5) job feedback.

Each of these variables is measured by grouping the statements as described below:

- Skill variety: the scores for questions 1, 7 and 11 are summed together and an average is calculated for the sample.
- Task Identity: the scores for questions 3, 12 and 14 are summed together and an average is calculated for the sample.
- Task significance: the scores for questions 5, 9 and 15 are summed together and an average is calculated for the sample.
- Autonomy: the scores for questions 2, 6 and 10 are summed together and an average is calculated for the sample.
- Feedback: the scores for questions 4, 8 and 13 are summed together and an average is calculated for the sample.

The average scores for the abovementioned variables are summed together to obtain an overall score. An overall score of between 60-75 indicates that the core job characteristics contribute significantly to the positive psychological state, which invariably leads to a positive personal and work outcome (Slocum & Hellriegel, 2011:170). Low scores suggest that the opposite is invariably the case for a particular job and is indicative of the fact that the motivators of the job in question are relatively low. The motivational potential score (MPS) of a job can also now be calculated using the equation presented in Chapter 2 (section 2.3.7.4). Using the MPS and job characteristic scores enables managers to identify problematic jobs (or job areas) that

warrant attention in relation to the different demographical variables, such as age, race, and job title.

3.5 DATA COLLECTION METHOD

The primary data was collected by distributing two hundred (200) questionnaires to a convenience sample (non-probability method) of the population. The sample represented approximately 13.25% of the entire population. The questionnaire was presented in English. The questionnaire was printed on a single page, back-to-back, to create the impression that it would be quick to complete. This presentation of the questionnaire produced a response rate of 75.5% (151 questionnaires returned) resulting in the intended consequence. In some cases respondents completed and returned the questionnaires as it was handed to them. On average it took respondents five (5) minutes to complete the questionnaire. Completed questionnaires were collected in person by going around the different departments on agreed-upon dates. This contributed further to the high response rate.

3.6 DATA ANALYSIS: THEORATICAL FRAMEWORK

The Statistical Consultation Services of the North-West University interrogated the collected data using the SPSS statistical software package. The statistics conducted included proving the reliability and validity of the model, significance testing of the associated variables, correlation, descriptive statistics and analysis of variance (ANOVA). This section presents a brief theoretical framework for the associated statistical techniques that were performed on the collected data. The results are discussed in Chapter 4.

3.6.1 Reliability Testing

A measurement instrument can be used to measure various concepts, such as in the case of this research, the motivational potential score of a job, as well as its core characteristics. According to classical test theory a measurement instrument requires two elements to ascertain the quality of its measurement, namely validity and reliability (Scholtus & Bakker; 2013:4). In this sub-section a means to evaluate the reliability of an

instrument will be discussed whilst the following sub-section presents the technique used for measuring validity. Tavakol and Dennick (2011:53) stress the relationship of these two concepts and that an instrument cannot be valid if it is not reliable. They further advocate that an instrument's reliability can be measured without determining its validity but not the other way around.

3.6.1.1 Cronbach's Alpha

Measuring an instrument's reliability gives the extent to which an instrument has the ability to measure consistently and credibly (Welman *et al.*, 2010:145). It also reflects the instrument's internal consistency. Welman *et al.* (2010:145) postulate that a reliable instrument can allow research to be replicated under different measuring occasions, measurements forms and test administrators. The most common measure of reliability is the Cronbach's coefficient alpha (Welman *et al.*, 2010:147). The Cronbach's coefficient alpha was developed by Lee Cronbach in 1951 and is presented as a number between 0 and 1 (Tavakol & Dennick, 2011:53). This number depicts the degree to which items measure the same concept, such as trust and MPS. Tavakol and Dennick (2011) also explain that the higher the alpha value that is observed the less the error will be. The value of the measured alpha will increase when tested items correlate to each other. They further suggest that alpha values should be measured every time a test is performed since the test will relate to a specific sample of respondents. They also identify that the measured alpha value should be accompanied by the results of other reliable statistic techniques, such as factor analysis. The Cronbach's coefficient alpha can be calculated by way of the equation as shown below (Miller, s.a.):

$$\alpha = \frac{N}{N-1} \left[1 - \frac{\sum \text{Var}(Y_i)}{\text{Var}(X)} \right]$$

Where:

N = # items

$\sum \text{Var}(Y_i)$ = sum of item variances

Var(X) = composite variance

Tavakol and Dennick (2011:54) state that the acceptable levels of alpha lie between 0.70 and 0.95. They also propose that lower alpha values can be the cause of 1) a low number of questions and/or 2) poor interrelatedness between the respective items.

3.6.2 Validity Testing

Validity testing is concerned with the extent to which an instrument measures what it is supposed to measure, i.e. in this case motivational potential score and core job characteristics (Tavakol & Dennick, 2011:53). Systematic measurement errors can be associated with validity and for the purpose of this research structural equation modelling (SEM) is used to ascertain the validity of the research instrument. SEM can also be used to measure reliability. The construct validity is of importance since the extent to which the instrument should measure what it is supposed to measure is of concern here.

3.6.2.1 Structural Equation Modelling (SEM)

Lei and Wu (2007:33) postulate that SEM consists of a large number of statistical models that are used to evaluate the validity of substantive theories with empirical data. Melby *et al.* (1995:280) state that traditional definitions are used to outline an approach for structural equation modelling. This approach empowers researchers, through SEM, to determine an instrument's validity, as well as its reliability. A direct structural relationship with latent construct and measured variable for the construct allows for the estimation of the instrument's reliability and validity. SEM consists of two major parts of which the first part depicts the casual relations amongst the substantive/latent variables whilst the second part depicts the relations between the latent variable and observed variables. The linear equation below expresses the relations among the latent variables.

$$\eta = \sum_{i=1}^m \beta_{ii} \eta_i + \sum_{j=1}^n \beta_{ij} \xi_{ij} + \zeta_i \quad i = 1, \dots, m,$$

According to Scholtus and Bakker (2013:6) the observed variables can either be endogenous or exogenous. The endogenous observed variable is represented by the equation below:

$$y_k = \lambda_{yk}\eta_{i(k)} + \varepsilon_k \quad k = 1, \dots, p$$

The exogenous observed variable is represented by the equation below:

$$x_l = \lambda_{yl}\xi_{i(k)} + \delta_l \quad l = 1, \dots, q$$

SEM also allows a researcher to determine the overall fit of the model (Melby *et al.*, 1995:283). The overall fit of the model can be evaluated by calculating the Chi-square value of the model. The Chi-square value of the model can be calculated as shown in the equation below:

$$\chi^2 = \frac{\sum (\text{Observed Value} - \text{Expected Value})^2}{\text{Expected Value}}$$

Table 3.2 below presents cut-off criteria for several fit indexes as identified by Schreiber *et al.* (2006:330). These indexes can be used for comparison purposes to evaluate whether the model fits well with the collected data. This approach allows research to evaluate construct validity of an instrument.

Table 3.2: Cut-off criteria for several fit indexes

Source: Schreiber et al. (2006)

Indexes	Shorthand	General rule for acceptable fit if data are continuous	Categorical data
Absolute/predictive fit			
Chi-square	χ^2	Ratio of χ^2 to $df \leq 2$ or 3, useful for nested models/model trimming	
Akaike information criterion	AIC	Smaller the better; good for model comparison (nonnested), not a single model	
Browne-Cudeck criterion	BCC	Smaller the better; good for model comparison, not a single model	
Bayes information criterion	BIC	Smaller the better; good for model comparison (nonnested), not a single model	
Consistent AIC	CAIC	Smaller the better; good for model comparison (nonnested), not a single model	
Expected cross-validation index	ECVI	Smaller the better; good for model comparison (nonnested), not a single model	
Comparative fit		Comparison to a baseline (independence) or other model	
Normed fit index	NFI	$\geq .95$ for acceptance	
Incremental fit index	IFI	$\geq .95$ for acceptance	
Tucker-Lewis index	TLI	$\geq .95$ can be 0 > TLI > 1 for acceptance	0.96
Comparative fit index	CFI	$\geq .95$ for acceptance	0.95
Relative noncentrality fit index	RNI	$\geq .95$, similar to CFI but can be negative, therefore CFI better choice	
Parsimonious fit			
Parsimony-adjusted NFI	PNFI	Very sensitive to model size	
Parsimony-adjusted CFI	PCFI	Sensitive to model size	
Parsimony-adjusted GFI	PGFI	Closer to 1 the better, though typically lower than other indexes and sensitive to model size	
Other			
Goodness-of-fit index	GFI	$\geq .95$ Not generally recommended	
Adjusted GFI	AGFI	$\geq .95$ Performance poor in simulation studies	
Hoelter .05 index		Critical N largest sample size for accepting that model is correct	
Hoelter .01 index		Hoelter suggestion, $N = 200$, better for satisfactory fit	
Root mean square residual	RMR	Smaller, the better; 0 indicates perfect fit	
Standardized RMR	SRMR	$\leq .08$	
Weighted root mean residual	WRMR	$< .90$	$< .90$
Root mean square error of approximation	RMSEA	$< .06$ to $.08$ with confidence interval	$< .06$

From this table the model fit indexes that will be used to evaluate the fit of the model will be as follows:

- The Chi-square χ^2 value must be less than 2 or 3.
- The Tucker Lewis Index (TFL) must be equal to or greater than 0.95.
- The Comparative Fit Index (CFI) must be equal to or greater than 0.95 for acceptance.

- The Root Mean Square Error of Approximation (RMSEA) must fall between 0.06 and 0.08.

These criteria are further comparable to the indexes values that were used by Tinakon and Nahathai (2011) in their research on the Rosenberg self-esteem scale.

3.6.3 Test of Significance

3.6.3.1 Hypothesis Testing

Significance testing is aimed at statistically testing hypotheses. Levine *et al.* (2011:327) identify two methods to do hypothesis testing. These are the 1) critical value approach and 2) the p-value approach. The critical value approach involves performing six steps to make a statistical decision about the test statistic T (and the hypothesis) whilst the p-value require five steps (Levine *et al.*, 2011:327-335). For both these methods a level of significance is selected (usually $\alpha = 0.05$) to which the test statistic T value is compared. Thereafter the test static in the data sample is calculated and compared to the selected level of significance. The null hypothesis is accepted if the test statistic value is equal to or greater than the level of significance whilst it is rejected if it is less (Levine *et al.*, 2011: 233). For the purpose of this research the p-value approach will be considered as the basis for reliability testing of the means. The p-value approach will allow the researcher to determine the statistical significance achieved from the results obtained from the collected data (Welman *et al.*, 2010:234). The p-value can be determined by performing a t-Test. The t-Test can be calculated for one sample or for two samples as indicated in the equations below:

$$\text{One Sample Test: } T = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

$$\text{Two Sample Test: } T = \frac{\bar{x} - \bar{y} - (\mu_1 - \mu_2)}{s_p / \sqrt{\frac{1}{m} + \frac{1}{n}}}$$

Where:

T = test statistic

$\bar{x}$ = mean of the sample taken from population 1

$\bar{y}$ = mean of the sample taken from population 2

μ = expected population mean

s = sample variance

s_p^2 = pooled variance

n = size of the sample taken from population 1

μ_1 = expected population mean 1

μ_2 = expected population mean 2

m = size of the sample taken from population 2

For this research the significance level has been selected as $\alpha=0.05$ and the one-sample test has been performed.

3.6.3.2 Effect Size: Cohen's d value

Whilst the aforementioned approach calculates the probability by which the observed result will differ from what is expected, the effect size indicates the actual size of the difference (Thalheimer & Cook, 2002:2). This difference in magnitude is in fact the difference in the two means. Cohen's d effect size can in actual fact be calculated from the results obtained from the t-test approach. The equation below depicts how the effect size d can be calculated:

$$d = \frac{\overline{X}_1 - \overline{X}_2}{s_w}$$

Where:

$\overline{X}_1 - \overline{X}_2$ = difference between the means

s_w = pooled standard deviation

According to Cohen the effect size d values can be interpreted as follows (Warmbrod, 2001:14):

- d value of 0.2 has little effect,
- d value of 0.5 has a medium effect,
- d value of 0.8 has a large, and
- d value of greater than or equal to 0.8 is practical significant.

3.6.4 Descriptive Statistics

Welman *et al.* (2010:231) describes descriptive statistics as being interested in describing and/or summarizing data obtained for a group of units of analysis. Welman *et al.* (2010: 231) further identify three forms of analysis, namely univariate analysis used for a single variable, bivariate analysis used when two variables are used and multivariate analysis used when more than three variables are used. For the purpose of this research more than two variables are used and hence a multivariate analysis needs to be used. The aim of the analysis is to group data and present it in the form of tables and graphs by describing means, variances, as well as correlations (Welman *et al.*, 2010:232). A brief description of each of these follows.

3.6.4.1 Mean

Levine *et al.* (2011:114) describe the mean as one of the measures of central tendency, which is aimed at showing distinct tendencies that are grouped around a central value. Welman *et al.* (2010:232) define the mean as the arithmetic average of scores, which is obtained by adding a list of scores and dividing the result by the number of scores. The mean is calculated as shown in the equation below:

$$\bar{X} = \frac{\text{Sum of all values}}{\text{Number of Values}} = \frac{\sum_{i=1}^n X_i}{n}$$

Where:

$\bar{X}$ = sample mean

n = number of values or sample size

X_i = *ith* value of the variable X

$\sum_{i=1}^n X_i$ = summation of all the X_i values in the sample

3.6.4.2 Standard Deviation

The standard deviation denotes the range of distribution that is around the mean (Welman *et al.*, 2010:233). It is fundamentally a measure of variance of how the data values are distributed around the mean (Levine *et al.*, 2011:120). The computation of the standard deviation is given in the equation below:

$$S = \sqrt{S^2} = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n - 1}}$$

Where:

S= standard deviation

3.6.4.3 Correlation

Correlation is used for describing relationships amongst a number of variables indicating how changes in one variable may be associated with changes in a related variable (Welman *et al.*, 2010:234). The correlation coefficient is calculated to highlight the nature of the relationship between variables. A positive correlation coefficient suggests that the variables in question have a direct linear relationship whilst a negative coefficient suggests the opposite. Thus a correlation coefficient of -1 suggests a perfect inverse relationship whilst a value of +1 suggests a perfect direct relationship (Welman *et al.*, 2010:234). A coefficient value of 0 suggests that there is no relationship between the variables in question. The correlation coefficient (r) can be calculated as shown in the equation below:

$$r = \frac{cov(X, Y)}{S_x S_y}$$

Where:

$$cov(X, Y) = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{n - 1}$$

$$S_x = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n - 1}}$$

$$S_y = \sqrt{\frac{\sum_{i=1}^n (Y_i - \bar{Y})^2}{n - 1}}$$

A guideline for the values of the correlation effect sizes is indicated below (Warmbrod, 2001:8):

- r values of about +/- 0.1 have little correlation
- r values of about +/- 0.3 have a medium correlation
- r values of about +/- 0.5 have large practical correlation

3.6.5 ANOVA

According to Gabrenya (2003:1) the Analysis of Variance (ANOVA) can be thought of as an extension of the t-Test where the test statistic is considered for either more than one group or for more than one independent variable. It is also a simpler form of a complex correlation (Gabrenya, 2003:1). The ANOVA therefore is concerned with variations and in essence measures the differences in the means of groups as a function of the variances in errors. The ANOVA coefficient (**F** statistic) can be calculated as in the equation below for a one-way ANOVA:

$$F = \frac{\text{Between group variance}}{\text{Error variance within the group}}$$

The *F* statistic is then compared with the selected significance level (usually $\alpha=0.05$). If the *F* statistic is greater than alpha (i.e. $F > 0.05$) we reject the null hypothesis and accept that the means of the population is not equal.

3.7 SUMMARY

This section described the research approach and methods used to collect the data. A theoretical framework has also been presented that will assist with interpreting the statistical results obtained from interrogating the collected data. The next chapter will present the results and discussion of the findings.

CHAPTER 4

DISCUSSION OF RESULTS

4.1 INTRODUCTION

Chapter 3 discussed the research approach that was used to investigate the research objective. In addition to this the questionnaire used for collecting raw data from the sample was also discussed, as well as the theoretical framework for several statistical techniques that will be used for analysing the data. This framework forms the basis of how the collected data will be analysed and discussed. The purpose of Chapter 4 is therefore to present and discuss the results achieved by applying the statistical techniques as discussed in Chapter 3.

4.2 RESPONSE RATE

Two hundred (200) questionnaires were distributed of which one hundred and fifty one (151) were completed by the respondents. This in essence produced a response rate of 75.5%, which is an exceptional result in itself. In some cases respondents completed and returned the questionnaires as they were handed to them. On average it took respondents five (5) minutes to complete the questionnaire.

4.3 DEMOGRAPHICAL PROFILE OF RESPONDENTS

Section 2 of the questionnaire required the respondents to complete demographical information. The information they had to complete can be seen in Appendix A (questionnaire).

For the sake of conciseness, only core elements of the biographical questionnaire will be highlighted here. Figure 4-1 below graphically depicts the result obtained for the gender units of analysis. It can be seen that 60% of the respondents were male whilst 37% were female. Another 3% did not indicate their gender on their questionnaire.

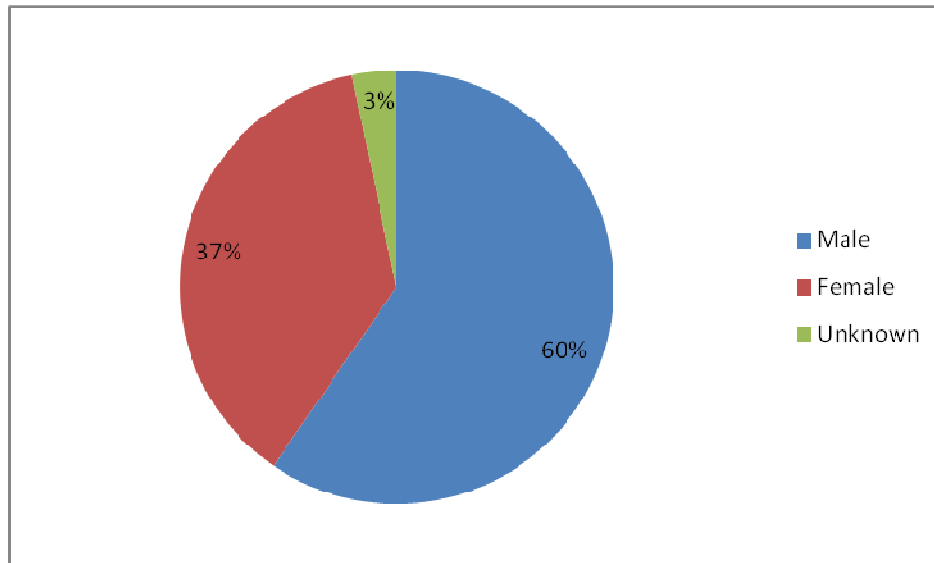


Figure 4-1: Demographical Result (Gender)

Figure 4-2 below depicts the results obtained for the age units of analysis. This indicates that the majority of the respondents who completed the questionnaire were either 41 years of age or older (30%). This is followed by 19% of the respondents who did not indicate their age on the questionnaire whilst 18% of the questionnaires were completed by respondents between the ages of 31 and 35. The respondents aged 25 and younger were the least number of participants and represented 7% of the sample.

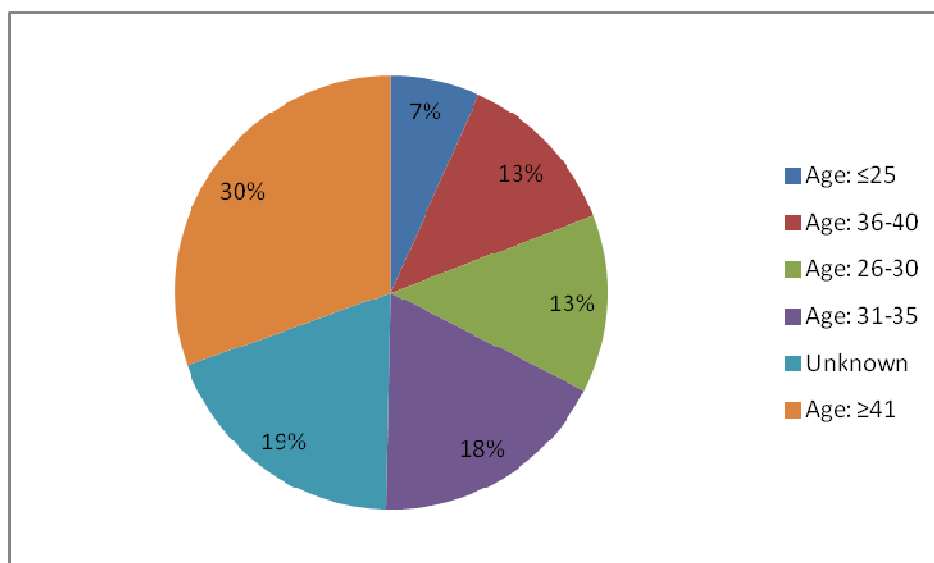


Figure 4-2: Demographical Result (Age)

The demographical groups are made up of four race groups. The most number of respondents are from the African race group, which makes up 41% of the sample whilst this is followed by the White race group, which makes up 38% of the sample. The combined Asian race group is in third place with 13%, followed by the Coloured race group with 7%. 1% did not indicate their race group on the completed questionnaires. As can be seen from Figure 4-3 more than 70% of the respondents are from just two race groups. This may also skew the results obtained from the collected data.

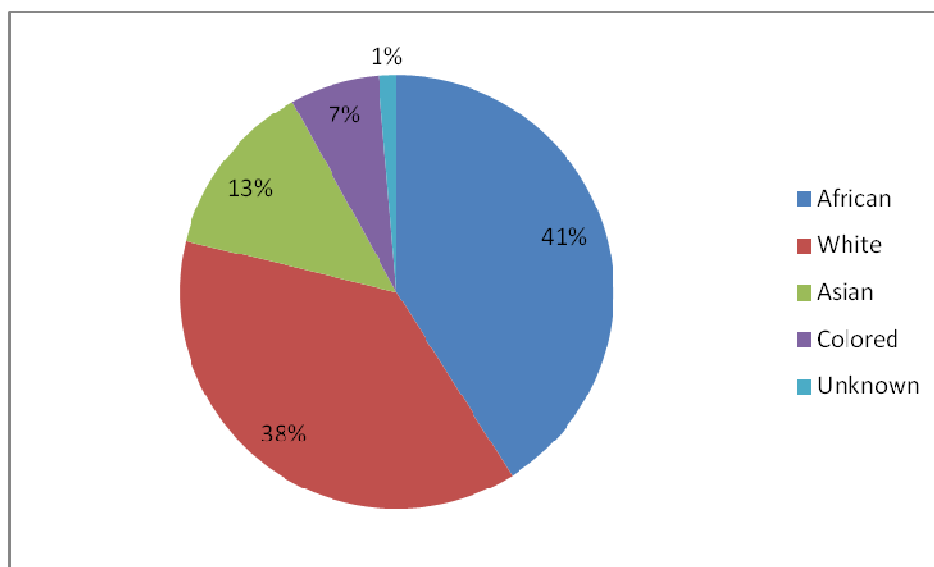


Figure 4-3: Demographical Result (Race)

From the collected data it was deduced that the majority of the respondents (59%) were not in management. It can be seen from Figure 4-4 below that 35% of the respondents were, however, in management positions and 6% did not indicate if they were in management or not.

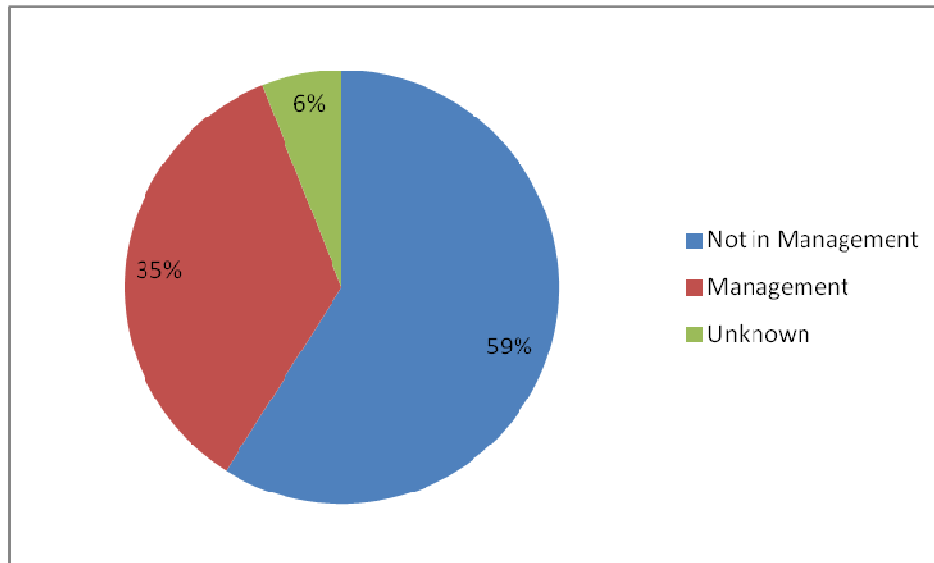


Figure 4-4: Demographical Result (Management)

Figure 4-5 below depicts the results for the different levels of management in the sample. From the pie chart the highest number of respondents is not in management (29%). The bulk of respondents who are in management are situated in middle management levels. The lowest and equal number of respondents is those who are at supervisory level and senior management level. These make up 9% of the sample respectively. Approximately 32% of the respondents are unclear on whether they are in management or not. This can be ascribed to section 2 of the questionnaire not being specific enough, as well as to respondents being unwilling to supply the required information.

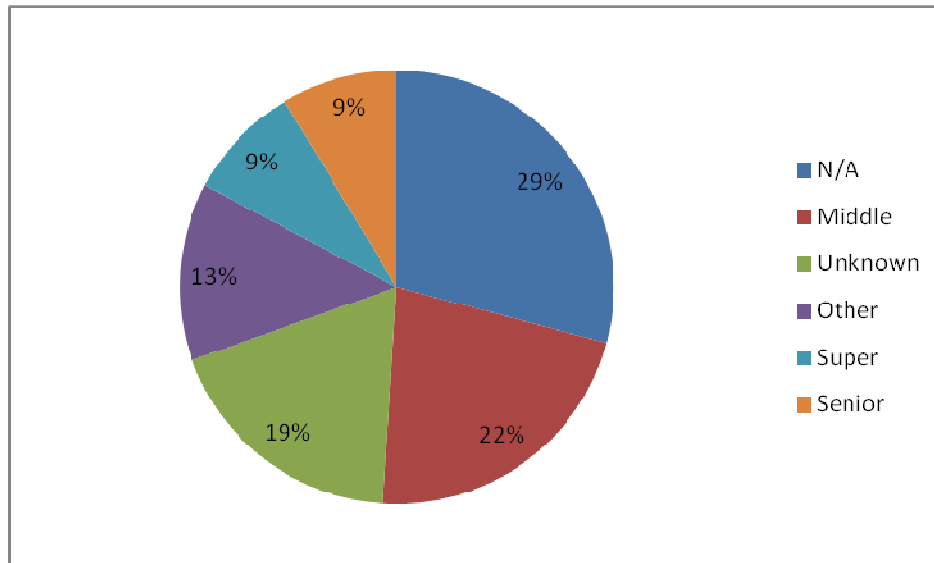


Figure 4-5: Demographical Result (Level of Management)

4.4 RELIABILITY ANALYSIS: CRONBACH ALPHA

Chapter 3 (section 3.6.1) recognizes that the measuring instrument used for this research is aimed at measuring the five core job characteristics. It is further accepted that the instrument had to be subjected to a reliability and validity test. In this section the results of the reliability test are presented. The reliability test is conducted by determining if the three observed variables/questions linked to their associated latent variable/ construct do in fact measure the same as described in Chapter 3 (section 3.4.3). The SPSS software package was used to generate these results.

4.4.1 Skill Variety

The Cronbach alpha for skill variety was calculated to be 0.75 as shown in Table 4-1 below. This is well within the specified range, as defined in Chapter 3 (section 3.6.1.1) and suggests that this construct can be considered reliable. This also suggests that the associated questions for this construct do in actual fact measure skill variety.

Table 4-1: Calculated Alpha for Skill Variety

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.755	.754	3

0.7< α <0.9

4.4.2 Task Identity

The Cronbach alpha for task identity was calculated to be 0.689 as depicted in Table 4-2 below. Although lower than 0.7 this calculated value is still within an acceptable range and is approximately 1.5% lower than the recommended value of 0.7. A possible reason for this can be attributed to the fact that one of the questions measuring task identity does not have such a strong correlation with the construct. Another possible reason can be due to the number of questions that is supposed to measure this construct. It is also possible that respondents did not interpret the questions properly. However, one can still consider this construct to be reliable and can possibly rectify this situation by adding additional relevant questions to the construct. Literature also suggests that values below 0.7 are a realistic expectation when dealing with psychological constructs (Field, 2009). This is due to the multiplicity of the constructs that are being measured.

Table 4-2: Calculated Alpha for Task Identity

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.689	.695	3

$$0.7\alpha < 0.9$$

4.4.3 Task Significance

The Cronbach alpha for task significance was calculated to be 0.703 as shown in Table 4-3 below. This is within the specified range, as defined in Chapter 3 (section 3.6.1.1) and suggests that this construct can be considered reliable. This also suggests that the associated questions for this construct do in actual fact measure task significance.

Table 4-3: Calculated Alpha for Task Significance

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.703	.705	3

$$0.7 < \alpha < 0.9$$

4.4.4 Autonomy

The Cronbach alpha for autonomy was calculated to be 0.717 as indicated in Table 4-4 below. This is within the specified range, as defined in Chapter 3 (section 3.6.1.1) and

suggests that this construct can be considered reliable. This also suggests that the associated questions with this construct do in actual fact measure autonomy.

Table 4-4: Calculated Alpha for Autonomy

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.717	.718	3

$$0.7 < \alpha < 0.9$$

4.4.5 Job Feedback

The Cronbach alpha for *feedback* was calculated to be 0.835 as shown in Table 4-5 below. This is well within the specified range, as defined in Chapter 3 (section 3.6.1.1) and suggests that this construct can be considered reliable. This also suggests that the associated questions with this construct do in actual fact measure job feedback.

Table 4-5: Calculated Alpha for Job Feedback

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.835	.836	3

$$0.7 < \alpha < 0.9$$

4.4.6 Discussion

In general the reliability of the instrument is ascertained by the Cronbach alpha values that were obtained from interrogating the collected data coupled to respective constructs. These values are further indicative of the internal consistency of the relevant constructs. On the other hand one of the constructs obtained an alpha value that is slightly lower than the proposed recommended range. This in essence is not such a major difference and hence the construct can still be considered valid. However, to improve this construct one could possibly delete questions with weak correlations and/or add more related questions to the questionnaire.

4.5 VALIDITY ANALYSIS: SEM RESULTS

This section presents the results obtained for the validity test. Structural equation modelling has been used to obtain these results. Discussions in respect of the results

of the path diagram, regression weights and fit indexes are given in this section. The SPSS software package was used for testing the fit of this model.

4.5.1 Path Diagram of Model

The relationships between the latent variables/constructs and observed variables/questions have been defined in Chapter 2 (section 2.3.7.4) and Chapter 3 (section 3.4.3). These relationships invariably represent the model to be tested. Figure 4-6 is a path diagram for the model and reflects the various relationships between latent and observed variables. This path diagram in Figure 4-6 was generated by populating and compiling the collected data in the SPSS software package. It demonstrates the pattern of correlations (and/or co-variances) amongst a group of variables. The model can further be explained as follows: the latent variables are represented by the ellipses whilst the associated observed variables are represented by the rectangles. The respective observed variables are linked to the respective latent variables via single-headed arrow lines. These single-headed arrow lines indicate the prognostic relationship that exists between the observed variables and the latent variables. The double-headed arrow lines represent the associated correlations (or covariances) of the respective variables that is joined by them. The interpretation of the obtained model, as in Figure 4-6, will now be discussed.

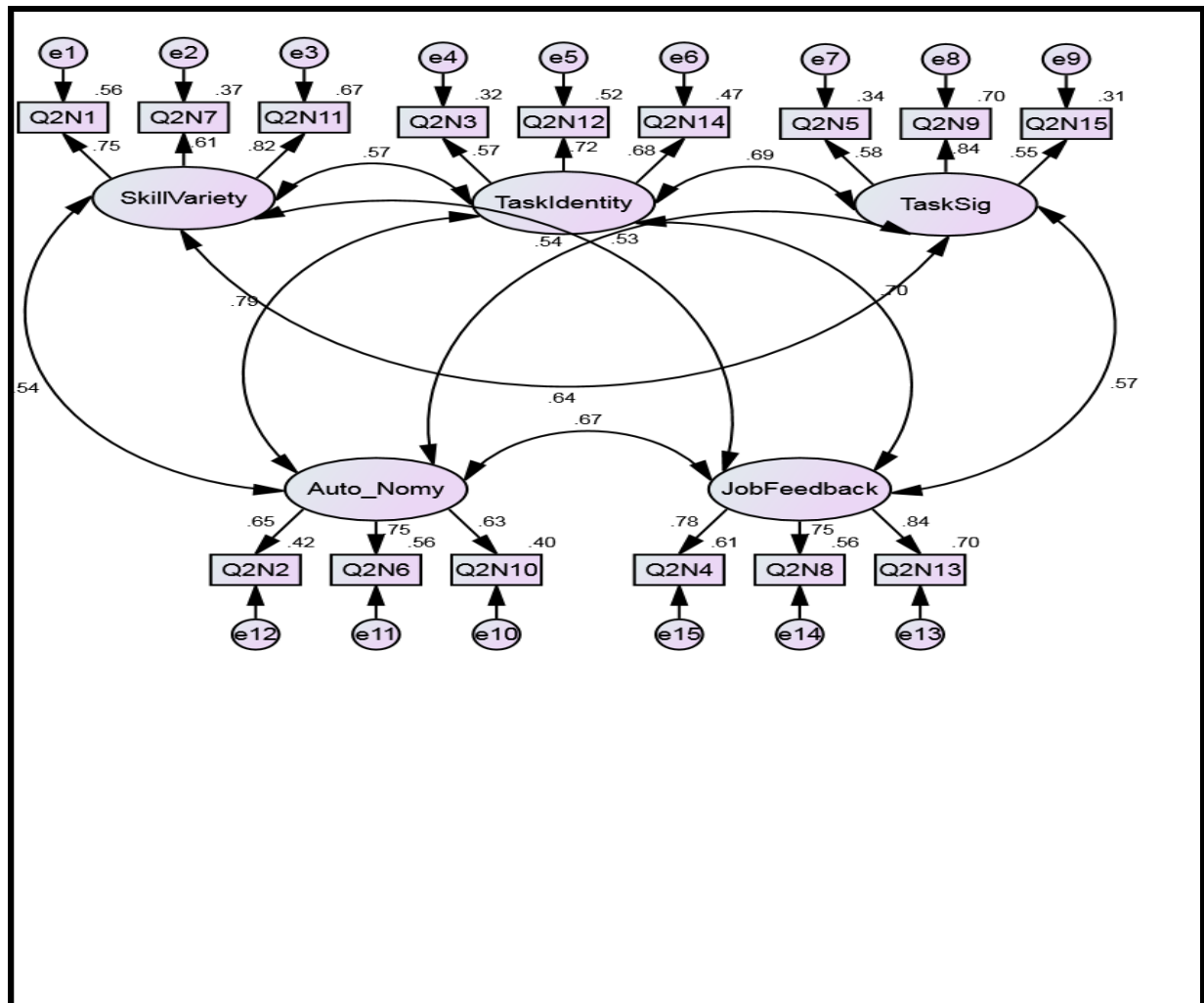


Figure 4-6: Path Diagram for Model

From the model depicted in Figure 4-6 above it can be deduced that each respective latent variable is predicted by three associated observed variables. There are also some interactions between the respective latent variables. The latent variables (or constructs) in this instance are 1) Skill Variety, 2) Task Identity, 3) Task Significance, 4) Autonomy and 5) Job Feedback. The significance of the standard error (e) is discussed in the next sub-section.

4.5.1.1 Correlation between Latent and Observed Variables

Table 4-6 depicts the relationship each of the respective latent variables has with its associated observed variables.

Table 4-6 Correlations between Latent and Observed Variables

Latent Variables	Observed Variables	Correlation
Skill Variety	Question 1	0.75
	Question 7	0.61
	Question11	0.82
Task Identity	Question 3	0.57
	Question 12	0.72
	Question14	0.68
Task Significance	Question 5	0.58
	Question 9	0.84
	Question15	0.55
Autonomy	Question 2	0.42
	Question 6	0.56
	Question10	0.40
Job Feedback	Question 4	0.61
	Question 8	0.56
	Question 13	0.70

The interpretation for each of the latent variables in this table follows below.

4.5.1.1.1 Skill Variety

All of these values are above 0.5. From Chapter 3 (section 3.6.4.3) this suggests that the variables have a high practical correlation with the latent variable. This can further be interpreted as follows:

- Skill Variety has a positive linear relationship with the associated observed variables (or questions).
- A one standard deviation of change in question 1 will constitute a 0.75 standard deviation of change in Skill Variety.
- A one standard deviation of change in question 7 will constitute a 0.61 standard deviation of change in Skill Variety.
- A one standard deviation of change in question 11 will constitute a 0.82 standard deviation of change in Skill Variety.

4.5.1.1.2 Task Identity

All of these values are above 0.5. From Chapter 3 (section 3.6.4.3) this suggests that the variables have a high practical correlation with the latent variable. This can further be interpreted as follows:

- Task Identity has a positive linear relationship with the associated observed variables (or questions).
- A one standard deviation of change in question 3 will constitute a 0.57 standard deviation of change in Task Identity.
- A one standard deviation of change in question 12 will constitute a 0.72 standard deviation of change in Task Identity.
- A one standard deviation of change in question 14 will constitute a 0.68 standard deviation of change in Task Identity.

4.5.1.1.3 Task Significance

All of these values are above 0.5. From Chapter 3 (section 3.6.4.3) this suggests that the variables have a high practical correlation with the latent variable. This can further be interpreted as follows:

- Task Significance has a positive linear relationship with the associated observed variables (or questions).
- A one standard deviation of change in question 5 will constitute a 0.58 standard deviation of change in Task Significance.
- A one standard deviation of change in question 9 will constitute a 0.84 standard deviation of change in Task Significance.
- A one standard deviation of change in question 15 will constitute a 0.55 standard deviation of change in Task Significance.

4.5.1.1.4 Autonomy

Autonomy's behaviour can be explained by the behaviour of questions 2, 6 and 10 of the research instrument. The correlation that each of these observed variables has with Autonomy is as follows:

The average value of these observed variables is 0.46, which is close to 0.5. From Chapter 3 (section 3.6.4.3) this suggests that the variables have a medium to high correlation with the latent variable. This can further be interpreted as follows:

- Autonomy has a positive linear relationship with the associated observed variables (or questions).
- A one standard deviation of change in question 2 will constitute a 0.42 standard deviation of change in Autonomy.
- A one standard deviation of change in question 6 will constitute a 0.56 standard deviation of change in Autonomy.
- A one standard deviation of change in question 10 will constitute a 0.40 standard deviation of change in Autonomy.

4.5.1.1.5 Job Feedback

All of these values are above 0.5. From Chapter 3 (section 3.6.4.3) this suggests that the variables have a high practical correlation with the latent variable. This can further be interpreted as follows:

- Feedback has a positive linear relationship with the associated observed variables (or questions).
- A one standard deviation of change in question 4 will constitute a 0.61 standard deviation of change in Feedback.
- A one standard deviation of change in question 8 will constitute a 0.56 standard deviation of change in Feedback.
- A one standard deviation of change in question 13 will constitute a 0.70 standard deviation of change in Feedback.

4.5.1.2 Correlation between Latent Variables

From the model obtained from the collected data the correlation between the latent variables ranges from 0.53 to 0.79. The lowest correlation is between Task Significance and Autonomy whilst the strongest correlation is between Task Identity and Autonomy.

From Chapter 3 (section 3.4.6.3) these calculated correlations between the latent variables have a high practical significance. By considering the MPS equation, presented in Chapter 2 (section 2.3.7.4), this relationship is a definite requirement to measure employee motivational levels. The correlation between the respective observed variables will be discussed briefly in section 4.8.2.

4.5.2 Regression Weights

Table 4-7 presents the regression weights associated with the respective observed and latent variables. The regression weights as displayed in Table 4-7 below presents the achieved results in a tabular form as opposed to the pictorial representation of the path diagram in the previous section. Of concern here is the critical ratio (C.R), which is in essence the Estimate value divided by the Standard Error (Anglim, 2007:9). All the parameters in this result are significant since the critical ratio (C.R) value is greater than 2 (Anglim, 2007:9). From Table 4-7 it can be seen that the C.R values for all parameters are greater than 2 suggesting that statistically all the parameters are significantly different from zero at the $\alpha=0.05$ level.

Table 4-7: Tabular Representation of SEM Regression Weights

	Estimate	S.E.	C.R.	P	Label
Q2N1 <--- Skill Variety	1.000				
Q2N7 <--- Skill Variety	.666	.100	6.626	***	
Q2N11 <--- Skill Variety	1.008	.124	8.098	***	
Q2N3 <--- Task Identity	1.000				
Q2N12 <--- Task Identity	1.151	.191	6.018	***	
Q2N14 <--- Task Identity	1.027	.175	5.861	***	
Q2N5 <--- Task Sig	1.000				
Q2N9 <--- Task Sig	1.426	.230	6.214	***	
Q2N15 <--- Task Sig	1.004	.193	5.204	***	
Q2N10 <--- Auto_Nomy	1.000				
Q2N6 <--- Auto_Nomy	1.390	.211	6.582	***	
Q2N2 <--- Auto_Nomy	1.058	.174	6.065	***	
Q2N13 <--- Job Feedback	1.000				
Q2N8 <--- Job Feedback	.853	.091	9.362	***	
Q2N4 <--- Job Feedback	1.051	.108	9.766	***	

C.R < 2.0

4.5.3 Model Fit Indexess

In Chapter 3 (section 3.6.2.1) the absolute fit index Chi-square value is presented as the primary evaluation of the model. Additional cut-off criteria for incremental indexes are also discussed. The measured fit indexes from the collected data will now be discussed.

4.5.3.1 Chi-square

The calculated Chi-square value obtained from interrogating the collected data is 1.85 as depicted in Table 4-8 below. From Chapter 3 (section 3.6.2.1) it is indicative that the model is a good fit since the calculated Chi-square value for this model is less than 2.

Table 4-8: Calculated Chi-square Value

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	55	148.021	80	.000	1.850
Saturated model	135	.000	0		
Independence model	15	918.376	120	.000	7.653

CMIN/DF $\leq$ 2.0

4.5.3.2 Tucker Lewis Index (TLF) and Comparative Fit Index (CFI)

The calculated TFL value obtained from interrogating the collected data is 0.872 as depicted in Table 4-9 below. This is fairly close to the recommended value of 0.95. This suggests that the model for this research is 87.2% from the null model, where TFL=0, to the ideal model where TLF =100%, i.e. 12.8% away from being a perfect model for the collected data (Widaman & Thompson, 2003:21). The deviation from the recommended 0.95 can be ascribed to either the root mean square value being too small or the degrees of freedom being too large for this model.

From Table 4-8 below the calculated value of the CFI is 0.915. This is also close to the recommended value of 0.95 as mentioned in Chapter 3 (section 3.6.2.1). Again this suggests that the model is a good fit.

Table 4-9: Calculated TFL and CFI Values

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.839	.758	.919	.872	.915
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

TLI $\geq$ 0.95, CFI $\geq$ 0.95 for acceptance

4.5.3.3 Root Mean Square Error of Approximation (RMSEA)

The calculated RMSEA value obtained from interrogating the collected data is 0.075 as shown in Table 4-10 below. This value is well within the range between 0.06 and 0.08 as discussed in Chapter 3 (section 3.6.2.1). This is suggestive of the model being a good fit.

Table 4-10: Calculated RMSEA Value

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.075	.056	.094	.017
Independence model	.211	.198	.223	.000

RMSEA < 0.06 to 0.08

4.5.3.4 Discussion

The path diagram has been developed from the collected data. Excellent correlation coefficient values between the latent and observed variables have been established. This invariably ascertains the validity of the instrument used for collecting the primary data. The critical ratios (C.R) obtained were also ideal with all values above 2. Furthermore goodness-of-fit indexes have been explored. From the calculated absolute Chi-square fit index one can deduce that the model has an excellent fit even though the TLI and the CFI values are slightly off the mark. The RMSEA value is also within the specified range and hence is again suggestive of a good model. To improve the values of the other two indexes, questions that do not contribute to the model should be determined and deleted (Hooper *et al.*, 2008:56). The overall analysis using the structural equation model suggests that the model fits the data comparatively well.

4.6 HYPOTHESIS TEST: p VALUE

The hypothesis reporting will be discussed for each core job characteristic as a function of a demographical unit of analysis, namely 1) gender, 2) race, 3) management and 4) positions in management. This result basically highlights the statistical difference, if any between the means of the respondents. In essence the reporting of these results is aimed at determining if there are significantly different views about the respective constructs from the views of groups categorized by the different demographical units of analysis.

4.6.1 Gender

Table 4-11 below depicts t-Test results for the five core job characteristics as a function of gender. In essence the t-Test aims to compare the means of the respondents to that of a given value. The number of valid male respondents was ninety (90) and that of the females was fifty-six (56). For all the core job characteristics in question, for both male and female respondents, the significance levels obtained were greater than the specified α value of 0.05. The results from Table 4-10 can be explained as follows:

- Skill Variety: the p-Value of 0.084 suggests that there is no statistical difference in the scores obtained for both male and female respondents for this construct.
- Task Identity: the p-Value of 0.068 suggests that there is no statistical difference in the scores obtained for both male and female respondents for this construct.
- Task Significance: the p-Value of 0.477 suggests that there is no statistical difference in the scores obtained for both male and female respondents for this construct.
- Autonomy: the p-Value of 0.098 suggests that there is no statistical difference in the scores for both male and female respondents for this construct.
- Feedback: the p-Value of 0.774 suggests that there is no statistical difference in the scores for both male and female respondents for this construct.
- MPS: the respective motivational potential scores for the both males and females are also reported in Table 4-10. Again the p-Value of 0.43 suggests that there is no statistical difference in the scores that females and male respondents obtained. However, it can be noted that the average MPS of male respondents

is higher than that obtained for female respondents. This further supports, from Chapter 3 (section 2.3.7), that male respondents will experience a perceived higher psychological state than female respondents. This situation substantiates that male respondents can be perceived to be more effectiveness, have a high internal work motivation and job satisfaction when compared to female respondents.

Table 4-11: t-Test Results as a Function of Gender

GENDER		N	Mean	Std. Deviation	p value
Skill_Variety	Male	90	11.9778	1.98295	.084
	Female	56	11.3214	2.34410	
Task_Identity	Male	90	11.6889	2.03699	.068
	Female	56	11.0179	2.30802	
Task_Significance	Male	90	12.4444	1.86096	.477
	Female	56	12.2143	1.95136	
Autonomy	Male	90	12.3889	1.65369	.098
	Female	56	11.8036	2.27572	
Job_Feedback	Male	90	10.9333	2.43938	.774
	Female	56	11.0536	2.47474	
MPS	Male	90	1691.9296	674.84359	.430
	Female	56	1597.0000	751.46380	

$p < 0.05$

4.6.2 Race

Table 4-12 below depicts t-Test results for the five core job characteristics as a function of race. The number of valid Coloured respondents was ten (10), African was sixty-two (62), Asian was twenty (20) and Whites was fifty-seven (57). For all the core job characteristics in question, for all the race groups, the significance levels obtained were greater than the specified α value of 0.05. The results from Table 4-12 can further be explained as follows:

- Skill Variety: the p-Value of 0.37 suggests that there is no statistical difference in the scores obtained for any of the race groups for this construct.
- Task Identity: the p-Value of 0.11 suggests that there is no statistical difference in the scores obtained for any of the race groups for this construct.

- Task Significance: the p-Value of 0.77 suggests that there is no statistical difference in the scores obtained for any of the race groups for this construct.
- Autonomy: the p-Value of 0.25 suggests that there is no statistical difference in the scores obtained for any of the race groups for this construct.
- Feedback: the p-Value of 0.76 suggests that there is no statistical difference in the scores obtained for any of the race groups for this construct.
- MPS: the respective motivational potential scores for the different race groups are also reported in Table 4-12. Again the p-Value of 0.33 suggests that there is no statistical difference in the scores obtained by the different race groups. However, it can be noted that the average MPS for Coloured respondents is higher when compared to the other race groups. This further suggests, from Chapter 3 (section 2.3.7), that Coloured respondents will experience a higher psychological state than the rest of the race groups. This situation suggests that the Coloured respondents may be more effective and have higher internal work motivation and job satisfaction than any of the other race groups. It should also be noted that the Coloured race group has the lowest number of respondents. This data can in fact skew the results causing an impaired view of the actual situation. Looking at the standard deviations does support this notion since the least number of variances is seen in the White race group whilst the Coloured group has the greatest number of variances with respect to the MPS. On average the Asian race group scored lower for most job characteristics, as well as for the motivational score.

Table 4-12: t-Test Results as a Function of Race

RACE		N	Mean	Std. Deviation	p value
Skill_Variety	Coloured	10	12.10	2.88	0.37
	African	62	11.94	2.14	
	Asian	20	10.80	2.63	
	White	57	11.63	1.74	
	Total	149	11.68	2.14	
Task_Identity	Coloured	10	12.20	1.14	0.11

	African	62	11.68	2.42	
	Asian	20	10.85	2.32	
	White	57	11.25	1.91	
	Total	149	11.44	2.17	
Task_Significance	Coloured	10	12.70	1.95	0.77
	African	62	12.16	2.23	
	Asian	20	12.35	1.84	
	White	57	12.49	1.44	
Autonomy	Total	149	12.35	1.88	0.25
	Coloured	10	12.00	2.54	
	African	62	12.45	1.90	
	Asian	20	11.90	2.20	
Job_Feedback	White	57	11.72	1.96	0.76
	Total	149	12.07	2.02	
	Coloured	10	11.10	3.31	
	African	62	11.08	2.56	
MPS	Asian	20	10.45	2.87	0.33
	White	57	10.75	2.18	
	Total	149	10.87	2.50	
	Coloured	10	1775.00	1024.99	
	African	62	1734.00	764.28	
	Asian	20	1492.32	733.58	
	White	57	1537.58	564.71	
	Total	149	1629.17	711.47	

p<0.05

4.6.3 Management

Table 4-13 below depicts t-Test results for the five core job characteristics as a function of respondents who are in management positions and those who are not. The number of valid respondents who were in management is fifty-three (53) and for those not in management it is eighty-nine (89). For all the core job characteristics in question, except for Skill Variety and Task Significance, the significance levels obtained were greater than the specified α value of 0.05. The results from Table 4-13 can be explained as follows:

- Skill Variety: the p-Value of 0.02 suggests that there is a statistical difference in the scores obtained for respondents who are in management compared to those who are not for this construct.

- Task Identity: the p-Value of 0.28 suggests that there is no statistical difference in the scores obtained for respondents who are in management and those who not in management for this construct.
- Task Significance: the p-Value of 0.00 suggests that there is statistical difference in the scores obtained for those respondents who are in management and those who are not in management for this construct.
- Autonomy: the p-Value of 0.71 suggests that that there is no statistical difference in the scores obtained for any of the respondents for this construct.
- Feedback: the p-Value of 0.31 suggests that that there is no statistical difference in the scores obtained for any respondents for this construct.
- MPS: the respective motivational potential scores for the different respondents are also reported in Table 4-13. Again the p-Value of 0.13 suggests that there is no statistical difference in the scores obtained for any of the respondents. However, it can be noted that the average MPS for respondents who are in management are higher than those obtained for those who were not in management. This further suggests, from Chapter 3 (section 2.3.7), that respondents in management will experience a higher positive psychological state than the rest of the respondents. This situation suggests that the respondent who is in management will be more effective and have higher internal work motivation and job satisfaction. Looking at the standard deviations the results appear to support this, with respondents being in management having the least number of variances in their responses.

Table 4-13: t-Test Results as a Function of Management

IN MANAGEMENT		N	Mean	Std. Deviation	p value
Skill_Variety	Yes	53	12.2075	1.66824	.02
	No	89	11.3708	2.37593	
Task_Identity	Yes	53	11.7358	2.15862	.28
	No	89	11.3258	2.17828	
Task_Significance	Yes	53	12.9623	1.56847	.00
	No	89	12.0562	1.96769	
Autonomy	Yes	53	12.1887	2.25369	.71

Job_Feedback	No	89	12.0562	1.86084	.31
	Yes	53	11.2264	2.31750	
MPS	No	89	10.7865	2.58260	.13
	Yes	53	1771.4025	713.99528	
	No	89	1582.4607	714.95273	

$p < 0.05$

4.6.4 Position in Management

Table 4-14 below depicts t-Test results for the five core job characteristics as a function of the level of management respondents occupy. The number of valid respondents who are in supervisory roles is thirteen (13), for those in middle management the number is thirty-three (33), for those in senior management it is thirteen (13) and for the rest the number is sixty-four (64). For all the core job characteristics in question, except for Skill Variety, the significance levels obtained were greater than the specified α value of 0.05. The results from Table 4-14 can be explained as follows:

- *Skill Variety*: the p-Value of 0.05 suggests that there is a statistical difference in the scores obtained for respondents occupying different levels of management for this construct.
- *Task Identity*: the p-Value of 0.73 suggests that there is no statistical difference in the scores obtained for any of the respondents in the different levels of management for this construct.
- *Task Significance*: the p-Value of 0.09 suggests that there is no statistical difference in the scores obtained for any of the respondents in the different levels of management for this construct.
- *Autonomy*: the p-Value of 0.16 suggests that there is no statistical difference in the scores obtained for any of the respondents in the different levels of management for this construct.
- *Feedback*: the p-Value of 0.07 suggests that there is no statistical difference in the scores obtained for any of the respondents in the different levels of management for this construct.
- *MPS*: the respective motivational potential scores for the different respondents within the different levels of management for this construct are also reported on

in Table 4-14. Again the p-Value of 0.19 suggests that there is no statistical difference in the scores obtained by the different respondents. However, it can be noted that the average MPS for respondents who are in senior management are higher than that obtained for the rest of the respondents. This further suggests, from Chapter 3 (section 2.3.7), that respondents in senior management roles will experience a higher positive psychological state than the rest of the respondents. This situation suggests further that respondents who are in senior management roles will be more effective and have higher internal work motivation and job satisfaction than any other respondents.

Table 4-14: t-Test Results as a Function of Position is Management

		Mean	Std. Deviation	p value
Skill_Variety	Supervisor	11.2308	1.64083	0.05
	Middle	12.6667	1.74404	
	Senior	12.3846	1.98068	
	Other	11.3500	2.00722	
	NA	11.5682	2.30669	
	Total	11.8780	2.06686	
Task_Identity	Supervisor	11.5385	2.43637	0.73
	Middle	11.9091	2.08212	
	Senior	11.6923	2.32324	
	Other	11.2000	2.52566	
	NA	11.3182	1.83978	
	Total	11.5203	2.12460	
Task_Significance	Supervisor	12.3846	2.10311	0.09
	Middle	13.0000	1.39194	
	Senior	13.0769	1.60528	
	Other	11.8500	2.03328	
	NA	12.1136	1.94358	
	Total	12.4390	1.84278	
Autonomy	Supervisor	11.2308	2.65059	0.16
	Middle	12.4545	2.22333	
	Senior	12.6923	2.05688	
	Other	11.4500	2.41650	
	NA	12.2727	1.48424	

Job_Feedback	Total	12.1220	2.07872	0.07
	Supervisor	11.5385	1.56074	
	Middle	10.9394	2.57317	
	Senior	12.3077	1.84321	
	Other	10.3000	3.26222	
	NA	10.5909	2.58185	
MPS	Total	10.9187	2.58176	0.19
	Supervisor	1607.3077	689.01879	
	Middle	1809.2424	780.11318	
	Senior	2006.3333	705.45743	
	Other	1482.8667	867.91410	
	NA	1563.6970	644.39278	
	Total	1667.8238	739.23737	

$p < 0.05$

4.6.5 Discussion

The t-Test results have been discussed for the various core job characteristics and MPS as a function of some of the demographical units of analysis. The greatest level of variance was reported for respondents who were in management and those who were not. The notable variances could be viewed for this group of respondents for Skill Variety and Task Significance. It was also reported that respondents who are in management appear to have the highest level of internal work motivation, effectiveness and job satisfaction. This observation appeared to be supported by the results obtained by the group of respondents that occupies different management levels with senior management enjoying the highest score.

4.7 EFFECT SIZE: Cohen's d Value

Cohen's d value measures the practical difference between means. For this section of the discussion the d values for the different core characteristics as a function of the various demographical units of analysis are presented.

4.7.1 Gender

Table 4-15 below depicts Cohen's d value results for the five core job characteristics as a function of gender. For all the core job characteristics in question the d value is close

to 0.2. From Chapter 3 (section 3.6.3.2) this suggests that there is no practical significant difference between the responses for male as compared to female respondents.

Table 4-15 Cohen's d value as a Function of Gender

GENDER		N	Mean	Std. Deviation	Effect Size
Skill_Variety	Male	90	11.9778	1.98295	.280
	Female	56	11.3214	2.34410	
Task_Identity	Male	90	11.6889	2.03699	.291
	Female	56	11.0179	2.30802	
Task_Significance	Male	90	12.4444	1.86096	.118
	Female	56	12.2143	1.95136	
Autonomy	Male	90	12.3889	1.65369	.257
	Female	56	11.8036	2.27572	
Job_Feedback	Male	90	10.9333	2.43938	.049
	Female	56	11.0536	2.47474	
MPS	Male	90	1691.9296	674.84359	.126
	Female	56	1597.0000	751.46380	

4.7.2 Race

Table 4-16 below depicts Cohen's d value results for the five core job characteristics as a function of race. From Chapter 3 (section 3.6.3.2) the results for the respective core job characteristics can be explained as follows:

- Skill Variety: there is no practical significant difference in the responses between the different race groups except for the responses of Coloured respondents compared to Asian respondents and of Asian respondents compared to African respondents. From the table one can also compare the means and deduce the same.
- Task Identity: there is no practical significant difference in the responses between the different race groups except for the responses of Coloured respondents compared to Asian respondents and of Coloured respondents compared to African respondents. From the results obtained it can be deduced that there is

medium practical difference between how Asian respondents view Skill Variety as compared to Coloured respondents and the same between Asian respondents and African respondents.

- Task Significance: there is no practical significant difference in the responses between the different race groups for this construct.
- Autonomy: there is no practical significant difference in the responses between the different race groups for this construct.
- Feedback: there is no practical significant difference in the responses between the different race groups for this construct.
- MPS: there is no practical significant difference in the responses between the different race groups. Again the Coloured respondents appear to have the higher level of MPS, which suggests that they will experience higher psychological states as compared to the other races. This further suggests, from Chapter 2 (section 2.3.7), that Coloured respondents will experience a higher positive psychological state than the rest of the respondents. This situation suggests that Coloured respondents will be more effective and have higher internal work motivation and job satisfaction than any other respondents. This result seems to be consistent with the statistical result previously obtained in section 4.6.

Table 4-16 Cohen's d value Results for Race

RACE		N	Mean	Std. Deviation	Effect Size		
					Coloured with	African with	Asian with
Skill_Variety	Coloured	10	12.10	2.88	0.06 0.45 0.16	0.43	0.32
	African	62	11.94	2.14			
	Asian	20	10.80	2.63			
	White	57	11.63	1.74			
	Total	149	11.68	2.14			
Task_Identity	Coloured	10	12.20	1.14	0.22 0.58 0.50	0.34 0.18	0.17
	African	62	11.68	2.42			
	Asian	20	10.85	2.32			
	White	57	11.25	1.91			
	Total	149	11.44	2.17			

Task_Significance	Coloured	10	12.70	1.95			
	African	62	12.16	2.23	0.24		
	Asian	20	12.35	1.84	0.18	0.08	
	White	57	12.49	1.44	0.11	0.15	0.08
	Total	149	12.35	1.88			
Autonomy	Coloured	10	12.00	2.54			
	African	62	12.45	1.90	0.18		
	Asian	20	11.90	2.20	0.04	0.25	
	White	57	11.72	1.96	0.11	0.37	0.08
	Total	149	12.07	2.02			
Job_Feedback	Coloured	10	11.10	3.31			
	African	62	11.08	2.56	0.01		
	Asian	20	10.45	2.87	0.20	0.22	
	White	57	10.75	2.18	0.10	0.13	0.11
	Total	149	10.87	2.50			
MPS	Coloured	10	1775.00	1024.99			
	African	62	1734.00	764.28	0.04		
	Asian	20	1492.32	733.58	0.28	0.32	
	White	57	1537.58	564.71	0.23	0.26	0.06
	Total	149	1629.17	711.47			

4.7.3 Management

Table 4-17 below depicts Cohen's d value results for the five core job characteristics as a function of Management. For all the core job characteristics in question the d value is close to 0.2 except for the Skill Variety and Task Significant constructs. From Chapter 3 (section 3.6.3.2) this suggests that there is little to medium practical significant difference between the responses for respondents who are in Management and those who are not with respect to the aforementioned constructs. From the results obtained in Table 4-8 it can also be seen that respondents who are in management have a higher motivational potential score (1771.4025) than those respondents who are not (1582.4607). This further suggests, from Chapter 2 (section 2.3.7), that respondents in management will experience a higher positive psychological state than other respondents. This situation suggests that the respondent who is in management be more effective and have higher internal work motivation and job satisfaction than any other respondents. This result is consistent with the statistical results obtained in section 4.6.

Table 4-17 Cohen's d value Results of Management

IN_MANAGEMENT		N	Mean	Std. Deviation	Effect Size
Skill_Variety	Yes	53	12.2075	1.66824	.35
	No	89	11.3708	2.37593	
Task_Identity	Yes	53	11.7358	2.15862	.19
	No	89	11.3258	2.17828	
Task_Significance	Yes	53	12.9623	1.56847	.46
	No	89	12.0562	1.96769	
Autonomy	Yes	53	12.1887	2.25369	.06
	No	89	12.0562	1.86084	
Job_Feedback	Yes	53	11.2264	2.31750	.17
	No	89	10.7865	2.58260	
MPS	Yes	53	1771.4025	713.99528	.26
	No	89	1582.4607	714.95273	

4.7.4 Position in Management

Table 4-18 below depicts Cohen's d value results for the five core job characteristics as a function of the management position respondents occupy. From Chapter 3 (section 3.6.3.2) the results for the respective core job characteristic can be explained as follows:

- Skill Variety: there is no practical significant difference in the responses between the different respondents except for the responses of Supervisors compared to Middle Management, Supervisors compared to Senior Management, Middle Management compared to respondents who are not in management, and Senior Management compared to respondents who are not in management. This is rather significant for this construct and suggests that there are huge practical differences in respondents' views regarding the skills required to complete their duties.
- Task Identity: there is no practical significant difference in the responses between the respondents with respect to this construct.
- Task Significance: practical significant differences in the responses are seen between Middle Managers and those who are not in management. The same observation is made between Senior Managers and those who are not in

management. This clearly suggests that the duties Managers regard as important are not held in the same high regard by respondents who are not in management and vice versa.

- Autonomy: there is a practical significant difference in the responses between Senior Managers and Supervisors, as well as between Supervisors and Middle Managers. This result would appear to suggest that Senior and Middle Managers would like to have more control over the way Supervisors and other respondents execute their duties, whilst Supervisors and other respondents would prefer to be left to their own devices to complete their duties.
- Feedback: there is a practical significant difference in the responses between Supervisors and Senior Managers, as well as between Middle Managers and Senior Managers. In both instances it appears that Senior Managers do not provide feedback on how Middle Managers and Supervisors are performing their duties. This is also the case for respondents who are not in management at all.
- MPS: there is a practical significant difference in the responses between Supervisors and Middle Managers, as well as between Senior Managers and respondents who are not in management. This result suggests that Supervisors, Senior Managers and other respondents are not motivated by the same motivators and experience meaningfulness, responsibility and knowledge of their performance differently.

Table 4-18 Cohen's d value Results of Various Management Levels

		Mean	SD	Effect Size			
				Superv with	Middle with	Senior with	Other with
Skill_Variety	Supervisor	11.2308	1.64083				
	Middle	12.6667	1.74404	0.82			
	Senior	12.3846	1.98068	0.58	0.14		
	Other	11.3500	2.00722	0.06	0.66	0.52	
	NA	11.5682	2.30669	0.15	0.48	0.35	0.09
	Total	11.8780	2.06686				
Task_Identity	Supervisor	11.5385	2.43637				
	Middle	11.9091	2.08212	0.15			

Task_Significance	Senior	11.6923	2.32324	0.06	0.09		
	Other	11.2000	2.52566	0.13	0.28	0.19	
	NA	11.3182	1.83978	0.09	0.28	0.16	0.05
	Total	11.5203	2.12460				
	Supervisor	12.3846	2.10311				
	Middle	13.0000	1.39194	0.29			
	Senior	13.0769	1.60528	0.33	0.05		
	Other	11.8500	2.03328	0.25	0.57	0.60	
	NA	12.1136	1.94358	0.13	0.46	0.50	0.13
	Total	12.4390	1.84278				
Autonomy	Supervisor	11.2308	2.65059				
	Middle	12.4545	2.22333	0.46			
	Senior	12.6923	2.05688	0.55	0.11		
	Other	11.4500	2.41650	0.08	0.42	0.51	
	NA	12.2727	1.48424	0.39	0.08	0.20	0.34
	Total	12.1220	2.07872				
	Supervisor	11.5385	1.56074				
Job_Feedback	Middle	10.9394	2.57317	0.23			
	Senior	12.3077	1.84321	0.42	0.53		
	Other	10.3000	3.26222	0.38	0.20	0.62	
	NA	10.5909	2.58185	0.37	0.13	0.66	0.09
	Total	10.9187	2.58176				
MPS	Supervisor	1607.3077	689.01879				
	Middle	1809.2424	780.11318	0.26			
	Senior	2006.3333	705.45743	0.57	0.25		
	Other	1482.8667	867.91410	0.14	0.38	0.60	
	NA	1563.6970	644.39278	0.06	0.31	0.63	0.09
	Total	1667.8238	739.23737				
	Supervisor	11.6923	2.32324	0.06	0.09		
	Other	11.2000	2.52566	0.13	0.28	0.19	

4.7.5 Discussion

The practical significance for the core job characteristics and MPS has been discussed as a function of demographical units of analysis. No practical differences were seen from the perspective of females and male respondents as far as the aforementioned are concerned. However, great practical differences were observed between respondents occupying different management roles. Some of the results obtained here were also consistent with the statistical results that were reported in the previous section.

4.8 DESCRIPTIVE STATISTICS

The mean and standard deviations for a number of different variables will be presented in this section.

4.8.1 Means and Standard Deviations

4.8.1.1 Research Instrument Questions

Table 4-18 presents the mean values for each of the questions (or observed variables) that constitute the research instrument. The average age, years working for the company, as well as the respondents who are foreigners working in South Africa are also reported in Table 4-19.

The average age of respondents was 39.07 years with ages scattered ± 10.937 years from this value (i.e. range from 28.133 to 50.007). The average number of years that respondents are working for the company in question is 9.08 years with the number of years scattered ± 8.744 years from this value.

Question Q2N2 from the research instrument has the highest average score of 4.22 with scores scattered close to this value as depicted by a standard deviation of 0.785. Question Q2N2 is one of the three observed variables that measures the construct/or latent variable of Autonomy. This question is particularly aimed at determining the degree to which respondents are left by themselves to do their work. This result indicates that most respondents feel that they have the freedom to execute their duties in a manner that is fitting to them. It also suggests that respondents value this core job characteristic of their job the highest from all the other characteristics. From Chapter 2 (section 2.3.7) this core characteristic suggests that the respondents experience a major sense of responsibility for their work output. It further suggests that they will have a high degree of satisfaction with their jobs if measured against the model by Hackman and Oldham presented in Figure 2-6.

The lowest scored question is Q2N4 with a score of 3.50 and a standard deviation of 1.026. This suggests that the rest of the scores for this question are also scattered

closely around the mean value. This observed variable contributes to measuring the construct (or latent variable) of Job Feedback. These questions further also exhibit the highest variances in response according to the standard deviation value of 1.026 as far as the observed variables are concerned. Although this is the lowest scored latent variable the mean value is still higher than the mid-point value of 2.5 from the Likert scale used for the questionnaire. The mean value of the question suggests, although to a lesser extent than the other questions, that employees do feel that they receive adequate feedback with respect to their performance but value this job characteristic the least.

As can be seen from the table below, all the mean scores of the respective questions are above the mid-point according to the Likert scale used for the questionnaire. As discussed in Chapter 2 (2.3.7) this result is suggestive of the fact that the respondents will experience a moderate to high level of meaningfulness, responsibility and knowledge of their performance from their respective jobs. These will be discussed in greater detail in the following sub-section.

Table 4-19: Means and SD for Research Instrument Questions

	Mean	Std. Deviation
AGE	39.07	10.937
YEARS_IN_COMPANY	9.08	8.744
WORKING_SA	1.01	.082
Q2N1	3.81	.934
Q2N2	4.22	.785
Q2N3	3.73	.960
Q2N4	3.50	1.026
Q2N5	4.19	.741
Q2N6	3.93	.895
Q2N7	3.99	.766
Q2N8	3.70	.868
Q2N9	4.05	.736
Q2N10	3.97	.761
Q2N11	3.91	.859
Q2N12	3.90	.868
Q2N13	3.77	.908
Q2N14	3.89	.818

Q2N15	4.21	.786
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4.8.1.2 Core Job Characteristics

The values of the respective constructs (or latent variables) have been calculated as discussed in Chapter 3 (section 3.4.3). From this the means and standard deviations have been determined with the results presented in Table 4-20.

Table 4-20: Means and SD for Core Job Characteristics and MPS

	Mean	Std. Deviation
Skill_Variety	11.69	2.13
Task_Identity	11.45	2.16
Task_Significance	12.36	1.88
Autonomy	12.07	2.00
Job_Feedback	10.89	2.50
Total_Score	58.46	8.09
MPS	1633.18	708.17

From Table 4-20 the highest scored latent variable is Task Significance with a value of 12.36. Task Significance also exhibits the least amount of variance against the standard deviation value of 1.88. These results suggest that most of the respondents view their jobs as being a significant part of the company's operations. This situation will invariably contribute to respondents accomplishing a high level of meaning from their jobs, as well as having a high internal work motivation. This is illustrated by the Hackman and Oldham model as depicted by Figure 2-6.

The second highest scored latent variable is Autonomy with a mean value of 12.07 and a standard deviation of 2.00. This suggests that respondents feel that they are left to decide for themselves on how they will execute their duties. This result further also suggests that, to a great extent respondents feel responsible for their jobs. This psychological state of feeling responsible for their own jobs will foster high levels of satisfaction by respondents as illustrated by the Hackman and Oldham model depicted in Figure 2-6. Respondents may also produce high quality work performances.

This is followed by respondents believing that their jobs require different skills to be successful. This is demonstrated by the mean value of 11.69 for Skill Variety. This result should contribute to respondents finding their respective jobs meaningful. As illustrated by Figure 2-6 respondents may also produce high quality work, as well as experience high levels of internal work motivation.

Task Identity follows with a mean score of 11.45, which should contribute to respondents' experience of meaningfulness from performing their respective jobs. As seen in Figure 2-6 this result will also contribute to respondents having a high internal work motivation.

The lowest score is for the Job Feedback with a mean value of 10.89. This latent variable also has the highest variation as indicated by the standard deviation of 8.09. Although this is the lowest scored latent variable, it does by no means suggest that respondents feel that they do not receive feedback with regard to their performance. The average score for this latent variable is still above the midpoint value of 7.5 (i.e. the maximum score for any latent variable is 15 and can only be achieved if each of the associated three observed variables scored a maximum of 5). In fact the mean value for Job Feedback suggests that employees receive adequate feedback about their performance, which should stimulate low absenteeism and less turnover as indicated in the Hackman and Oldham model depicted in Figure 2-6.

This result calculated from the data is high compare to similar work conducted in different industries where the JCM was administered as an instrument (Rusconi, 2005:46; Lawrence, 2001:93; Sekhar, s.a.:6-7; Hackman and Oldham, 1976). In essence this is a good result that was achieved and reflects a positive situation for the South African operations of an international engineering company.

4.8.1.3 Motivational Potential Score

From Table 4-20 above, the sum of the average scores for latent variables (or core job characteristics) is 58.46. The standard deviation suggests that these results are scattered around this value by ± 8.09 . This value is therefore close the ideal value, as described in Chapter 3 (section 3.4.3), and contributes greatly to the respondents' positive psychological state. In addition this score advocates that the respondents are experiencing a high level of personal outcomes at their place of employment. Amongst other things these personal outcomes should include respondents having a high internal work motivation, growth and job satisfaction. Respondents should also have high levels of work outcomes, which should include being effective, producing quality work, being absent less and resulting in decreased employee turnover.

Furthermore the motivational potential score has been calculated to be 1633.18. This is extremely high when compared to previous work where values of 161.11, 96.16, 789.4, 845.6, and 944.5 were obtained (Rusconi, 2005:46; Lawrence, 2001:93; Sekhar, s.a.:6-7; Hackman and Oldham, 1976). Considering the results for the total scores for the core job characteristics and the MPS this is indeed a good result achieved for the South African operations of an international engineering company.

4.8.2 Correlation between Observed Variables

Table 4-21 below presents the results for the correlations between the different observed variables. However, for the purpose of this research study the discussion will be limited to the correlations between observed variables that are supposed to measure the same latent variables.

Table 4-21: Correlation between Observed Variables

	Q2N1	Q2N2	Q2N3	Q2N4	Q2N5	Q2N6	Q2N7	Q2N8	Q2N9	Q2N10	Q2N11	Q2N12	Q2N13	Q2N14	Q2N15
Q2N1	1.000	.291	.411	.285	.266	.326	.380	.293	.416	.328	.659	.142	.256	.316	.076
Q2N2	.291	1.000	.266	.281	.193	.546	.318	.240	.324	.430	.121	.432	.419	.362	.213
Q2N3	.411	.266	1.000	.421	.229	.354	.327	.237	.339	.218	.368	.341	.338	.474	.184
Q2N4	.285	.281	.421	1.000	.211	.359	.367	.611	.343	.383	.328	.429	.676	.371	.113
Q2N5	.266	.193	.229	.211	1.000	.299	.317	.360	.532	.142	.237	.319	.237	.313	.369
Q2N6	.326	.546	.354	.359	.299	1.000	.401	.347	.303	.463	.243	.473	.418	.482	.202
Q2N7	.380	.318	.327	.367	.317	.401	1.000	.400	.446	.428	.476	.414	.372	.319	.283
Q2N8	.293	.240	.237	.611	.360	.347	.400	1.000	.446	.479	.417	.406	.633	.354	.320
Q2N9	.416	.324	.339	.343	.532	.303	.446	.446	1.000	.388	.455	.363	.405	.352	.459
Q2N10	.328	.430	.218	.383	.142	.463	.428	.479	.388	1.000	.421	.359	.482	.264	.176
Q2N11	.659	.121	.368	.328	.237	.243	.476	.417	.455	.421	1.000	.237	.315	.292	.245
Q2N12	.142	.432	.341	.429	.319	.473	.414	.406	.363	.359	.237	1.000	.528	.549	.392
Q2N13	.256	.419	.338	.676	.237	.418	.372	.633	.405	.482	.315	.528	1.000	.417	.271
Q2N14	.316	.362	.474	.371	.313	.482	.319	.354	.352	.264	.292	.549	.417	1.000	.389
Q2N15	.076	.213	.184	.113	.369	.202	.283	.320	.459	.176	.245	.392	.271	.389	1.000

4.8.2.1 Skill Variety

This latent variable is measured by the observed variable questions Q2N1, Q2N7 and Q2N11. The correlation between these variables is as follows:

- Q2N1 and Q2N7 are 0.38. From Chapter 3 (section 3.6.4.3) this value suggests a medium practical correlation between these two variables.
- Q2N1 and Q2N11 are 0.659. From Chapter 3 (section 3.6.4.3) these values suggest that there is a large practical correlation between these two variables.
- Q2N7 and Q2N11 are 0.476. From Chapter 3 (section 3.6.4.3) this value is close to 0.5, which suggests that there is a large practical correlation between these variables.

From these results it can be concluded that these observed variables tend to measure and contribute to measuring the same latent construct of Skill Variety.

4.8.2.2 Task Significance

This latent variable is measured by the observed variable questions Q2N5, Q2N9 and Q2N15. The correlation between these variables follows:

- Q2N5 and Q2N9 are 0.532. From Chapter 3 (section 3.6.4.3) this value suggests a large practical correlation between these two variables.
- Q2N5 and Q2N15 are 0.369. From Chapter 3 (section 3.6.4.3) these values suggest that there is a medium practical correlation between these two variables.
- Q2N9 and Q2N15 are 0.459. From Chapter 3 (section 3.6.4.3) this value is close to 0.5, which suggests that there is a large practical correlation between these variables.

From these results it can be concluded that these observed variables tend to measure and contribute to measuring the same latent variable of Task Significance.

4.8.2.3 Task Identity

This latent variable is measured by the observed variable questions Q2N3, Q2N12 and Q2N14. The correlation between these variables follows:

- Q2N3 and Q2N12 are 0.341. From Chapter 3 (section 3.6.4.3) this value suggests a that there is a medium practical correlation between these two variables.
- Q2N3 and Q2N14 are 0.474. From Chapter 3 (section 3.6.4.3) this value is close to 0.5, which suggests that there is a large practical correlation between these two variables.
- Q2N12 and Q2N14 are 0.549. From Chapter 3 (section 3.6.4.3) this value is greater than 0.5, which suggests that there is a large practical correlation between these variables.

From these findings it can be concluded that these observed variables do indeed measure the latent variable of Task Identity.

4.8.2.4 Autonomy

This latent variable is measured by the observed variable questions Q2N2, Q2N6 and Q2N10. The correlation between these variables follows:

- Q2N2 and Q2N6 are 0.546. From Chapter 3 (section 3.6.4.3) this value suggests a large practical correlation between these two variables.

- Q2N2 and Q2N10 are 0.430. From Chapter 3 (section 3.6.4.3) this value is close to 0.5, which suggests that there is a large practical correlation between these two variables.
- Q2N6 and Q2N10 are 0.463. From Chapter 3 (section 3.6.4.3) this value is close to 0.5, which suggests that there is a large practical correlation between these variables.

From these results it can be concluded that these observed variables do indeed contribute to measure Autonomy.

4.8.2.5 Job Feedback

This construct/latent variable is measured by the observed variable of questions Q2N4, Q2N8 and Q2N13. The correlation between these variables follows:

- Q2N4 and Q2N8 are 0.0611. From Chapter 3 (section 3.6.4.3) this value suggests a large practical correlation between these two variables.
- Q2N4 and Q2N13 are 0.676. From Chapter 3 (section 3.6.4.3) these values suggest that there is a large practical correlation between these two variables.
- Q2N8 and Q2N13 are 0.633. From Chapter 3 (section 3.6.4.3) this value suggests that there is a large practical correlation between these variables.

From these observations it can be concluded that these observed variables do indeed contribute to measure Job Feedback. The questions drafted for this construct also appear to have the strongest correlation of all the other constructs.

Combining the results obtained for the correlation between the observed variables and the results obtained in section 4.5 conclusively suggests that the instrument does in fact measure what it set out to measure.

4.8.3 ANOVA

The ANOVA results for the two units of analysis are presented and discussed in this section.

4.8.3.1 Position in Management

The ANOVA results for the respective core job characteristics and the MPS were conducted for respondents occupying different levels of management in the company. The results are captured in Table 4-22 and reveal that there are no statistical differences for respondents in this group for all the core job characteristics, as well as for the MPS (significance levels above $\alpha=0.05$ have been achieved). This is further supported by the Post Hoc Test results, which obtained significance levels of above 0.05 for all the comparisons between different respondents in this group. The Post Hoc Test results can be viewed in Appendix B, which is a consolidation of all the statistical results.

Table 4-22: ANOVA Results for Positions in Management

		Sum of Squares	Df	Mean Square	F	Sig.
Skill_Variety	Between Groups	39.107	4	9.777	2.393	.054
	Within Groups	482.063	118	4.085		
	Total	521.171	122			
Task_Identity	Between Groups	9.226	4	2.307	.503	.734
	Within Groups	541.473	118	4.589		
	Total	550.699	122			
Task_Significance	Between Groups	27.311	4	6.828	2.082	.087
	Within Groups	386.982	118	3.280		
	Total	414.293	122			
Autonomy	Between Groups	28.235	4	7.059	1.669	.162
	Within Groups	498.936	118	4.228		
	Total	527.171	122			
Job_Feedback	Between Groups	42.472	4	10.618	1.626	.172
	Within Groups	770.715	118	6.531		
	Total	813.187	122			
MPS	Between Groups	3358484.527	4	839621.132	1.565	.188
	Within Groups	63311086.434	118	536534.631		
	Total	66669570.961	122			

$p < 0.05$

4.8.3.2 Race

The ANOVA results for the respective core job characteristics and the MPS were conducted for different respondents for the race group unit of analysis. The results are captured in Table 4-23 and reveal that there are no statistical differences for respondents in this group for all the core job characteristics, as well as for the MPS (significance levels above $\alpha=0.05$ have been achieved). This is further supported by the Post Hoc Test results, which obtained significance levels of above 0.05 for all the comparisons between different respondents in these race groups. The Post Hoc Test results can be viewed in Appendix B, which is a consolidation all the statistical results.

Table 4-23: ANOVA Results for Race Groups

		Sum of Squares	Df	Mean Square	F	Sig.
Skill_Variety	Between Groups	21.432	3	7.144	1.581	.196
	Within Groups	655.105	145	4.518		
	Total	676.537	148			
Task_Identity	Between Groups	18.385	3	6.128	1.314	.272
	Within Groups	676.260	145	4.664		
	Total	694.644	148			
Task_Significance	Between Groups	4.570	3	1.523	.425	.735
	Within Groups	519.283	145	3.581		
	Total	523.852	148			
Autonomy	Between Groups	16.665	3	5.555	1.378	.252
	Within Groups	584.664	145	4.032		
	Total	601.329	148			
Job_Feedback	Between Groups	7.569	3	2.523	.397	.755
	Within Groups	921.008	145	6.352		
	Total	928.577	148			
MPS	Between Groups	1746686.411	3	582228.804	1.154	.330
	Within Groups	73170151.723	145	504621.736		
	Total	74916838.134	148			

$p < 0.05$

4.8.4 Discussion

The values of the means and standard deviations suggest that respondents are positive about their jobs and get high personal outcomes and work outcomes from their jobs.

The results suggest that the observed variables do in fact measure the associated latent variables. In general the results from the descriptive statistics also support the results obtained by the structural equation model.

4.9 PSYCHOLOGICAL STATES CALCULATIONS

4.9.1 Experiencing Meaningfulness

According to Hackman and Oldham (1976:257), this result is obtained by adding skill variety, task identity and task significance. Therefore this result is calculated to be:

$$\text{Meaningfulness} = (\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}) / 3$$

Taking the average scores as calculated in section 4.8.1.2 the critical psychological state for the respondents is calculated as indicated below.

$$\text{Meaningfulness} = (11.69 + 11.45 + 12.36) / 3 = 11.83$$

This result, compared to Lawrence (2001:94), is relatively high. This suggests that compared to similar work the result for this psychological state is extremely high (at least double).

4.9.2 Experiencing Responsibility for Work Outcome

According to Hackman and Oldham (1976:257), this result is captured by autonomy. Therefore this result is calculated to be:

$$\text{Responsibility} = 12.07$$

This result, compared to Lawrence (2001:94), is relatively high. This suggests that compared to similar work the result for this psychological state is extremely high (at least double).

4.9.3 Knowledge of Results

According to Hackman and Oldham (1976:257) this result is captured by autonomy. Therefore this result is calculated to be:

Knowledge of Results = 10.89

This result, compared to Lawrence (2001:94), is relatively high. This suggests that compared to similar work the result for this psychological state is extremely high (at least double).

4.10 SUMMARY

This chapter presented the statistical results obtained for the research conducted. The results for the demographical results have been discussed and are followed by a discussion on the reliability and validity of the research instrument. The Cronbach alpha yielded excellent results, as did the structural equation model with its goodness-of-fit indexes. The results obtained for the descriptive statistics were also discussed and presented. These results appeared to support the results obtained for the reliability and validity test. In essence the statistical data proved that the research instrument measured what it was supposed to measure. The results obtained further suggested that the respective jobs of the respective respondents do have a high level of motivational potential, which is to a great extent due to motivator factors of the job itself as opposed to hygiene factors. The results obtained by the structural equation model are supported by the results obtained from the correlation between the observed variables.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The objective of this research was to evaluate employees' perception of their core job characteristics, as well as to determine the motivational levels at the South African operations of an international engineering company. This research used Hackman and Oldham's job characteristics model (JCM), which is a form of job design, to evaluate employees' perception of their core job characteristics. The JCM has five constructs, which consist of determining employees' views on their skill variety, task identity, task significance, autonomy and job feedback. Measuring these job characteristics enabled the researcher to determine the three psychological states of the respondents, as well as their job's motivational potential score. Having information about the respondents' psychological state and motivational potential scores may enable employers to understand what employees personal and work outcomes will be and can assist employers with remedying problems as and when identified.

To support this objective a quantitative research approach was used, with a questionnaire as an instrument, for collecting data. The collected data was then subjected to statistical techniques to determine amongst other things the reliability and validity of the questionnaire and the relationship between variables. The results for the complete statistical analysis were presented and discussed in the previous Chapter.

This Chapter will therefore discuss the recommendations that can be made and conclusions that can be drawn from the results achieved. Recommendations are provided to management and to researchers for future work. The achievement of the research results are also compared to the objectives as stipulated in Chapter 1. The next section will discuss the importance of the results obtained in Chapter 4, as well as conclusions that can be drawn from the same.

5.2 DISCUSSIONS AND CONCLUSIONS

The results obtained in Chapter 4 tend to support the reliability and validity of the instrument that was administered for collecting primary data from the sample. Four out of five Cronbach alpha values achieved acceptable levels for the respective constructs, with the fifth value being below par by 1.5%. This is still acceptable as some researchers suggest a value of 0.6 as still acceptable. The results obtained from the structural equation model (SEM) supported the validity of the instrument as illustrated by the path diagram producing excellent correlation coefficients between the latent and observed variables. The SEM produced critical ratios, which suggests that all the questions, as in the instrument, were in fact significant in measuring their respective constructs. The results were further supplemented by the model fit indexes, in particular the Chi-square value, which was determined to be in the required range for the absolute fit of the model. It can be concluded that the instrument that was administered did in actual fact measure the constructs in a reliable manner as defined in Chapter 3.

The five core job characteristics were calculated next. These characteristics were further subjected to both statistical and practical significance testing for the respective groups of respondents. From both a statistical and practical point of view male respondents scored the highest for all the job characteristics and subsequently for the motivational potential score (MPS). It was also established that from both a practical and statistical perspective there was a difference in opinion between respondents who were in management and those who were not. This difference was primarily related to their views on what the number of skills should be to complete their jobs, their perceived importance of their jobs and the degree to which they are left to their own devices to execute their duties. From this scenario it can be concluded that managers' expectation of employees is not always clearly articulated whilst it follows that employees do not know exactly what managers require of them. This may lead to frustration and resentment between the parties and can result in inefficiencies.

From a practical and statistical perspective the Coloured race group obtained on average the highest scores for most job characteristics, as well as for the MPS. The converse can be said about the Asian respondents who on average scored the lowest for the core job characteristics. It can therefore be concluded that this race group will most likely experience the least meaning, responsibility and knowledge of their performance from their jobs. Nevertheless the average motivational potential score achieved for this research was 1633.18. Comparing this result to similar research conducted in different industries by administering a JDS, this result achieved is exceptionally high. This in essence disproves the premise this research is based on as outlined by the problem statement in Chapter 1(section 1.3). It can therefore be concluded that the employees working for the South African operations of an international engineering company do experience a high degree of internal work motivation from the jobs they occupy.

In addition the highest scoring characteristic on average was for Task Significance with an average score of 12.36. From this result (and the other results) it can be concluded that respondents prefer to occupy jobs that add value and that matter in the bigger scheme of the company's operations. This suggests that respondents will have a high internal work motivation and consequently experience their jobs as meaningful. The lowest scoring characteristic is for job feedback with an average score of 10.89. This indicates, according to the respondents, that management does not communicate regarding the performance of the subordinates as often as the respondents would like.

The three critical psychological states were also determined. The highest score for the psychological state as perceived by respondents was for experiencing responsibility for their own work outcome. This result is somewhat different from what was expected considering the results for the core job characteristics. One would expect that the highest score would be for respondents wanting to experience meaningfulness from their respective jobs. This may very well be due to the average scores of the corresponding job characteristics that relate to these psychological states. This situation could have occurred due to the way in which the average scores for the critical

psychological states were calculated in Chapter 4, i.e. the average scores for the respective core characteristics, as indicated in Table 4-19, were used instead of determining the respective psychological states of each respondent and then determining the averages of the psychological states.

From these discussions and conclusions recommendations can be made to management. The next section discusses these recommendations.

5.3 RECOMMENDATIONS TO MANAGEMENT

The lowest scored job characteristic was job feedback. Although this is not low considering what the middle value is for the range (i.e. 7.5) management should take heed of this result. It is clear that management does not provide enough feedback on employees' performance as perceived by the respondents. This can result in a situation where employees do not know what is required of them. This matter could be addressed when new employees join the company and during performance appraisals. It should therefore become mandatory that managers communicate to employees what is expected of them both from a behavioural perspective, as well as from a business perspective. Targets should be clearly communicated to all employees, i.e. financial and customer relationship targets for sales personnel, employee retention and reduced turnover, as well as remuneration targets for HR, expected product output and cost-saving targets for production personnel. A corporate strategy could also be developed to communicate the company's performance more frequently to provide feedback to employees about their collective performance. Good results should be celebrated with quarterly events, such as a braai and awards ceremonies. This would create a culture of celebrating success and successful habits.

The results also suggest that female respondents find their jobs having less motivational potential than male respondents. Management should therefore engage female employees and strive to enhance their work environment to such an extent that their evaluation of perceived core characteristics, as well as their motivational potential scores is improved. The drive to achieve this could be started by forming a female

forum with the mandate to determine how females' job environments could be improved. An increase in female representation at management levels could also be explored by strategically appointing talented and competent females in critical positions. This could very well also increase the company's BBEE rating.

The Asian respondents have also been flagged as having the lowest motivational potential from their jobs. This is further supported by the average scores obtained for this race group for the five core job characteristics. Management should therefore first investigate if there is a need to improve this race group's motivational potential and in general should apply job redesign techniques to improve the motivational potential of jobs if required. This may be achieved by applying job rotation, job enlargement and job enrichment approaches to jobs that are monotonous, boring and cumbersome. This could benefit both management and employees. Management would benefit by having developed multiskilled employees whilst employees would benefit by increasing and improving their skill sets. On the other hand this should be implemented with great circumspection taking into consideration the disadvantages of the various approaches as highlighted in Chapter 2. This effort could also create the impression that management is benevolent towards employees, which could result in increased internal work motivation in employees. The needed psychological states required for employees to perform well in their duties could be established. The same could be done for females employees.

From the results achieved in Chapter 4 it can be concluded that the company is doing extremely well in providing an environment that is conducive to internal work motivation for their employees. This environment should benefit both the employee and the company and should therefore assist the company in achieving its financial and strategic objectives. The company should therefore continue to provide this environment and even look at means to improve on it.

5.4 ACHIEVEMENT OF THE RESEARCH OBJECTIVES

5.4.1 Research Objectives

As far as the primary and secondary research objectives are concerned the following have been achieved:

- The research conducted managed to evaluate the perception of employees regarding their core characteristics. Compared to similar studies conducted in different industries where a JDS was administered, the results achieved were extremely high and hence reflect positively on the company in question.
- Relevant literature was examined to establish the theoretical framework for this research.
- A questionnaire, the Job Diagnostic Survey, was used to collect primary data from respondents from the sample.
- The reliability and validity of the Questionnaire was also proven with great results obtained by calculating the Cronbach alpha's for the respective constructs and by developing a structural equation model from the collected data.
- The average motivational potential score, which is a measure of the job to motivate employees, was also calculated. Compared to other studies this was found to be extremely high. This in essence disproves the research problem as stated in Chapter 1 (section 1.3).

5.4.2 Additional Success of Research

From the literature conducted it was deduced that this type of research has not previously been conducted for any operations for the international engineering company in question. This is also a success in that this study was successfully implemented in an international engineering company. Furthermore no evidence has been forthcoming to suggest that this type of research was ever conducted in any engineering company in South Africa. This fact is further underpinned when looking at the application of the JCM and the types of industry in which it has been applied previously. This in essence will add tremendous value to the existing body of knowledge, particularly when considering the application of the JCM and the engineering sector of South Africa.

5.5 RECOMMENDATION FOR FUTURE RESEARCH

Although the research instrument used for this research was proven to be reliable and valid, one of the constructs showed a slightly lower Cronbach alpha value. Adding and dropping certain questions may improve the reliability for a construct. For future work it would be recommended that each construct be supplemented with an additional number of questions (observed variables). The addition of these questions could reduce the reliability of the questionnaire and therefore care should be taken regarding where these questions are sourced from. A pilot study should also be conducted to test the revised questionnaire in order to determine both reliability and validity. A random sampling technique using a larger sample size in future studies is recommended to enable generalisation.

To further improve the value of this research, additional questions and constructs should be added to the instrument. These additional questions and constructs should be aligned with the model developed by Hackman and Oldham (1976) as depicted in Figure 2-6. The psychological states are mediation between the core job characteristics and the outcomes as depicted by the model in Figure 2-6. These constructs should therefore also be added to the instrument to measure the psychological states, as well as the personal and work outcomes. Observed variables to measure the suggested constructs should be developed or sourced from reliable instruments that have previously been used. Validity and reliability calculations will therefore have to be done to proof the added constructs and their associated observed variables. The associated relationships between the new constructs and observed variables, as well as the relationship between the new constructs and the current constructs should also be determined.

The results discussed in Chapter 4 suggest that employees at an international engineering company perceived their jobs to have high motivational potential. This is deduced from evaluating employees' perception about the importance of their core job characteristics and then also determining their psychological states. Although the results obtained reflect positively on the company, they could be distorted due to

employees' "love" of their jobs. It is therefore suggested that to further validate these results the job design approach adopted for this research should be supplemented with an additional/alternative model to determine employee motivation as a function of something other than their jobs. Theories, such as self-determination theory (Deci *et al.*, 1991), Maslow's hierarchy of needs (Kaltko-Revera, 2006), and Lawler-Porter model (Lunenberg, 2011) can be used to this end.

5.6 SUMMARY

The primary objective of this research was to evaluate employees' perception of the importance of their core job characteristics at an international engineering company. The research has set out to achieve this by means of using the Job Characteristic Model that was developed by Hackman and Oldham. A questionnaire was used for collecting primary data and statistical analysis was conducted on the collected data. The statistical analysis proved the validity and reliability of the instrument, as well as proving the relationship that exists between constructs and observed variables. Amongst other things the core job characteristics were also measured, with Task Significance scoring the highest. The overall results achieved reflected positively on the engineering company as perceived by the employees who believe their jobs have a high motivational potential.

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APPENDIX A: RESEARCH INSTRUMENT

JOB DIAGNOSTIC SURVEY

Dear Survey Participant,

Thank you for taking valuable time to participate in this research on Job Design with specific reference to Core Job Characteristics.

Aim: This research is for academic purposes only and will take a maximum of ten (10) minutes to complete. Also note that permission has been obtained from the company to perform this research. The objective of the research is to evaluate employees' perception of the motivational potential of jobs at an international engineering company.

Required: Participants are requested to complete section one (1) and two (2) as accurately and honestly as possible.

Confidentially: The survey is completely voluntary and confidential. This will also be the case when analyzing the data, in presenting the data and in discussing the results obtained.

Researcher: The study is conducted by Mr. Osrick Morne Hendricks who is enrolled as an MBA student at the North West University. The researcher can be contacted at osrick.hendricks@gmail.com for any further queries.

Please complete the demographic profile by ticking the appropriate blocks for each category.

1. Demographic Profile

1	Gender	Male		Female			
2	Age						
3	Race	Coloured	African	Asian	Indian	White	Other
4	Are you in management?	Yes		No			
5	Level of Management	Supervisor	Middle	Senior	Director	Other	N/A
6	Years at current company						
7	Current Business Unit						

8	Current job title					
9	Years in current position					
10	Are you working in South Africa	Yes		No		

2. Questionnaire Directions

The following list contains statements that could be used to describe a job. Please indicate the extent to which you agree or disagree with each statement as a description of a job you currently hold, by ticking the appropriate number next to the statement. Try to be as objective as possible when answering the questions.

Indicate the degree to which you agree with each statement by using the following scale:

1	2	3	4	5
Disagree strongly	Disagree	Neither agree nor disagree	Agree	Agree strongly

This job...

NO.	STATEMENT	SCORE				
1	Provides much variety	1	2	3	4	5
2	Permits me to be left on my own to do my work	1	2	3	4	5
3	Is arranged so that I often have the opportunity to see jobs or projects through to completion	1	2	3	4	5
4	Provides feedback on how well I am doing as I am working	1	2	3	4	5
5	Is relatively significant in my organization	1	2	3	4	5
6	Gives me considerable opportunity for independence and freedom in how I do my work	1	2	3	4	5
7	Provides different responsibilities	1	2	3	4	5
8	Enables me to find out how well I am doing	1	2	3	4	5
9	Is important in the broader scheme of things	1	2	3	4	5
10	Provides me an opportunity for independent thought and action	1	2	3	4	5
11	Provides me with a considerable variety of work	1	2	3	4	5
12	Is arranged so that I have an opportunity to complete the work I start	1	2	3	4	5

13	Provides me with the feeling that I know whether I am performing well or poorly	1	2	3	4	5
14	Is arranged so that I have the chance to do a job from the beginning to the end (i.e. a chance to do the whole job)	1	2	3	4	5
15	Is one where a lot of other people can be affected by how well the works gets done	1	2	3	4	5

Thank you for your participation! 😊

APPENDIX B: CONSOLIDATED STATISTICAL RESULTS

T-TEST GROUPS=GENDER(1 2)												
/MISSING=ANALYSIS												
/VARIABLES=Skill_Variety Task_Identity Task_Significance Autonomy Job_Feedback MPS												
/CRITERIA=CI(.95).												
T-Test												
Notes												
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Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.										
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.										
Syntax		T-TEST GROUPS=GENDER(1 2) /MISSING=ANALYSIS /VARIABLES=Skill_Variety Task_Identity Task_Significance Autonomy Job_Feedback MPS /CRITERIA=CI(.95).										
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	Elapsed Time	00:00:00.01										
[DataSet1] Q:\H\Hendricks_July2013\Hendricks.sav												
GENDER												
Group Statistics												
GENDER		N	Mean	Std. Deviation	p value	Effect Size	most important table to report on					
Skill_Variety	Male	90	11.9778	1.98295	.084	.280	essentially this is a consolidated table of all t					
	Female	56	11.3214	2.34410								
Task_Identity	Male	90	11.6889	2.03699	.068	.291						
	Female	56	11.0179	2.30802								
Task_Significance	Male	90	12.4444	1.86096	.477	.118						
	Female	56	12.2143	1.95136								
Autonomy	Male	90	12.3889	1.65369	.098	.257						
	Female	56	11.8036	2.27572								
Job_Feedback	Male	90	10.9333	2.43938	.774	.049						
	Female	56	11.0536	2.47474								
MPS	Male	90	1691.9296	674.84359	.430	.126						
	Female	56	1597.0000	751.46380								
Independent Samples Test												
		Levene's Test for Equality of Variances		t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval			
Skill_Variety	Equal variances assumed	4.519	.035	1.812	144	.072	.65635	.36221	Lower			
									Upper			

[DataSet1] Q:\VNHendricks_July2013\Hendricks.sav		RACE							
Descriptives									
		N	Mean	Std. Deviation	p value	Effect Size			Report on p
						Coloured with	African with	Asian with	
Skill_Variety	Coloured	10	12.10	2.88	0.37				
	African	62	11.94	2.14		0.06			
	Asian	20	10.80	2.63		0.45	0.43		
	White	57	11.63	1.74		0.16	0.14	0.32	
	Total	149	11.68	2.14					
Task_Identity	Coloured	10	12.20	1.14	0.11				
	African	62	11.68	2.42		0.22			
	Asian	20	10.85	2.32		0.58	0.34		
	White	57	11.25	1.91		0.50	0.18	0.17	
	Total	149	11.44	2.17					
Task_Significance	Coloured	10	12.70	1.95	0.77				
	African	62	12.16	2.23		0.24			
	Asian	20	12.35	1.84		0.18	0.08		
	White	57	12.49	1.44		0.11	0.15	0.08	
	Total	149	12.35	1.88					
Autonomy	Coloured	10	12.00	2.54	0.25				
	African	62	12.45	1.90		0.18			
	Asian	20	11.90	2.20		0.04	0.25		
	White	57	11.72	1.96		0.11	0.37	0.08	
	Total	149	12.07	2.02					
Job_Feedback	Coloured	10	11.10	3.31	0.76				
	African	62	11.08	2.56		0.01			
	Asian	20	10.45	2.87		0.20	0.22		
	White	57	10.75	2.18		0.10	0.13	0.11	
	Total	149	10.87	2.50					
MPS	Coloured	10	1775.00	1024.99	0.33				
	African	62	1734.00	764.28		0.04			
	Asian	20	1492.32	733.58		0.28	0.32		
	White	57	1537.58	564.71		0.23	0.26	0.06	
	Total	149	1629.17	711.47					
Test of Homogeneity of Variances									
	Levene Statistic	df1	df2	Sig.					
Skill_Variety	3.819	3	145	.011					
Task_Identity	3.404	3	145	.019					
Task_Significance	5.244	3	145	.002					
Autonomy	.736	3	145	.532					
Job_Feedback	1.808	3	145	.148					
MPS	3.566	3	145	.016					
ANOVA									
		Sum of Squares	df	Mean Square	F	Sig.	ignore		
Skill_Variety	Between Groups	21.432	3	7.144	1.581	.196			
	Within Groups	655.105	145	4.518					
	Total	676.537	148						
Task_Identity	Between Groups	18.385	3	6.128	1.314	.272			
	Within Groups	676.260	145	4.664					
	Total	694.644	148						
Task_Significance	Between Groups	4.570	3	1.523	.425	.735			
	Within Groups	519.283	145	3.581					
	Total	523.852	148						
Autonomy	Between Groups	16.665	3	5.555	1.378	.252			
	Within Groups	584.664	145	4.032					

Task_Significance	Games-Howell	Coloured	African	.53871	.67777	.856	-1.4477	2.5251	
			Asian	.35000	.74078	.964	-1.7527	2.4527	
			White	.20877	.64444	.988	-1.7367	2.1542	
		African	Coloured	-.53871	.67777	.856	-2.5251	1.4477	
			Asian	-.18871	.50035	.981	-1.5320	1.1546	
			White	-.32994	.34191	.770	-1.2225	.5626	
		Asian	Coloured	-.35000	.74078	.964	-2.4527	1.7527	
			African	.18871	.50035	.981	-1.1546	1.5320	
			White	-.14123	.45419	.989	-1.3824	1.1000	
		White	Coloured	-.20877	.64444	.988	-2.1542	1.7367	
			African	.32994	.34191	.770	-.5626	1.2225	
			Asian	.14123	.45419	.989	-1.1000	1.3824	
Autonomy	Games-Howell	Coloured	African	-.45161	.83812	.948	-2.9864	2.0832	
			Asian	.10000	.94129	1.000	-2.5940	2.7940	
			White	.28070	.84378	.987	-2.2600	2.8214	
		African	Coloured	.45161	.83812	.948	-2.0832	2.9864	
			Asian	.55161	.54734	.746	-.9405	2.0438	
			White	.73231	.35428	.170	-.1912	1.6559	
		Asian	Coloured	-.10000	.94129	1.000	-2.7940	2.5940	
			African	-.55161	.54734	.746	-2.0438	.9405	
			White	.18070	.55596	.988	-1.3302	1.6916	
		White	Coloured	-.28070	.84378	.987	-2.8214	2.2600	
			African	-.73231	.35428	.170	-1.6559	.1912	
			Asian	-.18070	.55596	.988	-1.6916	1.3302	
Job_Feedback	Games-Howell	Coloured	African	.01935	1.09740	1.000	-3.2936	3.3323	
			Asian	.65000	1.22960	.951	-2.8687	4.1687	
			White	.34561	1.08738	.988	-2.9574	3.6487	
		African	Coloured	-.01935	1.09740	1.000	-3.3323	3.2936	
			Asian	.63065	.72001	.817	-1.3297	2.5910	
			White	.32626	.43463	.876	-.8066	1.4591	
		Asian	Coloured	-.65000	1.22960	.951	-4.1687	2.8687	
			African	-.63065	.72001	.817	-2.5910	1.3297	
			White	-.30439	.70465	.972	-2.2323	1.6236	
		White	Coloured	-.34561	1.08738	.988	-3.6487	2.9574	
			African	-.32626	.43463	.876	-1.4591	.8066	
			Asian	.30439	.70465	.972	-1.6236	2.2323	
MPS	Games-Howell	Coloured	African	41.00000	338.35032	.999	-982.3892	1064.3892	
			Asian	282.68333	363.27220	.863	-775.4061	1340.7728	
			White	237.41520	332.64710	.889	-780.6491	1255.4796	
		African	Coloured	-41.00000	338.35032	.999	-1064.3892	982.3892	
			Asian	241.68333	190.60088	.589	-273.5912	756.9578	
			White	196.41520	122.54019	.381	-123.1745	516.0049	
		Asian	Coloured	-282.68333	363.27220	.863	-1340.7728	775.4061	
			African	-241.68333	190.60088	.589	-756.9578	273.5912	
			White	-45.26813	180.28270	.994	-538.2512	447.7149	
		White	Coloured	-237.41520	332.64710	.889	-1255.4796	780.6491	
			African	-196.41520	122.54019	.381	-516.0049	123.1745	
			Asian	45.26813	180.28270	.994	-447.7149	538.2512	
Homogeneous Subsets									
Skill_Variety									
RACE_COMB		N		Subset for alpha = 0.05					
Tukey/B ^{ab}				1					
	Asian	20		10.8000					
	White	57		11.6316					
	African	62		11.9355					
	Coloured	10		12.1000					

MPS							
RACE_COMB		N	Subset for alpha = 0.05 1				
TukeyB ^{ab}	Asian	20	1492.3167				
	White	57	1537.5848				
	African	62	1734.0000				
	Coloured	10	1775.0000				
Means for groups in homogeneous subsets are displayed.							
a. Uses Harmonic Mean Sample Size = 21.778.							
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.							
T-TEST GROUPS=IN_MANAGEMENT(1 2)							
/MISSING=ANALYSIS							
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Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.					
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.					
Syntax		T-TEST GROUPS=IN_MANAGEMENT(1 2) /MISSING=ANALYSIS /VARIABLES=Skill_Variety Task_Identity Task_Significance Autonomy Job_Feedback MPS /CRITERIA=CI(.95).					
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	Elapsed Time	00:00:00.02					
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MANAGEMENT							
Group Statistics							
IN_MANAGEMENT		N	Mean	Std. Deviation	p value	Effect Size	REPORT ON P VALUES AND EFFECT SIZE
Skill_Variety	Yes	53	12.2075	1.66824	.02	.35	
	No	89	11.3708	2.37593			
Task_Identity	Yes	53	11.7358	2.15862	.28	.19	
	No	89	11.3258	2.17828			
Task_Significance	Yes	53	12.9623	1.56847	.00	.46	

FACTOR										
/VARIABLES Q2N1 Q2N2 Q2N3 Q2N4 Q2N5 Q2N6 Q2N7 Q2N8 Q2N9 Q2N10 Q2N11 Q2N12 Q2N13 Q2N14 Q2N15										
/MISSING LISTWISE										
/ANALYSIS Q2N1 Q2N2 Q2N3 Q2N4 Q2N5 Q2N6 Q2N7 Q2N8 Q2N9 Q2N10 Q2N11 Q2N12 Q2N13 Q2N14 Q2N15										
/PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION										
/FORMAT SORT BLANK(.28)										
/CRITERIA FACTORS(5) ITERATE(25)										
/EXTRACTION PAF										
/CRITERIA ITERATE(25) DELTA(0)										
/ROTATION OBLIMIN										
/METHOD=CORRELATION.										
Factor Analysis										
Notes										
Output Created		01-JUL-2013 08:08:44								
Comments										
Input	Data	Q:\H-Hendricks 2013\Hendricks.sav								
	Active Dataset	DataSet1								
	Filter	<none>								
	Weight	<none>								
	Split File	<none>								
	N of Rows in Working Data File	151								
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.								
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.								
Syntax		FACTOR /VARIABLES Q2N1 Q2N2 Q2N3 Q2N4 Q2N5 Q2N6 Q2N7 Q2N8 Q2N9 Q2N10 Q2N11 Q2N12 Q2N13 Q2N14 Q2N15 /MISSING LISTWISE /ANALYSIS Q2N1 Q2N2 Q2N3 Q2N4 Q2N5 Q2N6 Q2N7 Q2N8 Q2N9 Q2N10 Q2N11 Q2N12 Q2N13 Q2N14 Q2N15 /PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION /FORMAT SORT BLANK(.28) /CRITERIA FACTORS(5) ITERATE(25) /EXTRACTION PAF /CRITERIA ITERATE(25) DELTA(0) /ROTATION OBLIMIN /METHOD=CORRELATION.								
Resources	Processor Time	00:00:00.03								
	Elapsed Time	00:00:00.03								
	Maximum Memory Required	28528 (27.859K) bytes								
[DataSet1] Q:\H-Hendricks 2013\Hendricks.sav										
Correlation Matrix ^a										
		Q2N1	Q2N2	Q2N3	Q2N4	Q2N5	Q2N6	Q2N7	Q2N8	Q2N9
Correlation	Q2N1	1.000	.291	.411	.285	.266	.326	.390	.293	.416
	Q2N2		1.000	.266	.281	.193	.546	.318	.240	.324
	Q2N3			1.000	.421	.229	.354	.327	.237	.339

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	6.002	40.013	40.013	5.595	37.299	37.299	4.037
2	1.384	9.227	49.240	1.031	6.876	44.175	2.896
3	1.291	8.605	57.846	.844	5.626	49.800	3.257
4	1.106	7.370	65.216	.714	4.758	54.558	3.677
5	.953	6.354	71.570	.515	3.436	57.994	.985
6	.724	4.824	76.394				
7	.611	4.071	80.465				
8	.554	3.693	84.158				
9	.469	3.125	87.283				
10	.423	2.820	90.103				
11	.366	2.440	92.543				
12	.332	2.217	94.760				
13	.284	1.895	96.655				
14	.268	1.789	98.444				
15	.233	1.556	100.000				

Extraction Method: Principal Axis Factoring.

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

Factor Matrix ^a					
	Factor				
	1	2	3	4	5
Q2N13	.723				
Q2N8	.692			-.371	
Q2N4	.669		-.422		
Q2N9	.667				
Q2N12	.655	-.327			
Q2N14	.636				-.287
Q2N6	.635			.363	
Q2N7	.620				
Q2N10	.618				.382
Q2N11	.599	.547			
Q2N2	.547			.380	
Q2N3	.546				-.371
Q2N5	.476		.343		
Q2N1	.560	.580			
Q2N15	.450		.475		

Extraction Method: Principal Axis Factoring.

a. 5 factors extracted. 15 iterations required.

Pattern Matrix ^a					
	Factor				
	Feedback	Skill Variety	Task Significance	Autonomy	Task Identity
Q2N4	.890				
Q2N13	.724				
Q2N8	.691				
Q2N1		.829			
Q2N11		.732			
Q2N7		.288			
Q2N15			.728		
Q2N9			.586		
Q2N5			.570		
Q2N2				.755	
Q2N6				.678	
Q2N10				.519	.320
Q2N12			.305	.356	
Q2N3		.315			-.451

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		Sum of Squares	df	Mean Square	F	Sig.		
Skill_Variety	Between Groups	39.107	4	9.777	2.393	.054		
	Within Groups	482.063	118	4.085				
	Total	521.171	122					
Task_Identity	Between Groups	9.226	4	2.307	.503	.734		
	Within Groups	541.473	118	4.589				
	Total	550.699	122					
Task_Significance	Between Groups	27.311	4	6.828	2.082	.087		
	Within Groups	386.982	118	3.280				
	Total	414.293	122					
Autonomy	Between Groups	28.235	4	7.059	1.669	.162		
	Within Groups	498.936	118	4.228				
	Total	527.171	122					
Job_Feedback	Between Groups	42.472	4	10.618	1.626	.172		
	Within Groups	770.715	118	6.531				
	Total	813.187	122					
MPS	Between Groups	3358484.527	4	839621.132	1.565	.188		
	Within Groups	63311086.434	118	536534.631				
	Total	66669570.961	122					
Robust Tests of Equality of Means								
		Statistic ^a	df1	df2	Sig.			
Skill_Variety	Welch	2.787	4	41.759	.039			
Task_Identity	Welch	.493	4	38.855	.741			
Task_Significance	Welch	2.255	4	39.955	.080			
Autonomy	Welch	1.174	4	37.793	.338			
Job_Feedback	Welch	2.290	4	44.172	.075			
MPS	Welch	1.484	4	40.149	.225			
a. Asymptotically F distributed.								
Post Hoc Tests								
Multiple Comparisons								
Dependent Variable				Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Skill_Variety	Games-Howell	Supervisor	Middle	-1.43590	.54706	.098	-3.0512	.1794
			Senior	-1.15385	.71336	.502	-3.2611	.9534
			Other	-.11923	.63918	1.000	-1.9763	1.7378
			NA	-.33741	.57274	.976	-2.0081	1.3333
		Middle	Supervisor	1.43590	.54706	.098	-.1794	3.0512
			Senior	.28205	.62765	.991	-1.5983	2.1624
			Other	1.31667	.54187	.131	-.2392	2.8725
			NA	1.09848	.46163	.132	-.1919	2.3889
		Senior	Supervisor	1.15385	.71336	.502	-.9534	3.2611
			Middle	-.28205	.62765	.991	-2.1624	1.5983
			Other	1.03462	.70938	.597	-1.0425	3.1118
			NA	.81643	.65016	.720	-1.1087	2.7415
		Other	Supervisor	.11923	.63918	1.000	-1.7378	1.9763
			Middle	-1.31667	.54187	.131	-2.8725	.2392
			Senior	-1.03462	.70938	.597	-3.1118	1.0425
			NA	-.21818	.56778	.995	-1.8363	1.3999
		NA	Supervisor	.33741	.57274	.976	-1.3333	2.0081
			Middle	-1.09848	.46163	.132	-2.3889	.1919
			Senior	-.81643	.65016	.720	-2.7415	1.1087
			Other	.21818	.56778	.995	-1.3999	1.8363
Task_Identity	Games-Howell	Supervisor	Middle	-.37063	.76680	.988	-2.6730	1.9318
			Senior	-.15385	.93370	1.000	-2.9050	2.5973
			Other	.33846	.88066	.995	-2.2373	2.9142

Autonomy	Games-Howell	Supervisor	Middle	-1.22378	.83080	.591	-3.7218	1.2743	
			Senior	-1.46154	.93053	.530	-4.2161	1.2930	
			Other	-21923	.91236	.999	-2.9068	2.4683	
			NA	-1.04196	.76844	.663	-3.4297	1.3458	
		Middle	Supervisor	1.22378	.83080	.591	-1.2743	3.7218	
			Senior	-.23776	.68937	.997	-2.2706	1.7951	
			Other	1.00455	.66466	.562	-.8993	2.9084	
			NA	.18182	.44706	.994	-1.0810	1.4446	
		Senior	Supervisor	1.46154	.93053	.530	-1.2930	4.2161	
			Middle	.23776	.68937	.997	-1.7951	2.2706	
			Other	1.24231	.78576	.521	-1.0436	3.5282	
			NA	.41958	.61279	.957	-1.4596	2.2988	
		Other	Supervisor	21923	.91236	.999	-2.4683	2.9068	
			Middle	-1.00455	.66466	.562	-2.9084	.8993	
			Senior	-1.24231	.78576	.521	-3.5282	1.0436	
			NA	-.82273	.58484	.629	-2.5367	.8912	
		NA	Supervisor	1.04196	.76844	.663	-1.3458	3.4297	
			Middle	-.18182	.44706	.994	-1.4446	1.0810	
			Senior	-.41958	.61279	.957	-2.2988	1.4596	
			Other	.82273	.58484	.629	-.8912	2.5367	
Job_Feedback	Games-Howell	Supervisor	Middle	.59907	.62291	.870	-1.1892	2.3874	
			Senior	-.76923	.66986	.780	-2.7469	1.2084	
			Other	1.23846	.84822	.595	-1.2270	3.7039	
			NA	.94755	.58213	.491	-.7309	2.6260	
		Middle	Supervisor	-.59907	.62291	.870	-2.3874	1.1892	
			Senior	-1.36830	.67969	.284	-3.3370	.6004	
			Other	.63939	.85601	.944	-1.8287	3.1074	
			NA	.34848	.59342	.977	-1.3137	2.0106	
		Senior	Supervisor	.76923	.66986	.780	-1.2084	2.7469	
			Middle	1.36830	.67969	.284	-.6004	3.3370	
			Other	2.00769	.89076	.188	-.5731	4.5884	
			NA	1.71678	.64253	.085	-1.580	3.5916	
		Other	Supervisor	-1.23846	.84822	.595	-3.7039	1.2270	
			Middle	-.63939	.85601	.944	-3.1074	1.8287	
			Senior	-2.00769	.89076	.188	-4.5884	.5731	
			NA	-.29091	.82680	.997	-2.6878	2.1060	
		NA	Supervisor	-.94755	.58213	.491	-2.6260	.7309	
			Middle	-.34848	.59342	.977	-2.0106	1.3137	
			Senior	-1.71678	.64253	.085	-3.5916	.1580	
			Other	.29091	.82680	.997	-2.1060	2.6878	
MPS	Games-Howell	Supervisor	Middle	-201.93473	234.43700	.908	-890.8451	486.9756	
			Senior	-399.02564	273.49829	.597	-1204.7944	406.7431	
			Other	124.44103	272.36508	.991	-666.2142	915.0963	
			NA	43.61072	214.37423	1.000	-602.2349	689.4563	
		Middle	Supervisor	201.93473	234.43700	.908	-486.9756	890.8451	
			Senior	-197.09091	238.16808	.919	-898.2068	504.0250	
			Other	326.37576	236.86591	.645	-352.7654	1005.5169	
			NA	245.54545	166.97016	.585	-223.7678	714.8587	
		Senior	Supervisor	399.02564	273.49829	.597	-406.7431	1204.7944	
			Middle	197.09091	238.16808	.919	-504.0250	898.2068	
			Other	523.46667	275.58314	.340	-277.0606	1323.9940	
			NA	442.63636	218.44826	.293	-216.6464	1101.9191	
		Other	Supervisor	-124.44103	272.36508	.991	-915.0963	666.2142	
			Middle	-326.37576	236.86591	.645	-1005.5169	352.7654	
			Senior	-523.46667	275.58314	.340	-1323.9940	277.0606	
			NA	-80.83030	217.02779	.996	-711.8135	550.1529	
		NA	Supervisor	-43.61072	214.37423	1.000	-689.4563	602.2349	
			Middle	-245.54545	166.97016	.585	-714.8587	223.7678	
			Senior	-442.63636	218.44826	.293	-1101.9191	216.6464	
			Other	80.83030	217.02779	.996	-550.1529	711.8135	

a Use Harmonic Mean Sample Size = 1945

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Axioms

LEVEL_OF_MANAGER		N	Substalpha=0.05 1
Title ^B	Supervisor	13	112308
	Other	20	114000
	NA	44	122727
	Middle	38	124545
	Senior	13	126923

Mens for groups in homogeneous based played

a Use Harmonic Mean Sample Size = 1945

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Job Feedback

LEVEL_OF_MANAGEMENT		N	Substratp=0.05 1
Title ^{ab}	Chief	20	10300
	NA	44	10500
	Middle	38	10994
	Supervisor	13	11535
	Senior	13	12307

Manifolds in homogeneous spaces are displayed

a Use Harmonic Mean Sample Size = 1945

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

MPS

LEVEL_OF MANAGEMENT		N	Subset alpha=0.05 1
Tukey ^B	Other	20	1482.8667
	NA	44	1563.6970
	Supervisor	13	1607.3077
	Middle	33	1809.2424
	Senior	13	2006.3333

Men for groups in homogeneous and mixed-sex dyads

Use Harmonic Mean Sample Size = 1945

b The group sizes are equal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

