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THE EFFECT OF DIVERSITY TARGETING ON THE MOTIVATION AND RETENTION OF WHITE TECHNICAL GRADUATES IN A LARGE SOUTH AFRICAN CORPORATION

A research project submitted

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ABSTRACT

The aim of this research was to determine whether or not if levels of employee engagement is affected by their organisation's diversity targeting programs, and whether this could be a possible reason for the perceived high turnover of certain classes of employees. The research was conducted using a structured survey sent out via email with the results being analysed quantitatively. The research was limited to engineering graduates working at Sasol.

A secondary aim was to explore if there were any differences in motivation between the engineers of various race groups, ages and sexes. Finally the research aimed to rank factors known to affect employee engagement to assist organisations in developing their retention strategies.

The most significant finding of the research done, was that the aggressive diversity targeting program within Sasol has not had a significant effect on the employee engagement of white engineers or for that matter on any of the racial groups, ages or sexes investigated.

The results from this study supported the findings from various other studies in terms of which factors are perceived as the most important in terms of employee motivation. From the results a two stage employee engagement maturity model was developed which is presented.

DECLARATION

I, Alistair A. Wright, declare that this research report is my own. It is submitted in partial fulfilment for the degree of Masters of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in this or any other university.

_____

Alistair Wright

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CHAPTER 1

1 Introduction

1.1 Background

In South Africa presently there is growing pressure on Companies to undergo transformation. This pressure is based on moral obligation, industry charters and Government Policy for example Amended Employment Equity Act (No. 55/1998). One of the key transformation scorecard measures is the degree to which the composition of middle and upper management reflects the demographics of the nation (chapter 1, section 2 of the Amended Employment Equity Act). As such, many companies have as one of their strategic priorities to achieve specific diversity targets within specified time frames by means of formal affirmative action policies.

At the same time the country is undergoing a period of sustained growth and is about to embark on an extensive multi-billion rand public infrastructure development programme. This has exposed an acute shortage of certain technical skills (DOL, 2003), making people with those skills highly marketable and mobile.

Research by Ngo, Tang and Au (2002) suggests that one of the ways that employees respond to discrimination in the workplace is by high levels of turnover. To put it in perspective Thomas and Jain (2004, p. 36) quote 2001

Statistics SA data which states that “the number of people in professional and technical occupations who left the country in 2000 had increased by 33 per cent since 1998, a figure that represented almost 25 per cent of the total number that had emigrated”. Horwitz, Teng and Quasi (2003), point out that global converging technology has changed the nature of work which makes it all the more important to attract, motivate and retain knowledge workers, especially in a knowledge-based and tight labour market.

1.2 Motivation For Research

Currently there is a worldwide shortage of certain key skills, and with the advent of globalisation, barriers to the transfer of people across borders are rapidly disappearing. This has lead to the dramatic increase in mobility of labour (Desai, 2000). As a result of the above companies are suffering the consequences of losses in productivity due to insufficient skilled people, and increased costs associated with higher labour turnover. In the 2007 interim results presentation, Sasol CEO Pat Davies is quoted as saying “…, the increasing demand for scarce skills and concerns relating to climate change will continue to pose challenges to our business”. As such it is becoming ever more critical for companies to implement specific retention strategies in order to reduce turnover. By doing this research it is hoped that some valuable insight will be obtained relating to the psychological contracts of knowledge workers within the current South African context which can be used by companies in developing their retention strategies.

1.3 The Aims Of Research

The aim of this research is to evaluate whether the phenomenon of diversity targeting, which has in the South African context an unavoidable discrimination component towards the previously advantaged, makes a significant contribution to the high level of turnover amongst white technical graduates within a large corporation. The intention is also to explore if there are any significant differences in the motivation of the various racial groups, sexes and age groups. Finally an attempt will be made to rank the effect of diversity targeting as a factor affecting motivation and retention with other known factors.

1.4 Key Definitions And Abbreviations

DOL: Department of Labour

EE: Employment Equity, used interchangeably with Diversity Targeting and Affirmative action.

Technical Graduate: For purposes of this research the definition of a technical graduate is restricted to graduate engineers of all disciplines with graduate referring explicitly to university qualified engineers only.

ANOVA: Analysis of Variance, statistical method.

NCSS: Number Crunching Statistical Systems. Software package used to analyse data.

α: Significance level. This is the maximum chance that you are willing to take that you are wrong when rejecting the null hypothesis and it is in fact true.

ρ: Probability Level. This is the result from the ANOVA method which indicates the significance of the mean square for this term and the mean square of its corresponding error term. It must be less than α in order to accept the null hypothesis.

CHAPTER 2

2 Theory and Literature Review

2.1 Introduction

The theory that is reviewed in this section describes the concepts of employee motivation and commitment; it describes the current dynamics of the labour market in South Africa, and in particular the concept of Affirmative Action, as well as various factors affecting knowledge worker turnover. Literature is then presented on the methodology of measuring motivation and retention as well as the resulting financial costs of disengaged employees.

2.2 Employee Commitment and Motivation

Meyer, Becker and Vandenberghe (2004) define motivation as an energising force originating within the individual that induces action within the employee governing direction, form and intensity of behaviour. They further go on to define commitment as the force that binds the individual towards a relevant course of action. Taking these definitions it is clear that it would be beneficial to any organisation to have a motivated and committed workforce.

In their research Meyer, Becker and Vandenberghe (2004) develop an integrated model for employee commitment and motivation. As a core part of the model is the setting and achieving of goals. They show that the successful attainment of goals leads to satisfaction and ultimately to organisational

commitment while the failure to attain the goals can lead to dissatisfaction and ultimately to job and work avoidance, defiance and protest. It follows that company policies that directly or indirectly prevent employees from attaining goals will reduce motivation and commitment towards the organisation which can lead to employee turnover.

2.2.1 The Changing Psychological Contract

An employee's organisational commitment and motivation is not a tangible property that can be easily and directly measured. To a large extent it depends on a concept known as the psychological contract. Armstrong and Murlis (1998, p. 22) define the psychological contract as the set of "expectations held by the individual employee that specify what the individual and the organisation expect to give and receive from one another in the course of their working relationship". Sutherland (2004) contends that there have been major shifts in the types and content of psychological contracts in the era of knowledge workers and Armstrong and Murlis (1998) showed that perceived contract violations had a direct positive correlation with staff turnover. Thus understanding what makes up the psychological contract of a modern day knowledge worker will enable the organisation to build a retention strategy that is cognizant of its obligations under the contract. In the next section various factors are discussed that pertain to psychological contracts.

2.2.2 Factors Affecting Turnover of Technical Graduates

The decision by an employee to leave an organisation can be the result of a number of factors. Research by Sutherland (2004, p. 29), groups these factors into 3 main sections: environmental antecedents external to the organisation; antecedents internal to the organisation; and employee specific issues. The main issues discussed above, namely skills scarcity, governmental policy relating to EE, fall into the external antecedents. To be of value it would be beneficial to compare the relative impact of these external antecedents with factors from the other two sections and in particular the employee specific issues. Obviously employee specific issues will vary from worker to worker, but qualitative research by Sithole (2006) into factors influencing turnover of Black Technical Graduates within South Africa were identified which could be used in a questionnaire for comparison. The five most common factors identified in his research were:

1. Better career prospects/ development
2. Better package/ remuneration
3. Better working environment (accommodating culture/ value system/ principles)
4. Family (work, life balance)/ convenience/ location
5. Exposure (accelerated/ wider/ business)

In her research, Sutherland (2004) also identified and ranked the following factors affecting turnover which she named retention variables:

1. Lack of challenging work
2. Your level of trust in management
3. Lack of career development opportunities
4. Incentive/bonus/variable pay

5. Base pay
6. Individual recognition & praise being given
7. Freedom to work independently
8. Career planning by the organisation
9. Relationship with your immediate boss
10. Issues you have raised being unattended

In addition, Bhatnager (2007) reported from a study he conducted in the Indian IT industry the following five factors:

1. exciting work/challenge (48.4 percent);
2. career growth/learning (42.6 percent);
3. relationships/working with great people (41.8 percent);
4. fair pay (31.8 percent); and
5. supportive management/great boss (25.1 percent).

As can be seen there is reasonable consistency amongst the respective lists presented by Sithole (2006), Sutherland (2004) and Bhatnager (2007) and so by using the recurring themes within them it will be possible to create a list of factors that are known to affect motivation and retention. By setting up a list of these factors together with some affirmative action variables and asking respondents how important each variable was to them, it would be possible to rank affirmative action as a factor amongst them.

2.2.3 Measuring Commitment and Motivation

As discussed above employee commitment and motivation is affected by the psychological contract between the employee and the company. However, since this contract is an intangible construct, it can not be measured directly.

There is a lot of relevant research however relating to this topic. In most of the literature that was reviewed the concept of Motivation and Retention was referred to as Employee Engagement and the terms will be used interchangeably from now on in this report.

Kahn (1990, p. 694) defines employee engagement as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances.” He later goes on to suggest that there are three types of employee engagement, namely *physical*, *cognitive* and *emotional* engagement.

In contrast to the above employee centric definition, Saks (2006) looks at it more from an environmental perspective suggesting that overall engagement is a combination of *job* engagement and *organisation* engagement.

There is a great deal of literature on this topic but it is out of scope of this report. Of relevance here is only to define for purposes of this research what is understood by the term. This is given below and was adapted from Kahn (1990).

- Engaged Employees are cognitively vigilant and emotionally connected to others such that their efforts result in desirable organisational outcomes such as increased profit, productivity, safety, retention and customer satisfaction.

- Disengaged Employee's uncouple themselves from work roles and withdraw cognitively and emotionally. They display incomplete role performances and task behaviours become effortless, automatic and robotic.

There is extensive literature in terms of measuring the degree of employee engagement. The most popular method used is the Gallup Workplace Audit which has been applied in over 2500 organisation in the USA alone (Luthans, 2002). It is done by a series of questions which ask the respondent to comment on how satisfied he or she is with certain factors which have been shown to be correlated to employee engagement (Sutherland, 2004). For example:

- How satisfied the individual is with respect to the retention variables mentioned in the previous section?
- How long does the employee intend remaining with his current employer?
- Whether the employee would recommend his present employer to a family member looking for employment?

The second bullet relates to research that showed "intention to leave" is the best predictor of turnover (Sutherland, 2004). The final bullet is a direct way of determining whether the psychological contract has already been breached since in most cases the employee would recommend his company unless something quite serious has already happened to tarnish the relationship.

2.2.4 Generational Effects on Employee Motivation

There are four main generational groups present in the workplace (Glass, 2007). These age groups break down as follows:

- Veterans / traditionalists – born between 1925-1940;
- baby boomers – born between 1941-1960;
- generation X – born between 1961-1976; and
- millennials, born between 1977-1992

Today, the three generations most represented in the workplace are baby boomers, generation X, and millennials (also known as Gen Y, nexters and echo boomers).

Each of these generations has their own distinct characteristics, values, attitudes and drivers. This difference can be explained by many factors such as the differences in living environments when the values of these generations were formed (Yu and Miller, 2005).

The main characteristics, traits and differences between these groups are described below, which has been adapted from the research presented by Glass (2007).

She states that baby boomers value the title and a prestigious office. They

enjoy ceremony and publicity when being recognized, and appreciate traditional gifts like leisure travel and quality watches. Due to their large numbers and the times in which they matured, baby boomers were able to make an impact in the societies in which they lived, making them idealistic and driven. Work and personal sacrifice to them equaled financial success.

She continues to describe generation X'ers as valuing recognition over rewards, and appreciating timely feedback. They require supportive training and career development to allow for creativity and autonomy. They appreciate independence, flexibility and incentives with choice, like gift certificates. She goes on to describe them as being often more skeptical, less loyal, and fiercely independent. The most important thing to them is a work/life balance – something they think boomers do not have.

Millennials are more group oriented and idealistic, valuing challenging, and meaningful work in a fun environment. Free time is a great reward. They are the most confident generation, as they grew up in a time where the school systems catered to people's self-esteem.

The main aspects for the groups have been summarized and put into Table 2.2.3.1.

	Career Goals	Work / Life Balance	Feedback
Veterans	Build a legacy.	Support me in shifting the balance	No news is good news.
Baby Boomers	Build a stellar career.	Help me balance everyone else and find meaning myself	Once a year, with lots of documentation.
Generation Xers	Build a portable career.	Give me balance now, not when I'm sixty-five	Sorry to interrupt, but how am I doing?
Millennials	Build parallel careers.	Work isn't everything; flexibility to balance my activities is	Feedback whenever I want it at the push of a button.

Table 2.2.3.1: Comparison of main traits for the various generational groups

As can be seen from the above, the values, attitudes and aspirations of the different generations are in some cases quite different. Thus it would be reasonable to expect that the external influences such as diversity targeting could have a varied effect on one generation compared to another.

2.3 Human Resources Management in a changing South Africa

Post Apartheid South Africa is described by Jackson (1999, p. 307) as "…a multicultural, polyglot society (with eleven official languages) of overwhelming complexity, deep historical antagonisms, profound differences between rich and poor, but now with unlimited potential to achieve centre stage in the global community". In the same article he then goes on to state that within this context "organizations in South Africa are grappling with the problems of managing

change through appropriate management and development of people within an economy in transition". High on the list of issues that are being grappled with is how the organisation should be transformed and how and to what extent Affirmative Action policies should be implemented.

Horwitz, Browning, Jain and Steenkamp (2002, p. 1109) state "The legacy of apartheid has resulted in structural inequalities in the acquisition of education, work skills and access to managerial, professional and occupational positions". To redress this issue the Government has promulgated legislation such as the Amended Employment Equity Act (55/1998). This act although not prescriptive with regard to explicit targets and time frames compels employers to develop their own plans to achieve greater representativeness in the workforce, especially at the managerial and skilled category levels. These plans must be submitted to the Department of Labour and must be aligned with national and regional demographics (Horwitz, Browning, Jain and Steenkamp, 2002).

As can be seen from the above, within the current South African context companies are obligated to embark on Affirmative Action programmes from both a moral and legal point of view. Looking at the latest demographic information of listed South African corporations (October 2007, sourced from the JSE), we can see that this process still has a long way to go and can be expected to be part of the Corporate Environment for a substantial period to come. These statistics are summarized in Table 2.3.1:

Total Directors	**2728**	**100%**
Total Female Directors	**269**	**9.86%**
Black Female Directors	148	5.43%
White Female Directors	121	4.44%
Total Male Directors	**2459**	**89.60%**
Black Male Directors	432	18.03%
White Male Directors	2027	71.58%

Table 2.3.1: Demographics of JSE Listed Company Directors (source JSE)

From the above table one can add the number of black female and black male directors together which still only gives a total of 580 directors out of a total of 2728 (or 24.26%). Clearly the current affirmative action policies have not resolved the inequality yet and may need to be implemented with even more vigour. The next section describes affirmative action in more detail.

2.4 Affirmative Action

Thomas and Jain (2004, p. 41) summarise the intent of Employment Equity Act and define Affirmative Action as follows:

> "The South African Employment Equity Act aims to redress historical workplace discrimination against blacks (Africans, Coloureds and Indians), as well as women and people with disabilities (all collectively referred to as the designated groups). The objective of the Act is to achieve equality in the

> workplace by the elimination of unfair discrimination and the promotion of equal opportunity through the implementation of positive and proactive measures (termed affirmative action measures) to advance members of the designated groups. The Act requires employers with fifty or more employees or those who have certain specified financial turnovers to undertake affirmative action measures. Such measures are aimed at ensuring that the designated groups have equitable representation in all occupational categories and levels in an employer's workforce, consistent with their availability in the external labour market and their demographic representation within the economically active population".

Extensive research has been done highlighting viewpoints for and against affirmative action and comprehensive studies have been carried out on affirmative action programmes that have been implemented around the world including South Africa, India, Ireland, United States of America and Malaysia (Jain, et al, 2003). The different approaches that can be followed are described and include quota-based policies, affirmative action and employment equity, all of which are legislated and mandatory, and diversity management, which is a voluntary and a corporate approach. It is not in the scope of this research to discuss the various methods and their advantages and disadvantages. From the research however in all cases it has been shown that the policies result in a degree of unhappiness amongst both those who have been advantaged and also those who have not been advantaged by the policies which then needs to be managed by the organisations concerned.

With particular reference to South Africa, Adams (2000) highlights the following applicable issues:

- Stigmatization of blacks by implying that they can not compete on an equal basis and need to be “assisted” by policies. This results in lowered self esteem
- Coloureds and Indian’s deemed as not being “black” enough and the associated consequences thereof
- A drop in standards and productivity in cases where the best candidate is no longer appointed
- Indifference to the career prospects of other citizens at whose expense past injustice is compensated
- Loss of precious expertise through continued white emigration of scarce skills
- Affirmative action’s dual effect of contributing to the recovery of a fledgling new democracy but in doing so undermining its liberal pretensions of non-racial individual equality (reverse racial discrimination).

As can be seen from the above research affirmative action is a wider reaching and emotive topic in present day South Africa. Depending on how it is implemented, and the relative maturity of the organisation there could easily be a resulting effect on the motivation of both the groups advantaged and those disadvantaged by it.

Finally it is important to put the consequence loss of employee motivation and retention, (i.e. employee disengagement) into financial terms. This is done in Section 2.5 below.

2.5 Cost of Labour Turnover

Labour turnover is defined as the total number of separations that occur during a specific period (Zimmerman 1971). The nature of the separations can be grouped into separations beyond the control of management and those that can be mitigated by management. An example of the former case would be the death of an employee and an example of the latter case is when an employee goes on retirement. The largest incidence of separations however falls in between these two extremes and occurs when an employee quits.

In general when an employee quits there follows a sequence of events with a certain lag time before he or she is replaced with a competent replacement and productivity and service level returns to their former standard.

Adapted from Zimmerman (1971) the sequence of events at a high level is as follows:

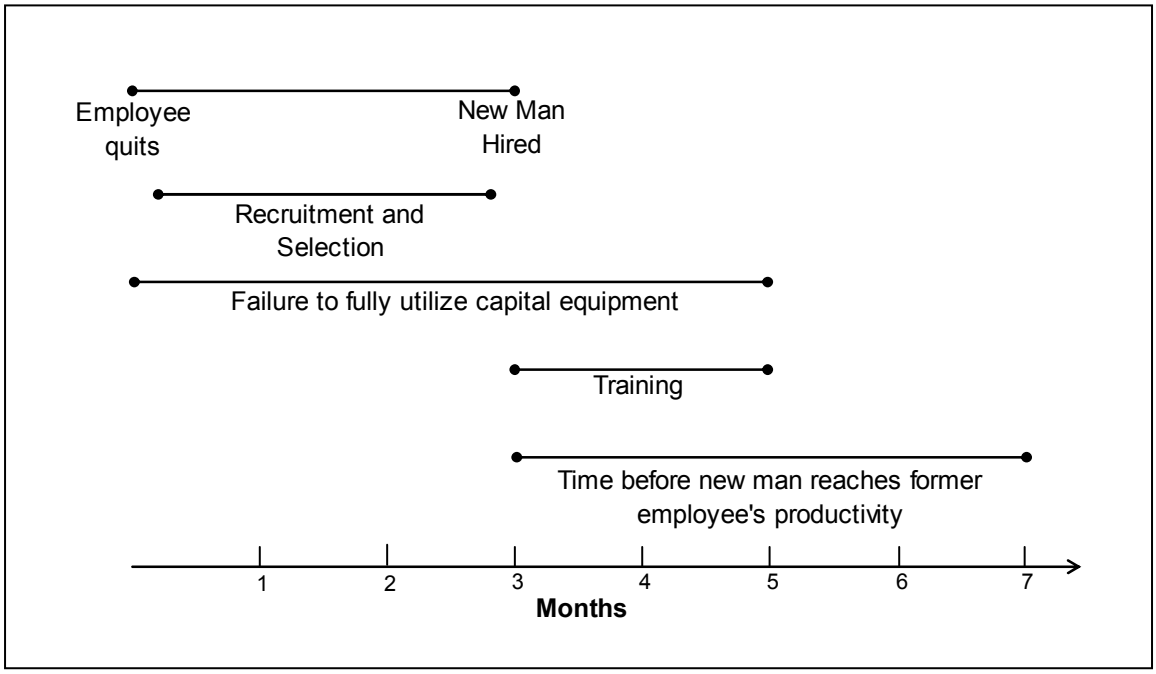

Figure 2.3.1: Typical replacement schedule for an employee who quit

The figure above shows a lag time of about 7 months from the time the employee quits to the time the former productivity is restored. More recent research by Michaud (2000) and Sutherland (2004) show that the lag time applicable to knowledge workers and executives can be significantly longer and there are also many other direct and indirect costs to take into account.

Direct costs of replacing an employee comprise of recruitment and advertising costs, agency fees, applicant expenses, relocation expenses, and all employment office expenses, sign on bonuses etc. These must be added to other direct costs such as extra overtime for remaining employees in order to close the resulting loss in productivity gap. Indirect costs, apart from the productivity loses described above include loss of knowledge and Organisational Memory, decrease in morale of remaining staff, customer dissatisfaction due to a drop in service levels and loss of momentum of the

organisation.

Michaud (2000) quotes a study from the United States Department of Labour that concluded that it costs an organisation 70-200% of a departing employee's annual salary to replace him.

In addition to the above not all disengaged employees will leave immediately. Bhatnagar (2007) draws the perhaps obvious conclusion that disengaged employees are less productive than engaged employees. This loss in productivity can manifest itself in a number of ways including *presenteeism* (employee is present but there is a loss of output and / or a drop in quality of output) and *absenteeism*. This loss of productivity will have a direct negative effect on the financial performance of the business.

Clearly the above shows that in today's context it is important for all organisations to understand the reasons for disengagement and turnover and have a clear and informed strategy on how to reduce and mitigate it.

2.6 Conclusion

This chapter has highlighted that in the current South African context, understanding the psychological contract between organisations and their employees is essential in order to create retention strategies to mitigate the loss in productivity and cost associated with employee disengagement and turnover.

It was discussed that although affirmative action and diversity targeting has a real and needed role in the transformation of South Africa, by its very intent it will impact on the motivation and retention of employees which needs to be understood and managed by the organisations.

The aim of this research is to fill the existing gap of knowledge and tries to quantify this effect of diversity targeting and to rank it with other known factors affecting retention within organisations so that effective and informed retention strategies can be developed.

CHAPTER 3

3 Research questions and hypotheses

From the literature summary above we see that South African companies need to retain scarce talent within an external environment where there is a skills shortage, and a legal and moral obligation to implement policies which will have the effect of discriminating against previously advantaged individuals. The latter has been shown to erode employee motivation and commitment which could lead to increased turnover. Since there are many factors which contribute to employee turnover the purpose of this research will be to try and quantify how much of an issue Affirmative Action is relative to other factors (if at all).

3.1 Research Question 1

Is there a significant difference in motivation and retention between black and white technical graduates in a large South African corporation currently implementing an aggressive diversity targeting policy?

To measure this, the following null hypothesis will be tested:
There is no significant difference in the motivation and retention of black and white technical graduates within Sasol.

3.2 Research Question 2

Does diversity targeting have a significant effect on the motivation and retention of white technical graduates in a large South African corporation?

3.3 Research Question 3

Does diversity targeting have a more significant effect on certain age groups?

To measure this, the following null hypothesis will be tested:
There is no significant difference in the motivation and retention of different age groups of technical graduates within Sasol.

3.4 Research Question 4

Does diversity targeting have a more significant effect on either males or females?

To measure this, the following null hypothesis will be tested:
There is no significant difference in the motivation and retention of male and female technical graduates within Sasol.

3.5 Research Question 5

How does diversity targeting rank compared to employee specific issues affecting motivation?

CHAPTER 4

4 Research Methodology

4.1 Introduction

As discussed in chapter 2, the skills shortage and high turnover of technical graduates is adversely affecting the operations of many South African firms in very real and tangible ways. Any insight into factors responsible for this high turnover would therefore be beneficial to the firms as an input towards developing and enhancing their retention strategies. This therefore justified the need for this study. The purpose of this chapter is to report on the method used to collect and analyse the data.

4.2 Research Method

Zikmund (2003) describes quantitative research as a method to determine the quantity or extent of a phenomenon in the form of numbers in order to explain the causes of objectively observable and measurable behaviour while the qualitative approach allows the researcher to explore all kinds of unexplained as well as so-called previously explained but misunderstood phenomena. Since the purpose of this research was to test the impact of a certain factor, namely affirmative action, on the motivation and retention of various groups and to further rank known factors a quantitative approach was found to be most suitable.

The ability of a quantitative analysis to yield meaningful findings depends entirely on the amount and quality of the data available. Thus to obtain sufficient data, a two pronged strategy was developed to encourage participation and at the same time minimise response bias. As will be discussed in more detail in the two following sections an email containing a short structured questionnaire was decided on with the option of an anonymous response.

4.2.1 Encouraging Participation

The two biggest barriers to participation were identified as “the hassle factor” and a reluctance to share personal information. To reduce “the hassle factor”, the questionnaire was set up electronically, limited to a single page which would not take more than five minutes to complete and which could be submitted back via email at the click of a mouse.

Since personal career aspirations and attitudes towards affirmative action are both sensitive issues it was identified that the topic of the research may lead to reluctance on the part of the target population to participate. To overcome this obstacle it was decided to use a method that allowed the potential respondents within the target population to submit their answers anonymously. To achieve this personal information was not asked and the option was made available to print and fax back the response. Again to reduce “the hassle factor” for this option the questionnaire was already pre-formatted for printing on a single page.

4.2.2 Minimizing Response Bias

Response bias is defined by Zikmund (2003, p. 178) as “survey error that occurs when respondents tend to answer questions in a certain direction”. It was identified that the most likely form of response bias to be encountered in this case was “social desirability bias”, which occurs consciously or unconsciously because the respondent wishes to create a favourable impression in the presence of an interviewer. To minimise this two approaches were used. Firstly the exact topic of the research was not highlighted. The covering letter referred only to motivation and retention of technical graduates and secondly an impersonal medium, that of email, was used rather than a face to face interview. Within the questionnaire the questions pertaining to affirmative action were mixed together with a number of other factors thus hiding the main intent of the survey.

4.3 Questionnaire Design

As discussed in the previous section to encourage participation the questionnaire had to be both simple, such that it could be completed within five minutes, and anonymous. Obviously both of these constraints had a large impact on the structure and content of the questionnaire. The questionnaire, which can be found in Appendix B of this report, comprised of 27 questions, broken down into 3 main sections. The first section consisted of 7 questions and captured basic demographic information which was later used to group the data. The second section consisting of questions 8 to 15 on a Likert scale tested motivation and retention, while the last section consisting of the

remaining 12 questions tested the importance to the respondent of various factors relating to his working environment and career. In her research, Sutherland (2004) presented a validated questionnaire to test retention amongst knowledge workers. The questions in section 2 of the questionnaire were extracted from this source, together with two questions from a research questionnaire testing motivation (International Survey Research LLC).

In his explorative research Sithole (2006) identified 8 main factors which influence turnover amongst black technical graduates and in her research Sutherland (2004) identified another 10. As discussed in section 2.5 these two lists were combined and after removing the duplicates which appeared on both lists the top factors were identified. The third section of the questionnaire comprised of the top 7 factors from this combined list. Added to these were two questions relating to affirmative action. Two questions were added so that the results could be checked for internal consistency.

For purposes of adding a component of exploratory research it was decided to add to this list another 3 questions relating to commonly perceived factors. These included testing for

- Desire for global experience
- Emigration due to crime
- Geographical Location

The third question relates to the fact that Sasol's main operating areas in South Africa include Sasolburg and Secunda which do not have all the features and

facilities of the main city centres. The order of the 12 questions was then selected randomly.

The questionnaire was then sent to 5 engineers known to the author for purposes of pre-testing the instrument. The primary aim was to test the electronic interface, formatting, understandability and intent of the questions, and to get comments on layout and ease of use. Once they had been completed the questionnaire and answers were discussed with the respondents to test the above. As a result of the pre-testing a few minor changes to the questionnaire were made including cosmetic changes and the rewording of one of the questions. The questionnaires were then marked as pre-test and not used further or included as part of the quantitative analysis.

4.4 Population

It is intended to analyse the data using statistics in order to determine if there are any significant differences between groups of respondents. The respondents will be grouped according to race, age and sex. Since the dependent variables in this case (motivation and retention) can be influenced by so many factors which are not possible to control, the population will be limited to only one profession within one company, namely engineers within Sasol. This is still a large enough target group to do meaningful quantitative research. Since only engineers within Sasol will be included, the analysis will therefore exclude any inter-company issues and inter-professional issues. This will however limit the generalisability of the potential findings. Thus the population being

investigated will be engineering graduates working at Sasol.

4.5 Sampling Method

A list of names was extracted out of Sasol's SAP HR system into Microsoft Excel consisting of all the engineers working within Sasol's South African operations, between the salary grade levels for a Junior Engineer and that of a Principle Engineer. Graduate engineers at higher levels than Principle Engineer form part of group management and hence were excluded. Approximately 1500 names were obtained. To avoid any sampling bias it was decided to randomly select from this sample.

Normally for an email survey 4-5% response can be expected. Since this was internal to Sasol and for academic purposes and relating to a current hot topic within the company, it was expected that a higher response rate of around 15% would be achieved. A sample size of around 100 respondents was desired to enable a meaningful statistical analysis, which meant around 600 questionnaires needed to be sent out. In order to choose a random sample from this population, a random number was generated next to each name using the excel function, Rand(). The list was then sorted by this random number and initially the top 600 were chosen for the survey. The questionnaire was then sent via email together with a short covering note which can be found in Appendix A. From this batch there were 168 usable replies which exceeded the initial target and was deemed sufficient for meaningful analysis so no further surveys were sent out. This represented a 28% response rate which exceeded

expectations. Of the respondents 36 or 21% made use of the anonymous fax option.

4.6 Data Collection

In order to facilitate data collection and minimize transcription errors the questionnaire was composed using Microsoft Excel, with a second hidden worksheet which automatically processed the questionnaire into a list of numbers that could be easily cut and pasted directly into another worksheet containing all the results. In a similar way, questionnaires that were faxed through were first transcribed onto a blank questionnaire and then the data copied across.

4.7 Data Analysis

The data analysis consisted of 3 main stages consisting of descriptive statistics, calculating derived data and finally analysis of group results.

4.7.1 Descriptive Statistics

The data from all the questionnaires were collated into a single file and then grouped by age, sex, race, engineering discipline, length of service etc. The mean values and standard deviations for the groups were then calculated.

4.7.2 Calculation of derived data

As discussed in section 4.3, motivation and retention were not measured directly but were inferred from a set of 8 questions. An objective function was created which combined and converted the answers to these questions into a score from 1 to 48 which was then later converted into a percentage. As discussed in section 2.3 some factors are better predictors of turnover than others, and hence were given a greater weighting. Intention to leave has been shown as the most accurate predictor of turnover (Maertz and Campion 1998) and hence had a weighting of 2.5. Similarly the question of "Would you recommend Sasol as an employer to family member" does not indicate much for a positive response but shows major dissatisfaction with a negative response, and hence also received a 2.5 weighting. Finally the result for overall satisfaction was given a weighting of 2 as it directly asks the respondent to consider and indicate their current attitude. Below in Table 4.7.1 the complete set of weightings is given:

Factor	Relative Weighting
Recommend Sasol as Employer	2.5
How long intend staying	2.5
Satisfaction with current work	1
Satisfaction with Supervisor	1
Satisfaction with opportunities	1
Opportunity to use your full abilities	1
Satisfaction with Morale	1
Overall Satisfaction	2

Table 4.7.1: Relative weightings used to calculate Motivation and Retention Score

4.7.3 Analysis of group results

For comparing population means for more than two distinct populations the one-way ANOVA method should be used (Albright, Winston and Zappe 2006). For cases however where there were less than 30 samples in each group, for example in the case for some of the race groups, the Kruskall-Wallis method must be used instead. This method was selected since the equal variance test passed while the normality assumptions test did not. To do these tests the data was copied from Microsoft Excel into NCSS (Number Crunching Statistical Systems) 2004 version and processed. This method was used to compare Motivation scores for the various groups.

To compare retention variables for the various groups, these were simply ranked per group and then the rankings for each of the groups compared.

4.8 Research Limitations

The research was limited to engineers at Sasol. This was done in part due to accessibility to the population but was also done in order to exclude inter-company issues and inter-professional issues from skewing the data. This however significantly limits the generalisability of the results.

Research Question 5 is of an exploratory nature, but since a structured questionnaire was used without any open ended questions, the ranking of the relative importance to the respondents of the various retention variables will be limited to the retention variables previously identified in the research by Sutherland (2004) and Sithole (2006) with only three new factors included in the questionnaire.

CHAPTER 5

5 Research Results

5.1 Introduction

In the previous section the contents of the questionnaire that was sent out was discussed. As mentioned it was sent out via email to 600 respondents selected randomly from the target population. From this 168 usable responses were received. In the following sections the demographics of the respondents will be presented along with the results. The analysis of these results will be discussed in Section 6.

5.2 Demographics of Respondents

Of the 600 questionnaires sent out, 170 were received. Of the 170 received, two were discarded as they were incomplete leaving 168 usable sets. These were collated into a single dataset which was then used for analysis. The dataset can be found in Appendix C. The very reason why there is the need for diversity targeting at companies like Sasol is as a result of the fact that the engineering profession within South Africa is still largely dominated by white males. This was true for the demographics of the respondents as well.

Of the 168 respondents, there were 37 female respondents and 131 male respondents as shown in Figure 5.2.1.

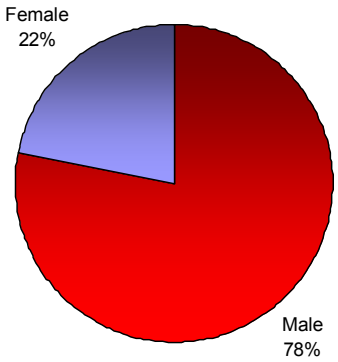

Figure 5.2.1: Breakdown of Respondents by Sex

Of the respondents, there were 22 Africans, 27 Indians, 7 Coloureds and 112 Whites as shown in Figure 5.2.2 below.

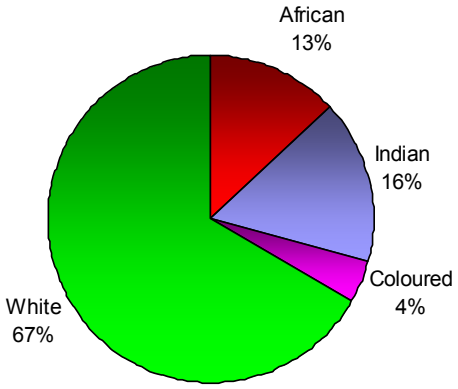

Figure 5.2.2: Breakdown of Respondents by Race

For hypothesis testing using the one way ANOVA method, to look for significant differences in the means between subgroups, it is important that all subgroups

should contain more than 30 occurrences (NCSS manual, p.210-3). Therefore in order to analyse the above one needs to either combine African, Indian and coloureds into a single group 'Blacks' or use a different method such as Kruskal-Wallis ANOVA which providing certain normality and equal variance assumptions are met, can be used with smaller subgroups.

In terms of age, there were 129 respondents between the ages of 20 and 35 years, 32 between the age of 35 and 50, and only 7 between the ages of 50 and 65 (retirement age). This distribution is the result of a combination of factors which include the recent effort by the company to hire new engineers to support the company's rapid growth, the problem being investigated here (the high turnover of experienced engineers) and the fact that older engineers have either changed careers or gone into group management. It is shown graphically below in Figure 5.2.3.

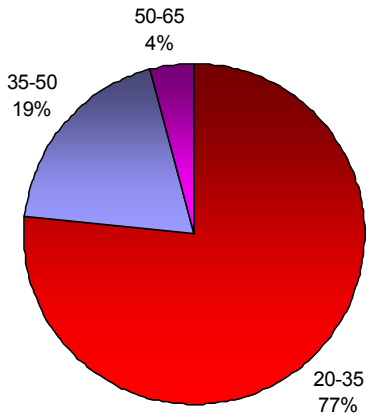

Figure 5.2.3: Breakdown of Respondents by Age Group

The age groups used here do not exactly correspond with the generational groups. Therefore the amount in each generation was estimated by looking at a total years work experience and inferring age from it. This estimation is given in Table 5.2.1 below.

Generation Classification	Number of Respondents
Baby Boomer	5
Generation X	28
Millenials	135

Table 5.2.1: Respondents Counted by Generation Classification

In terms of engineering discipline, being a chemical company one would expect the respondents to be dominated by chemical, mechanical and electrical / control engineers. This was the case with 40 Mechanical, 97 Chemical, 23 Electrical / Control and 8 others comprising 2 Mining, 3 Civil and 3 Industrial Engineers. This is shown graphically by Figure 5.2.4 below.

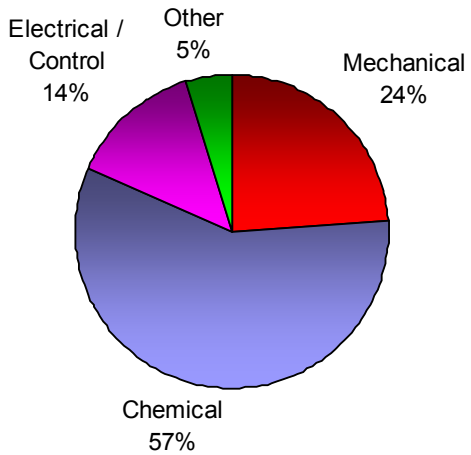

Figure 5.2.4: Breakdown of Respondents by Engineering Discipline

From the respondent's data it was also calculated that the average length of service at Sasol was 5.7 years and the average working experience was 7.3 years.

5.3 Motivation and Retention Scores

As discussed in Section 4, Motivation and Retention were not measured directly, but were derived from an objective function which used a weighted combination of the responses to questions 8 through 15 to give a motivation score between 0 and 100%, with 0 being the lowest possible score and 100% being the highest. Using this objective function a distribution was obtained for the respondents that had a mean of 66%, a median value of 70%, a minimum value of 8%, a maximum value of 95%, and a standard deviation of 18%. Using this result the respondents were also grouped into quartiles, with 1 having the lowest motivation and 4 having the highest.

In Figure 5.3.1 is the distribution of motivation scores for all respondents is shown. On the graph there is a density plot superimposed over the actual histogram.

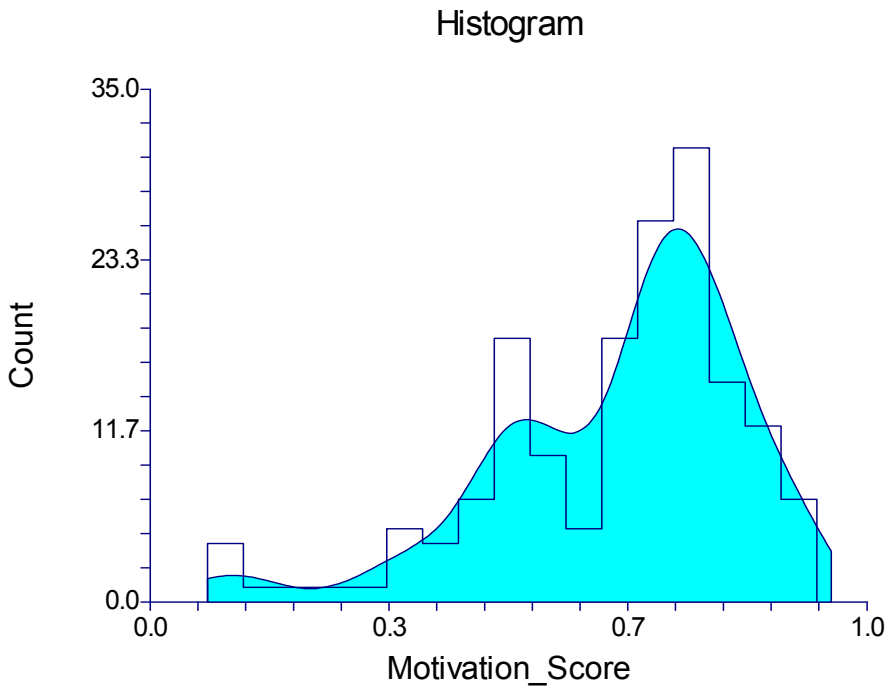

Figure 5.3.1: Distribution of Motivation Scores for all Respondents

Of course what we are interested in is to determine if there is a significant difference in the motivation scores between the white and black respondents. This will be determined statistically but in order to compare the data it was grouped by race and then re-plotted. The two plots are presented side by side for easy comparison in Figure 5.3.2.

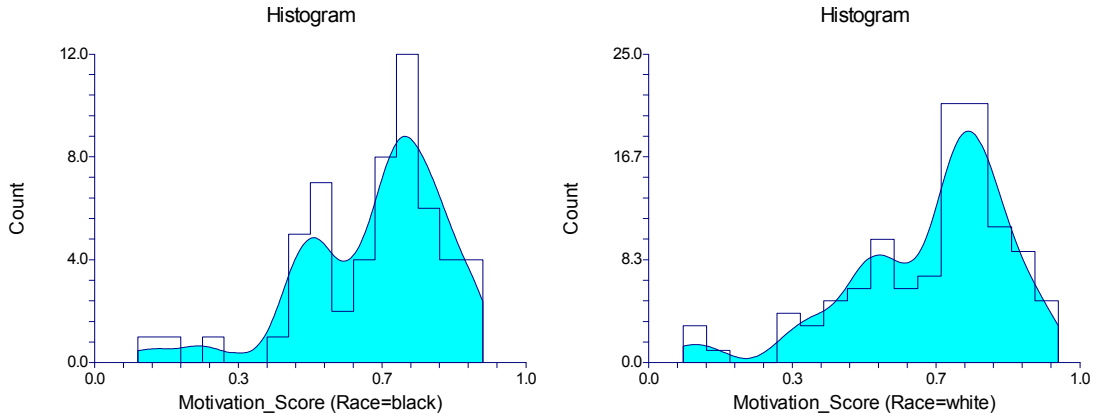

Figure 5.3.2: Comparison of Motivation Scores grouped by Race

The main parameters for the two distributions above are presented in Table 5.3.1 below.

	Black	White
Count	56	112
Minimum	10%	8%
Mean	65.1%	65.8%
Maximum	90%	95%
Standard Deviation	16.7%	18.1%

Table 5.3.1: Comparison of Motivation Scores grouped by Race

At a glance at the above table and from looking at the shape of the respective plots which are very similar it would indicate that the distribution of motivation scores amongst the two subgroups are similar which would imply race is not one of the major factors affecting motivation. By inference this would imply that factors applicable to race, such as diversity targeting are therefore also not a factor. Note, when comparing graphs ignore the difference in the nominal values on the vertical axis as this is just an effect of the different number of data points.

What is evident on the above plots is the noticeable tail on the low motivation side. This represents the *unhappy* employees and investigating the responses to the questions in section three of the survey compared to the answers of these employees on the right hand side may yield some interesting insight. This will be done in section 5.5.

In the same way as the graphs were plotted for “Whites” and “Blacks” the same was done grouped by sex. The two graphs of “males” and “females” is shown in Figure 5.3.3.

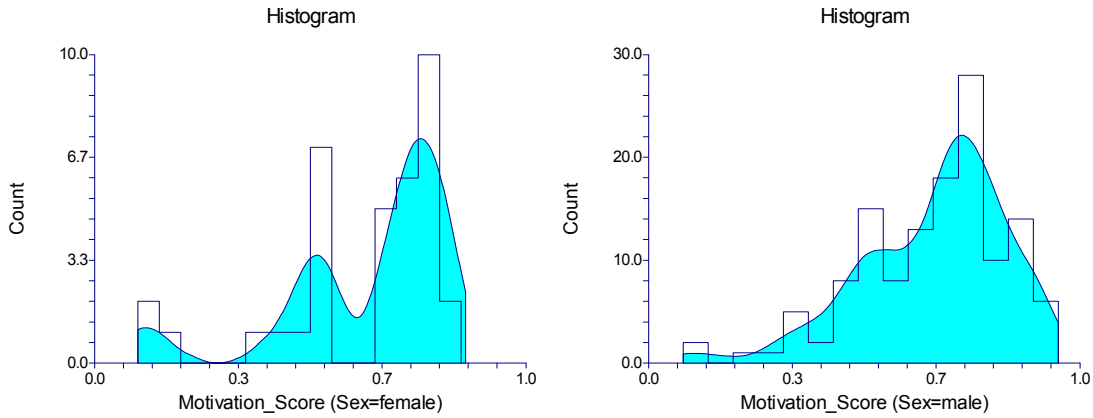

Figure 5.3.3: Comparison of Motivation Scores grouped by Sex

The main parameters for the two distributions above are presented in Table 5.3.2 below.

	Female	Male
Count	37	131
Minimum	10%	8%
Mean	64.40%	66.10%
Maximum	86%	95%
Standard Deviation	19.60%	17.00%

Table 5.3.2: Comparison of Motivation Scores grouped by Sex

Again looking at the main parameters of the two distributions and comparing their general shape there does not appear to be major differences in the motivation scores for the two subgroups. The female graph however does appear to exhibit a more distinctive low end tail (dissatisfaction). Note that in general the graph for the female subgroup is more pronounced due to the smaller sample size.

Finally the same was done for age. In this case however the group of respondents between 50 and 65 years old was not plotted due to insufficient

sample size. The result is shown below in Figure 5.3.4. Although not quite as pronounced as in the sex graph there also appears to be a more pronounced low end tail (dissatisfaction) amongst the '36-50yrs' group.

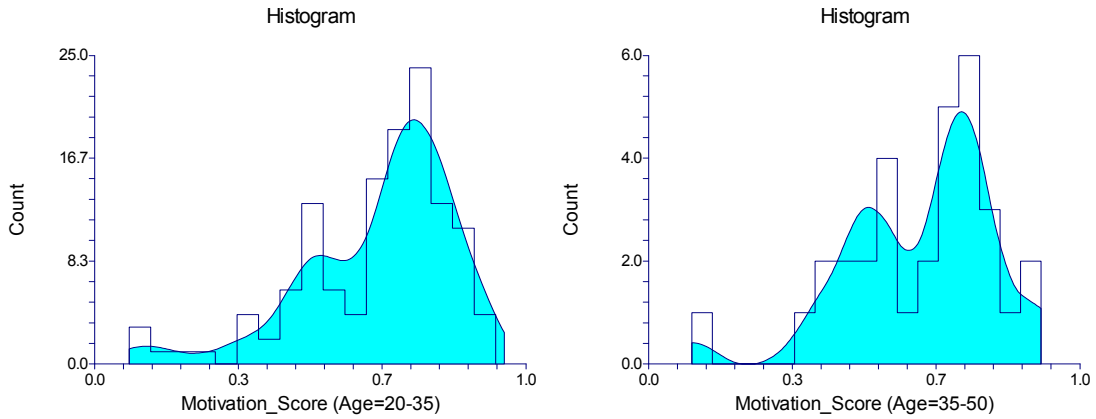

Figure 5.3.4: Comparison of Motivation Scores Grouped by Age

The main parameters for the three distributions above are presented in Table 5.3.3 below.

	20-35yrs	36-50yrs	51-65yrs
Count	129	32	7
Minimum	8%	10%	33%
Mean	66.1%	63.2%	65.1%
Maximum	95%	91%	90%
Standard Deviation	17.7%	17.3%	18.8%

Table 5.3.3: Comparison of Motivation Scores grouped by Age

5.4 Hypothesis Testing

In the previous Section the distribution of motivation scores for the various subgroups were plotted and compared qualitatively. In this section the means for each subgroup will be compared rigorously using the appropriate statistical method. For the following Hypothesis Test a confidence limit of 95% has been selected (α = 0.05). This means that the probability of making a type II error, i.e. by rejecting the hypothesis that the means are equal when they are in fact not

equal is less than 5% (NCSS manual, p. 211-13).

From the Kruskal-Wallis ANOVA method a probability level (ρ) will be calculated. In order to reject the hypothesis the value of ρ must be less than α i.e. less than 0.05.

5.4.1 Hypothesis Test for Research Question 1

The null hypothesis states that there is no significant difference in the motivation and retention of black and white technical graduates within Sasol.

Using the Kruskal-Wallis method it was found that ρ=0.6 which being significantly greater than the α of 0.05 means there is insufficient evidence to reject the null hypothesis. In other words no significant difference was found between the medians for the different race groups. The report generated out of NCSS for this test can be found in Appendix D. Looking at the box plot for each race group, in Figure 5.4.1.1, we see that the plots for the Africans, Indians and Whites are in fact very similar with the most difference been for that of the Coloured subgroup. This apparent difference is just a consequence of the very small sample size (n=7) and is not statistically significant.

The box plot is a convenient way of representing the properties of a distribution; with the central horizontal line being the median value, the top and bottom horizontal lines being the 25th and 75th percentile respectively and the extension lines indicate 1.5 times the inter-quartile range. Points lying higher or lower than

the ends of these extensions are considered outliers (NCSS manual, p. 152-1).

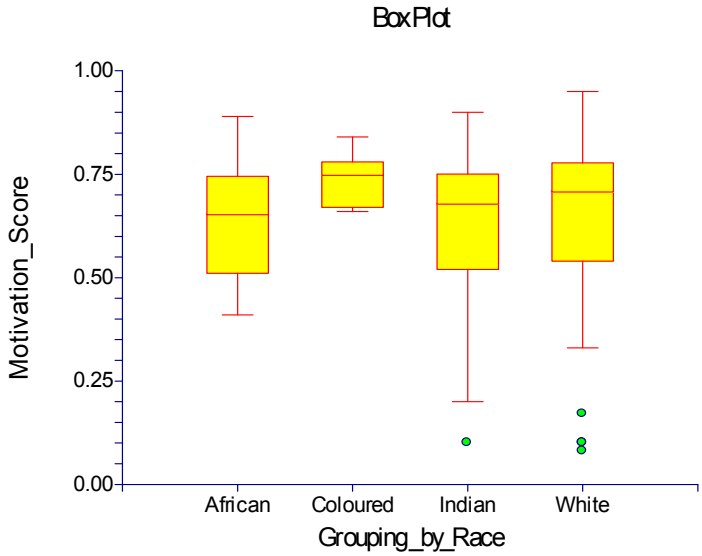

Figure 5.4.1.1: Box Plot of Motivation Scores grouped by Race

5.4.2 Hypothesis Test for Research Question 3

The null hypothesis states that there is no significant difference in the motivation and retention of younger and older technical graduates within Sasol.

Using the Kruskal-Wallis method it was found that ρ=0.71 which being much greater than 0.05 means there is insufficient evidence to reject the null hypothesis. In other words no significant difference was found between the medians for the different age groups. The report generated out of NCSS for this analysis can be found in Appendix D. Again looking at the box plot for the various groups confirms this finding as shown in Figure 5.4.2.1.

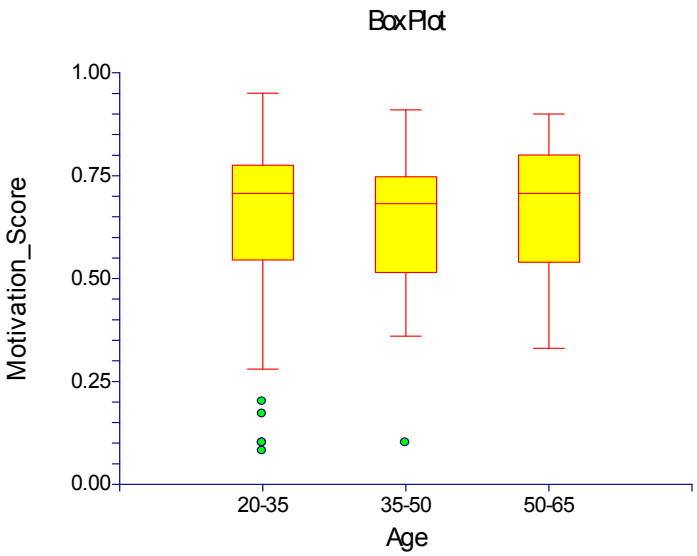

Figure 5.4.2.1: Box Plot of Motivation Scores grouped by Age

5.4.3 Hypothesis Test for Research Question 4

The null hypothesis states that there is no significant difference in the motivation and retention of male and female technical graduates within Sasol.

Using the Kruskal-Wallis method it was found that ρ=0.77 which being much greater than 0.05 means there is insufficient evidence to reject the null hypothesis. In other words no significant difference was found between the medians for the different sexes. The report generated out of NCSS for this analysis can be found in Appendix D. Again looking at the box plot for the two groups confirms this finding, as shown in Figure 5.4.3.1.

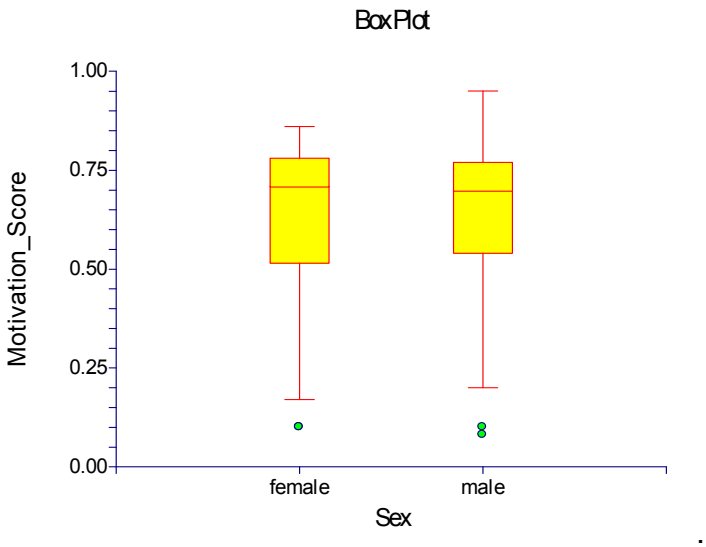

Figure 5.4.3.1: Box Plot of Motivation Scores grouped by Sex

5.5 Analysis of Retention Variable Response Data

The intent of Research Question 2 was to determine directly if affirmative action was a major factor in determining motivation scores for white technical graduates. Research Question 5 follows on from this in that it states that assuming affirmative action is not one of the major factors then its intent is to explore what the most important factors are. Note however that due to the nature of the questionnaire the alternative factors are limited to those previously identified in the research by Sutherland (2004) and Sithole (2006) with only three new exploratory type questions added.

5.5.1 Analysis for Research Question 2

The data from the White respondents was extracted from the combined dataset and was classified into quartiles in terms of the derived motivational scores. The data from the bottom and top quartiles, namely white respondents from the

'*demotivated*' bottom quartile and white respondents from the '*motivated*' top quartile was then analysed further. The responses to the 12 questions from the 3rd section of the questionnaire, which contains the importance to the respondent of the identified retention variables, were then ranked for both of these groups with the results shown in Tables 5.5.1.1 and 5.5.1.2 below.

Retention variable	Rank
Better career prospects / development	1
Better working environment	1
Work/ Life Balance	3
Total financial package	4
Emigration due to crime	5
Exposure to leading technologies	6
Job security	6
Emigration due to government policy	8
Desire for global experience	9
Geographic location	9
Different career direction	11
Affirmative action policies	12

Table 5.5.1.1: Importance Rankings of retention factors for *Demotivated* White subgroup

Retention variable	Rank
Work/ Life Balance	1
Better career prospects / development	2
Total financial package	3
Exposure to leading technologies	4
Job security	5
Better working environment	6
Desire for global experience	7
Geographic location	8
Emigration due to crime	9
Affirmative action policies	10
Different career direction	11
Emigration due to government policy	11

Table 5.5.1.2: Importance Rankings of retention factors for *Motivated* White subgroup

As can be seen from the above two tables, in both cases affirmative action was not seen as being a high ranking factor when ranked against the other known

factors. It ranked 12th out of 12 for the *'Demotivated'* subgroup and 10th out of 12 for the *'Motivated'* subgroup respectively.

The above would indicate that Affirmative Action is not the main reason for the difference in motivation and retention scores for the two groups. Figure 5.5.1.1 below plots the relative importance of all 12 factors for the two groups. It is a very busy graph, but highlights the factors which are viewed with significantly different importance between the two groups. To try make the graph more readable factors that had similar importance to both groups were plotted with thin dotted lines while factors that were different have been plotted with thick solid lines.

Figure 5.5.1.1: Relative importance of factors between disengaged & engaged subgroups

As can be seen the 'Disengaged' group gave significantly more importance to Better Working Environment, Emigration due to crime, and Emigration due to

Government Policy while the 'Engaged' group gave more importance to Work/ Life Balance, Exposure to leading technologies and Desire for global experience.

To put it into context and allow for comparison the relative importance of 'Affirmative Action' and 'Government Policy' was plotted on the same graph for various subgroups, including race, sex and age. The result is shown in Figure 5.5.1.2 below.

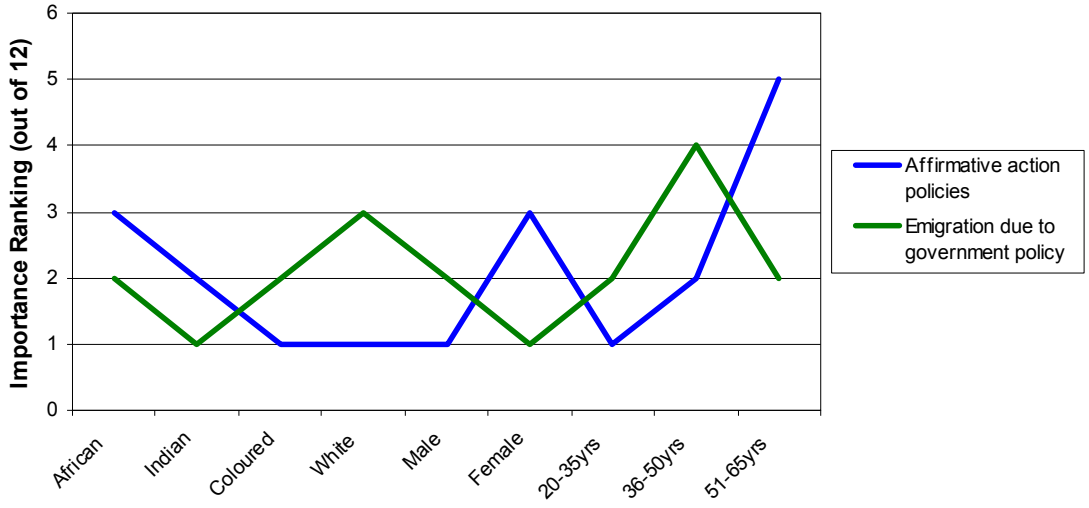

Figure 5.5.1.2: Graph showing relative importance of affirmative action by group

As can be seen in the graph 'affirmative action' and 'emigration due to government policy' were for most of the subgroups not ranked very high when compared to the other 10 factors. The two exceptions were the ranking by the '36-50yr olds' for emigration due to government policy which ranked 4 out of 12, and the ranking by the '51-65yr olds' for importance of affirmative action policies which ranked 5 out of 12. It is also interesting to note that none of the results for any of the racial subgroups or sex subgroups stands out when compared to the

others.

5.5.2 Analysis for Research Question 5

It was shown above in 5.4.1 that there is no significant difference in the motivation scores for the different races, ages or sexes. For this reason the entire data set was used in the exploratory investigation of which retention factors are the most important to the technical graduates within Sasol. The respondents were broken down into four quartiles based on their derived motivation scores. The relative importance of the identified retention variables was then analysed for each subgroup. The data set was broken down as shown in Table 5.5.2.1 below.

Quartile	Motivation Score Range	Size of Subgroup	Description of Subgroup
1	0.00 - 0.54	42	Disengaged
2	0.54 - 0.70	43	Low to average motivation
3	0.71 - 0.78	43	Average to high motivation
4	0.79 - 1.00	40	Engaged

Table 5.5.2.1: Breakdown of dataset into motivations by quartiles

In Section 5.3 above it was shown that the motivation scores for the data set had a median of 0.70 and that the density plots were skewed to the right. This is reflected in the motivation score ranges which are not the same in size. Also due to the discrete nature of the data it was not possible to get exact quartiles (each group having 42 members), but a good approximation was achieved with the groups having 42, 43, 43 and 40 members respectively. To be consistent with the literature the quartiles have been named ‘Disengaged’, ‘Low to average

motivation', 'Average to high motivation' and 'Engaged' respectively.

The relative importance for the various retention factors for **each subgroup** was then ranked and is shown in Table 5.5.2.2 to Table 5.5.2.5 below.

Retention variable	Rank
Better career prospects / development	1
Work/ Life Balance	2
Better working environment	3
Total financial package	4
Exposure to leading technologies	5
Job security	6
Desire for global experience	7
Geographic location	7
Different career direction	9
Emigration due to crime	10
Emigration due to government policy	11
Affirmative action policies	12

Table 5.5.2.2: Importance of retention factors for *'Disengaged'* respondents

As can be seen for the above subgroup 'Better career prospects / development opportunities' scored highest followed by 'Better work/ Life Balance' and 'Better working environment'.

The relative importance of retention factors for the second quartile, the 'Low to average motivation' subgroup follows in Table 5.5.2.3.

Retention variable	Rank
Work/ Life Balance	1
Better career prospects / development	2
Geographic location	3
Total financial package	4
Better working environment	5
Exposure to leading technologies	6
Job security	7
Desire for global experience	8
Different career direction	9
Emigration due to crime	10
Emigration due to government policy	11
Affirmative action policies	12

Table 5.5.2.3: Importance of retention factors for *'Low-average motivation'* respondents

In the above table it can be seen that the top three most important retention variables for this subgroup are reported to be in order of importance 'Better Work/ Life Balance', then 'Better career prospects and development opportunities' followed by 'Geographic Location'.

The relative importance of the retention factors for the third quartile, the 'Average to high motivation' subgroup follows in Table 5.5.2.4 below.

Retention variable	Rank
Work/ Life Balance	1
Total financial package	2
Better working environment	3
Better career prospects / development	4
Geographic location	5
Job security	6
Exposure to leading technologies	7
Desire for global experience	8
Emigration due to crime	9
Emigration due to government policy	10
Different career direction	11
Affirmative action policies	12

Table 5.5.2.4: Importance of retention factors for *'Average-high motivation'* respondents

In the above table it can be seen that the top three most important retention variables for this subgroup are reported to be in order of importance 'Better Work/ Life Balance', then 'Total Financial Package' followed by 'Better Working Environment'.

Finally the relative importance of retention factors for the 4th quartile, the 'Engaged' subgroup is shown in Table 5.5.2.5 below.

Retention variable	Rank
Work/ Life Balance	1
Total financial package	2
Better career prospects / development	2
Exposure to leading technologies	4
Job security	5
Better working environment	6
Geographic location	7
Desire for global experience	8
Emigration due to crime	9
Different career direction	10
Affirmative action policies	11
Emigration due to government policy	12

Table 5.5.2.5: Importance of retention factors for *'Engaged'* respondents

From the table above it can be seen that the top 2 factors identified for the 'Engaged' subgroup are the same as those identified for the 'Average to high motivation' subgroup, and that 'Better Career Prospects and development opportunities' which was ranked 4th in the previous subgroup has moved up to joint second.

To assist in analysing the above information further the relative importance of

the top five factors identified from the responses from the 'Disengaged' group and the 'Engaged' group have been plotted for all the subgroups on the same graph. To have the top factor highest the numerical values for the rankings have been reversed (i.e. 12 now represents the most important factor and 1 the least important). This is shown in Figure 5.5.2.1 below.

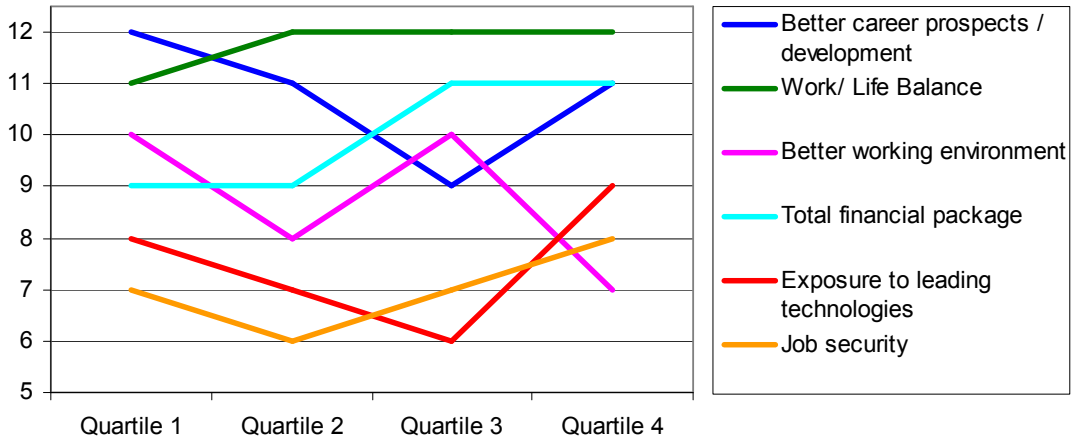

Figure 5.5.2.1: Graph showing top 5 retention factors for each subgroup

As can be seen from the above graph there are a couple of noticeable trends, for example the increasing importance of 'Work/ Life Balance' and 'Total Financial Package' as motivation scores increase, and the relative decreasing importance of 'Better Working Environment ' as motivation scores increase. Also as motivation increases so does the importance for the need to be exposed to leading technologies and to have job security.

5.6 Conclusion from the Research Results

In this section the results from the questionnaires that were sent out has been presented. From the raw data obtained it was possible to derive motivation

scores using the results from section two of the questionnaire. The motivations scores for various subgroups were compared using Kruskal-Wallis ANOVA method in order to do the hypothesis testing required to answer three of the Research Questions presented in section 3. Thereafter the relative importance of the retention variables identified and discussed in Section 2.2.2. were ranked for various subgroups of respondents. In the following chapter these results will be analysed further with particular reference to the information presented in the literature review and the main findings of the research will be presented.

CHAPTER 6

6 Discussion of Research Results

6.1 Introduction

The data from 168 responses to a structured questionnaire was analysed quantitatively and the results were presented in the previous section. In this section these research findings will be discussed with reference to the relevant literature. In some cases the findings will support the current thinking and in other cases it will contradict it.

The basis of the discussion will be on what insights the research results yielded noting that comparing and contrasting the findings to existing literature is an invaluable tool in determining new insights and expanding the existing body of knowledge and perhaps stimulating debate and further research.

The section will be organised in the same order and context as that of the research questions in Chapter 3.

6.2 Interpretation of Findings Relating to Research Question 1

Research Question 1 asks *"Is there a significant difference in motivation and retention between black and white technical graduates in a large South African corporation currently implementing an aggressive diversity targeting policy?"*

Taking this to the context of the current South African work environment two theoretical constructs were found that would give an expectation of finding a significant difference between the two groups. Firstly, in his research Sithole (2006, p. 86) found that "There still exists an unaccommodating culture for black engineers in engineering organizations in SA". His research also revealed that "Black engineers feel that the white engineers progress quicker through the ranks because they have support, wider exposure and guidance" (Sithole 2006, p. 87). Both of these findings would indicate a likely expectation that motivation and retention scores of black engineers would be negatively influenced with respect to their white counterparts.

Conversely, affirmative action involves the preferential treatment of individuals or groups because of past or present disadvantages suffered by them (Reddy and Choudree, 1996). Research by Denton and Vloeberghs (2003) takes this to the next logical step finding that among many White South Africans, affirmative action is seen as a racist policy, resulting in reverse discrimination against Whites. In Section 2.2 research by Meyer, Becker and Vandenberghe (2004) was presented which showed that employees subjected to discriminatory policies are more likely to be de-motivated and lack organisational commitment. This too would indicate that diversity targeting should have an affect on the motivation of those it discriminates against (i.e. whites) compared to those that it favours i.e. blacks). This view is put succinctly by O'Brien, Haslam, Jetten, Humphrey, O'Sullivan, Postmes, Eggins & Reynolds (2004, p. 28) who state

"Work groups who felt they were devalued displayed higher levels of cynicism…" and "… were characterized by lower levels of organizational identification and members of these groups reported under-utilization of their skills by the organization."

The results from the research presented in Table 5.3.1 however do not confirm these expectations. The average motivation score for the 'blacks' subgroup and 'whites' subgroups were found to be 65.1% and 65.8% respectively. These are in fact very similar and were demonstrated to have no statistical significant difference in Section 5.4.1.

This finding does not in anyway disprove the theoretical constructs given above, since the research was carried out in universe where the respondents were also influenced by many other factors. The lack of difference in the findings does however suggest that in the current context, that is the current working environment for engineers within a large company within South Africa, there are other factors which appear to have a greater affect on motivation and retention than racial group and their corresponding race specific variables.

The other Research Questions presented in the next few sections will investigate the effect of other factors and attempt to identify the dominant ones.

6.3 Interpretation of Findings Relating to Research Question 2

Research Question 2 asks *"Does diversity targeting have a significant effect on the motivation and retention of white technical graduates in a large South African corporation?"*

For the same reasons found in the literature as stated above in 6.2 it was expected that there would be an effect. It was not possible to answer this question directly using the methodology which was chosen for this research. In order to test this question directly and rigorously would have required an alternative methodology with the following steps:

1. Take a group of white technical graduates working at a large South African corporation without diversity targeting.
2. Measure their motivation and retention scores.
3. Implement Diversity targeting and allow sufficient time to embed, while keeping all other factors constant.
4. Measure their motivation and retention scores and compare to the results obtained in step 2.

Such a methodology was not possible for this research due to various practical constraints and the time limitation. Hence the methodology as described in section 5.5 was applied. Table 5.5.1.1 and Table 5.5.1.2 show that the relative importance of affirmative action compared to the other factors was 12 out of 12 (i.e. least important) for the Disengaged White subgroup and 10 out of 12 for

the Engaged White subgroup. This would imply that it was not a major reason explaining the difference in the motivation and retention scores.

This was not the expected result based on work by O'Brien et al (2004) discussed in 6.2 above, but it is important to note that just because a factor ranks low on the list of the importance does not mean that it has no effect; it just means it has less of an effect when compared to the other variables on the list ranked above it.

For completeness the relative importance of affirmative action and effect of government policy was analysed for all various subgroups. This was plotted on Figure 5.5.1.2 which shows that neither of these factors ranked particularly highly amongst the various racial subgroups and for the two sex subgroups. This is result again was not what was expected from the research on the consequences of affirmative action by Adams (2000) discussed in section 2.4. Again though the low ranking does not disprove the variable has an effect it merely means it has a lesser effect than the other variables ranked above it.

6.4 Interpretation of Findings Relating to Research Question 3

Research Question 3 asks *"Does diversity targeting have a more significant effect on certain age groups?"*

The hypothesis testing presented in 5.4.1 revealed no significant differences

between the motivations scores for the various age groups. Looking at the relative importance rankings for affirmative action and emigration due to government policy, as shown in Figure 5.5.1.2, however there are some noticeable generational differences.

For the 51-65yr olds, affirmative action this was ranked the 7th most important (out of 12). This was the highest ranking of this factor for any of the subgroups analysed. A possible explanation could be that for this group, the baby boomers, they a) benefited the most by and still remembered the old order and b) this is their last career push before retirement and do not have the luxury of time to wait for diversity targets to be reached before being promoted. It must be noted remembered that of the 168 respondents, only 7 were in the category 51-65yrs old which would limit the generaliseability of the findings to be representative of the relevant population as a whole.

In terms of Emigration due to Government Policy, the 36-50yr old group, ranked this the highest, at 8th most important (out of 12) compared to both the older and younger generational groups where it was ranked 10th most important for both groups. Possible reasons for this, are the fact that they have the financial means to emigrate as compared to 20-35yrs, and there would still be enough time to re-establish a career on the other side as compared to the 51-65yr olds.

6.5 Interpretation of Findings Relating to Research Question 4

Research Question 4 asks *"Does diversity targeting have a more significant*

effect on either males or females?"

As can be seen from the box plot represented in Figure 5.4.3.1 above the distribution of motivation scores for the male and female subgroups are almost identical without any significant differences. This is also confirmed by the hypothesis testing. Again this is not the expected result as per the literature from O'Brien et al (2004) that was discussed in section 6.2 above. The reason for this however is Sasol specific. The diversity targeting for junior positions includes white females as part of the designated groups, but for the more senior positions they are excluded from the designated group. Since engineers slot in above the cut-off level for being included in the designated group and since the majority of female respondents to the survey were also white it means that they would experience the same treatment as their white male counterparts and hence no difference would be expected.

6.6 Interpretation of Findings Relating to Research Question 5

Research Question 5 asks *"How does diversity targeting rank compared to employee specific issues affecting motivation?"*

The results for all the previous research questions lead to the conclusion that diversity targeting does not appear to have a big effect on technical graduates at Sasol. Yet the distribution of motivation scores show there are a significant portion that are disengaged. This together with the empirical evidence of high turnover which led to the research being done begs the question if it is not due

to diversity targeting then what?

A comparison was made and presented in Figure 5.5.1.1 showing the relative importance of the 12 factors evaluated by the survey for both the disengaged subgroup and the engaged subgroup. Of the 12 factors there are three that are significantly more important to the disengaged group than the engaged group. These three factors were 'Better Working Conditions' which scored 1st for the disengaged subgroup vs. 7th for the engaged group. Then there were two questions relating to desire to emigrate. The disengaged subgroup ranked the relative importance (or perhaps their desire) of emigration as a result of crime as 4th most important vs. 8th for the engaged group and the relative importance of emigration due to government policy as 7th most important vs. 10th for the engaged group.

This first distinction regarding the Working Conditions is an interesting observation. Since in general the working conditions are the same for all employees the results indicate that if the employee is emotionally and cognitively engaged then he is willing to tolerate perhaps less than desirable working conditions (chemical plant environments can be quite physically demanding and the production pressures quite emotionally challenging). If he is not engaged however, then the poor working environment can in fact de-motivate him further.

For the two cases relating to emigration, this shows how influences external to

the company environment can have a significant effect on the employee engagement within the work environment. This is a major concern for the company since factors such as crime and government policy are outside of their control and hence difficult to mitigate with a particular retention strategy.

Removing the two company external factors from the list and then re-ranking the factors there is now quite a good correlation between the relative importance ranking of the factors for both the disengaged and engaged groups. The new list is shown below in Table 6.6.1 ordered in importance rank for the Engaged subgroup.

	Disengaged	Engaged
Work/ Life Balance	8	10
Better career prospects / development	10	9
Total financial package	7	8
Exposure to leading technologies	6	7
Job security	6	6
Better working environment	10	5
Desire for global experience	4	4
Geographic location	4	3
Affirmative action policies	1	2
Different career direction	2	1

Table 6.6.1: Relative importance of company specific / internal variables

As can be seen in the above table, except for the better working environment variable discussed above, all the other factors rank in importance within 1 or 2 slots regardless of the current state of motivation of the subgroup. This is powerful as one can now use this order to support or contradict existing findings.

At the top of the list for 3 of the 4 quartiles is work / life balance. This was also shown by Sithole (2006) to be a key factor for Black Engineers and also supports the findings by Glass (2007) which state it is a key attribute for both Generation X and Millennial generations. In the Sasol environment many engineers either work in the continuous production environment or the project environment. The production environment can require them to work evenings and over weekends when there are plant problems and in the project environment there are phases where tremendous schedule pressure is placed on the team members to achieve key milestones. As such it is not surprising that this factor came out as the most important factor for the majority of the respondents.

Better career prospects/ and development also came out consistently at the top of the rankings for all 4 quartiles. This was expected as it was identified by Sithole (2006), Sutherland (2004) and Bhatnager (2007) as a key variable and this research supports their findings. Similarly with the total financial package variable.

The exposure to leading technologies also scored highly. It was also one of the variables identified by Sithole (2006) and Bhatnager (2007). It links strongly with Better career prospects/ and development. This variable is more relevant within hi-tech industries such as Engineering and IT which were the focus of Sithole (2006) and Bhatnagars (2007) research respectively but may not be

generaliseable across all knowledge workers, as shown by its absence from the list presented by Sutherland (2004).

The other two factors, relating to geographic location and different career direction were added by the author to give an exploratory aspect to the research. The motivation for ranking geographic location was based on the authors' own perception that certain groups (for example Indians from KwaZulu Natal or engineers from major city centres) struggled to integrate into the predominately Afrikaans small town environments of Sasolburg and Secunda. This factor ranked only 7th out of the 10 so would appear not to be valid. However the current location of the respondents was not asked by the survey and the results to this question may have been skewed by the large number of responses from the engineers based in the Sasol Technology offices located in Johannesburg.

The other factor, desire to change career direction was an attempt to gauge the desire to change 'professions'. There is a perception that many engineers are leaving the profession for careers as in the financial (Business analysts) or sales and marketing environments. The relative importance ranking for this parameter was at the bottom of the list for both subgroups and hence is not found to be significant.

CHAPTER 7

7 Conclusion

7.1 Summary of Main Findings

The aim of this research as discussed in Chapter 1 was to determine whether or not the level of employee engagement of technical graduates is affected by the diversity targeting programs, and whether this could be a possible reason for the perceived high turnover of such employees. A secondary aim was to explore if there were any differences in motivation between the engineers of various race groups, ages and sexes. Lastly the research aimed to try and identify what factors were responsible for causing low levels of employee engagement so that this insight could be used by organizations in developing their retention strategies.

The most significant finding of the research done was that within the work environment at Sasol it would appear that the aggressive diversity targeting program that is taking place does not have a major impact or influence on the employee engagement of white technical graduates within the company. In fact, no significant effect was identified on any of the racial groups, age groups or sexes.

Another interesting finding was that it would appear that disengaged employees were significantly more concerned about crime and government policy than their

equivalent but engaged counterparts, and although they were exposed to the same working environments were not willing to tolerate it as their more engaged counterparts were.

In terms of factors which were found to be important and would lead to increased levels of employee engagement the following key variables were identified:

- Better work/ life balance
- Better career prospects and development opportunities
- Total Financial Package
- Exposure to leading technologies
- Desire for global experience

These findings were consistent with the findings from various other published sources. The main recommendation for employers of technical graduates are to be aware of the above 5 factors and have specific plans in place to include them within the strategic retention strategy.

The fact that better working conditions ranked so highly in importance for the disengaged subgroup and then was only moderately important for the engaged group gave rise to the development of a two stage maturity model for employee engagement which will be discussed in section 7.2.

7.2 Two Stage Employee Engagement Maturity Model

It was shown that employees who were cognitively and emotionally engaged were more willing to accept and tolerate the less than ideal working conditions that sometimes are associated within the production and project environments within the Petrochemical Industry. Therefore since in many cases it is not possible to improve the conditions it is critical to ensure that the employee gets engaged as quickly as possible. From comparing the importance rankings for the disengaged and engaged subgroups it became evident that initially one needs to focus on the fit and direction. That is to make sure career prospects and expectations of the employee are matched as best as possible and do what ever possible to mitigate problems associated with the working environment.

Once the employee has become engaged then in order to keep him or her engaged is the organisation needs to look after their balance, sustainability and growth. This is done by managing work life balance, equitable financial packages and supplying opportunities for exposure to leading technologies and perhaps allow rotation to give some global experience.

From the literature it was shown that the more engaged an employee is the more productive he or she is which would result in high organisation productivity and associated financial performance. Combining the above factors it was possible to develop a simple two stage employee engagement maturity model to illustrate these concepts. The model is presented in Figure 7.3.1.

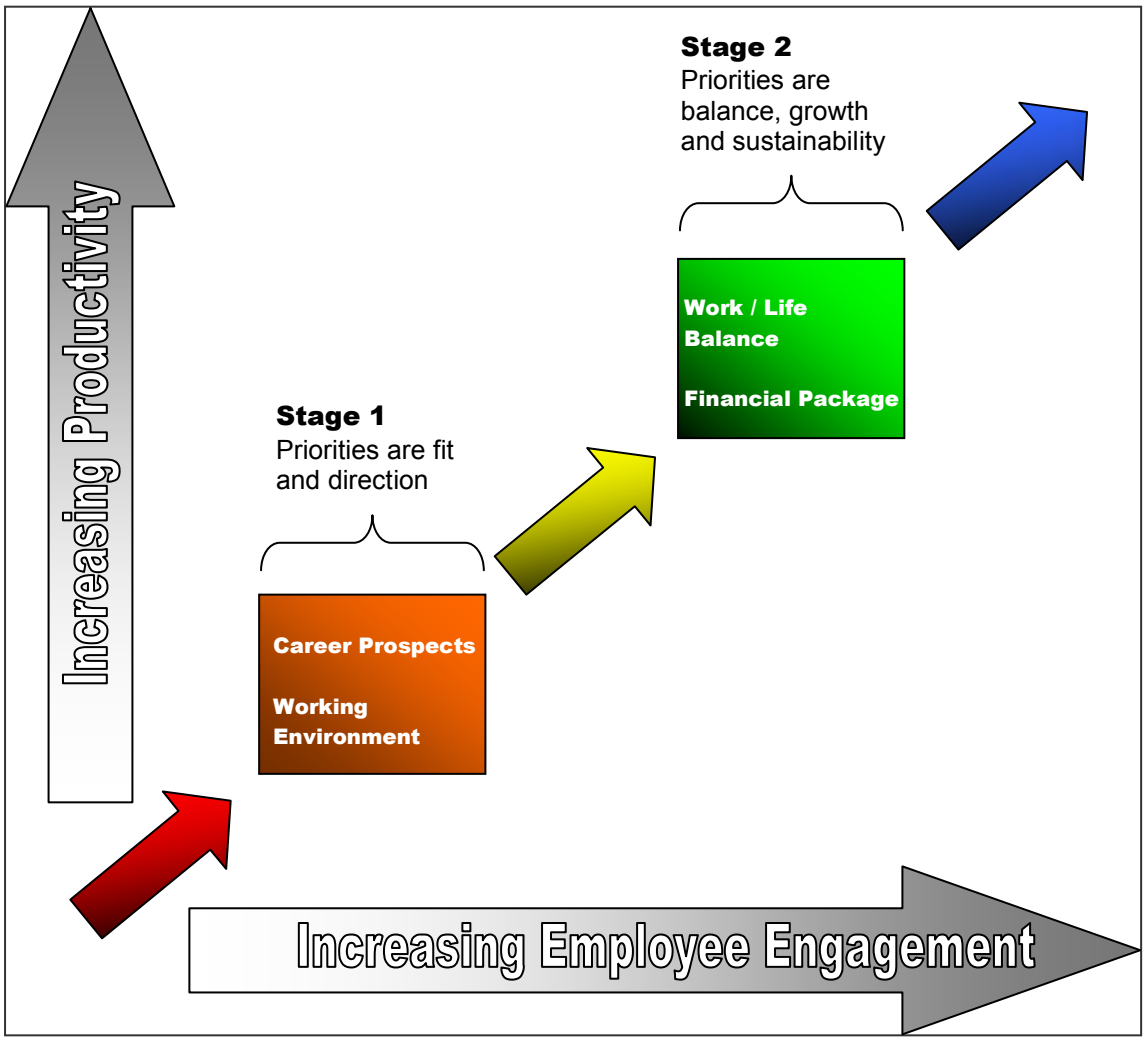

Figure 7.3.1: Employee Engagement 2 Stage Maturity Model

7.3 Recommendations for Future Research

In terms of the main purpose of this research, which was to test the effect of diversity targeting on the motivation and retention of white technical graduates, the results were fairly conclusive and so no further work is envisaged.

In terms of the fact that there remains a high turnover of technical graduates within the industry which is expected to be exacerbated going forward by a

genuine worldwide shortage of these skills together with the reduction of barriers to move, and the propensity of the Millennial generation for mobility it is expected to get worse. This research identified a few of the factors contributing to the turnover but was in no way comprehensive or conclusive. It is suggested that explorative research be done to identify a more extensive list of potential factors, which can then be used by a similar methodology that was used here to rank in terms of importance and resulting effect.

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9 APPENDICES

9.1 Appendix A: Covering Note

From: Alistair Wright [mailto:alistair.wright@tiscali.co.za]
Sent: 07 August 2007 18:11
To: undisclosed-recipients
Subject: Please help with MBA research project.

Hi, this mail is intended for graduate engineers only. If you are not one then please disregard.

My name is Alistair Wright, I am an chemical engineer currently working within Polymers and have been with the Sasol group for 14 years. I was part of the Poly 3 project (part of Turbo) and during this project became aware of the acute shortages of engineers within Sasol needed to realise the company's growth ambitions. During this time I became interested in the high turnover of engineers and the possible reasons for it.

With this in mind I decided to do my final year MBA thesis (GIBS) on "motivation and retention of technical graduates in a big corporate within the modern work environment". For my analysis I have created a short questionnaire (will not take longer than 5 minutes to complete – I promise) and I would appreciate it if you could complete it and send it back to me before 18 August. The questionnaire is in the attached excel file. Your name was randomly selected from a name list of engineers that I obtained from Corporate HR.

For my analysis to be meaningful I need a large number of respondents or the statistical results will not be valid so please help me. I guarantee your confidentiality (name and place of work are not even asked) and only aggregate results will be reported. I would prefer the responses by email, but if you would like to ensure confidentiality you can also print and fax the questionnaire back to me.

Please return the questionnaire to either alistair.wright@tiscali.co.za or fax 011 883-8376

I am currently off work (car accident) which is why I am using my home email. If you would like to discuss you can reach me on 082 808 1920.

Thanking you in advance

Alistair

9.2 Appendix B: Sample Questionnaire

Please fill in the yellow blocks below with an x or number as appropriate.

1	Gender	Male	Female				
2	Age	20-35	36-50	51-65			
3	Race	African	Indian	Coloured	White	Other	
4	Engineering Discipline	Mech	Chemical	Mining	Civil	Industrial	Other
5	Total working experience (completed years)	Years					
6	Experience within Sasol (completed years)	Years					
7	Are you currently working as an engineer in the field you studied?	Yes	No				
8	Would you recommend Sasol as an employer to a family member	Yes	No				
9	How long do you intend remaining working at Sasol	0-1 year	2-3 years	4-5 years	> 5 years	until retire	
10	How satisfied are you with the nature of the work you currently perform?	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	
11	How satisfied are you with the person who supervises you ?	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	
12	How satisfied are you with opportunities which exist in the organisation for promotion and advancement?	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	
13	How satisfied are you with opportunity to use your full abilities within the organisation?	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	
14	How satisfied are you with the general morale within your organisation	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	
15	Overall how satisfied are you with your current job?	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Satisfied	Very Satisfied	

Should you decide to leave your current organisation and actively seek another which of the following factors would be important to you.

		Not Important at all	Little Importance	Important	Critically Important
16	Desire for global experience				
17	Better career prospects / development				
18	Exposure to leading technologies				
19	Total financial package				
20	Job security				
21	Different career direction				
22	Affirmative action policies				
23	Geographic location				
24	Work/ Life Balance				
25	Better working environment				
26	Emigration due to crime				
27	Emigration due to government policy				

9.3 Appendix C: Dataset

Question		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Gender	1	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1
2	Age	2	1	2	1	1	2	1	3	1	1	1	3	1	1	2	1	1	1	1	1	1
3	Race	4	4	4	4	4	4	4	4	4	4	1	4	4	4	4	4	2	4	1	4	4
4	Discipline	2	2	1	2	2	1	1	6	6	1	2	6	2	6	2	1	2	1	2	5	6
5	Working Exp	14	2.6	10	0	3.5	12	7	38	1.5	2	3.5	27	8	4	5	8	4	6	2	1	5
6	Sasol Exp	14	1.5	10	0	3.5	6	7	28	1.5	2	3.5	27	8	4	1	5	4	6	2	1	5
7	Same Field	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	How long intend staying	4	2	4	3	4	3	3	2	3	3	4	5	3	3	4	3	3	2	4	3	2
10	Satisfaction with current work	4	3	4	4	4	5	4	4	4	5	4	4	4	5	5	4	5	3	5	5	2
11	Satisfaction with Supervisor	4	2	4	4	4	4	4	5	4	5	4	1	4	5	5	3	4	4	3	5	4
12	Satisfaction with opportunities	4	4	4	3	4	3	4	4	3	4	4	1	4	4	4	4	4	1	3	5	4
13	Opportunity to use your full abilities	4	4	2	3	4	5	4	5	4	4	4	1	4	4	4	4	5	3	4	4	2
14	Satisfaction with Morale	3	4	3	3	1	3	4	5	3	4	4	2	3	3	5	2	4	3	3	4	2
15	Overall Satisfaction	4	4	4	4	4	5	4	5	4	4	4	2	4	4	5	3	5	3	4	5	3
16	Desire for global experience	3	3	2	3	3	2	2	3	2	3	2	2	3	3	3	2	3	3	3	4	3
17	Better career prospects / development	4	4	3	3	4	4	4	2	3	3	4	3	3	3	4	4	4	3	4	4	3
18	Exposure to leading technologies	3	3	3	3	3	3	3	2	4	3	3	2	2	3	4	3	4	3	4	4	3
19	Total financial package	3	3	3	4	4	3	3	3	4	4	4	3	3	3	3	2	4	4	4	4	2
20	Job security	2	2	3	4	4	3	3	2	3	2	3	3	4	3	3	2	3	4	3	1	2
21	Different career direction	2	3	3	2	3	2	3	2	2	2	3	3	2	3	1	2	3	2	2	2	2
22	Affirmative action policies	2	1	2	3	2	1	2	2	4	4	3	1	3	1	3	1	2	1	4	3	5
23	Geographic location	2	4	3	3	4	4	2	3	4	2	2	3	4	3	3	2	3	2	3	3	2
24	Work/ Life Balance	3	4	4	3	4	4	3	4	3	3	4	4	4	4	4	4	3	3	3	4	3
25	Better working environment	2	4	3	3	4	3	3	3	3	3	4	4	4	4	4	2	3	3	4	3	3
26	Emigration due to crime	1	4	3	3	3	2	2	2	4	2	1	2	3	3	3	1	3	3	1	4	5
27	Emigration due to government policy	1	2	2	3	3	2	5	2	4	2	1	2	3	3	3	1	3	3	1	3	5

Question		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1	Gender	1	2	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2
2	Age	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	2	1	1	1	2	1
3	Race	4	4	4	1	1	4	4	1	4	2	4	4	4	1	4	4	2	4	4	4	4
4	Discipline	1	2	2	2	1	2	2	2	2	1	1	2	2	1	6	2	2	6	2	2	2
5	Working Exp	4	0.7	2	8	4.5	18	1	6	2	0.6	10	8	15	6	20	15	4.5	4	9	9	6
6	Sasol Exp	4	0.7	2	1	1	18	1	5	2	0.6	9	8	6	6	20	15	4.5	4	4	7	6
7	Same Field	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2
9	How long intend staying	2	4	3	4	2	4	3	2	2	4	3	4	4	4	4	4	2	1	4	1	1
10	Satisfaction with current work	2	4	4	4	3	2	4	4	3	3	4	4	3	4	2	4	4	1	5	4	2
11	Satisfaction with Supervisor	4	4	2	5	2	3	4	3	4	4	4	3	4	3	4	2	3	2	4	4	3
12	Satisfaction with opportunities	3	4	2	4	1	2	4	4	2	3	5	4	3	3	1	4	2	2	4	3	1
13	Opportunity to use your full abilities	2	4	1	5	2	2	4	4	2	3	4	4	3	4	2	3	3	1	4	2	1
14	Satisfaction with Morale	3	4	1	4	3	3	4	3	1	5	4	3	3	3	2	4	3	3	4	1	3
15	Overall Satisfaction	2	4	2	4	3	2	5	4	2	3	4	4	3	4	2	4	4	1	5	3	1
16	Desire for global experience	3	3	2	3	3	1	3	3	4	2	3	3	2	1	2	3	2	2	1	3	1
17	Better career prospects / development	3	4	4	3	4	3	4	3	3	3	4	4	2	3	3	3	4	4	3	4	3
18	Exposure to leading technologies	3	4	2	3	3	3	3	4	2	4	2	2	3	3	3	3	4	3	3	3	3
19	Total financial package	3	3	4	3	2	2	3	3	4	4	3	3	3	4	3	4	4	3	4	3	3
20	Job security	3	2	2	4	3	3	4	4	3	4	2	3	3	4	4	3	4	3	3	3	3
21	Different career direction	3	2	3	4	2	2	3	3	2	2	3	2	2	4	3	2	3	3	3	2	4
22	Affirmative action policies	3	2	4	3	1	4	2	3	4	1	3	3	2	3	2	2	3	1	3	3	2
23	Geographic location	4	2	2	2	1	2	3	3	4	3	3	4	3	4	2	2	4	3	1	3	4
24	Work/ Life Balance	4	4	4	4	2	3	4	4	4	3	3	3	4	3	4	4	4	3	2	4	4
25	Better working environment	3	4	4	4	2	2	3	3	3	3	3	4	2	4	4	4	4	4	2	4	4
26	Emigration due to crime	3	2	3	2	2	4	3	1	3	4	2	4	2	1	2	3	1	2	4	4	2
27	Emigration due to government policy	3	2	4	2	2	4	2	1	4	3	2	3	2	1	2	3	1	2	4	4	2

Question		43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
1	Gender	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	1	2	1	1	2	1
2	Age	1	1	1	2	1	1	1	2	1	1	1	1	1	2	1	2	1	1	2	1	2
3	Race	2	4	2	4	4	1	2	4	2	4	4	1	2	4	4	4	1	2	4	2	4
4	Discipline	1	2	2	2	2	2	2	1	2	2	2	2	2	2	5	1	6	6	1	2	2
5	Working Exp	6	2	5	23	0.5	9	9	13	1.5	3	7	0.5	0	11	2	26	0.6	7	10	7.5	14
6	Sasol Exp	6	2	1.5	8	0.5	9	9	13	1.5	3	7	0.5	0	5	2	21	0.6	2	7	7.5	13
7	Same Field	2	1	1	2	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1	1	1
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	How long intend staying	1	1	2	3	4	4	2	2	4	2	2	3	4	4	4	5	4	3	1	3	5
10	Satisfaction with current work	2	2	4	5	4	3	5	2	3	4	3	3	4	2	3	5	4	4	3	4	4
11	Satisfaction with Supervisor	4	3	4	4	5	4	4	3	4	3	4	4	4	4	5	3	4	4	4	4	3
12	Satisfaction with opportunities	2	4	4	2	5	4	5	3	2	5	3	3	4	4	3	4	3	4	3	4	2
13	Opportunity to use your full abilities	2	6	4	4	5	4	4	4	3	4	3	2	3	4	3	4	3	4	3	4	4
14	Satisfaction with Morale	1	2	4	2	4	3	4	1	3	2	2	3	3	2	2	4	3	4	4	2	2
15	Overall Satisfaction	4	3	4	4	4	3	4	3	3	4	2	4	3	2	4	5	4	4	3	4	4
16	Desire for global experience	4	3	3	3	3	3	4	3	3	3	3	2	3	2	2	3	2	3	3	2	3
17	Better career prospects / development	4	4	3	3	3	4	3	3	4	3	4	3	4	4	3	3	4	3	3	4	4
18	Exposure to leading technologies	3	3	3	2	4	2	3	3	4	4	3	3	4	3	2	4	3	3	3	2	3
19	Total financial package	4	2	4	4	4	3	3	3	4	3	2	4	4	3	4	4	3	4	3	3	3
20	Job security	4	2	4	3	4	3	3	4	4	2	2	4	3	2	4	4	4	2	3	3	4
21	Different career direction	3	5	2	1	2	3	2	2	2	3	3	3	2	3	3	2	3	2	3	3	2
22	Affirmative action policies	4	3	1	3	3	1	3	2	3	1	1	3	3	1	3	4	3	4	2	2	4
23	Geographic location	3	4	4	3	4	4	4	4	4	4	3	3	4	3	3	3	3	4	3	3	3
24	Work/ Life Balance	4	4	4	3	4	4	4	3	4	3	4	3	4	3	3	2	3	4	4	4	3
25	Better working environment	4	3	3	2	4	4	4	3	3	3	3	3	3	3	2	2	3	3	3	4	2
26	Emigration due to crime	1	2	4	3	3	1	3	3	2	2	4	3	2	1	2	3	4	2	3	3	2
27	Emigration due to government policy	1	1	4	3	3	1	1	2	2	1	2	3	2	1	3	3	2	2	3	3	4

Question		64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	Gender	1	2	1	1	1	1	2	2	1	1	2	1	1	1	1	2	1	2	1	1	1
2	Age	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
3	Race	1	4	2	4	4	1	4	1	4	4	4	3	4	2	4	4	1	1	4	4	4
4	Discipline	2	2	2	2	2	1	2	6	1	2	2	2	2	6	1	2	2	2	6	1	1
5	Working Exp	14	3	6	6	4	4.5	4.5	1.5	7	6	1.5	0	7	0.5	1	4	5	0	6.5	10	3
6	Sasol Exp	5	3	5	6	3	1	4.5	1.5	3	3	0.75	0	6	0.5	1	4	0.7	0	6.5	5	1
7	Same Field	1	1	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	2	1	1
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1
9	How long intend staying	2	3	2	3	2	2	2	3	3	4	1	4	2	3	3	2	4	2	3	3	3
10	Satisfaction with current work	2	3	4	2	3	3	2	4	5	5	3	4	2	4	4	4	5	3	4	2	2
11	Satisfaction with Supervisor	4	4	3	5	2	2	3	4	5	5	1	4	2	5	4	4	5	2	5	5	4
12	Satisfaction with opportunities	2	4	2	2	4	1	5	3	5	5	1	3	3	4	4	5	3	3	4	4	4
13	Opportunity to use your full abilities	1	4	2	4	4	2	4	4	5	5	4	3	2	4	4	5	5	4	4	4	2
14	Satisfaction with Morale	1	2	3	2	3	3	3	4	4	5	2	4	2	3	3	5	4	1	4	4	2
15	Overall Satisfaction	2	4	2	3	3	3	2	4	5	5	2	4	2	4	4	4	5	3	4	4	3
16	Desire for global experience	2	3	4	3	2	3	2	4	3	3	2	3	2	4	3	4	4	4	3	2	3
17	Better career prospects / development	4	4	4	4	2	4	1	4	4	3	4	3	4	3	3	3	5	4	3	4	3
18	Exposure to leading technologies	3	3	3	3	2	3	1	4	2	2	3	4	3	4	3	4	4	4	3	4	4
19	Total financial package	3	3	3	4	3	2	2	4	3	3	3	2	3	2	3	4	5	3	4	4	3
20	Job security	3	4	3	2	3	3	1	4	3	3	3	3	3	3	2	4	5	3	4	3	3
21	Different career direction	3	2	2	3	2	2	1	3	2	3	3	2	2	1	4	2	5	2	2	4	2
22	Affirmative action policies	3	3	2	4	1	1	1	4	3	3	1	2	2	1	4	3	5	4	3	1	1
23	Geographic location	4	3	2	3	4	1	4	4	3	3	1	2	2	1	3	4	5	4	4	4	3
24	Work/ Life Balance	4	4	3	4	4	2	4	4	4	4	4	3	3	4	4	4	5	4	4	4	4
25	Better working environment	3	3	3	4	3	2	4	4	3	4	4	3	3	3	3	3	5	4	3	4	3
26	Emigration due to crime	1	1	3	2	4	2	1	3	3	4	2	3	2	2	4	3	5	2	3	1	3
27	Emigration due to government policy	1	1	3	3	4	2	1	3	3	3	2	2	2	2	4	3	5	2	3	1	3

Question		85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
1	Gender	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
2	Age	2	1	2	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	2	1	1
3	Race	4	3	4	4	2	4	1	4	4	4	4	1	3	4	4	1	4	4	4	2	3
4	Discipline	1	1	6	1	2	2	1	2	4	6	1	1	2	2	2	1	2	2	2	1	6
5	Working Exp	11	5	13	8	4	20	5	0	31	8	10	7.5	1	4.5	3	2	1.5	14	18	6.5	1.5
6	Sasol Exp	11	5	13	6	0.5	4	5	0	17	8	10	7.5	1	4.5	3	2	1.5	9	16	5.5	0.5
7	Same Field	1	1	2	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	1
8	Recommend Sasol as Employer	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	How long intend staying	2	3	4	4	2	4	2	3	3	3	1	3	3	4	2	3	2	3	4	4	4
10	Satisfaction with current work	3	4	3	5	2	2	5	3	1	3	2	5	4	4	3	3	4	2	4	5	5
11	Satisfaction with Supervisor	1	5	5	5	2	3	4	5	1	3	4	5	4	2	4	4	5	3	4	5	4
12	Satisfaction with opportunities	2	4	3	3	3	4	4	3	1	2	2	4	3	4	4	3	4	2	1	4	3
13	Opportunity to use your full abilities	2	4	2	4	2	2	4	4	2	2	2	4	2	4	4	2	3	2	2	4	4
14	Satisfaction with Morale	1	3	2	4	1	3	3	3	1	2	1	4	3	4	4	2	3	1	4	3	4
15	Overall Satisfaction	3	4	2	5	2	3	4	5	1	2	2	4	4	4	3	3	4	2	4	5	5
16	Desire for global experience	4	4	3	2	3	1	1	3	3	3	3	3	4	3	4	5	4	1	3	2	2
17	Better career prospects / development	3	4	2	4	4	2	4	3	3	4	3	4	4	3	3	5	2	3	4	3	2
18	Exposure to leading technologies	3	4	2	3	3	2	3	3	2	3	4	3	4	3	3	5	3	2	3	3	4
19	Total financial package	4	4	3	3	4	2	3	4	4	3	2	3	4	4	4	3	2	3	3	4	3
20	Job security	3	3	2	3	3	2	2	4	4	3	2	3	2	4	4	5	2	4	2	4	1
21	Different career direction	2	1	3	2	3	2	3	4	3	2	4	2	3	2	3	3	2	2	3	3	2
22	Affirmative action policies	1	1	4	4	3	2	1	4	4	2	3	3	1	1	4	5	3	1	1	3	1
23	Geographic location	3	4	3	2	3	3	3	4	3	4	1	3	4	3	3	3	4	3	2	3	1
24	Work/ Life Balance	3	4	4	3	3	4	3	4	3	3	4	3	4	3	4	3	3	4	2	4	1
25	Better working environment	4	4	2	3	4	4	3	4	4	3	4	3	4	3	3	3	3	4	3	4	2
26	Emigration due to crime	4	3	3	4	2	2	1	3	2	1	2	3	3	4	3	5	2	4	1	4	2
27	Emigration due to government policy	4	2	4	3	2	2	1	3	2	1	2	3	1	4	3	5	3	4	1	3	2

Question		106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
1	Gender	1	1	2	1	2	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1
2	Age	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Race	4	4	3	4	2	2	3	4	4	4	4	4	4	2	4	4	4	2	4	4	4
4	Discipline	1	2	2	2	2	6	1	2	1	1	2	2	6	1	5	2	1	2	2	2	2
5	Working Exp	5	0.7	2	1.5	2	5	6.5	2	1	0	3	4.5	3	0.5	6	9.5	4	2	1.5	1	2.5
6	Sasol Exp	2	0.7	0	1.5	1	5	6.5	1	1	0	3	2.7	2	0.5	6	7	4	1	1.5	1	2.5
7	Same Field	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1
9	How long intend staying	3	4	4	3	4	4	4	2	3	3	3	4	3	2	3	5	4	3	3	3	4
10	Satisfaction with current work	4	4	4	5	4	4	4	3	3	2	4	4	5	2	4	4	4	4	4	5	5
11	Satisfaction with Supervisor	5	5	4	5	4	4	4	5	3	3	4	5	4	3	4	3	5	4	5	4	5
12	Satisfaction with opportunities	4	5	5	5	5	4	2	3	3	4	3	4	4	4	4	4	5	1	5	4	5
13	Opportunity to use your full abilities	3	4	4	4	4	4	3	4	2	2	3	4	3	1	4	4	4	3	4	3	5
14	Satisfaction with Morale	2	4	2	5	4	4	2	2	2	4	2	3	4	4	2	4	4	4	3	1	5
15	Overall Satisfaction	4	5	4	4	5	4	3	2	4	2	4	4	4	2	4	4	5	4	4	4	5
16	Desire for global experience	3	2	3	4	2	3	2	4	2	4	4	5	4	2	2	4	3	2	3	2	2
17	Better career prospects / development	3	3	4	3	4	3	2	3	3	4	3	5	4	3	3	4	3	4	4	4	2
18	Exposure to leading technologies	2	3	3	3	4	3	2	3	3	3	3	5	4	4	2	4	3	2	4	4	4
19	Total financial package	3	3	4	3	2	4	2	4	3	3	3	5	3	3	4	3	3	4	3	4	3
20	Job security	3	4	4	2	4	3	2	2	3	2	3	5	3	2	3	3	3	3	4	2	2
21	Different career direction	2	2	3	2	2	3	3	3	3	3	3	5	4	3	2	3	3	2	3	2	2
22	Affirmative action policies	2	2	3	2	3	2	2	1	3	1	2	5	2	1	3	1	2	2	2	1	1
23	Geographic location	3	3	3	3	3	4	4	1	3	3	3	5	3	4	3	2	3	3	4	3	1
24	Work/ Life Balance	4	3	4	4	3	4	4	2	2	3	3	4	4	4	3	3	3	4	3	2	1
25	Better working environment	3	3	4	3	3	4	4	3	3	3	3	5	4	3	3	3	3	4	3	2	1
26	Emigration due to crime	3	2	2	2	1	3	1	4	2	2	2	5	2	1	1	1	3	4	3	1	1
27	Emigration due to government policy	3	2	2	2	1	2	1	2	3	2	2	5	3	1	1	1	3	2	3	1	1

Question		127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
1	Gender	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1
2	Age	1	1	2	1	1	2	2	1	2	1	1	1	1	1	3	2	2	1	1	1	1
3	Race	4	1	4	4	2	4	4	2	4	1	4	4	4	4	4	4	4	1	1	4	2
4	Discipline	6	1	2	2	2	1	2	2	6	2	1	2	2	2	2	2	2	2	3	6	2
5	Working Exp	4.5	4	12	9	5	18	13	5	22	7.5	4	1	6	3	38	11	19	1	1	4	5
6	Sasol Exp	4.5	1	12	9	5	18	0.5	5	2	7.5	2	1	5	3	15	10	6	1	1	4	5
7	Same Field	1	1	1	1	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	2
8	Recommend Sasol as Employer	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1
9	How long intend staying	4	4	4	1	3	4	4	2	4	2	4	4	4	1	5	1	2	2	3	2	5
10	Satisfaction with current work	4	3	4	3	1	4	5	2	2	3	4	4	4	4	4	2	1	2	4	4	5
11	Satisfaction with Supervisor	5	5	3	4	3	4	4	4	2	4	4	4	4	4	3	2	2	3	4	5	5
12	Satisfaction with opportunities	4	3	3	3	4	3	4	4	3	3	5	5	3	4	1	1	2	3	4	4	4
13	Opportunity to use your full abilities	4	2	3	3	4	4	4	2	2	2	4	4	5	3	4	1	1	2	3	3	4
14	Satisfaction with Morale	3	3	2	3	3	2	4	2	2	1	1	3	3	1	3	2	2	3	3	4	4
15	Overall Satisfaction	4	2	4	3	1	4	5	3	2	3	3	3	4	4	3	2	2	2	4	4	4
16	Desire for global experience	2	4	2	4	2	3	2	3	2	3	2	3	1	4	1	2	2	2	4	2	1
17	Better career prospects / development	4	4	3	4	3	3	4	4	3	4	3	3	2	4	2	3	4	3	3	3	4
18	Exposure to leading technologies	3	4	3	3	2	2	3	2	2	3	3	3	3	3	2	3	3	2	2	3	3
19	Total financial package	4	3	3	3	2	3	4	3	3	4	4	3	2	4	2	3	4	4	4	3	4
20	Job security	4	3	3	3	2	2	4	3	3	3	4	4	4	2	3	3	3	2	3	2	4
21	Different career direction	3	2	2	2	3	3	1	4	4	2	2	4	2	3	2	2	1	4	1	2	2
22	Affirmative action policies	2	3	3	3	2	1	1	2	4	2	1	3	2	1	3	3	3	2	1	2	1
23	Geographic location	2	1	4	4	4	3	3	3	3	4	3	4	3	4	3	3	2	2	4	2	4
24	Work/ Life Balance	4	3	4	3	4	4	4	3	4	4	4	4	4	4	2	3	3	3	4	3	4
25	Better working environment	3	4	3	3	3	4	2	3	4	3	3	4	3	4	2	3	3	3	3	3	3
26	Emigration due to crime	3	1	4	3	2	3	1	4	2	1	4	3	2	4	1	4	4	2	1	3	3
27	Emigration due to government policy	2	3	4	3	2	2	1	2	2	1	4	3	2	4	1	4	3	2	1	3	3

Question		148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168
1	Gender	1	1	2	1	2	2	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2
2	Age	1	3	1	3	1	1	2	1	1	3	1	1	1	2	1	1	1	2	2	1	1
3	Race	2	4	2	4	2	4	4	4	3	4	2	4	4	4	1	4	4	4	4	2	2
4	Discipline	2	1	2	2	2	1	2	2	2	4	6	2	2	6	2	2	1	6	2	4	3
5	Working Exp	9	39	3	34	4	3	14	6	4	33	3	8	4	10	2.7	7	12	14	12	6	0.8
6	Sasol Exp	9	39	2	34	4	3	14	6	0	25	3	8	1	10	2.7	7	12	12	12	3	0.8
7	Same Field	1	1	1	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1
8	Recommend Sasol as Employer	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	How long intend staying	4	5	1	2	2	3	3	3	3	5	2	2	4	4	2	4	4	2	4	2	4
10	Satisfaction with current work	5	5	2	4	3	4	4	4	4	3	4	4	3	4	3	3	5	4	4	3	2
11	Satisfaction with Supervisor	5	4	2	3	4	3	4	4	4	3	4	3	5	4	4	4	5	3	3	2	3
12	Satisfaction with opportunities	4	5	2	2	4	5	5	5	4	2	3	2	5	4	2	4	3	2	3	2	2
13	Opportunity to use your full abilities	5	5	1	4	4	4	4	4	4	3	3	3	4	4	3	4	4	2	3	3	2
14	Satisfaction with Morale	3	3	1	1	4	3	3	3	4	4	3	3	4	3	4	6	4	2	2	3	3
15	Overall Satisfaction	4	4	2	4	4	4	4	4	4	3	4	4	4	4	4	4	5	3	4	3	2
16	Desire for global experience	2	3	3	3	1	2	3	3	3	2	3	4	3	2	3	2	2	3	2	2	4
17	Better career prospects / development	3	2	4	2	3	3	3	3	4	3	3	3	4	2	4	3	3	4	3	3	4
18	Exposure to leading technologies	3	4	3	3	2	2	3	4	3	3	3	3	3	3	4	3	3	3	3	3	3
19	Total financial package	4	3	3	4	3	4	4	3	3	4	3	4	3	4	3	3	2	4	3	3	3
20	Job security	4	2	3	2	3	3	2	3	4	3	3	3	3	4	2	4	3	1	3	3	4
21	Different career direction	2	3	2	2	3	2	1	3	3	3	2	2	3	1	3	3	2	4	2	3	2
22	Affirmative action policies	1	2	4	3	2	3	3	2	2	2	2	3	2	1	3	3	1	3	3	3	2
23	Geographic location	3	3	3	4	4	4	3	3	3	3	3	3	3	3	2	2	1	1	4	2	2
24	Work/ Life Balance	4	4	4	4	4	4	4	4	4	4	4	4	3	3	2	3	4	3	4	4	3
25	Better working environment	3	3	4	2	4	3	4	3	4	4	3	2	3	3	2	3	2	3	3	3	3
26	Emigration due to crime	2	2	2	1	3	4	3	4	3	3	2	4	3	2	1	2	1	4	4	3	2
27	Emigration due to government policy	2	2	2	1	3	4	4	4	3	3	3	3	3	2	1	2	1	3	4	2	3

9.4 Appendix D: NCSS Reports

9.4.1 Analysis of Variance Report – Comparison of Race Groups

Response Motivation_Score

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	-4.9473	0.000001	Reject
Kurtosis Normality of Residuals	2.4787	0.013186	Reject
Omnibus Normality of Residuals	30.6194	0.000000	Reject
Modified-Levene Equal-Variance Test	0.2229	0.637458	Accept

Kruskal-Wallis One-Way ANOVA on Ranks
Hypotheses
Ho: All medians are equal.
Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	1	0.2702374	0.603173	Accept Ho
Corrected for Ties	1	0.2704653	0.603020	Accept Ho

Number Sets of Ties	39
Multiplicity Factor	3996

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
Black	56	4577.50	81.74	-0.5198	0.69
White	112	9618.50	85.88	0.5198	0.71

9.4.2 Analysis of Variance Report – Comparison of Age Groups

Response Motivation_Score

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	-4.9712	0.000001	Reject
Kurtosis Normality of Residuals	2.5355	0.011229	Reject
Omnibus Normality of Residuals	31.1419	0.000000	Reject
Modified-Levene Equal-Variance Test	0.0162	0.983890	Accept

Kruskal-Wallis One-Way ANOVA on Ranks
Hypotheses
Ho: All medians are equal.
Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	2	1.312567	0.518776	Accept Ho
Corrected for Ties	2	1.313674	0.518489	Accept Ho

Number Sets of Ties	39
Multiplicity Factor	3996

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
20-35	129	11189.00	86.74	1.0838	0.71
35-50	32	2424.00	75.75	-1.1310	0.685
50-65	7	583.00	83.29	-0.0675	0.71

9.4.3 Analysis of Variance Report – Comparison of Males and Females

Response Motivation_Score

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	-4.8731	0.000001	Reject
Kurtosis Normality of Residuals	2.3232	0.020166	Reject
Omnibus Normality of Residuals	29.1448	0.000000	Reject
Modified-Levene Equal-Variance Test	0.1923	0.661562	Accept

Kruskal-Wallis One-Way ANOVA on Ranks
Hypotheses
Ho: All medians are equal.
Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	1	8.685663E-02	0.768212	Accept Ho
Corrected for Ties	1	8.692989E-02	0.768117	Accept Ho
Number Sets of Ties	39			
Multiplicity Factor	3996			

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
Female	37	3049.50	82.42	-0.2947	0.71
Male	131	11146.50	85.09	0.2947	0.7