

# Re-engineering an Engineering Career

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Dissertation submitted in partial fulfilment of the requirements for the degree *Master of Engineering* at the Potchefstroom Campus of the North-West University

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**NOVEMBER 2009**

## **Acknowledgements**

With this I express my sincerest gratitude and special appreciation to:

My dear wife, Wanda, who has stood by me with her invaluable love, encouragement, support and understanding.

Prof. J. Coetzee, for planting in me the seed for writing this dissertation.

My study leader, Prof. P. Stoker, for his invaluable assistance, support, guidance and encouragement that made this dissertation possible.

Elize van der Westhuizen and Barbra Mahlobogoane for the assistance they provided during the literature study.

Zita Kemp for her help and insight on the questionnaires for the engineering professionals.

My Sasol colleagues and friends for their support.

The Lord, who gave me the ability and endurance to complete this dissertation.

## **Abstract**

Re-engineering is an ongoing process of change that continues throughout a person's life. It includes all aspects of life, even your career and lifestyle as you continue to grow as an individual. There is no satisfaction or of self-fulfilment in clinging to a career and its accompanying lifestyle which you have outgrown. To change this, people should approach career planning and management from a different point of view. The making of a career and lifestyle change is something most people find horrendously difficult. Making effective career and lifestyle changes incorporating your dream and passion should be seen as a challenge.

There is a common denominator in this whole discussion which influences the decisions that people make when it comes to choosing their careers. It boils down to wanting to make a success of their lives and the fear of being a failure. But how does one define success? Success can mean different things to different people. For some, monetary reward is a measure of success. Yet others have multiple definitions of success. People should first determine their own definition of success before deciding what career they would like to pursue. Many of us make this decision based on what other people, such as our parents or friends, perceive as success.

Exploring career choices should be a positive undertaking for high school students. A thoughtfully constructed career choice process will provide a meaningful, productive and satisfying framework for making quality career choices. Some students do not begin to explore real career possibilities until after graduation. Tertiary education institutions should provide students with relevant information earlier in their studies. Institutions could be more proactive, giving students information that they could test and use in their daily studies and ultimately apply to their choice of career.

Young adults turn to their career guidance counsellors in their schools for advice on determining what career paths they should follow. The problem within the South African public educational system currently is that there is inadequate provision for career guidance or assessment of individual learners. The majority of young people leave school with only a vague knowledge of employment opportunities and with little insight concerning the career direction most appropriate to their abilities, interests and personality.

Believing that their only chance of future employment is the attainment of some sort of qualification, they are pitch-forked into tertiary education without any consideration given to the appropriateness of their chosen qualification to their abilities, interests and personality. This results in a large percentage of employees who feel trapped in an inappropriate career. This leads to low morale, disinterest and de-motivation, translating into poor performance and bad service levels. In the end unhappy employees either leave of their own free will or need to be dismissed. In either case, the cost to the business is substantial.

When it comes to making a career change in order to follow your dream and passion, people are normally shackled by the comfort and security they experience in their current jobs and the fear of failing should they risk following their dream. The decision to make a career change should follow a formal process in order to enable a person to make an informed and responsible career change.

The value to the researcher personally is that he will have a better understanding of why he decided to change his career. Is it a real choice or is it only a pipe dream that will eventually fade away because of the challenges facing him in the future?

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## CHAPTER 1: INTRODUCTION

*“There are two primary choices in life: to accept conditions as they exist, or accept the responsibility for changing them”.*

*- Denis Waitley*

### **1.1 Introduction and background to the study**

One of the biggest choices people face in life is choosing the right career path. This statement is also true for engineering professionals.

Parents and children often have different ideas about careers. It is not uncommon that there is a gap between the aspirations, or the ideas, that some parents hold regarding a suitable career for their children, and what the children see as their best prospects or passion. One of the reasons may be because of generation differences. What was perceived as a good career for the parents might not seem so attractive to the child (Politicalguru-ga, 2005).

Politicalguru-ga (2005) also states that another reason could be the nature of the relationship between the parents and the child. When children become curious about pursuing a particular career, parents who feel that they should not interfere may appear detached to their children, causing miscommunication between the two parties. The degree to which parents are involved with the career plans of their children might be an added cause. According to Salami (2007) such involvement by parents is done by giving or providing information on the choice of career that their children may want to follow. Information regarding the career paths of their children includes the extent to which parents give encouragement, responsiveness, approval and financial support.

In addition, new professions and occupations keep developing, while others phase out. An example of an emerging new type of career is protean careers

which are value-driven and are influenced by individual values such as citizenship behaviours and altruistic standards (Vigoda-Gadot and Grimland, 2008: 333). Some choose a career path that promises a large income and the value and status that society places on a career. Others choose a career because of the bursaries they can receive for further higher education and make life-changing decisions in haste. "Only one in five learners leaving grade 12 in 2009 will enter one of South Africa's higher education institutions" according to Higher Education South Africa (HESA). HESA interim chief executive Piyushi Kotecha stated that Grade 9 learners needed to choose subjects that suit their intellectual interest and desired career paths, including the option of higher education study (Kgosana, 2005).

## **1.2 Problem Statement**

One needs to understand oneself. Knowing your own abilities and understanding what is important to you regarding a career are crucial when making a decision that will help ensure job satisfaction. The goal should be to identify career fields that relate to and make the best use of the individual's interests, values, and strengths.

Career changes can be some of life's most complex and confusing decisions. Leaving the security of the engineering profession to pursue a new course can be scary, to put it mildly. Changing jobs is infinitely more complicated than many of the professional decisions we tackle in the course of our career life. Time and information are behind every good decision. Unfortunately people rarely have the luxury of infinite time and unlimited information and are sometimes forced to make tough calls.

According to Kerlin (2004) one of the most common causes of a desire to change career, particularly among experienced workers, is job dissatisfaction and declining morale in the workplace, as well as inadequate management

practices and ineffective leadership. If the work climate is stressful, it often spills over into one's personal life and inevitably affects family and friends.

Changing jobs is an intricate process that affects every member of one's family (Carman, 2004). In addition to trying to find the right niche in your professional life, you must consider whether you are willing to relocate, disrupt a spouse's career and children's schooling and change one's lifestyle to accommodate a potentially lower salary.

Regardless of whether one considers career alternatives from the perspective of an engineer or from any other profession for that matter, it is helpful to begin by thinking about the inevitable question: "What do you do?" This simple question forces one to confront career choices, and if you do not like this question, maybe it is because you do not like the answer (Carman, 2004).

*Somewhere else you'd rather be?* by Barbara Quinn includes stories of a number of people who struggled with the decision to change careers, inevitably did and were successful afterwards. She wrote of one engineer in a little town in Saskatchewan (is a Canadian province) who got involved in selling expensive box seats and sponsorships for world open tennis events in Shanghai, China. If a person's choices align with who they are, and what they are about, chances are they will find themselves leading a fulfilling life (Quinn, 2001).

Some people know ever since they are very young what they really want to do one day and yet so many of them do not follow their dreams due to certain aspects in their lives (e.g. lack of study funds) which frustrate them in following their dreams. They then start to think practically instead of creatively and settle for a career in something which, at that moment, seems more attainable and more convenient.

There are people who have the ability later on in their lives to break away from the comfort zones they have created for themselves and become creative in finding ways to realise their dream and then start working towards it. Some people cultivate other interests and their characters change as they grow with consequential career changes and the development of new goals.

The question then arises: If a person, more specifically a person following a career in the engineering profession, desires a career change, how should this be done?

Based on the above problem statement two primary objectives are formulated:

- I. Evaluate whether the time and money invested in an engineering profession, in the first place, is a sustainable investment in the event that an individual makes a career change at a later stage in his/her working life.
- II. Obtain a generalised process model for re-engineering an engineering career.

In order to achieve the primary objectives, the following secondary objectives should be realised:

- to conduct a survey in order to determine why current students choose a career in engineering;
- to conduct a literature review in order to identify the factors that play a role in initial career choices;
- to identify the factors that could cause individuals to make subsequent career changes; and to measure the perceptions, with regard to their initial career choice and the amount of time and money expended on their original career choice, of those individuals who are in the engineering profession.

### **1.3 Outline of this study**

This study consists of six chapters:

#### **Chapter One: Introduction**

The introduction and background to this study are provided in this chapter, with reference to the problem statement, the research objective and the expected value of the research.

#### **Chapter Two: Literature review**

Chapter 2 is centred on the theoretical objectives and literature overview. Concepts such as career, career management and career development are discussed.

#### **Chapter Three: Experimental design**

In this chapter the research design and method are discussed. These include sampling techniques, methods of data collection and data analysis that was used in the study.

#### **Chapter Four: Results and Findings**

The focus of chapter 4 is on the analysis, interpretation and evaluation of the findings of the study.

#### **Chapter Five: Re-engineering an engineering career – A case study: Marius Odendaal**

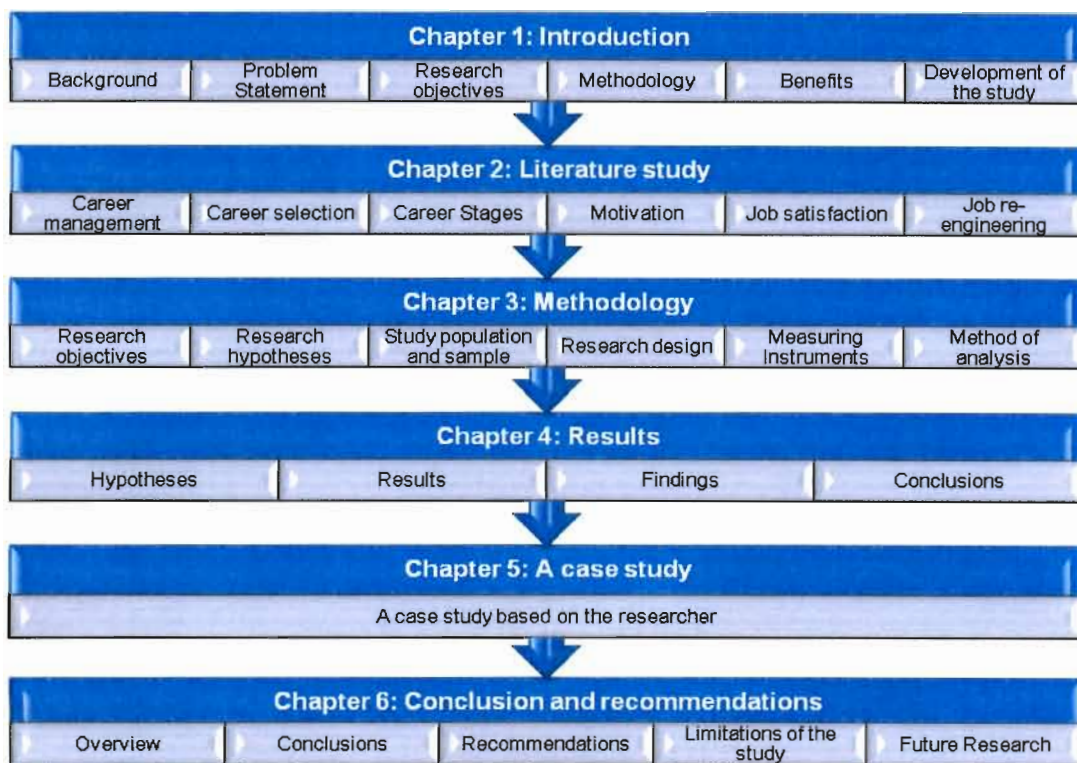
In this chapter the researcher analysed and positioned his own situation in the context of the dataset obtained from the experimental investigation. The chapter proceeds by telling the researcher's own story of why, where and how he started his career, how he reached the decision to change his career, and how the decision was implemented

## Chapter Six: Conclusions and Recommendations

The conclusions and recommendations which resulted from the study are presented in this chapter.

Figure 1.1 facilitates understanding of the outline of this study.

Figure 1.1: Outline of the study



Source: Author's own

### 1.4 Summary

Choosing a career is one of the most important decisions that a person will make during his or her lifetime. The choice of career is the first step towards the thirty to forty years that will form your "working" life. As work takes up such an immense part of our total lifetime, the importance of the right choice of

career cannot be overstated. It is therefore essential to understand what influences a person's choice of career as well as the guidance or support available to assist a person with this important decision. In order to better understand the concept of a career, the following chapter will look at the definitions of a career, career development and career management.

## CHAPTER 2: LITERATURE STUDY

*“The life-fate of the modern individual depends not only upon the family into which he was born or which he enters by marriage, but increasingly upon the corporation in which he spends the most alert hours of his best years”.*

*- C. Wright Mills*

### 2.1 Introduction

In the previous chapter the problem statement and the objectives of this study were presented. This chapter focuses on the theoretical objectives and literature study. Concepts such as career, career management and career development will be discussed.

### 2.2 Career

What is a career? Jones, *et al.* (1998: 354) state that a career is the sum total of work related experiences throughout a person's life. Careers encompass all of the different jobs people do throughout their lives and the different organisations they work for. One can have a sporting career or a musical career without being a professional athlete or musician, but most frequently "career" in the 20th century referenced the series of jobs or positions by which money for living is earned.

#### 2.2.1 Clarification of the concept “career”

According to Clark (1992) a career can be defined as a sequence of jobs or activities, planned or unplanned, involving elements of advancement, commitment and personal development over a period of time.

It is the sequence of work-related positions a person occupies throughout that person's vocational life (Mathis & Jackson, 1997: 327).

Grobler, *et al.* (2006: 246) defines a career as a sequence of jobs held during a person's working life.

A career is a sequence of positions occupied by a person during the course of a lifetime. A career consists of a sense of where one is going in one's working life (Cascio, 1998: 339).

Flippo (1984: 248) describes a career as a sequence of separate but work related activities that provide continuity, order, and meaning in a person's life.

A career is a lifelong sequence of jobs integrated with the attitudes and motives of the person as he or she engages in these work roles (Beach, 1985: 232).

The researcher defines, for the purpose of this research work, a career as:

*The sum of all jobs, tasks and experiences that a person undergoes and undertakes during a typical working lifetime. A career is not simply about what a person does for a living, but about what has been done in the past, what is being done now and what might be done in the future in pursuit of gainful employment, including the transition phase between different employments.*

### **2.2.2 Career selection**

The selection of a career is one of the most critical decisions an individual will make in his or her life. Many factors affect how and why an individual makes a specific career choice. Factors that can influence one's choice of profession include: family expectations, interests, values, skills, personality and social stereotypes. According to Mathis *et al.* (1997: 327), there are four general individual characteristics that affect how people make career choices:

- I. **Interest:** People tend to pursue careers that they believe match their interests.
- II. **Self-image:** A career is an extension of a person's self-image.
- III. **Personality:** This factor includes an employee's personal orientation and personal needs.
- IV. **Social background:** Socioeconomic status and the education and occupation level of a person's parents are some of the factors included in this category.

It is important to look at all the factors when choosing a career, because initial career choices and subsequent career moves do not occur in a vacuum. A person will initially need to discuss career choices and the available options with parents, career guidance teachers at schools and even professionals in the industry. When choosing a subsequent career it is a good idea to acquire a mentor who is in the same career, because it is a great way to learn new avenues to achieve career goals.

### **2.2.3 Planning, developing and managing the ultimate career**

Choosing and getting the right career is one of the most decisive of life's ventures. It is therefore important to plan, develop and ultimately manage your career so that the career life is successful, meaningful and satisfying.

It is rare that a person who really seeks that ultimate job would choose a career in the beginning of their working life and stick to that plan for the rest of his career life. A person is ultimately responsible for the chosen career and it is important that you know what you are good at and what you want to do with your life. A person should develop the attitude and skills to take charge of his own career. In the end, the goal is to find an opportunity for work related to what one loves to do and what one has always dreamed of doing.

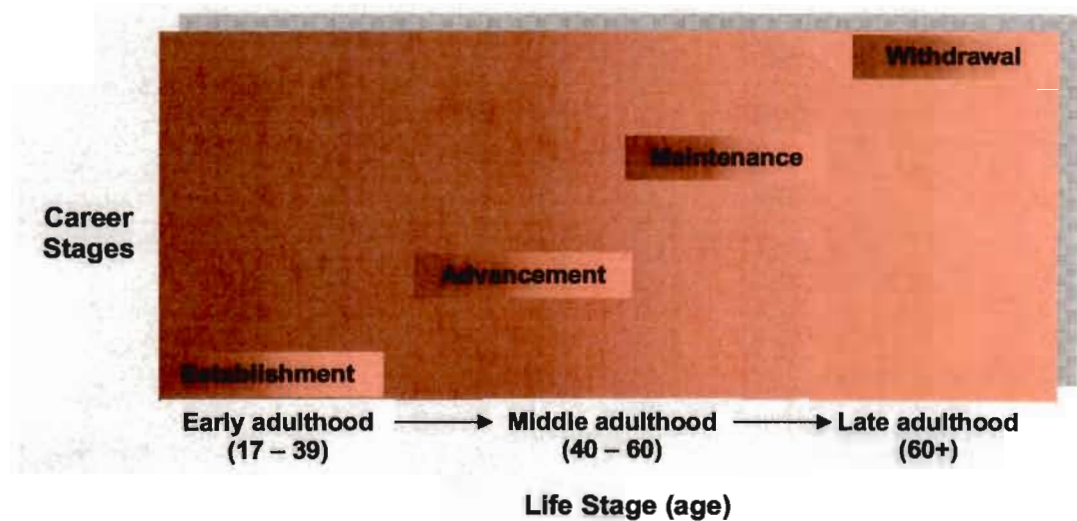
#### 2.2.4 Career stages

During their working lives, individuals generally progress through a series of career stages (Nelson and Quick, 2006:571). According to Grobler *et al.* (2006:251) it should be recognised that individuals' needs change as they progress to the next stage and that a unique set of opportunities, problems and circumstances manifest at each stage. These stages should be taken into account during career planning and career development. Grobler *et al.* (2006:251) describe the four career stages through which people generally progress as follows:

- I. **Establishment:** This is the first career stage. At this stage of an individual's career, the person faces anxiety and uncertainty regarding performance, potential and competency and therefore guidance is necessary at this stage.
- II. **Advancement:** At this second stage the person demonstrates competence and knowledge of the culture of organisational life and less guidance is necessary.
- III. **Maintenance:** During the third stage people generally achieve their highest advancement. To those individuals who have achieved their career goals this stage brings a lot of satisfaction. On the other hand, those individuals who have not been particularly successful or who have failed to reach their career objectives find this career stage frustrating and disappointing. Individuals falling in this last group must consider new directions.
- IV. **Withdrawal:** The final stage begins when an individual retires or moves on to a new career. More time is being devoted by the individual to leisure and family during this stage. Due to the loss of job identity and social contacts the individual might experience feelings of frustration, stress and boredom.

Nelson and Quick (2006:572) illustrate these career stages in the following career stage model.

**Figure 2.1: The career stage model**



Source: Nelson and Quick (2006:572)

(It must be noted that the age ranges in the model are approximates and that the career transitions differ from one individual to another).

### **2.3 Career planning**

Career planning allows individuals to be developed and promoted in areas where their full potential will be realised (Werner, *et al.* 2007:386). According to Vigoda-Gadot and Grimland (2008:334) individuals must plan their career cautiously in order to be successful at the different career stages. This should be done by making the most of the investment made in education and experience gained from earlier career stages.

Zajas and Jajas (1994) state that effective career planning and management begin with the self and need assessment process, which precedes goal

setting. As an ongoing, dynamic process, career planning should enable employees and managers to be cognisant of individual and organisational needs and to consider the changing organisational world and any personal life cycle changes when formulating goals.

The key advantages of career planning consist of: working toward progressive goals which assure a higher degree of participation, motivation, commitment, and productivity among those managers, organisations, and employees who are successful in developing and achieving effective career plans.

### **2.3.1 Clarification of the concept “career planning”**

Byars and Rue (2004: 436) define career planning as the process by which an individual formulates career goals and develops a plan for reaching such goals.

Mathis *et al.* (1997: 18) state that career planning identifies paths and activities for individuals as they develop within an organisation.

Career planning is the process by which individuals identify future career goals and the paths to reach these goals (Treasury Board of Canada, 1999).

Beach (1985: 234) defines career planning as the personal process of planning one's working life. This includes evaluating one's abilities and interests, examining career opportunities, setting career goals, and planning appropriate developmental activities.

Based on the above definitions, the researcher defines, for the purpose of this research work, career planning as:

*The process by which an individual identifies certain career ambitions and goals and maps paths to achieve these ambitions and goals.*

### **2.3.2 Career planning explained**

According to Werner *et al.* (2007:386) career planning basically consists of the following procedures:

- determining where you are
- determining where you want to be
- developing actions to get there

Career planning is beneficial to both organisations as well as individuals. It enables employees to identify skills and skill deficiencies while organisations can use this information to plan training and development actions (Nelson *et al.*, 2006:623). On the other hand, poor career planning might lead to the individual feeling confused and stressed (Werner *et al.*, 2007:319).

## **2.4 Career development**

There is a close relationship between career planning and career development. Lussier (2002:550) describes career planning as “the process of setting career objectives and determining how to accomplish them” and career development as “the process of gaining skill, experience, and education to achieve” the set career objectives from the career planning process.

### **2.4.1 Clarification of the concept “career development”**

Career development is defined as an ongoing, formalised effort by an organisation that focuses on developing and enriching the organisation’s human resources in light of both the employees’ and organisation’s needs (Byars *et al.*, 1997: 256).

Gerber, *et al.* (1990: 236) states that career development is a formal approach taken by the enterprise to ensure that employees with proper qualifications and experience are available when they are needed by the enterprise.

Career development is defined by Beach (1985: 234) as the planning of one's career and the implementation of career plans by means of education, training, job search and acquisition, and work experiences.

Based on the definitions above it can be concluded that career development is:

*A lifelong endeavour by an individual to develop skills, talent and knowledge to stay marketable in any job market and changing organisational dynamics.*

#### **2.4.2 Implementing career development**

According to Byars *et al.* (1997: 262) successful implementation of a career development programme involves the following four basic steps at the individual level:

**Table 2.1: Steps for implementing a career development programme**

<b>Step</b>	<b>Description</b>
1.	People need to analyse their abilities, interest and career goals. Most people fail to do this simply because they just do not take the time to do it. Usually big organisations can provide structures and impetus to assist employees in self assessments. An individual's self assessment should not be limit only by current resources and abilities. Career plans normally require that the individual acquire additional training and skills. Self assessment should be based on facts and realities. This means identification of personal strengths, weaknesses and even financial resources available.
2.	The most frequently used source for organisational assessment is the performance appraisal process. Other sources of information include the individual's personnel profile which reflects information such as education, previous positions held and work experience.
3.	To set realistic career goals, an individual must know the options and opportunities that are available. The organisation can contribute to facilitate such awareness, by advertising job vacancies and identify possible paths of advancement within the organisation.
4.	Career counselling is the activity that integrates the different steps in the career planning process. Career counselling may be performed by the employee's manager, human resource practitioner or a combination of the two. This is done to establish the skills level and experience of the employee and to set realistic goals and plans for the employee to make the employee more productive and gratified.

Source: Byars *et al.* (1997: 262)

### **2.4.3 Career development responsibilities**

The question can be posed: Who is responsible for an individual's career development? According to Robbins, *et al.* (2004:359) career planning is increasingly being done by individual employees due to the fact that flattened hierarchies have reduced promotion opportunities, consequently the responsibility to keep one's skills, abilities and knowledge current has shifted to the individual.

The individual is primarily responsible for career management whereas the organisation is responsible for creating a more employable employee by means of self development. The table below is a breakdown of the career development responsibilities of the individual and the organisation.

**Table 2.2: Career development responsibilities**

<b>Individual Responsibilities</b>	<b>Organisation Responsibilities</b>
<ul style="list-style-type: none"><li>• Know yourself</li><li>• Manage your reputation</li><li>• Build and maintain network contacts</li><li>• Keep current</li><li>• Balance your specialist and generalist competencies</li><li>• Document your achievements</li><li>• Keep your options open</li></ul>	<ul style="list-style-type: none"><li>• Clearly communicate the organisations goals and future strategies</li><li>• Create growth opportunities</li><li>• Offer financial assistance</li><li>• Provide the time for employees to learn</li></ul>

Source: Robbins (2003: 497)

Career development is the responsibility of the individual with some assistance from the organisation. The changing nature of organisations and the impact of technology are changing the fundamental social conditions of work and thus there is a greater need for individuals to focus on their own career development.

## 2.5 Career paths

Byars *et al.* (1997: 265) define career paths as a sequence of developmental activities involving informal and formal education, training and job experience that help make an individual capable of holding a more advanced job in the future.

Career paths are not simply a means to get to the top of the employment ladder in an organisation; it is a technique that addresses the specifics of progressing from one job to another in an organisation. Lussier (2002:556) argues that career paths are in a sense career plans and it is therefore easier to develop career plans in organisations that have career paths. Consequently following a career path is most useful if used as part of the overall career planning process.

According to Cascio (1998: 355) career paths should:

- represent real progression possibilities, whether lateral or upwards without implied normal rates of progress or forced specialisation in a technical area;
- be tentative and responsive to change in job content, work priorities, organisational patterns and management needs;
- be flexible, taking into consideration the compensation qualities of a person who influences the way that work is accomplished;
- specify the skills, knowledge and other attributes required to perform effectively at each position along the paths and specify how they can be acquired.

A career path is not a set of rules that has to be followed to the letter until retirement. There is a growing need for individuals to have a dynamic career path that incorporates continual learning and the gaining of multiple sets of skills, permitting, in consequence, multiple careers.

## **2.6 Career management**

People have different ideas of what a career should mean to them. To some a job is just a means to earn a living and they may feel that work and enjoyment are totally incompatible. Other people not only seek job satisfaction but also a good salary and benefits (Grobler *et al.*, 2006:245).

Activities undertaken by the organisation and the individual which are aimed at planning and managing employees' careers are referred to as career management (De Vos, *et al.*, 2008:160).

### **2.6.1 Clarification of the concept "career management"**

Career management is defined as the process of designing and implementing goals, plans and strategies that enable human resource professionals and managers to satisfy workforce needs and allow individuals to achieve their career objectives (Grobler *et al.*, 2006: 246).

According to Pieters (2004: 66) career management is the process whereby individuals collect information (their values, interests, skills) which helps them to identify a career goal, whereafter they engage in strategies to achieve their career goals.

Career management is the process that plans and shapes the progression of individuals within an organisation in accordance with the organisational needs and objectives, employees equal performance potential and their preferences (South Africa, Public Service Commission, 2000).

Career management refers to the policies and practices established by the organisation to help employees plan and develop their careers effectively (Treasury Board of Canada, 1999).

Career management can be defined as the ability to actively manage one's working life in a rapidly changing environment (Anon, 2006).

Based on the above definitions, the researcher defines career management as follows:

*Career management can be seen as a set of tools used in planning and shaping the progression of an individual's working life in an ever changing job market.*

### **2.6.2 Career management responsibilities – Organisation or Individual?**

Can an organisation be held responsible for an individual's career management and planning? Career management can be divided into two parts: individual career management and organisational career management. De Vos *et al.*, (2008:161) describe individual career management as "the proactivity employees show with respect to managing their own careers" and organisational career management as "those activities undertaken by the organisation in order to plan and manage the careers of its employees".

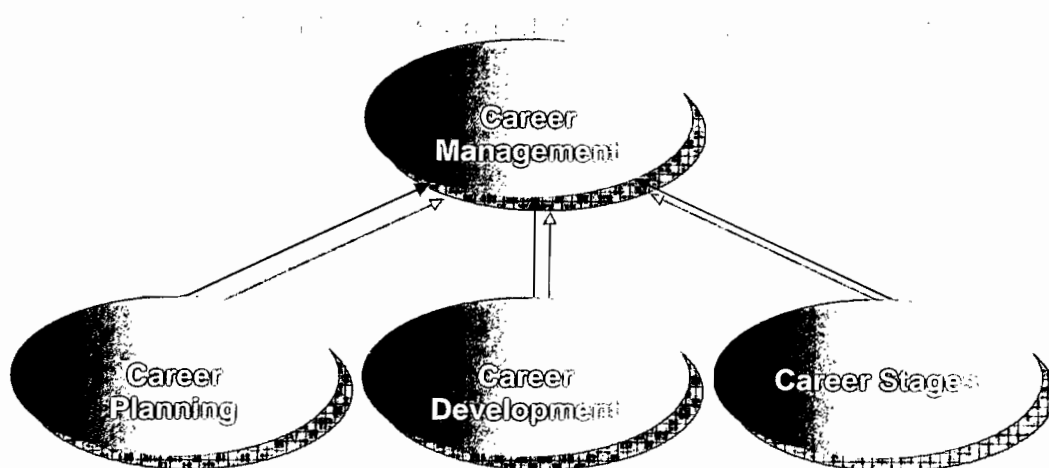
According to Grobler *et al* (2006:249) the success of an organisation's career management efforts is determined by the following factors:

- Career management must be planned.
- Career management must be supported by top management.
- Not one of the following must be omitted or neglected by administrators: organisational career planning, individual career planning, integration of organisational and individual plans, implementation and evaluation.
- A career match must be found between the employer's plans for the employee and the employee's personal aspirations.

An organisation can provide opportunities for self development in line with the individual's skills and abilities, but cannot force that individual to further his or her marketability in the job market. Individuals should take charge of the management and development of their own careers because of the increasing rate of change of the organisation (globalisation) and in the knowledge and skills they need to perform their jobs.

“Self” career management is important for the development of oneself. When you think about professional and personal growth by means of promotions within the organisation, your future is placed into someone else’s hands. If, however, you believe in controlling your own destiny, you think of professional and personal growth in terms of self career development and self career management.

**Figure 2.2: Elements of career management**



Source: Author’s own

For some individuals going to work is just the means to an end - the salary that they receive at the end of the month. These individuals are happy to do the same work every day and do not like any changes that might take them out of their “comfort zone”. Other individuals need challenges and feel the need to grow. What an individual ultimately wants to do is, however, a personal choice. Although the organisation may offer study aid and courses for personal and career development it is still the individual’s own responsibility to take control of his/her own life and career and the growth that it can offer.

## **2.7 Motivation**

The study of motivation is a science in itself and has always been a complicated topic. It includes aspects of human psychology, social and cultural factors as well as individual values and beliefs. According to Regina M Clark (2009:43) people are motivated for their own reasons.

It is important to be motivated and satisfied with regard to one's job. We spend at least eight hours a day for 50 years of our lives at work and it impacts on every area of our lives. We as humans need to discover the career that complements perfectly that which we want to do as well as that which we do well.

Motivation is what drives an individual through life – this is the reason why a person does certain things in life, be it satisfying basic needs like eating or sleeping or the higher needs like achievement or recognition.

### **2.7.1 Clarification of the concept “motivation”**

Motivation is defined by Hodgetts and Luthans (2000:372) as “a psychological process through which unsatisfied wants or needs lead to drives that are aimed at goals or incentives”.

According to Werner *et al.* (2007:69) motivation is “the force within us that arouses, directs and sustains our behaviour”.

Nelson *et al.*, (2006:150) define motivation as “the process of arousing and sustaining goal-directed behaviour”.

Mathis *et al.* (1997: 63) state that the behaviours employers look for in individuals rest on motivation, and explain that motivation is the desire within

a person which causes that person to act. People usually act for one reason: to reach a goal. Mathis *et al.* (1997) thus define motivation “as a goal-directed drive and, as such, it seldom occurs in a void”.

The researcher defines motivation as:

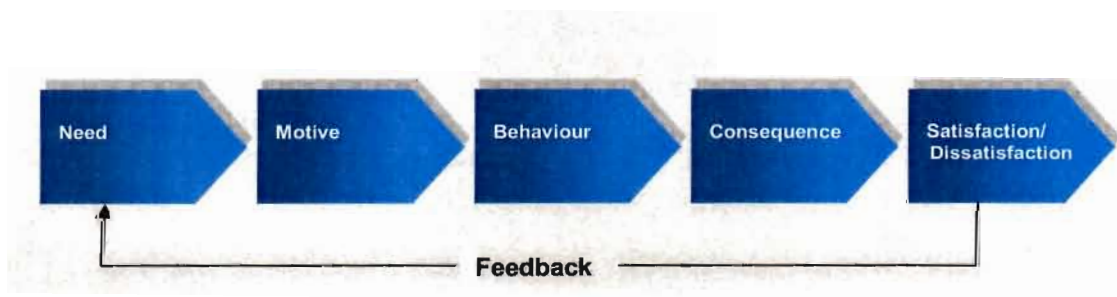
*An internal aspiration which moves an individual towards the realisation of goals.*

### 2.7.2 The motivation process

Smit *et al.* (2007: 338-339) identify the following elements in the motivation process:

- Need – unfulfilled need
- Motive – the desire to fulfil this need
- Behaviour – the need that motivate a person to engage in a specific behaviour
- Consequence – of the behaviour may be positive or negative
- Satisfaction/dissatisfaction – consequence of the behaviour could be satisfaction or dissatisfaction
- Feedback – the need remains unsatisfied if the outcome is dissatisfaction causing the motivation process to start all over again

**Figure 2.3: The motivation process**

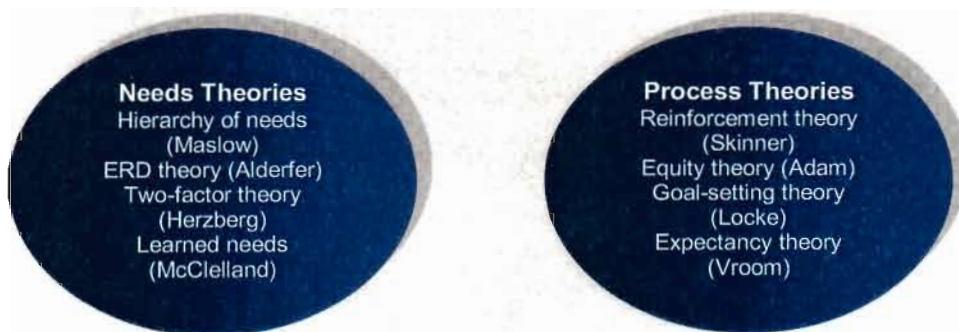


Source: Smit *et al.* (2007:338)

### 2.7.3 Classification of motivation theories

The motivation theories can be broadly divided in two groups: needs theories and process theories. Needs theories address the needs that are unique to each individual and focus on the factors within each person that initiate, guide, sustain and stop behaviour, while the process of how behaviour is initiated, directed, sustained and stopped is explained by process theories (Amos *et al.*, 2004: 150).

**Figure 2.4: Classification of motivation theories**



Source: Amos *et al.* (2004:150)

For the purpose of this research the researcher used the following motivation theories:

- Maslow's hierarchy of needs
- Herzberg's two-factor theory
- McClelland's achievements motive
- Locke's model of goal setting.

### 2.7.4 Maslow's hierarchy of needs

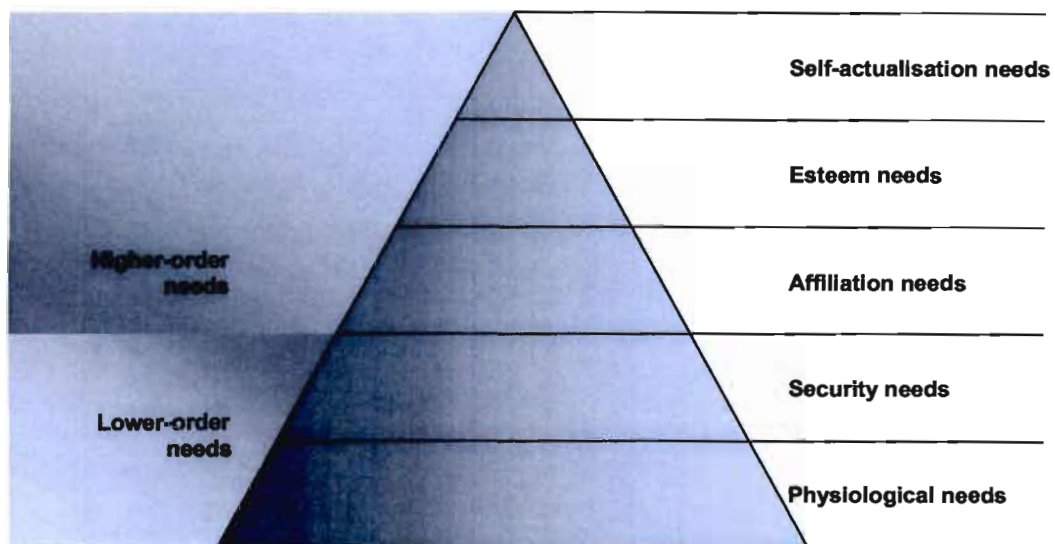
Abraham Maslow's hierarchy of needs theory is perhaps one of the best known and widely used motivation theories. According to Maslow every person has five basic needs, which characterise a hierarchy of needs. This

hierarchy starts with the most basic needs which are physiological and ends with self-actualisation needs – the highest level on the hierarchy. (Hodgetts *et al.*, 2000:374)

Fox (2006:61) describes the needs in the hierarchy as follows:

- Physiological needs – hunger, thirst, shelter and sex
- Safety needs – security and protection from physical and emotional harm
- Social needs – affection, belongingness, acceptance and friendship
- Esteem
- Internal factors – self-respect, autonomy and achievement
- External factors – status, recognition and attention
- Self-actualisation – achieving one’s potential or self-fulfilment

**Figure 2.5: Maslow’s hierarchy of needs model**



Source: Smit *et al.* (2007:342)

The first two needs, physiological and safety are described as lower-order needs and are predominantly satisfied externally. Social, esteem and self-actualisation needs are described as higher-order needs and are predominantly satisfied internally (Robbins *et al.*, 2004:131).

### 2.7.5 Herzberg's two-factor theory

Herzberg's research focussed on factors that made employees feel good about their jobs. Herzberg established by means of his research that the factors making employees feel good about their jobs differ considerably from the factors which make them feel bad about their jobs (Werner *et al.* 2007:81). He concluded that job satisfaction is influenced by two sets of factors, namely: hygiene factors and motivators (Hodgetts *et al.*, 2000:377).

If employees are feeling dissatisfied with their jobs, it stems from environmental factors – the hygiene factors. Motivators, on the other hand, relate more to the content of the job and have a positive effect on job satisfaction and performance (Amos *et al.* 2004: 156).

**Table 2.3: Hygiene factors and motivators**

<b>Hygiene factors</b>	<b>Motivators</b>
1) Company policy and administration	1) Work itself – interesting job
2) Supervision	2) Opportunity to achieve in the job
3) Interpersonal relationship with peers and supervisor	3) Recognition of accomplishment
4) Working conditions	4) Challenging work and growth options
5) Status	5) Responsibility with regard to the job
6) Job security	6) Growth
7) Salary	7) Advancement

Source: Amos *et al.* 2004: 156

It must be noted that a job is not necessarily satisfactory if you remove the dissatisfying factors. According to Herzberg his findings indicated the existence of a dual continuum, which means the opposite of "satisfaction", is "no satisfaction" and the opposite of "dissatisfaction" is "no dissatisfaction" (Robbins *et al.* 2004: 133).

### 2.7.6 McClelland's achievement motive

David McClelland and his associates have proposed a theory of motivation based on the premise that people acquire or learn certain needs from their culture. Among the cultural influences are family, peer groups and television shows. When a need is strong enough, it prompts a person to engage in work activities to satisfy this need (DuBrin, 2002: 92).

McClelland has been studying the relationship between needs and behaviour since the late 1940s. He is mainly recognised for his research on the need for achievement theory. The need for achievement is defined by the following desires (Kreitner and Kinicki, 2004: 265):

- to accomplish something difficult;
- to master, manipulate or organise physical objects, human beings or ideas;
- to do this as rapidly and as independently as possible;
- to overcome obstacles and attain a high standard;
- to excel one's self;
- to rival and surpass others; and
- to increase self-regard by the successful exercise of talent.

According to Nelson *et al.*, (2006: 156) McClelland found that high achievers often hope and plan for success and that these individuals with a high need for achievement perform better than those with a moderate or low need for achievement. The following unique characteristics can be seen in individuals with a high need for achievement:

- Although achievable, they set moderately difficult goals.
- As they progress towards this goal – they like to receive feedback.
- They do not like external events or people to interfere as they progress toward the goals.

An implication that needs to be taken into consideration is that high achievers tend to be loners because they have the inclination not to like or get along with other people. Their effectiveness as managers may also be influenced because they tend to have little empathy for other people's problems (Hodgetts *et al.*, 2000: 383).

**Table 2.4** is an idea comparison between the theories of Maslow, Herzberg and McClelland.

**Table 2.4: Idea comparison**

<b>Maslow:</b> Hierarchy of Needs	Self Actualisation	Esteem	Belonging and Love	Safety and Security	Basic Physiological Needs
<b>Herzberg:</b> Two Factors	<b>Motivators</b>		<b>Hygiene Factors</b>		
	<ul style="list-style-type: none"> <li>• Achievement</li> <li>• Recognition</li> <li>• Work itself</li> <li>• Responsibility</li> <li>• Advancement</li> </ul>		<ul style="list-style-type: none"> <li>• Interpersonal relationships</li> <li>• Company policy and administration</li> <li>• Supervision</li> <li>• Salary</li> <li>• Working condition</li> </ul>		
<b>Locke's Model</b>	Goal direction	Goals regulate effort	Goals increase persistence	Goals foster strategies and action plans	
<b>McClelland:</b> Achievement Motivation	<b>Need to achieve</b>		<b>Need for affiliation</b>	<b>Need for power</b>	
	Preoccupation to focus on goals, improving performance and tangible results		Motivates people to make friends, to become members of groups and to associate with others	The desire to obtain and exercise control over others, resources and the environment	

Source: Author's own

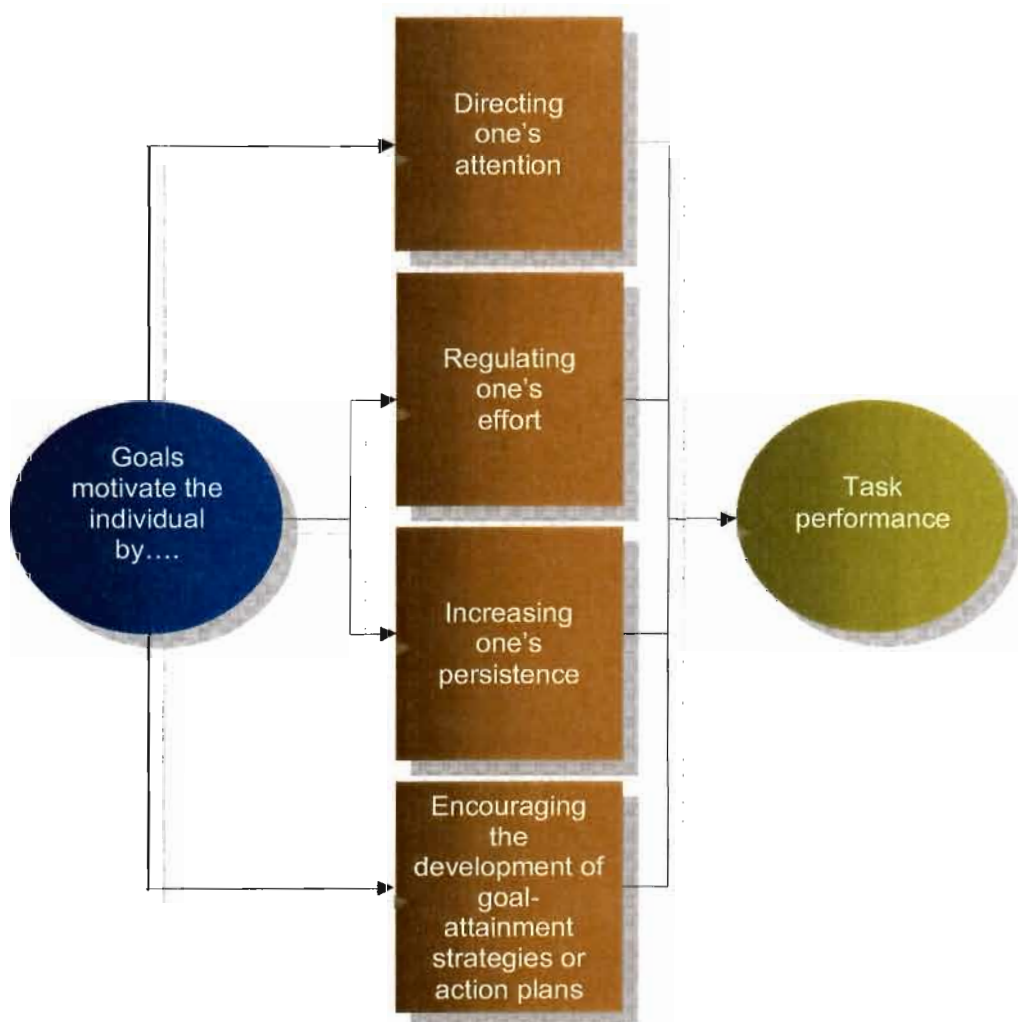
### 2.7.7 Motivation through goal setting

The goal setting theory of Edwin Locke focuses attention on the aspirations that people have (Hellriegel *et al.*, 2006: 276). Locke projected the intention to work towards a goal as a major source of work motivation (Robbins *et al.*, 2004: 137).

According to Edwin Locke a goal can be defined as “what an individual is trying to accomplish; it is the object or aim of an action” (Kreitner *et al.*, 2004: 305). A goal tells an individual what needs to be done and how much effort must be spent to achieve that goal (Robbins *et al.*, 2004:137).

Grobler *et al.* (2006: 218) state that goal-setting strategies entail a methodical process whereby the manager and subordinate discuss and agree on a set of mutually determined goals.

**Figure 2.6: Locke’s model of goal setting**



Source: Kreitner *et al.* (2004: 305)

According to Locke's model, goal setting has four motivational mechanisms (Kreitner *et al.* (2004: 305):

- I. **Goal direction:** Goals that are personally meaningful tend to focus one's attention on what is relevant and important.
- II. **Goals regulate effort:** Not only do goals make one selectively perceptive; they also motivate one to act. Generally, the level of effort expended is proportionate to the difficulty of the goal.
- III. **Goals increase persistence:** Persistence represents the effort expended on a task over an extended period of time. Persistent people tend to see obstacles as challenges to be overcome rather than reasons to fail.
- IV. **Goals foster strategies and action plans:** Goals can help because they encourage people to develop strategies and action plans that enable people to achieve the set goals.

One or more of the following functions can be achieved through goal setting (Nelson *et al.*, 2002: 169):

- increased work motivation and task performance;
- reducing the stress that is associated with conflicting or confusing expectation; and
- improving the accuracy and validity of performance evaluations.

According to Grobler *et al.* (2006: 218) management by objectives is the most well-known expression of the goal-setting theory. Amos *et al.*, (2004: 163) cite that due to the important implications that management by objectives has on management of performance, managers must:

- in collaboration with each individual set specific performance goals that are understood and accepted by the individual;
- set measurable goals;
- set goals that are challenging but realistic;
- set goals with a time frame;

- give feedback on accomplishment of goals; and
- revise goals if necessary.

According to Buelens *et al.* (2006: 221) goals plus feedback is the recommended approach: Goals inform people about performance standards and expectations so they can channel their energies accordingly, while feedback provides the information needed to adjust direction, effort and strategies for goal achievement - the outcome of specific, difficult goals are improved by feedback.

From the above it can be concluded that the purpose of goals is to give direction by telling an individual what must be achieved. By knowing what must be achieved a person can plan and identify what must be done to achieve that goal.

## **2.8 Job satisfaction**

Job satisfaction is one of the key attitudes that is of interest to managers and researchers (Nelson *et al.*, 2006: 120). Job satisfaction is basically how an individual feels about and what the individual gets out of work. What satisfies a person in his/her job will differ from individual to individual. Job satisfaction is an individual's general attitude towards his or her job (Robbins, 2003: 25). Job satisfaction is therefore an attitude and not a behaviour. Being based on employee attitudes, job satisfaction is inferred and personal and is influenced by an individual's perception (Lussier, 2002: 87).

### **2.8.1 Clarification of the concept "job satisfaction"**

According to Robbins *et al.* (2004: 16) job satisfaction can be defined as the difference between the rewards workers receive and the rewards they believe they should receive.

Buelens *et al.* (2006: 101) define job satisfaction as an affective or emotional response towards various facets of one's job. It refers to the degree of fulfilment and pleasure one finds in one's job. In other words, job satisfaction is the general attitude one has towards one's job.

Mathis *et al.* (1997: 72) state that job satisfaction has many dimensions. Some include satisfaction with the work itself, wages, recognition, attitude towards management and co-workers and organisational culture and philosophy.

The researcher defines job satisfaction as:

*An individual's general positive attitude towards his/her job in most aspects such as rewards, workplace interactions and relationships and work itself.*

### **2.8.2 Determinants of job satisfaction**

It is believed by most that work should be a positive and pleasurable experience. A person may however hold different attitudes towards various aspects of his or her job, such as in the case where an employee likes the responsibilities of his or her job but is dissatisfied with the opportunities for promotion (Nelson & Quick (2006: 120). According to Lusier (2002: 85) most people want job satisfaction more than they want job security or higher pay from their jobs.

According to O'Malley (2000: 159) the following three properties have to be present for a job to be satisfying:

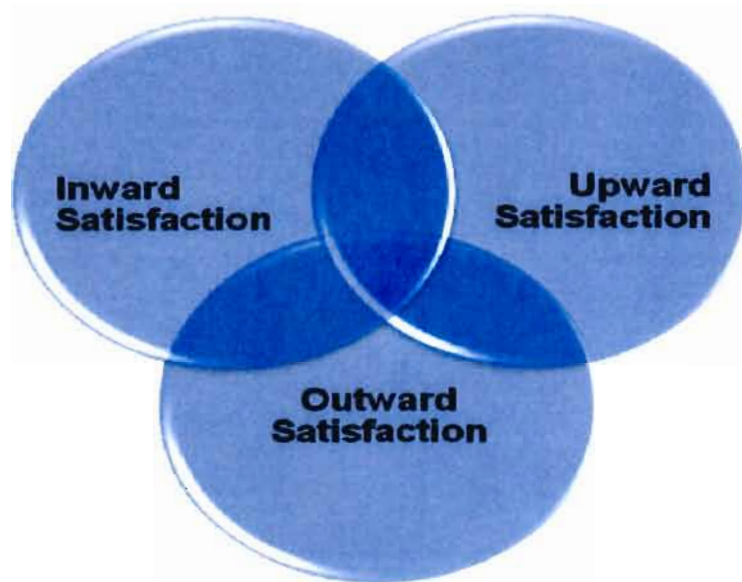
- the job must have intrinsically enjoyable features;
- the job must provide an opportunity for growth and development; and
- the job must make the employee feel effective in the execution of his or her duties.

O' Malley (2000: 159) refers to these properties as:

- Inward satisfaction – intrinsic satisfiers that are driven by the nature of the work.
- Upward satisfaction – personal growth satisfiers that are derived from technical and intellectual growth experiences.
- Outward satisfaction – personal effectiveness satisfiers when a person believes that he/she can have a positive influence on organisational outcomes.

Figure 2.7 illustrates the varieties of job satisfaction. From Fig. 2.7 it is clear that a job is more satisfying if more of the elements are present (O'Malley, 2000: 159).

**Figure 2.7: Varieties of job satisfaction**

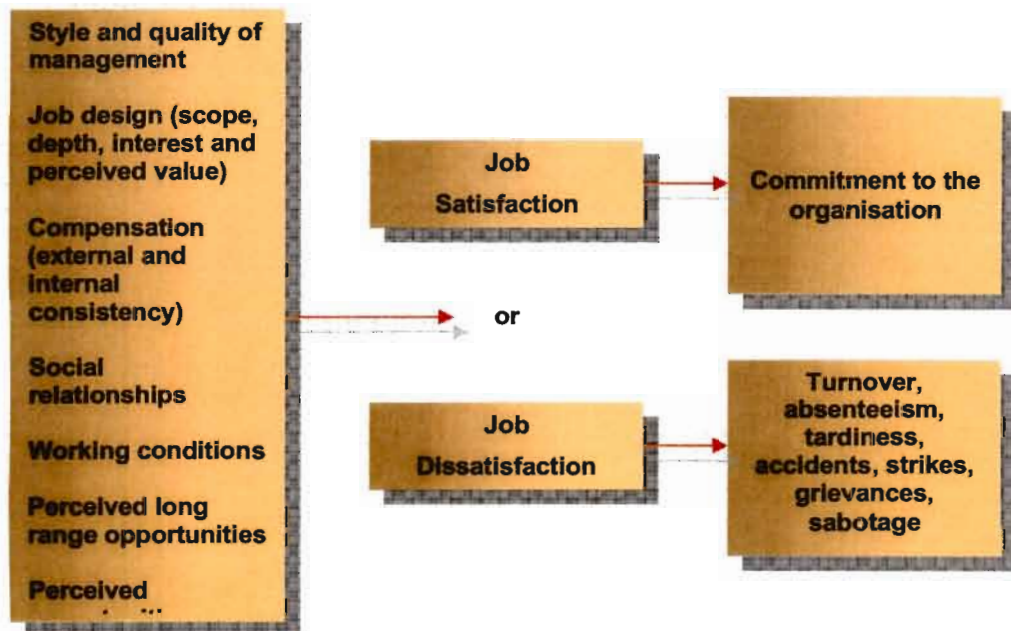


Source: O' Malley (2000: 159)

An individual's level of job satisfaction is influenced by a number of internal and external factors. In Figure 2.8 the left column indicates the major factors that determine an individual's level of satisfaction or dissatisfaction. The total

impact of these factors causes individuals to be either generally satisfied or dissatisfied with their jobs (Byars *et al.*, 1997: 319).

**Figure 2.8: Factors determining job satisfaction or dissatisfaction**



Source: Byars *et al.* (1997: 319)

According to Nelson *et al.*, (2006: 120) challenging work, valued rewards, opportunities for advancement, competent supervision and supportive co-workers are dimensions of the job which can lead to satisfaction. They also state that job satisfaction is affected by the characteristics of individuals. Individuals with a high negative affectivity are more likely to be dissatisfied with their jobs.

### **2.8.3 Employee expression of job satisfaction / dissatisfaction**

Employees can express their dissatisfaction in different ways. Robbins *et al.* (2004: 79) state that there are four responses that differ from each other along two dimensions:

- Constructiveness / destructiveness
- Activity / passivity

Robbins *et al.* (2004: 79) define these responses as follows:

- **Exit** – this behaviour is active but destructive. In this case an employee looks for a new position and resigns from the organisation.
- **Voice** – this response is active and constructive. The employee tries to improve the situation by approaching the organisation with suggestions of improvements, discussion of problems areas or even a number of forms of union activity.
- **Loyalty** – this response is passive but constructive. The employee waits for the situation to improve while trusting management and the organisation.
- **Neglect** – this response is passive and destructive. Employee allows conditions to deteriorate and does not take any action. Behaviours such as absenteeism, tardiness, reduced effort and increased error rate occur generally.

#### 2.8.4 Outcomes of job satisfaction

- Satisfaction and productivity:  
Although it is a common belief among managers and employees that satisfied employees are more productive than unsatisfied employees no direct relationship between satisfaction and productivity has been found. One view that exists is that satisfaction causes good performance, but on the other hand, it is argued that good performance causes satisfaction. Another problem is the intervening role of rewards (Nelson *et al.*, 2006: 122).
- Satisfaction and turnover:  
According to George and Jones (2005: 90) a weak to moderately negative relationship exists between job satisfaction and turnover,

which means high job satisfaction leads to low turnover. According to Mobley's model of the turnover process (George *et al.*, 2005: 90), the whole turnover process is triggered by a lack of job satisfaction. Employees who are satisfied with their jobs may therefore never even think about quitting, but for those who are dissatisfied, this dissatisfaction is what starts them thinking of quitting.

- Satisfaction and absenteeism:

Research has shown that there is an inverse relationship between job satisfaction and absenteeism. There tends to be a low absenteeism if satisfaction is high and a high absenteeism if satisfaction is low. Factors such as moderating variables (the degree to which people feel that their jobs are important) and the fact that high job satisfaction might not necessarily result in low absenteeism, although low job satisfaction is likely to bring about high absenteeism, need to be taken into consideration (Luthans, 1989: 187).

- Other effects of job satisfaction:

According to Luthans (1989: 187) research has shown that employees who are highly satisfied have better mental and physical health, tend to learn new job-related tasks more quickly and have fewer on-the-job accidents and grievances.

## **2.9 Job re-engineering**

Many organisations have been using re-engineering to achieve competitive advantage in operations and other areas within the firm. Re-engineering is the thorough analysis and radical redesign of existing business processes to achieve breakthrough improvements by focussing on critical performance criteria such as cost, quality, service and speed (Bartol and Martin, 1998: 594). Just as organisations re-engineer their processes to better serve its customers so can an individual re-engineer an initial career to achieve job fulfilment and satisfaction.

Many people choose a career path that promises a large income and the value and status that society places on a career. Yet, there is a trend toward creating lifestyles that have meaning and make a contribution to the community. The same old jobs and lifestyles are just not fulfilling to a generation who wants more out of life.

According to Muller-Smith (2004) re-engineering is no longer an event that has a beginning and an end. It is an ongoing process of change that continues to occur in all types of businesses. Because there is no longer the sense of security that doing a job well will guarantee continued employment, workers have to approach career planning from a different perspective. Moving up the career ladder in a single organisation can no longer serve as the benchmark of success. The contemporary approach to success will be more geared toward the ability to constantly reinvent your unique set of job skills that are transferable from one job setting to another, thus ensuring employability.

The essence of re-engineering is to start with a clean slate and redesign your career and future ventures so that it will provide a fulfilling personal life and job satisfaction. Re-engineering involves a major re-examination of what an individual is all about and is also about a fundamental reappraisal about what an individual do. This could mean a major step in reinventing the individual's way of life and of doing things. It may involve abandoning what has been successful in the past and start doing what may look like a complete failure in the beginning. Re-engineering thus involves rethinking and redesigning an individual's job and ultimately his/her career path.

## **2.10 Summary**

Many people are stuck in a career in an organisation that has somehow become less than satisfying. These people feel undervalued, do not add any value and are stressed and bored by the lack of challenges. Individuals have

the responsibility as humans to discover the career that perfectly complements what they want to do and what they are doing well. The search for a satisfying career is not only desirable but essential.

## CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

*“If one’s choices align with who you are, and what you are about, chances are one will find oneself leading a fulfilling life”.*

*- Barbara Quinn*

### 3.1 Introduction

It was determined during the literature study that to have a fulfilling and rewarding career life, planning, developing and managing one’s career is an integral part of having the ultimate successful career. It was also noticed that to have this fulfilling personal life and job satisfaction it is sometimes necessary to re-engineer one’s job or career. To achieve all of the abovementioned the individual needs to be motivated, whether they are basic needs like eating and sleeping or higher needs like achievement or recognition.

The objective of this chapter is to describe the research methodology that was followed and how the study population and sample were selected. This chapter also explains how the most important quantitative criteria were developed. The testing of these criteria in the market is also discussed.

### 3.2 Methodology and approach used for the empirical study

The primary objective of this study was to evaluate if the time and money invested in an engineering profession is a sustainable investment if an individual makes a career change at a later stage in his/her working life and to derive a generalised process model for re-engineering an engineering career.

The empirical study was done by:

- conducting a literature study regarding the importance of career planning, developing and managing;
- conducting a literature study regarding the importance of motivation and job satisfaction to have a fulfilling career; and
- conducting a literature study regarding job re-engineering to achieve job fulfilment and satisfaction.

According to Behr (1988: 5) the term empirical means that which is verifiable by observation.

The specific empirical objectives of this study are to:

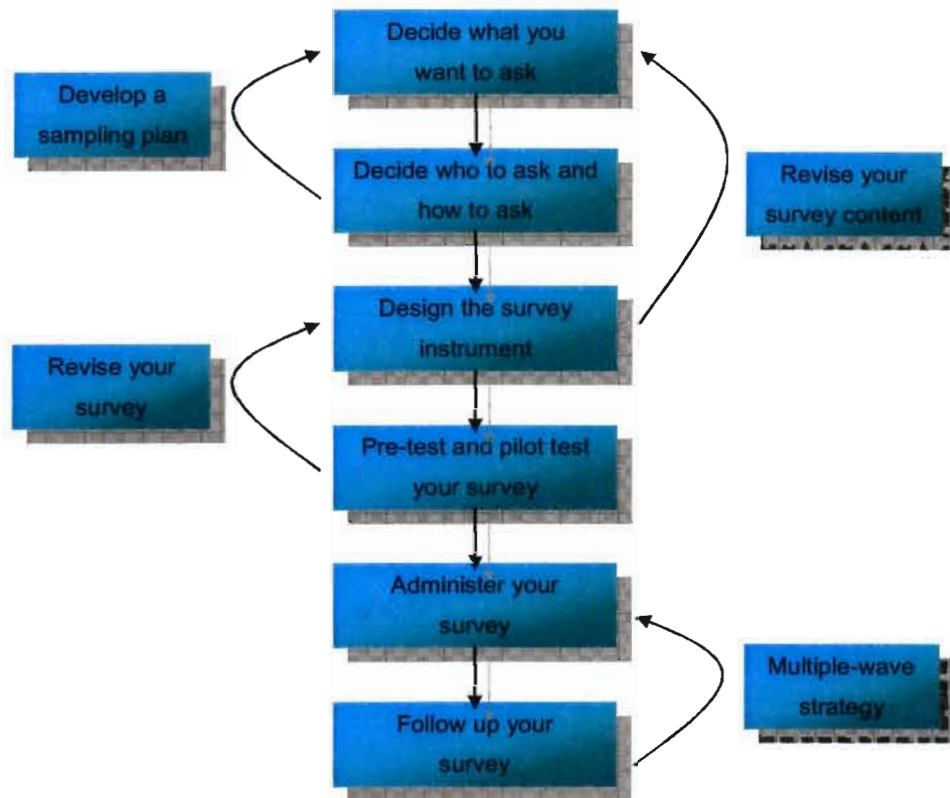
- investigate the reasons for an individual's initial choice of career;
- determine why current students choose a career in engineering;
- determine the reasons for an individual's subsequent choice of career; and
- to measure the perceptions of those individuals who have made a career in the engineering profession with regard to the amount of time and money expended on their career choice.

### **3.3 Research methodology**

For this study a quantitative methodology was followed. Quantitative research relies on measurement to compare and analyse different variables (Bless, *et al.*, 2006:43).

The strategy that fits the research question is the survey strategy, as it requires no control over the behavioural events. Questionnaires are used to gather information in a survey strategy.

**Figure 3.1: An overview of the survey process**



Source: Maylor and Blackmon (2005: 189)

Webb (2002: 22) avers that one of the primary data methods is the survey research method. This survey research method includes structured or semi-structured data collection methods, with their information being collected from a census of the population of interest or from a representative sample of the population. The survey research method can include personal interviews, mail interviews, telephone interviews, computer interviews, e-mail questionnaires and fax questionnaires.

### **3.4 Research design**

The empirical study will provide the reasons why students decided on a career in engineering and why professionals inevitably may change careers

and be successful afterwards. To achieve these goals, questionnaires were designed and sent to two different groups of people. These two groups consisted of:

- students in the engineering field and
- qualified engineering professionals in the workforce.

For the empirical study to be successful, it needs to measure those aspects that were focussed on during the discussion in the previous chapters and deliver statistical data that could be analysed and to serve as a basis from which a generic career guidance questionnaire can be formulated for use by career guidance professionals and teachers at school level.

### **3.5 Target population**

Sampling design is very important due to the fact that if the sample is selected appropriately it can provide the desired degree of accuracy without the necessity of testing the whole population. According to *Welman et al.* (2005: 55) a population “is a group of potential participants to whom you want to generalise the results of a study”. The term target population within this study refers to the current engineering students who are registered for a degree with the North-West University, Potchefstroom Campus and to individuals who are currently in the field of engineering at a petrochemical company situated in the Vaal Triangle Fezile Dabi district.

### **3.6 Composition of sample**

The approximate size of the student target population used is 400. The student study population included 230 fulltime students, randomly selected from the target population, who were registered with the North-West University, Potchefstroom Campus for a degree in engineering.

The approximate size of the engineering target population was 150. This study population included 76 engineering professionals, randomly selected from the target population. The engineering professionals are all employees of a petrochemical company situated in the Vaal Triangle Fezile Dabi district.

The use of random selection provides members of the target population with an equal opportunity of being included in the sample.

### **3.7 Measuring instrument**

For the intention of this study data was collected by means of surveys in the shape of questionnaires. According to Maylor and Blackmon (2005: 182) data is collected through surveys from a range of respondents by asking them questions. Maylor *et al.* (2005: 182) further state that surveys “are especially useful for capturing facts, opinions, behaviours or attitudes”.

### **3.8 Questionnaire design**

Webb (2002:23) defines questionnaires as consisting of a structured or semi-structured list of both open and closed questions, which are put directly to the respondent and which may be used to investigate attitudes, beliefs, feelings, behaviour, knowledge and demographic characteristics.

Two questionnaires were designed for the purpose of this study. The first questionnaire is aimed at the student population, while the second questionnaire is aimed at professionals in the engineering environment.

In both questionnaires section A is used to gather the biographical information of the respondents.

Section B of the students' questionnaire addresses the relevant field of the student's study, reasons for the choice of study and the student's contentment with the field of study.

Section B of the engineering professionals' questionnaire addresses the choice of engineering as a career, the respondent's satisfaction with engineering as a career as well as the respondent's opinion on career change. Section B of the engineering professionals' questionnaire is in the format of closed questions using a five-point scale which provides the possibility of a neutral answer.

The questionnaire for the engineering students consists of a cover page and the actual list of questions. The intent of the cover pages is to furnish the respondents with information about the questionnaire and to provide the channels of feedback that could be used for the reply. The purpose of this study was explained and utilisation of the information was clarified. Respondents were requested to complete a questionnaire. The respondents were also assured that the information obtained would be treated as confidential and that results would be used for research purposes only. The main purpose of the questionnaires was to test both the literature study as well as to investigate the reason for studying engineering in general.

The questionnaire for the engineering professionals consists of an electronic survey with questions relevant to this study. The electronic survey resides on a central server database at the Server Room of the petrochemical company. An electronic mail was sent to the study population with a cover page providing respondents with information about the questionnaire, which could be accessed by means of an attached hyperlink. The purpose of this study was explained and utilisation of the information clarified. Respondents were requested to complete the questionnaire and were also assured that the information obtained would be treated as confidential and that results would

be used for research purposes only. The main purpose of the questionnaires was to test both the literature study as well as to investigate the reason for choosing the engineering field as a first choice career and the possibility of changing to a different career.

Appendix A and B contain copies of the questionnaires sent to the different study populations.

### **3.9 Pre-testing**

According to Mouton (2001: 103) no piloting or pre-testing of questionnaires is one of the sources of error in questionnaire/scale construction. Questionnaires which are comprehensively pre-tested before being utilised ensure that errors of whatever nature can be immediately rectified at little cost (De Vos, *et al.* 2005: 171). For the purpose of this research, the questionnaire was pre-tested by 6 engineering professionals at the petrochemical company in order to establish the suitability of the questions, the design and the appropriateness of the wording and the language used. The necessary changes were made to the questionnaire according to the responses and comments received from pre-test respondents.

### **3.10 Data analysis**

Descriptive statistics were initially undertaken to analyse the composition of the sample. Descriptive statistics are concerned with the description and / or summarisation of the data obtained for a group of individual units of analysis (Welman *et al.*, 2005: 231). The statistical package, SAS System for Windows Release 9.1 TS Level 1M3, was used to process the raw data obtained from the questionnaires.

### **3.11 Summary**

This chapter is a summary of the empirical part of the study. This includes the way in which the information was gathered, the size and choice of the population group, the evaluation of the information and the processing and testing of the analysis model. The problem experienced within this part of the study was to obtain feedback data from the questionnaires sent to the respondents. A very important limitation of the study is that it only evaluates the perceptions with regard to career development and management of the respondents within the study group. There is currently only limited literature concerning this subject available in South Africa.

The following chapter will focus on the results and findings made during the execution of this research project.

## CHAPTER 4: INTERPRETATION OF RESULTS OBTAINED FROM THE EMPIRICAL STUDY

*“Living a life that matters doesn’t happen by accident. It’s not a matter of circumstance but of choice. Choose to live a life that matters.”*

*- Michael Josephson*

### 4.1 Introduction

The previous chapter discussed the methodology used for the research study. In this chapter, the results and findings of the research will be described. The results and findings were compiled by evaluating and analysing the information gathered from the questionnaires.

For the purpose of this research questionnaires were sent out to two different groups of people. The first group consisted of students studying in the engineering field and the second group consisted of qualified engineering professionals in the workforce. During the research the student questionnaire was distributed to 230 students of which 173 were received back. This shows a response rate of 75,3%. The engineering questionnaire was distributed to 76 engineering professionals of whom 36 were received back. This shows a response rate of 47,4%.

### 4.2 Student questionnaire

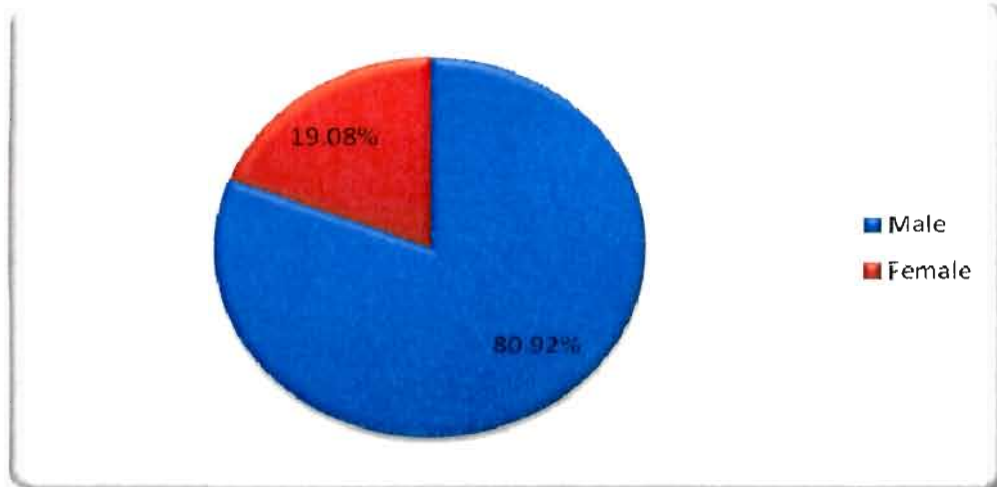
#### 4.2.1 Personal and biographical information

**Section A** of the student questionnaire consisted of questions regarding personal and biographical information of the respondents (see **Appendix A**).

**Graph 4.1** indicates the gender of students that participated in this study. The largest group of the students was male who make up 80,92% of the

respondents with females making up 19,08%. **Graph 4.1** also represents the percentage of respondents who answered the questionnaire.

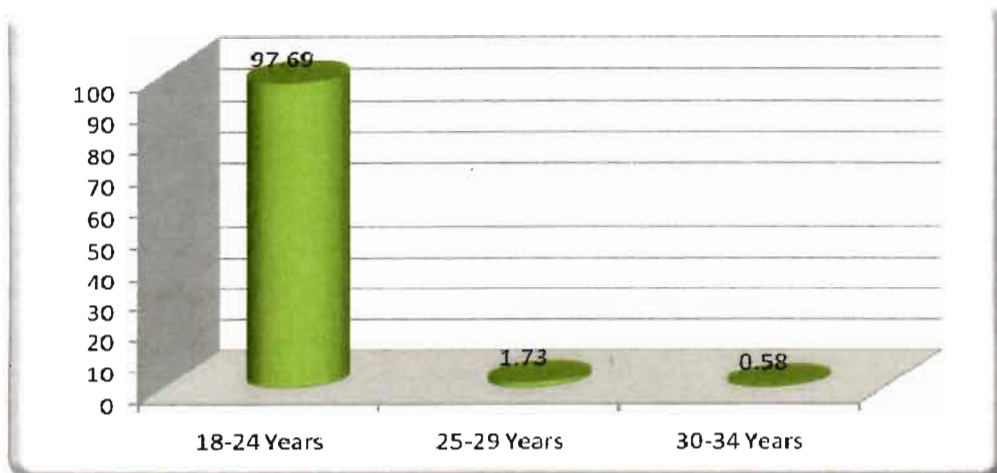
**Graph 4.1: Gender of students**



Source: Author's own reseach

Students were also asked to indicate their age group. **Graph 4.2** shows that the majority of students are between 18 and 24 years of age.

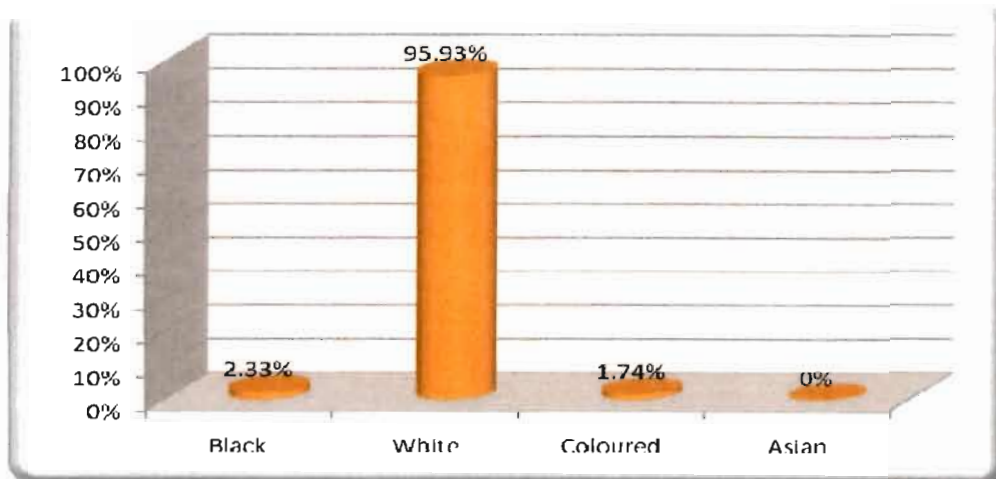
**Graph 4.2: Different ages of students**



Source: Author's own research

Graph 4.3 below reflects the students' race.

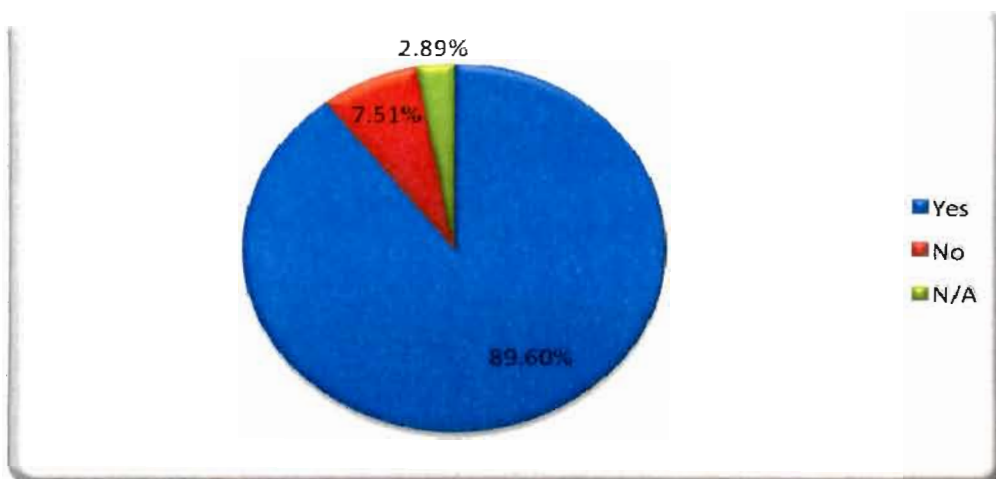
Graph 4.3: Different races of students



Source: Author's own research

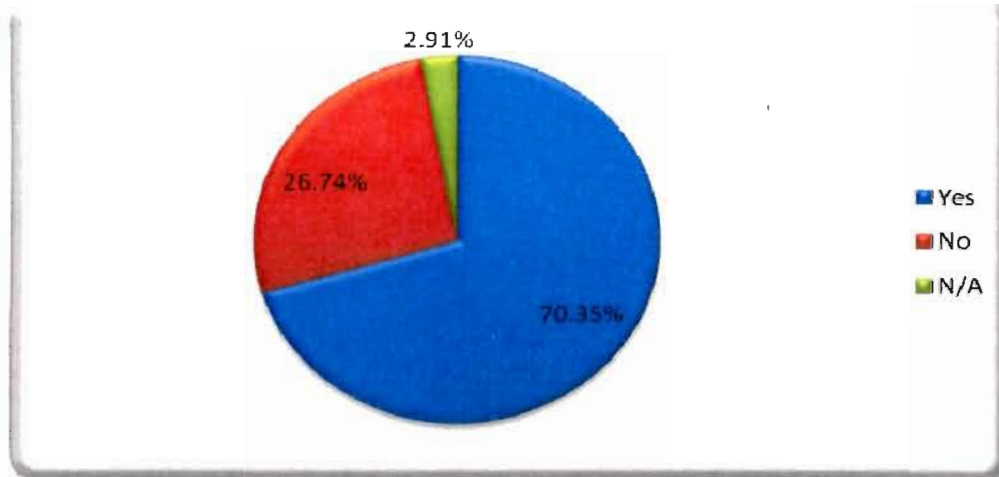
Students were asked to indicate if their fathers and mothers are employed or not. The results are shown graphically in **Graphs 4.4** and **4.5** respectively: 89,6% of fathers are employed against the 70,35% of mothers employed.

Graph 4.4: Fathers employed



Source: Author's own research

**Graph 4.5: Mothers employed**

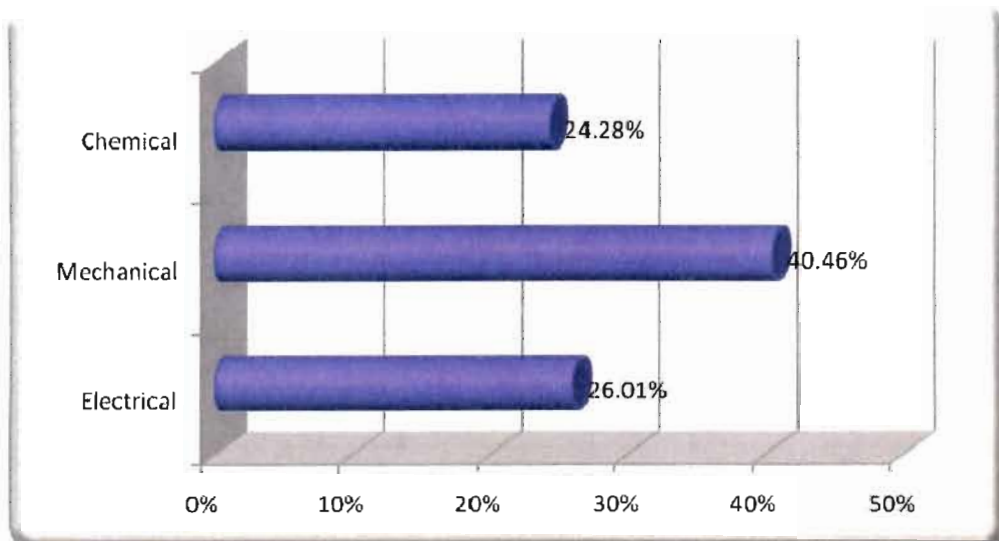


Source: Author's own research

#### **4.2.2 Studies and career information**

**Section B** of the questionnaire consisted of questions regarding the students' studies and career information (see **Appendix A**). **Graph 4.6** reflects the engineering field the majority of students are currently studying.

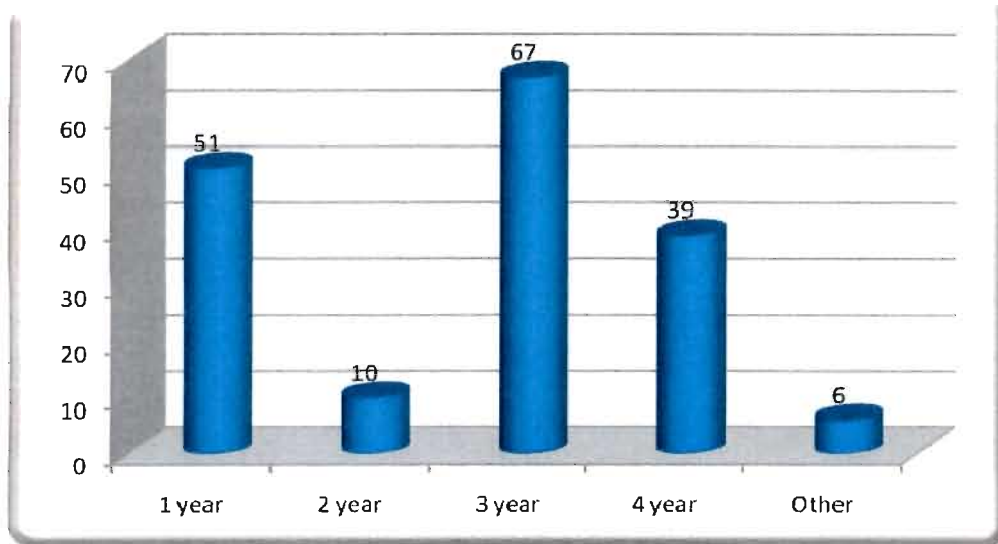
**Graph 4.6: Engineering field studying**



Source: Author's own research

Students were asked to indicate their current year of study. As shown in **Graph 4.7** responses were received from all the possible groups.

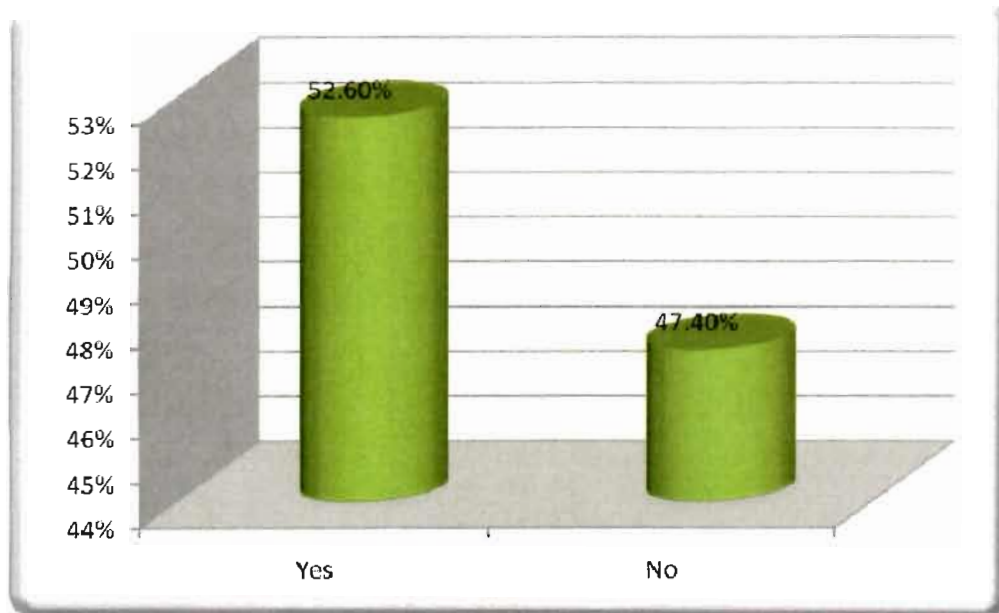
**Graph 4.7: Current year of study**



Source: Author's own research

**Graph 4.8** below indicates the outcome of the question which asked students to indicate whether or not they are studying on a bursary. From the results it is clear that more than half (52,6%) of the students that participated in this research study on a bursary.

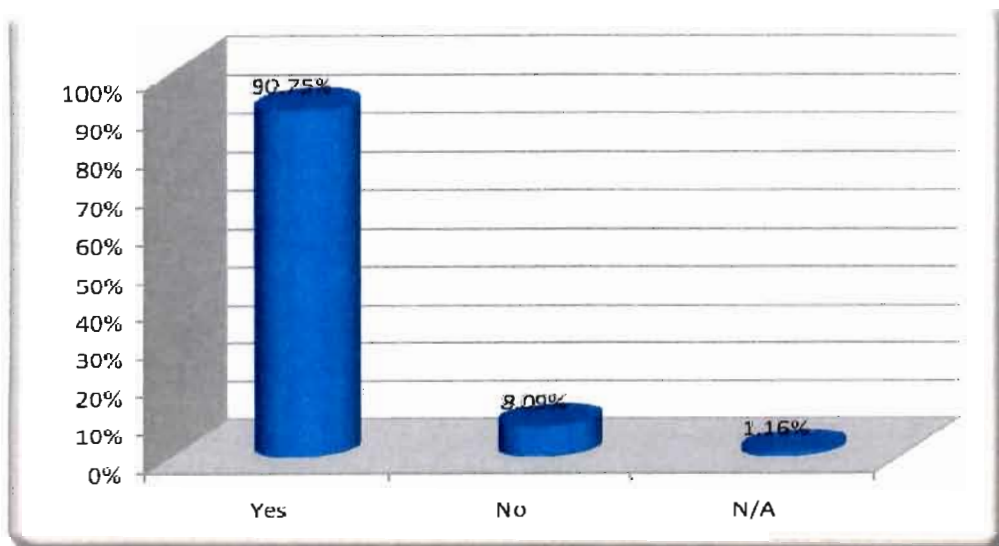
**Graph 4.8: Bursary for studies**



Source: Author's own research

**Graph 4.9** indicates the percentages of students who discussed their career choice with their parents.

**Graph 4.9: Discuss career choice with parents/guardian**

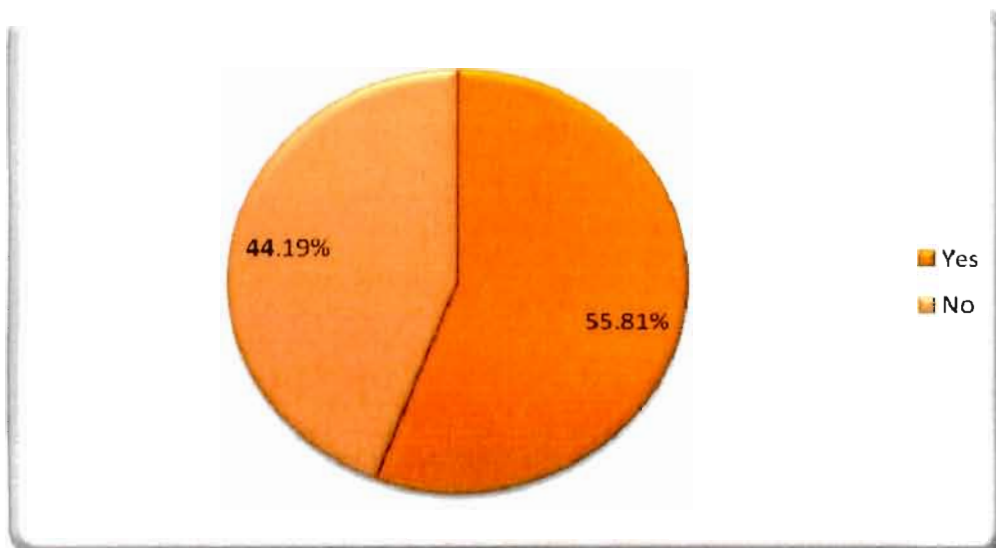


Source: Author's own research

According to research **Graph 4.9** above, more than 90% of students in the research indicated that they discussed their future careers with their parents/guardians. This is not an indication that the parents/guardians had an influence in the career choice of the student or offered any guidance, only that they were informed of the students' career choice.

**Graph 4.10** below indicates the percentage of students who received career guidance from a professional career guidance expert. Only 55,81% of the respondents indicated that they received advice from a career guidance expert.

**Graph 4.10: Advised by professional career guidance expert**

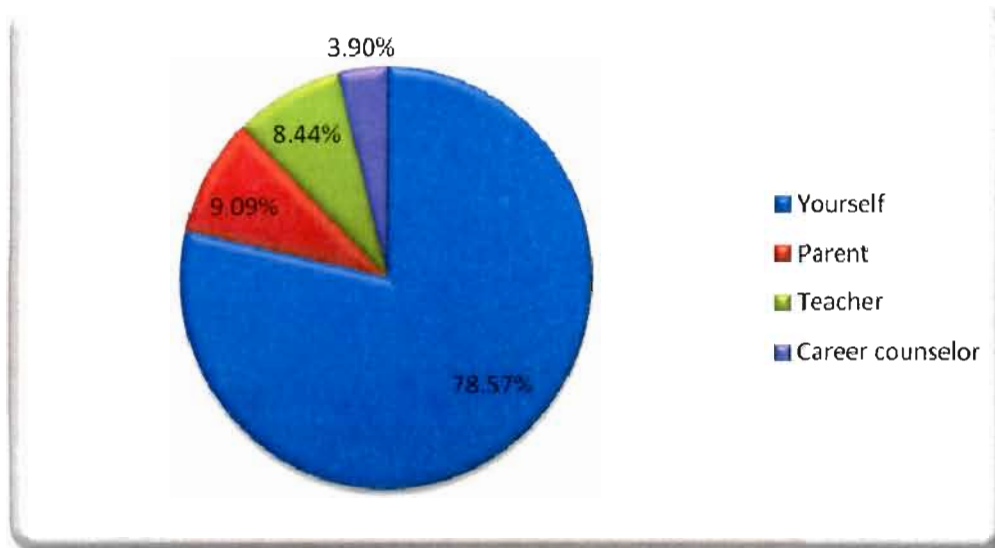


Source: Author's own research

**Graph 4.11** below indicates the students' perception of who is responsible for their career development at school level. As can be seen from the graph, more than 78% of the students think career development at school level is their own responsibility.

Only 3,9% of the students think it is the responsibility of the professional career guidance expert.

**Graph 4.11: Responsible for career development at school level**



Source: Author's own research

Students were asked to indicate why they have chosen to study engineering. From the 152 responses received, 28,95% said they are interested in engineering, whereas 11,18% said they did it for the money, 13,16% said it is what they want to do because they enjoy it and 7,24% said it is a challenging course. All the responses are summarised in **Table 4.1** below.

**Table 4.1: Reason for studying engineering**

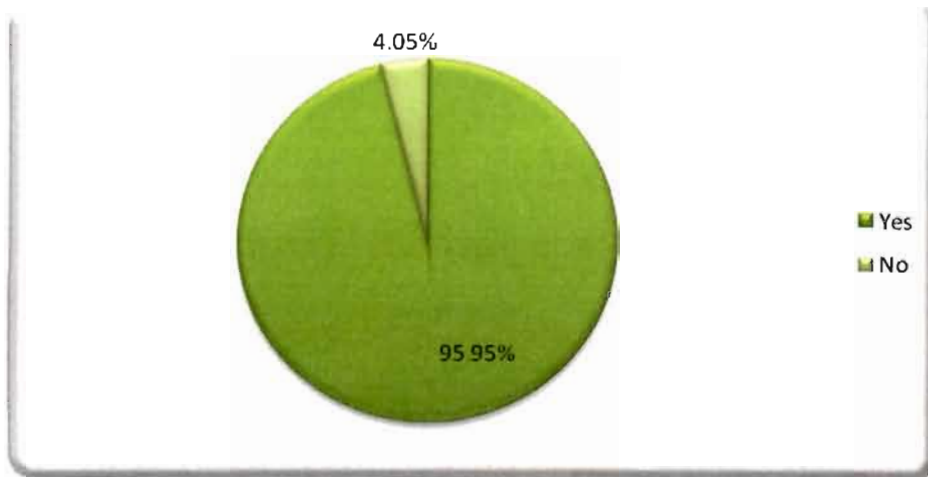
Number	Reason for studying engineering	Frequency	Percentage
1	Love of inventing and design	3	1,97
2	Interested in it	44	28,95
3	Want to achieve something great in life	2	1,32
4	Course where I can use my potential and managing skills	1	0,66
5	Only thing I want to study	1	0,66
6	Didn't want to work with human lives	1	0,66
7	Close to home	1	0,66
8	Exiting, ever changing field	3	1,97
9	Money	17	11,18
10	Enjoy it	20	13,16
11	Challenging course	11	7,24

12	Career counsellor	1	0,66
13	Sounded cool	1	0,66
14	To understand the "magic" in the world	1	0,66
15	Enjoy mathematics and science	2	1,32
16	Want to design and build engines	7	4,61
17	I have a natural passion for this field	1	0,66
18	Many opportunities	2	1,32
19	Always wanted to become an engineer	4	2,63
20	It satisfy my creativity	5	3,29
21	Enjoyed the subject at school	1	0,66
22	My strong point	1	0,66
23	I am a very practical person and like to reason with things	1	0,66
24	I like to know how things work	2	1,32
25	Love solving problems	2	1,32
26	Always loved trying to invent new things	3	1,97
27	The knack for it	1	0,66
28	My passion	3	1,97
29	I am a hands-on person	1	0,66
30	Further my knowledge in this field	1	0,66
31	The puzzles	1	0,66
32	Because I can	1	0,66
33	It is not worth studying medicine	1	0,66
34	Bursary available	1	0,66
35	Because I am smart	1	0,66
36	Practical	3	1,97

Source: Author's own research

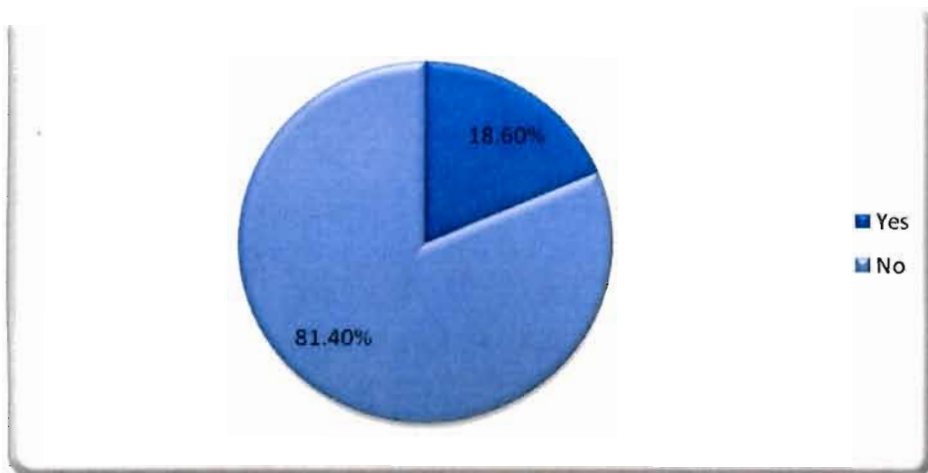
Students were asked to indicate if they are happy with their choice of study and if they can, would they change from engineering to something else. Graphs 4.12 and Graph 4.13 reflect the responses received. Although 95,95% of the students indicated that they are happy with their choice, 18,6% indicated that they would change from engineering to something else if they could.

**Graph 4.12: Happy with choice of study**



Source: Author's own research

**Graph 4.13: Change career from engineering to something else**



Source: Author's own research

Students who answered that they would like to change their career from engineering to something else were asked to indicate what they would prefer to study. In **Table 4.2** below is a summary of the responses received. From the 27 responses, 22,22% would like to study in a medical field and 18,52% would like to study agriculture.

**Table 4.2: Preferred field of study**

Number	Prefer field to study	Frequency	Percentage
1	Agriculture	5	18,52
2	Chemistry	2	7,41
3	Medical	6	22,22
4	Cooking	1	3,70
5	Equestrian	1	3,70
6	LLB	1	3,70
7	Management on software development	1	3,70
8	Entrepreneur	1	3,70
9	Mathematician	1	3,70
10	Bio-kinetic	1	3,70
11	Architect	1	3,70
12	Draftsman	1	3,70
13	Graphic designer	1	3,70
14	Marine biologist	1	3,70
15	BSc Physics	1	3,70
16	B Comm.	2	7,14

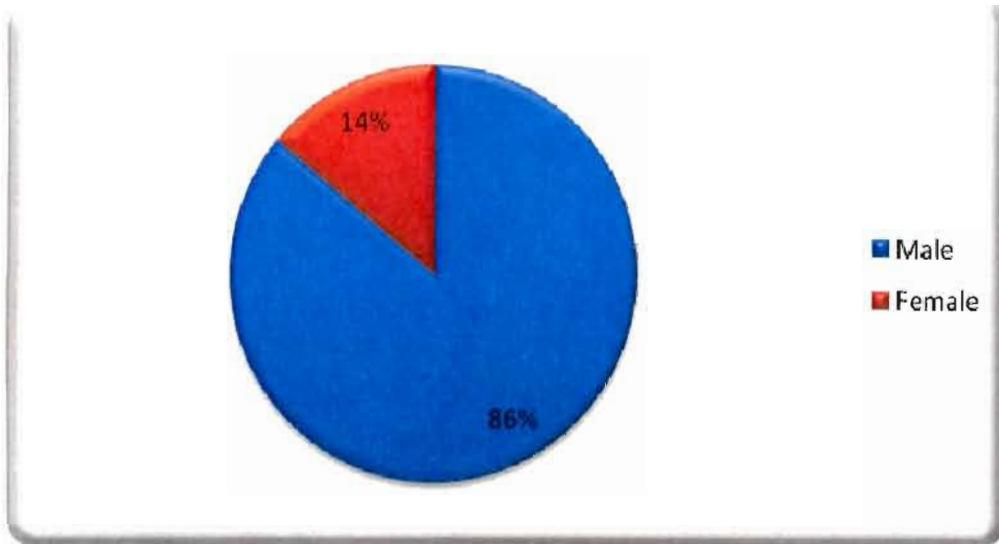
Source: Author's own research

### **4.3 Engineering questionnaire**

The first part of the Engineering Questionnaire consisted of questions regarding personal and biographical information of the respondents (see **Appendix B**).

Firstly, the respondents were asked to indicate their gender. The results as indicated in **graph 4.14** show that the majority of the respondents were male – 86% with only 14% female.

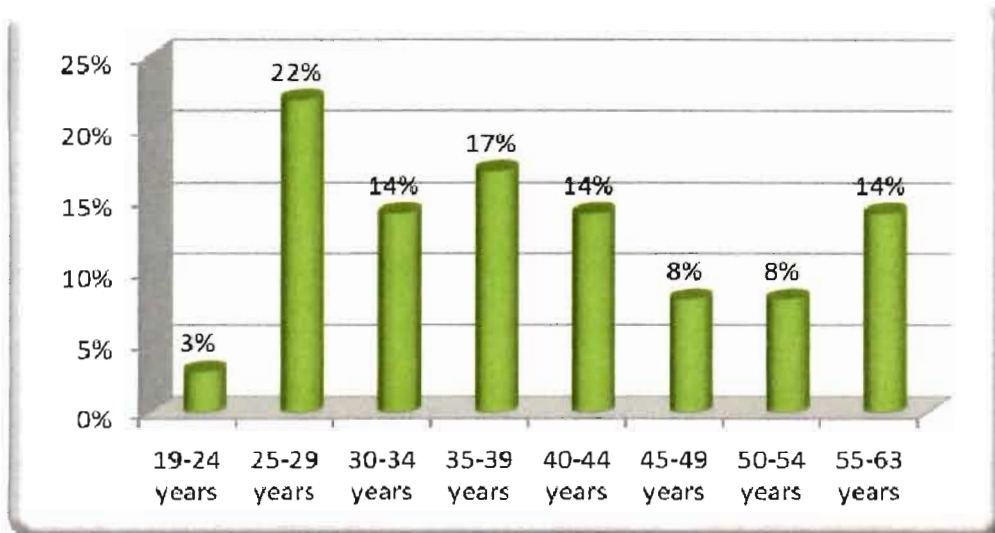
**Graph 4.14: Gender of respondents**



Source: Author's own research

**Graph 4.15** below indicates the age of the respondents.

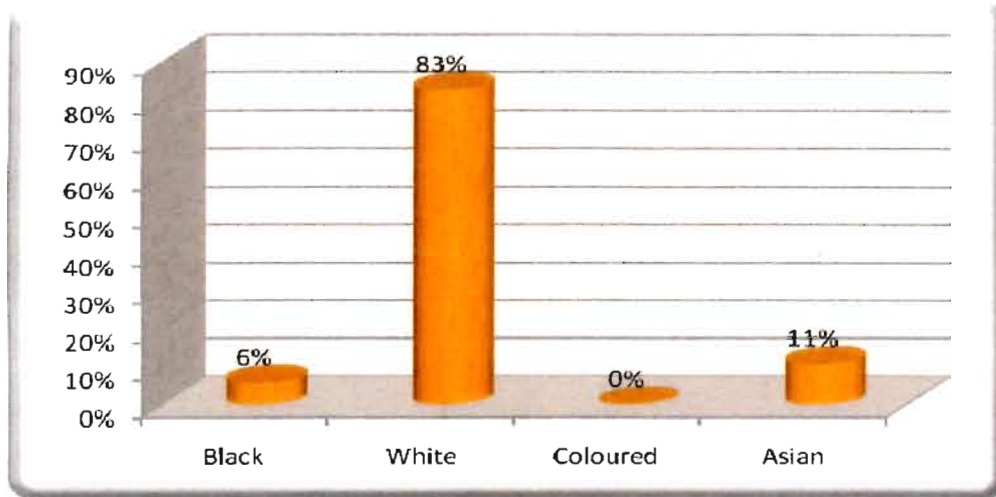
**Graph 4.15: Age of respondents**



Source: Author's own research

The race of the respondents is indicated by **graph 4.16** below.

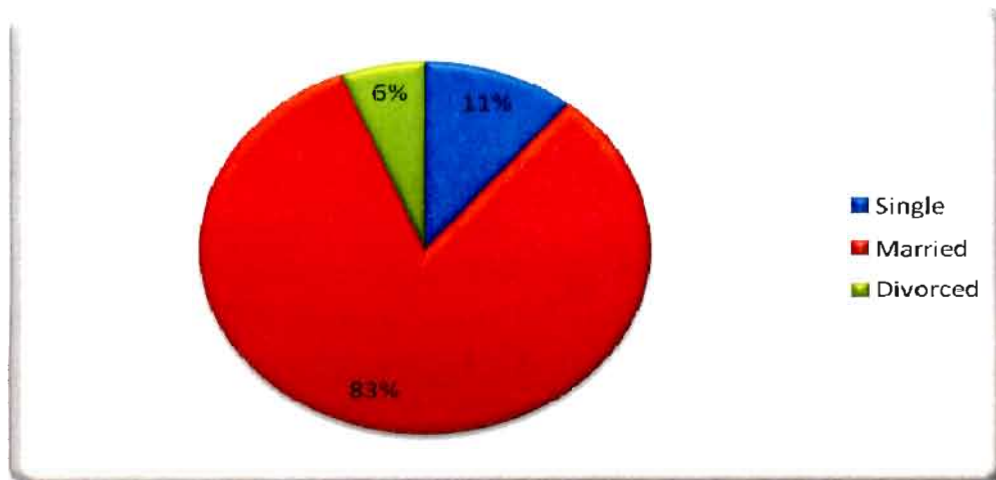
**Graph 4.16: Race of respondents**



Source: Author's own research

The respondents were asked to indicate their marital status. As shown in **graph 4.17** the majority of the respondents are married – 83%. Only 11% is single and 6% divorced.

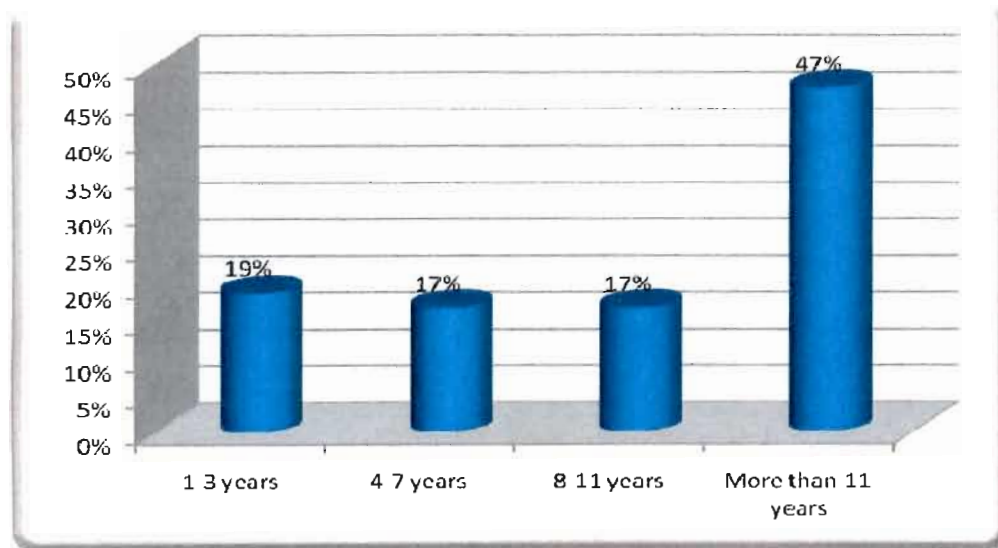
**Graph 4.17: Marital status of respondents**



Source: Author's own research

**Graph 4.18** represents the years the respondents have been in their current position. As shown in the results, 47% of the respondents have been in their current positions for more than 11 years, with only 19% in the time frame of 1-3 years.

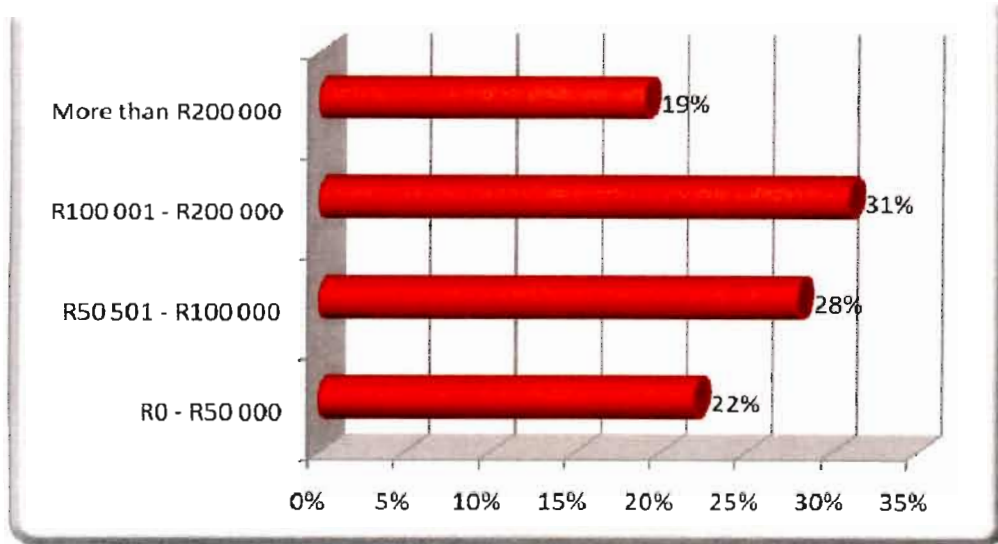
**Graph 4.18: Years in current position**



Source: Author's own research

The respondents were also asked to indicate the amount of money invested in their career. As shown in **graph 4.19** most of the respondents (31%) invested between R100 001 – R200 000 in their careers, with 28% investing between R50 501 – R100 000. In the expenditure brackets comprising more than R200 000 and R50 000 or less, the responses are 19% and 22% respectively.

**Graph 4.19: Money invested in career**



Source: Author's own research

**Graph 4.20** shows the respondents' responses to the question of whether they think that they really are doing what they want to do or not. Although 78% indicated that they are really doing what they want to do, 22% did not feel that they did.

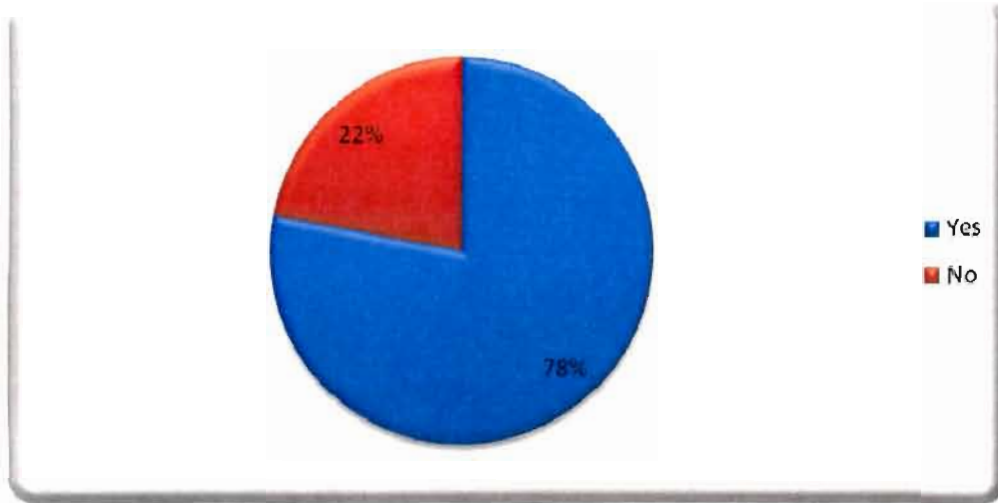
**Table 4.3** below indicates the years that it took engineers to complete their qualifications. The average time for completion is between 4 and 5 years.

**Table 4.3: Years of study**

Number	Years	Frequency	Percentage
1	4 years	13	36,1
2	5 years	7	19,4
3	6 years	1	2,8
4	7 years	2	5,6
5	8 years	2	5,6
6	10 years	2	5,6

Source: Author's own research

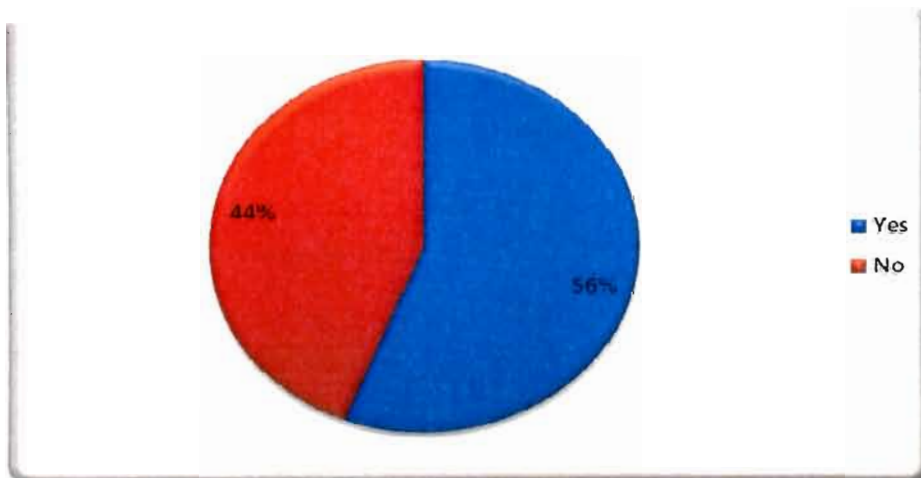
**Graph 4.20: Doing what they really want to do**



Source: Author's own research

Respondents were asked if they have any other career interests. **Graph 4.21** shows that 56% of the respondents replied positively to this question.

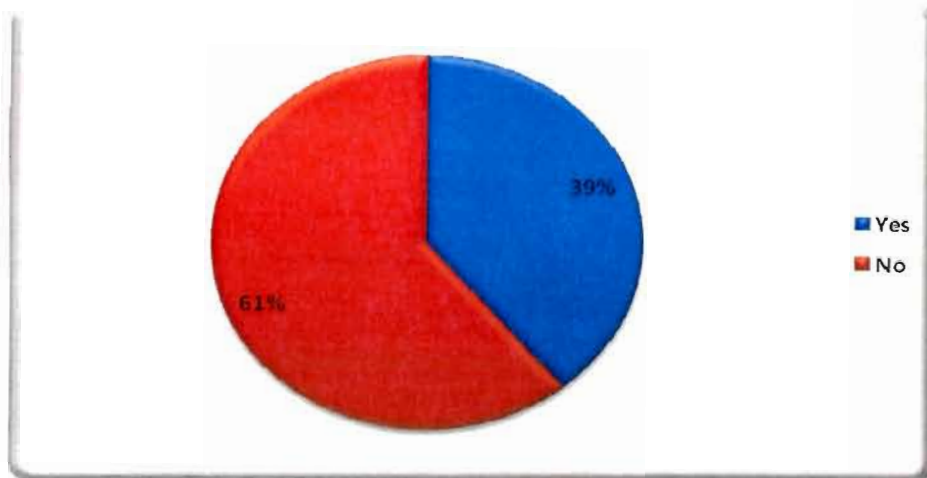
**Graph 4.21: Other career interests**



Source: Author's own research

The results are shown in **graph 4.22** below. When asked whether, if given the opportunity, they would change their careers from engineering to something else, 39% of the respondents replied affirmatively.

**Graph 4.22: Change career from engineering to something else**

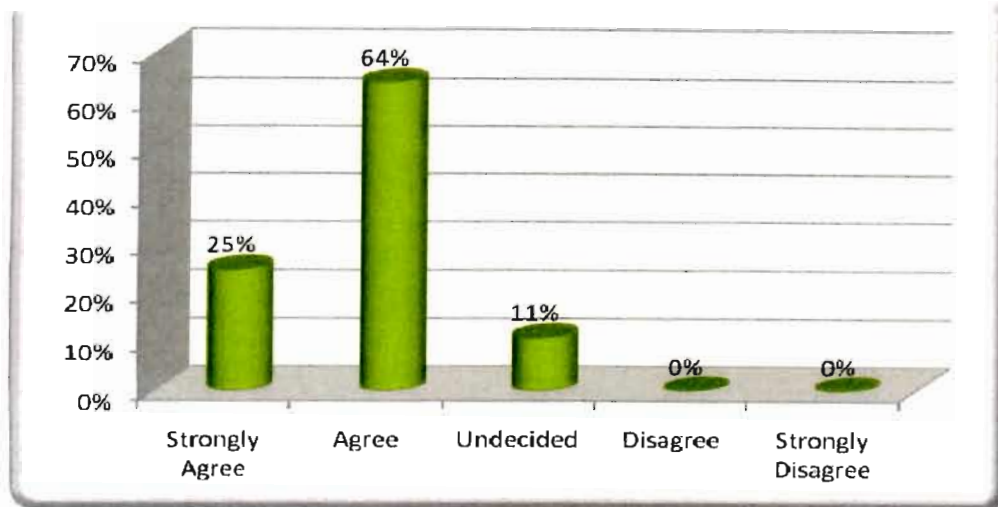


Source: Author's own research

The second part of the engineering questionnaire consisted of statements with a five-point scale possibility which also provided for the possibility of a neutral answer. The purpose of these statements was to evaluate the respondent's satisfaction with engineering as a career as well as the respondent's opinion on career change.

The first statement posited/submitted that the respondents were happy with their careers. **Graph 4.23** shows that more than 64% of the respondents agreed with this statement.

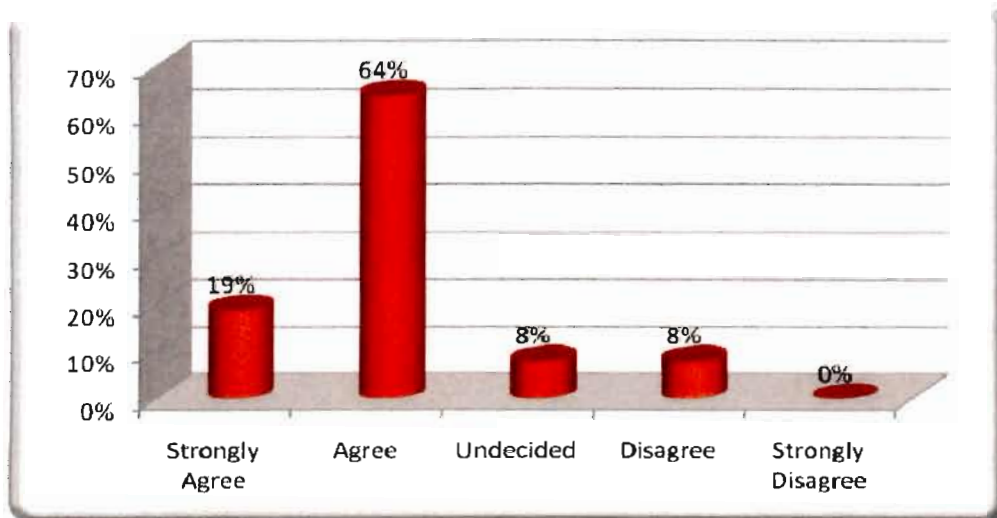
**Graph 4.23: Happy with career**



Source: Author's own research

Where the statement submitted that the respondents planned for a career in engineering, 64% of the respondents agreed with the statement and 19% strongly agreed. **Graph 4.24** gives an indication of the different responses.

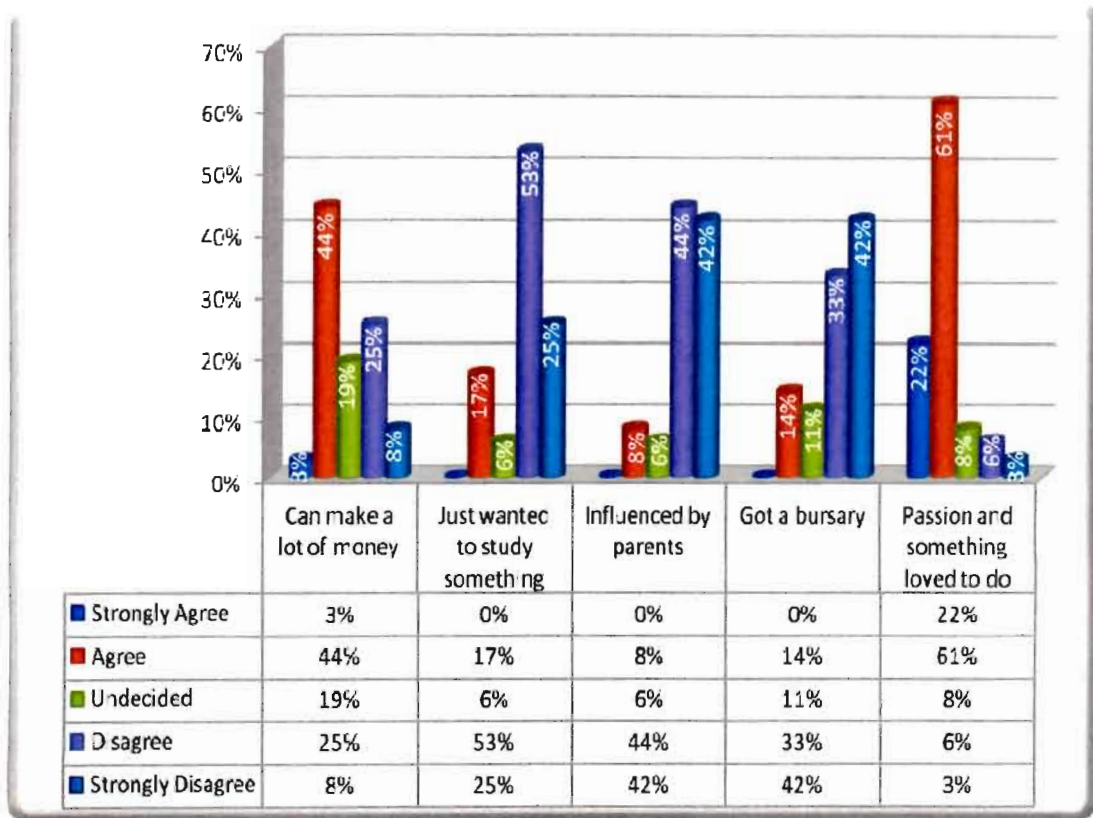
**Graph 4.24: Planned for career in engineering**



Source: Author's own research

The next part consisted of statements regarding the choice of career. It is summarised in **graph 4.25**.

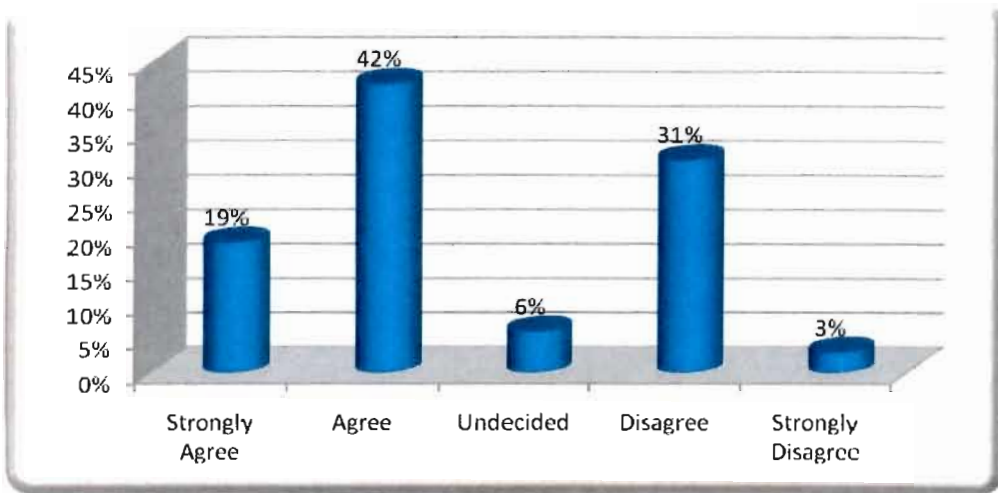
**Graph 4.25: Reason for choice of career**



Source: Author's own research

On the statement "I have achieved the goals that I have set for myself at the beginning of my career" (**graph 4.26**) 42% agreed, 19% strongly agreed, 31% disagreed while 6% were undecided and 3% strongly disagreed.

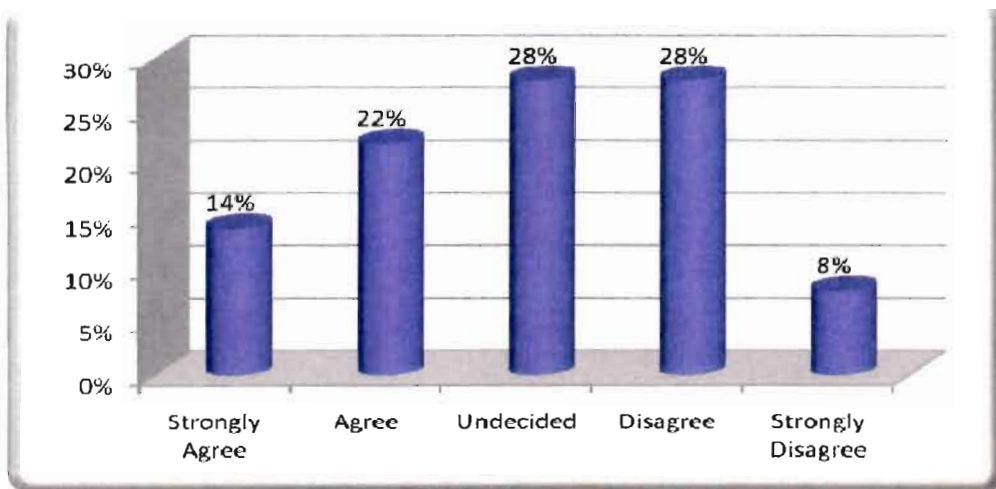
**Graph 4.26: Goals achieved**



Source: Author's own research

Responses to the statement "I am thinking about doing something else" are shown in **graph 4.27**.

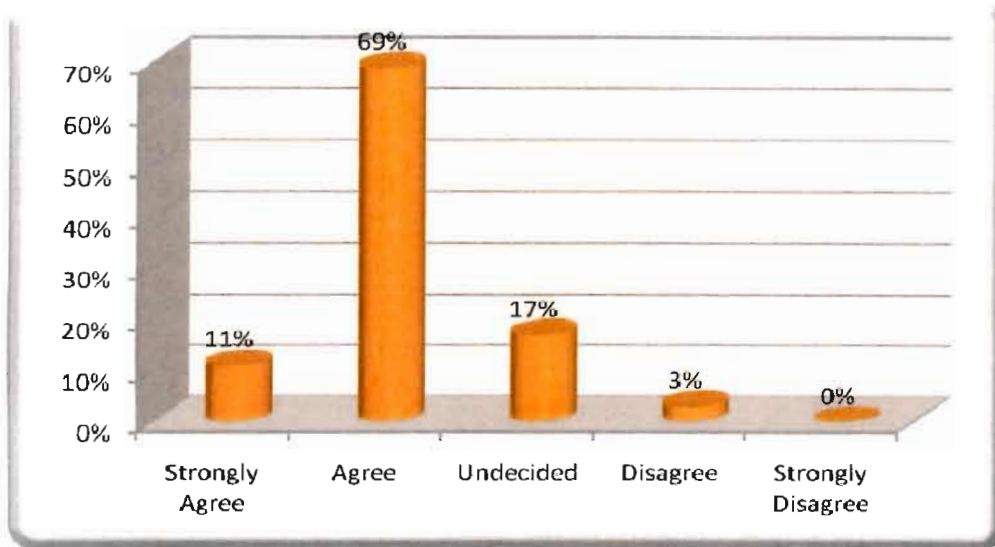
**Graph 4.27: Thinking about doing something else**



Source: Author's own research

As indicated by **graph 4.28** 69% of the respondents agreed with the statement that they planned for a career in engineering.

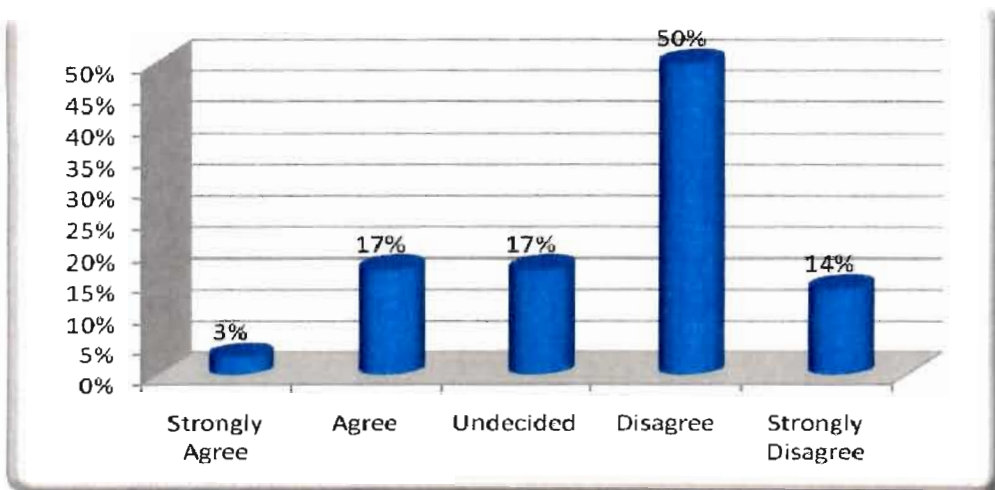
**Graph 4.28: Planned for career in engineering**



Source: Author's own research

In **graph 4.29** below the statement " I work because I have to earn a living for my family", 50% of the respondents disagreed.

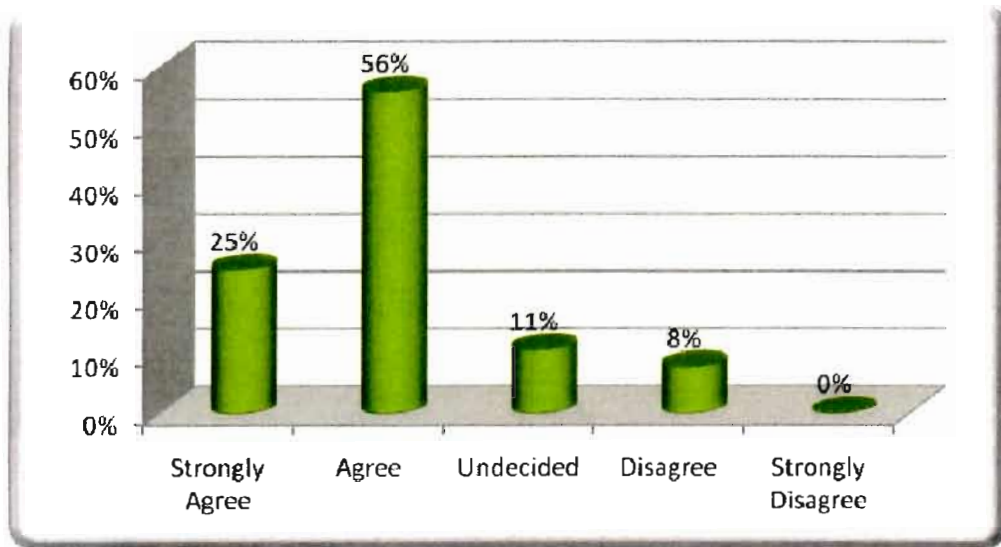
**Graph 4.29: Work to earn a living for family**



Source: Author's own research

In **graph 4.30** below, 56% of the respondents agreed and 25% strongly agreed with the statement that their jobs are personally challenging and satisfying.

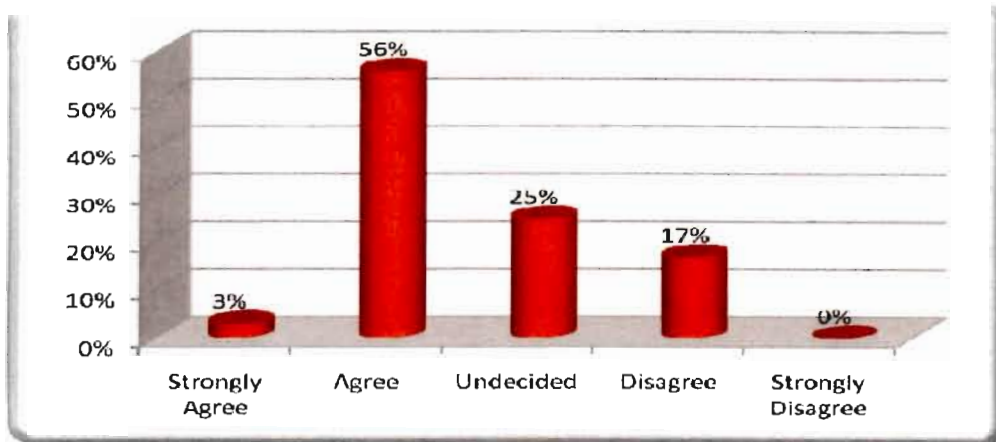
**Graph 4.30: Job is personally challenging and satisfying**



Source: Author's own research

Indicated in **graph 4.31** below only 56% of the respondents agreed and 3% strongly agreed with the statement that they are fully rewarded for the job that they do every day.

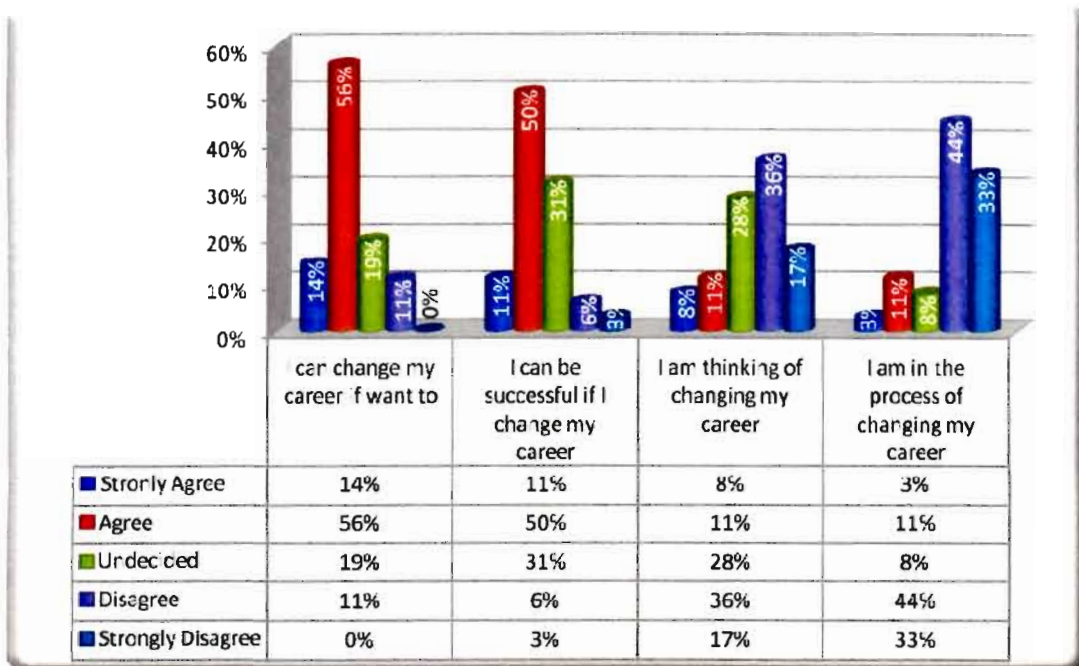
**Graph 4.31: Fully rewarded for job that they do every day**



Source: Author's own research

The last statements revolved around career change. **Graph 4.32** summarises the statements and the responses thereto.

**Graph 4.32: Changing my career**



Source: Author's own research

From the above results the following conclusions regarding the empirical objectives can be made:

Information gathered by means of the student questionnaire indicates that the three main reasons for their choice to study engineering is “interested in it” (28.95%), “enjoy it” (13.16%) and “for the money” (7.24%). Of the engineers that completed the questionnaire, 19% strongly agreed and 64% agreed that they planned for their engineering career. The main reasons indicated by the engineers for their choice of career is firstly “passion and something I love to do”, 22% strongly agreed and 61% agreed with this statement. The second reason is money, 3% strongly agreed and 44% agreed. The other reasons are “just wanted to study something” – 17% obtained a bursary – 14% and influenced by parents – 8%.

The research has shown that 78,57% of the students felt that they themselves were responsible for their own career development at school level. Although 90,75% of the students did discuss their choice of career with their parents, only 55,81% of them received advice form a career guidance expert.

Although 95,95% of the students indicated that they are happy with their choice, 18,6% indicated that they would change from engineering to something else if they could. Even though 78% of the engineering respondents agreed that they are doing what they really want to do, 39% stated that they would change from engineering to something else if given the opportunity. Results from the engineering questionnaire further indicate that 14% strongly agree and 22% agree that they are thinking about doing something else, while 8% strongly agree and 11% agree that they are thinking about changing their career. Furthermore, 3% strongly agree and 11% agrees that they are in the process of changing their career.

Most of the engineering respondents (31%) invested between R100 001 – R200 000 in their careers, while 28% invested between R50 501 – R100 000. In the expenditure brackets comprising more than R200 000 and R50 000 or less, the responses are 19% and 22% respectively. It took most of the engineers between 4 years (36,1% of the respondents) and 5 years (19,4% of the respondents) to complete their studies.

#### **4.4 Summary**

In this chapter the results of the empirical study were discussed and the most important quantitative criteria were identified. The results of the empirical study also showed that, within the study groups, the perception on career development and career management differed significantly from person to person.

## **CHAPTER 5: RE-ENGINEERING AN ENGINEERING CAREER - A CASE STUDY: MARIUS ODENDAAL**

*“The only thing that stands between a person and what he wants in life is the will to try it, and the faith to believe it’s possible.”*

- Rich Devos

### **5.1 Introduction**

This chapter introduces a case study for re-engineering an engineer’s career. Since a career change is a sensitive personal choice, the researcher elected to present his own experience as a case study.

The case study has been developed as follows:

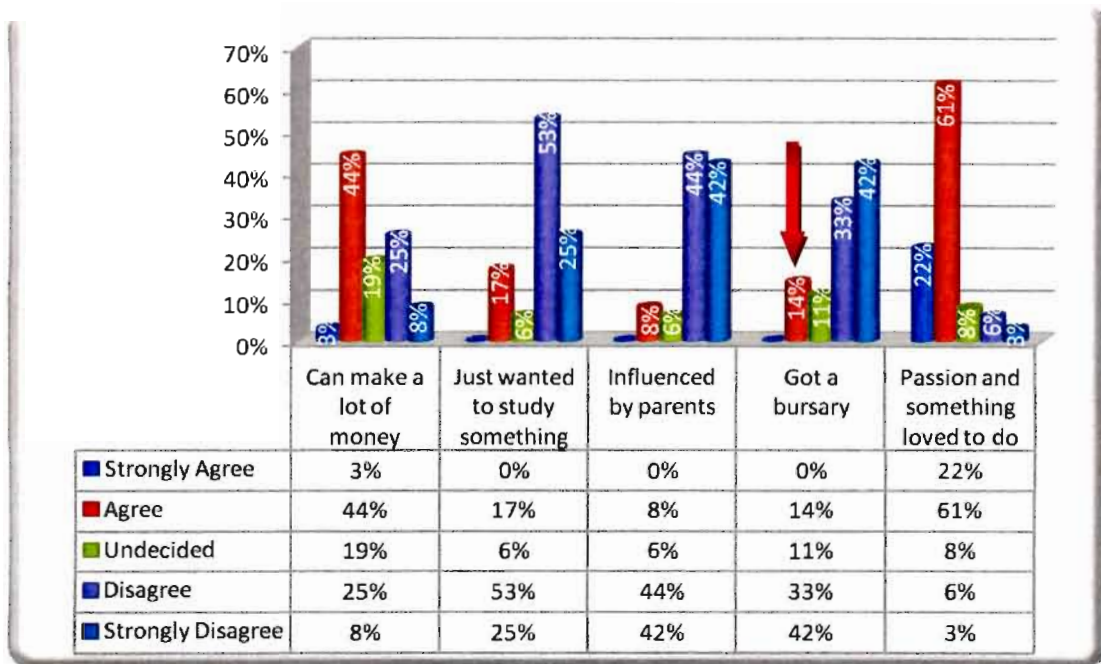
The researcher first described his personal situation. This is followed by positioning him within the context of the dataset as determined by the experimental investigation.

### **5.2 My career**

#### **5.2.1 Career selection**

I matriculated in 1989, subsequently started an apprenticeship programme as an instrumentation apprentice at AECI Ltd chemical factory in Sasolburg in January 1989. I was also called up to do national military duty in January of the same year. The company granted me leave for a year and I finished my military duties in December 1990. I restarted my apprenticeship in January 1991 and qualified as an instrument mechanic in June 1993. I chose to do an apprenticeship programme in instrumentation, because I was told that it was a good field to work in and the company paid for the programme.

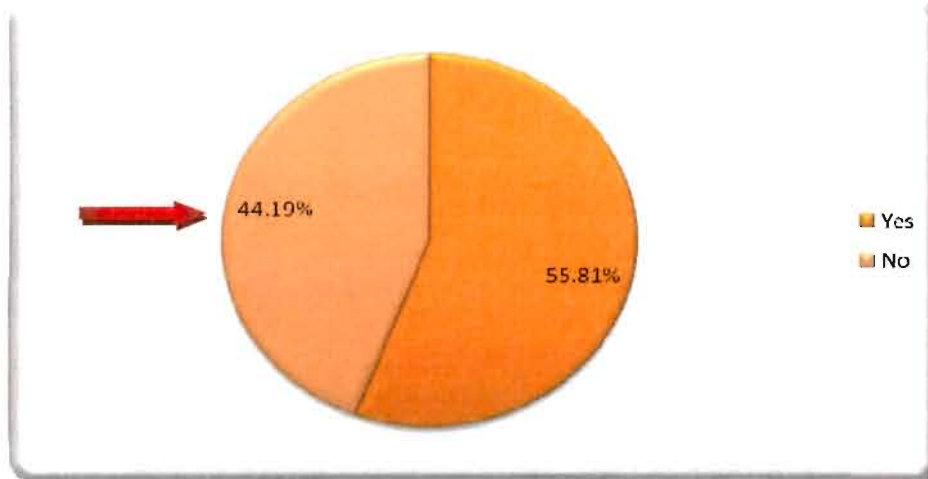
**Graph 5.1: Reason for choice of career**



Source: Author's own research

At school level, career guidance was very limited and I was basically responsible for my own career development aspirations. I also did not receive career guidance from a professional career guidance expert; I did, however, discuss my choice with my parents and had their support.

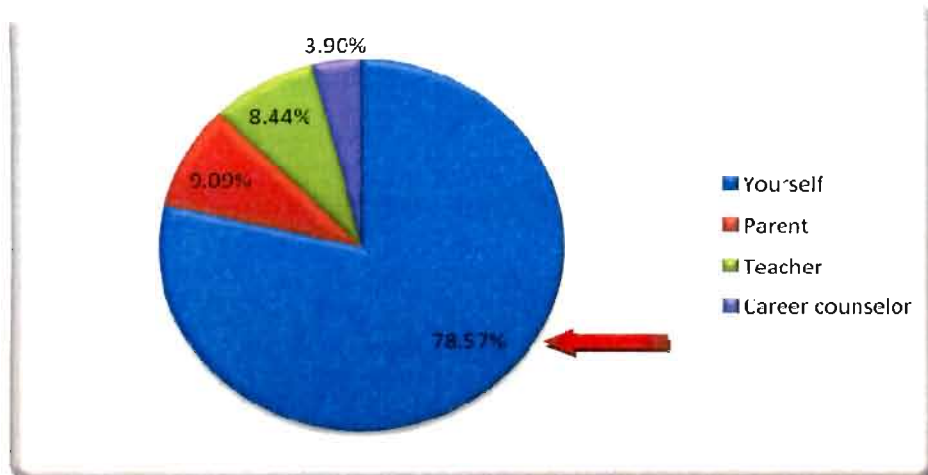
**Graph 5.2: Advised by professional career guidance expert**



Source: Author's own research

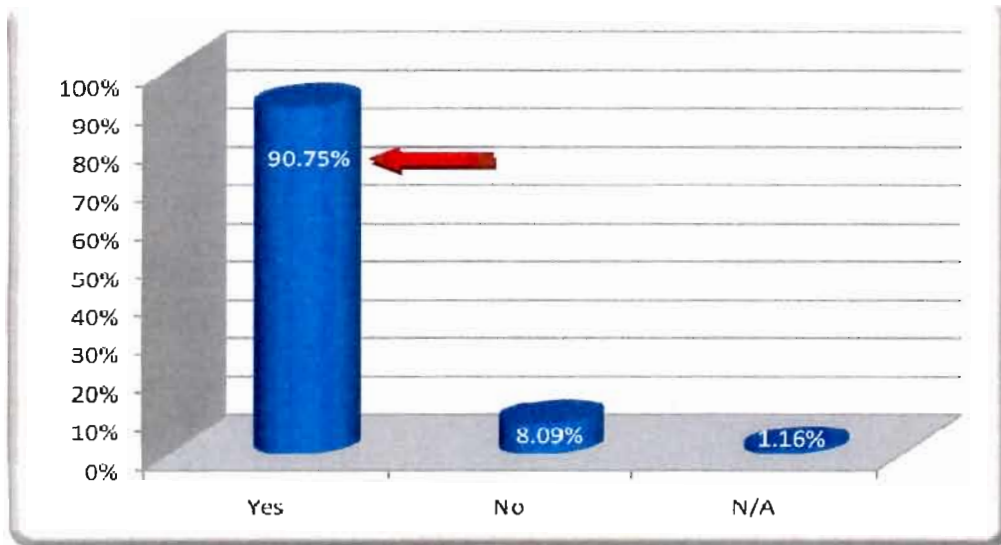
As indicated in **Graph 5.2**, I did not receive any career guidance from a professional career guidance expert. I was responsible for my own career development at school level and afterwards, as indicated in **Graph 5.3**. I did however discussed my career aspirations and what I would really like to do with my parents. See **Graph 5.4**.

**Graph 5.3: Responsible for career development at school level**



Source: Author's own research

**Graph 5.4: Discuss career choice with parents/guardian**



Source: Author's own research

### **5.2.2 Career development**

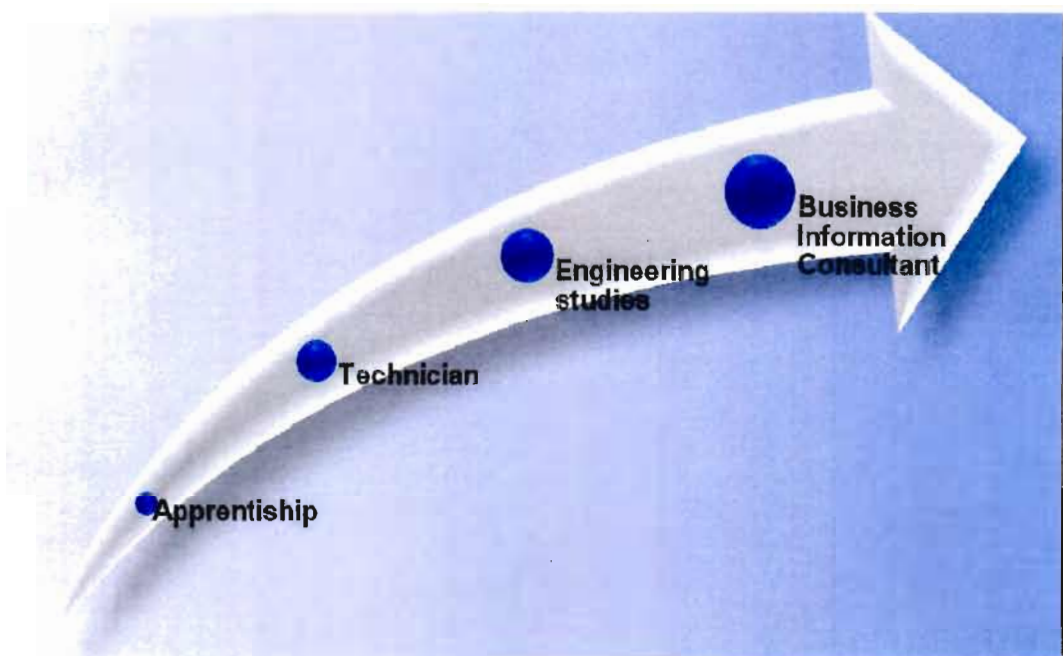
After I completed my apprenticeship programme, I worked at various plants inside the factory to gain as much experience as possible in all major process control systems and equipment. I was also managing various instrumentation projects or acted as a resource in these projects. During this time I studied part-time to gain my N3, N4 and N5 qualification.

In January 1997 I was selected to join the learner technician scheme. The company sent me to the Vaal Technikon to complete my S4 diploma in Electrical Engineering, Light Current. I finished my diploma in November 1998 and was seconded to an internal system integrators group, CCG (Control and Computing Group). I finished my practical and internship at this group and I was promoted to a technician in January 2001. My duties, being part of this group, included instrumentation projects and design, implementation and support of plant process control systems. During this time I also completed my B. Tech at the Vaal Technikon on a part time basis.

In January 2003 the group was incorporated into Information Management and our duties shifted more to managing projects rather than doing the projects itself. I was promoted in January 2006 to Business Information Consultant and I am still performing my duties in this role.

In January 2006 I started my M.Eng (development and Management) at the North-West University, Potchefstroom Campus after being granted permission to do so from the Dean of the Engineering Faculty.

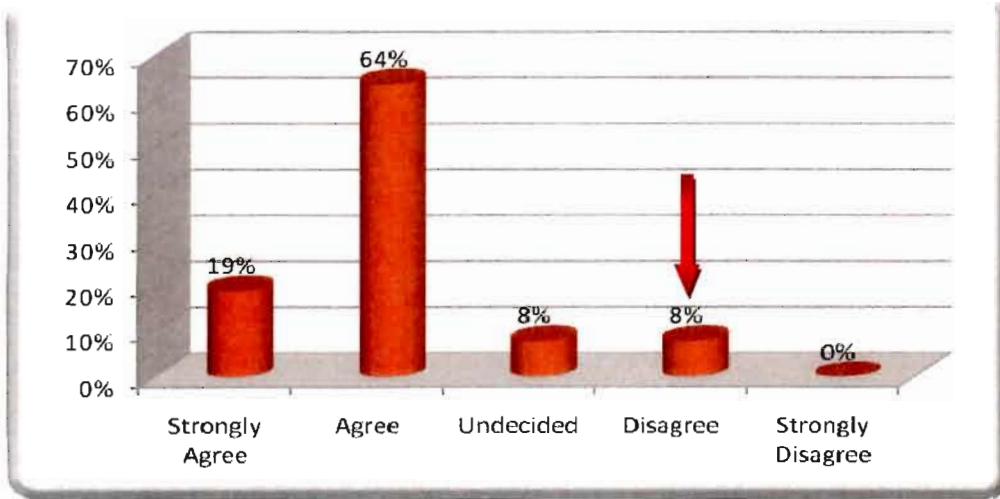
**Figure 5.1: Career development process**



Source: Author's own

Although I ended up in the engineering environment, I did not specifically plan for a career in engineering when I initially did my career planning. I basically moved into the engineering environment due to the opportunities I had to develop for myself and hard work.

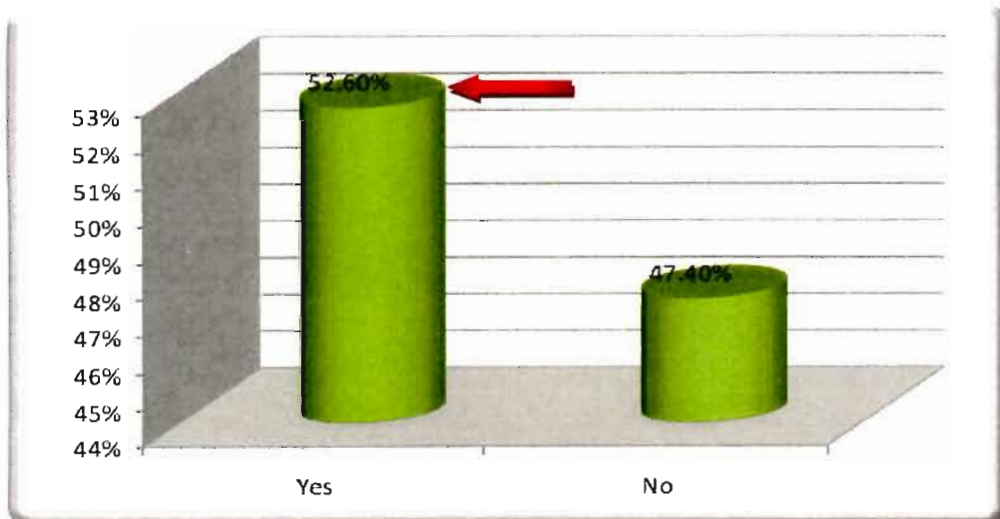
**Graph 5.5: Planned for career in engineering**



Source: Author's own research

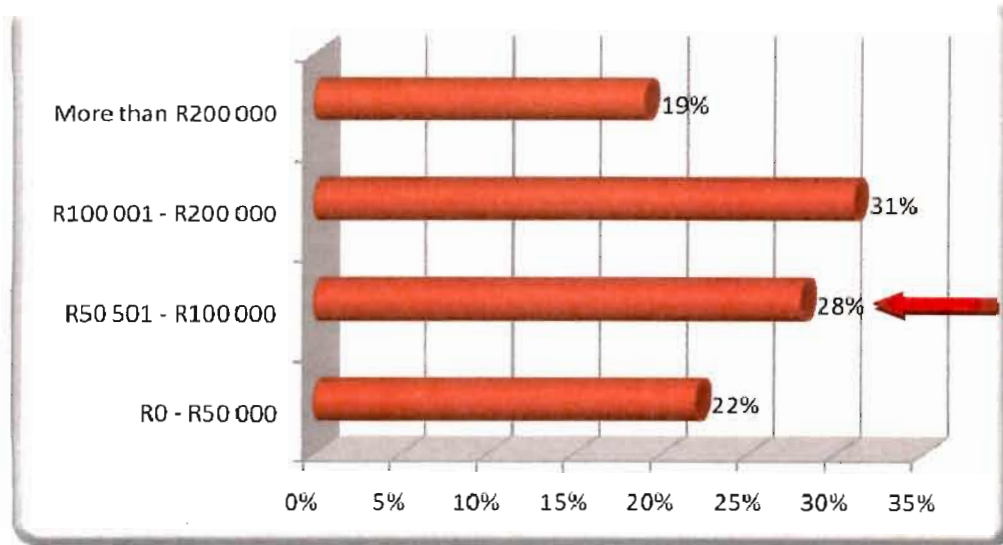
Since I started to work, I was in the fortunate position that the company I worked for supported my self development fully and paid for all my studies.

**Graph 5.6: Bursary for studies**



Source: Author's own research

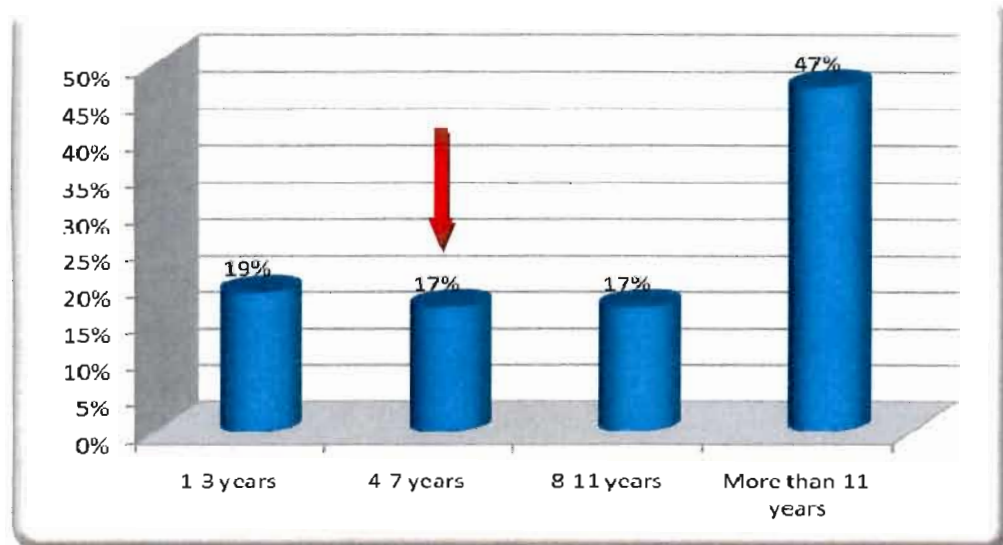
**Graph 5.7: Money invested in career**



Source: Author's own research

### 5.2.3 Career management

**Graph 5.8: Years in current position**

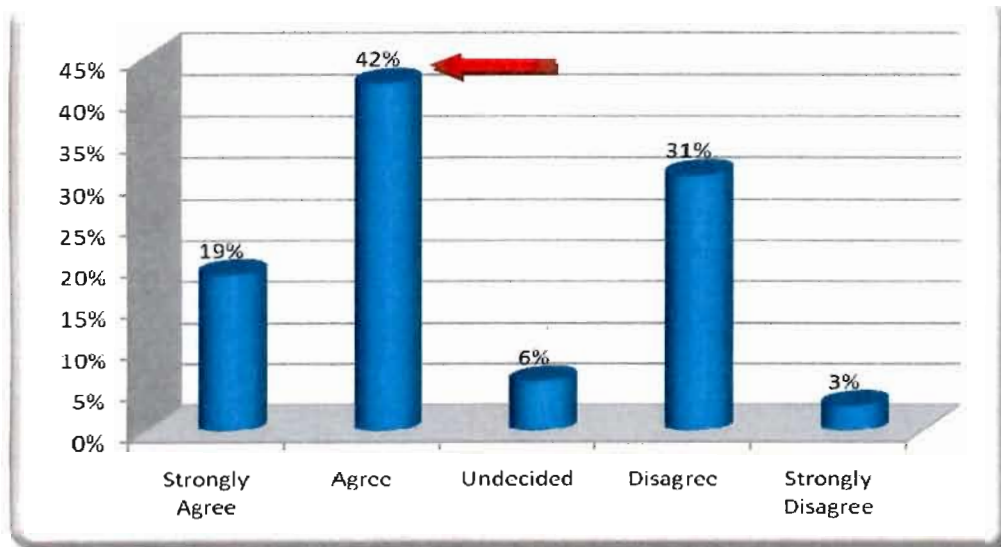


Source: Author's own research

I have achieved the goals that my current job is offering. The result of this is that I do not find my job challenging and satisfying anymore and although the

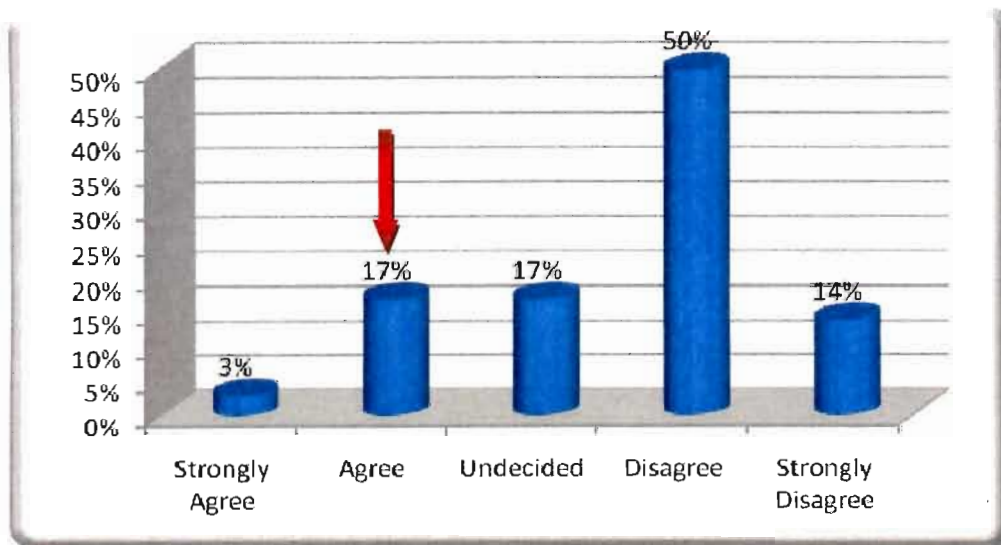
job is financially satisfactory, I do not experience the total job satisfaction possible. The outcome of this is that you are working just to earn a living and do not feel that you are fully rewarded for the job that you do.

**Graph 5.9: Goals achieved**



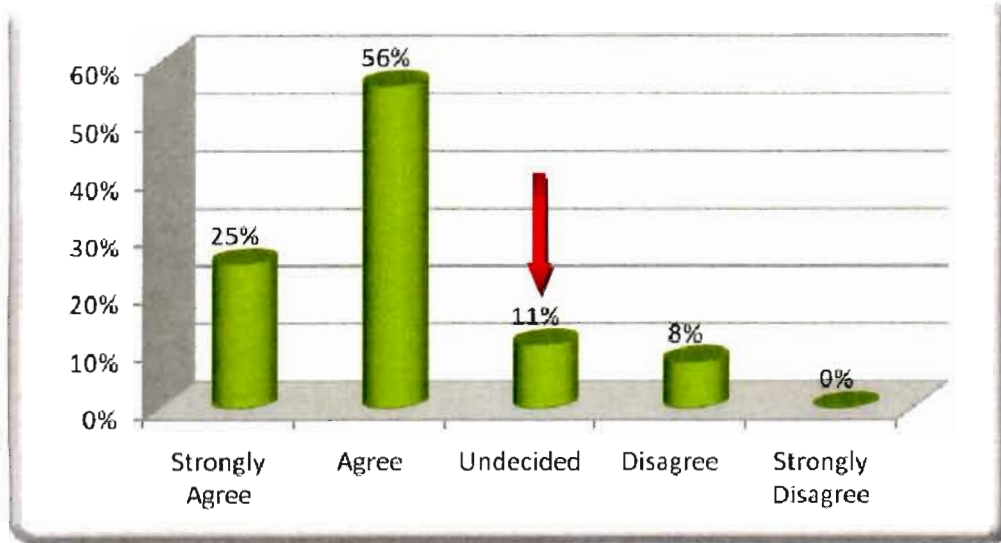
Source: Author's own research

**Graph 5.10: Working to earn a living for family**



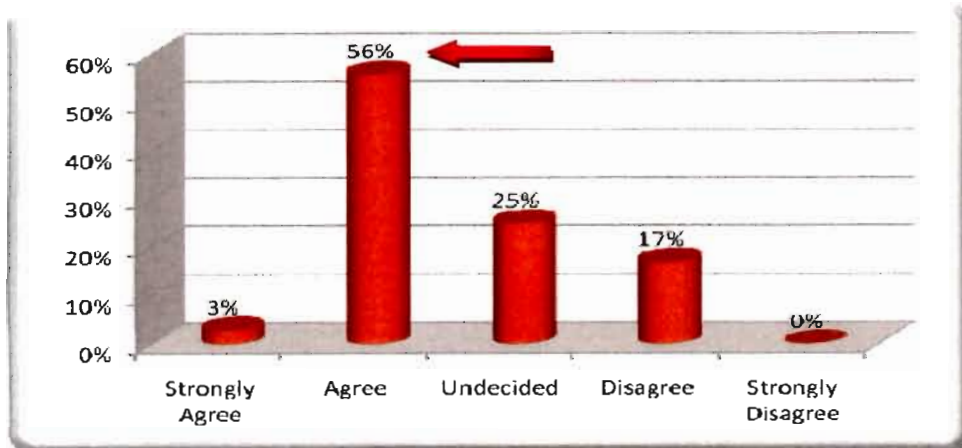
Source: Author's own research

**Graph 5.11: Job is personally challenging and satisfying**



Source: Author's own research

**Graph 5.12: Fully rewarded for job that they do every day**

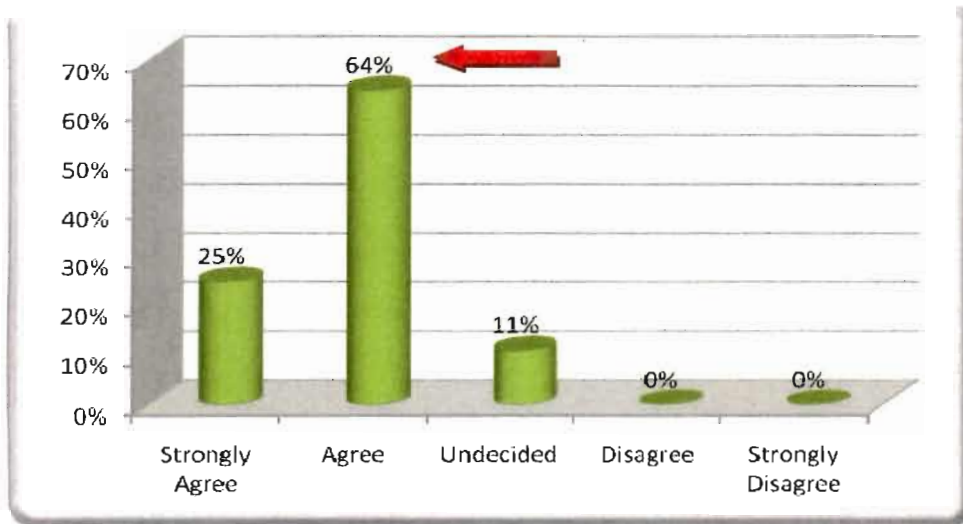


Source: Author's own research

#### **5.2.4 Career change**

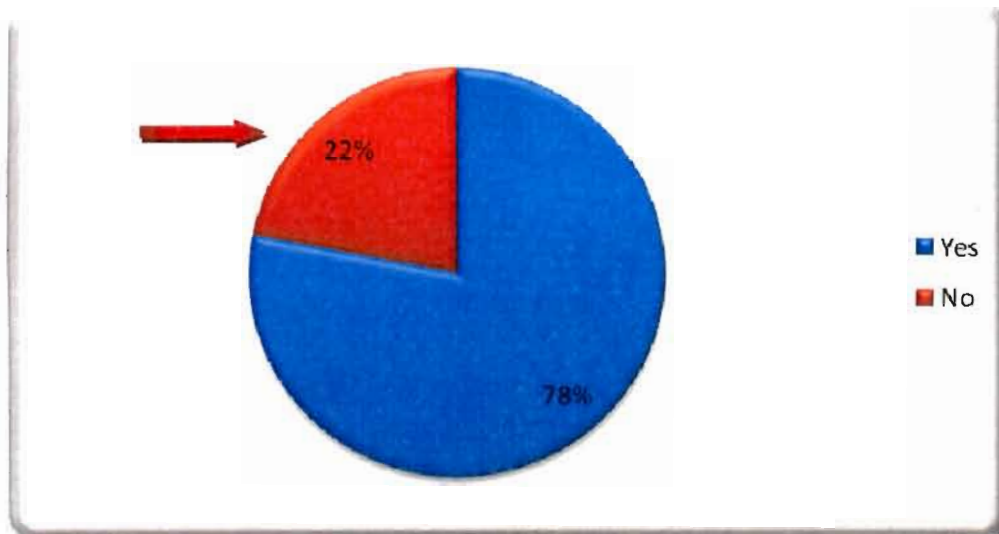
Although I am happy with what I have achieved during my career thus far, my current situation is not satisfactory anymore, and I feel that I am not doing what I really want to do.

**Graph 5.13: Happy with career**



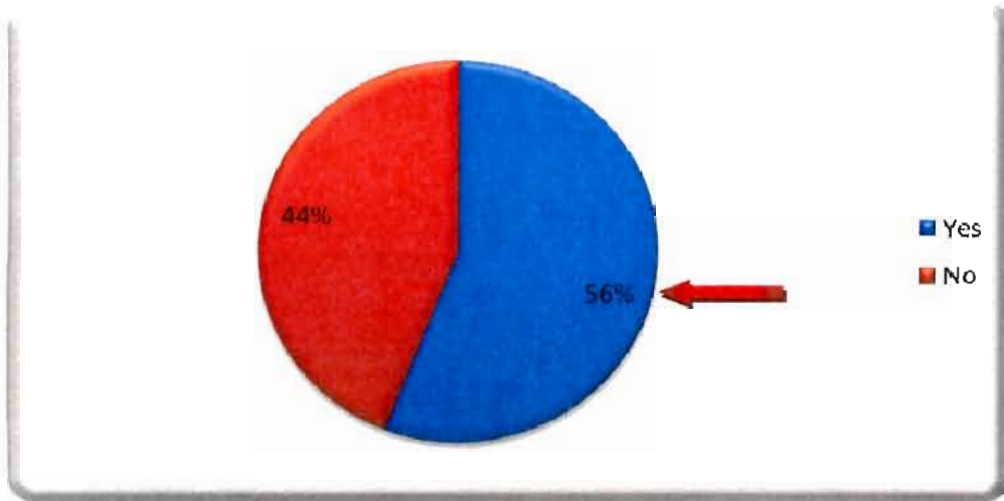
Source: Author's own research

**Graph 5.14: Doing what they really want to do**



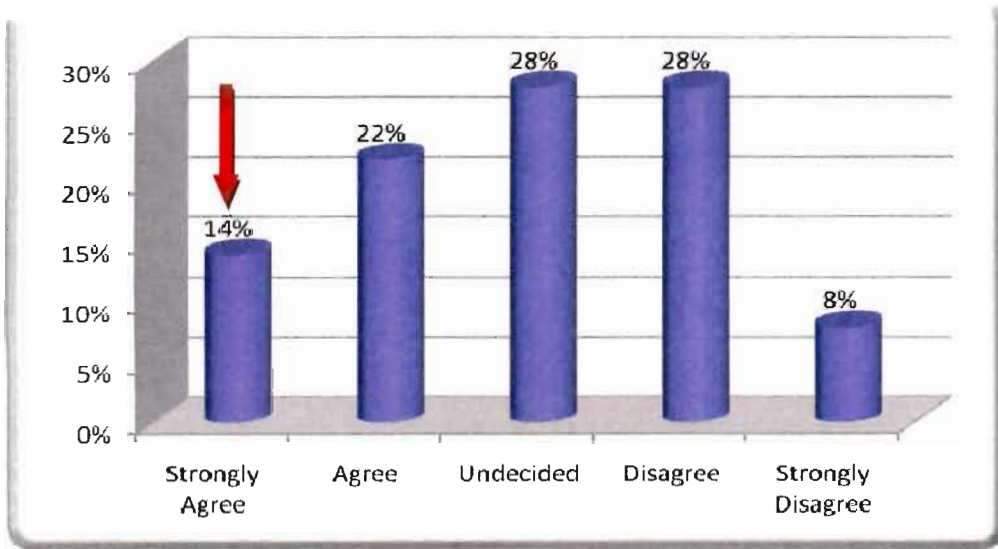
Source: Author's own research

**Graph 5.15: Other career interests**



Source: Author's own research

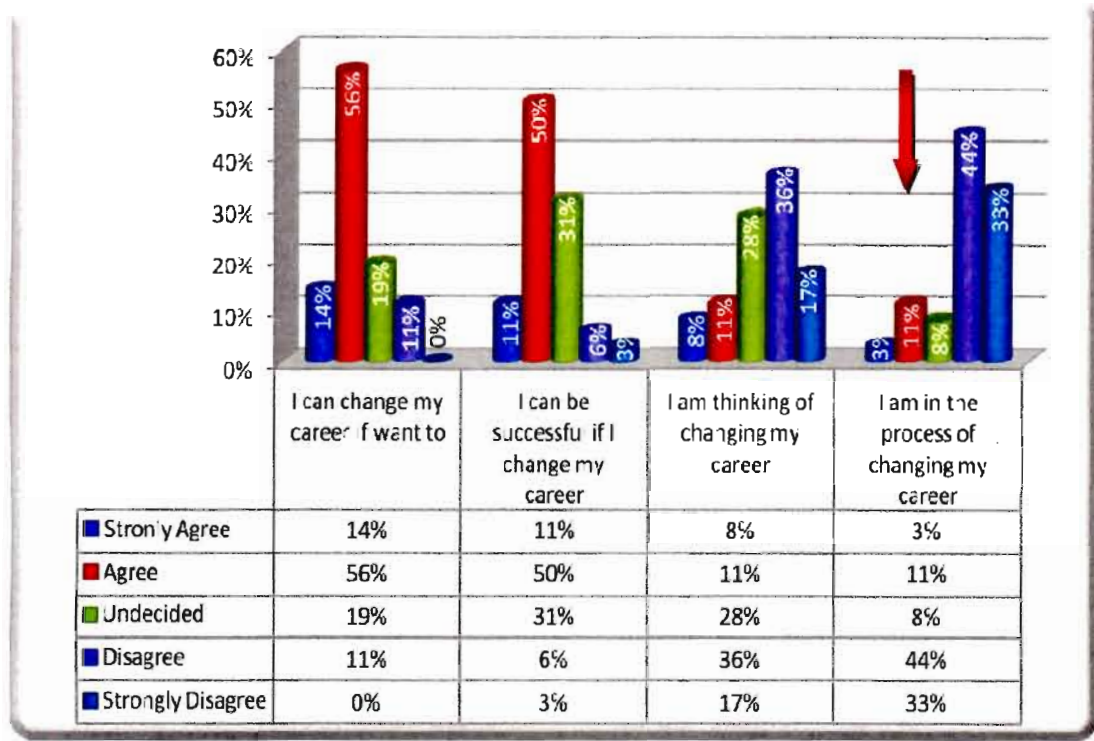
**Graph 5.16: Thinking about doing something else**



Source: Author's own research

I have reached the point where I have the knowledge and insight to know that I can change my career successfully if I want to and I have started the process of changing my career.

**Graph 5.17: Changing of career**



Source: Author's own research

### 5.3 My career change process

As mentioned in the literature study, career management is the responsibility of both the individual and the organisation. Although the organisation can provide us with opportunities for self development, the individual cannot be forced into any action. The first step of my career re-engineering process started with the realisation that I am ultimately responsible for my own career. Acceptance of this responsibility does not happen in isolation. The acceptance of this responsibility goes together with being honest with yourself and knowing yourself.

A well-paid job is no longer satisfactory when your working life does not provide enough challenges and stimulation to be entirely fulfilling. The

biggest difficulty is to recognise and admit your current situation to yourself. In my experience people tend to drift into a “comfort zone” which could be a very difficult state to get out of. This is firstly because one is content with your current situation and secondly there is change involved if you want to move on. One of the key factors that helped me during my re-engineering process was to be positive and to seek positive influences. This could be done by reading applicable literature such as “The Secret” by Rhonda Byrne and “Where would I rather be?” by Barbara Quinn. It may also help to attend sessions and workshops that focus on the inner self and self motivation.

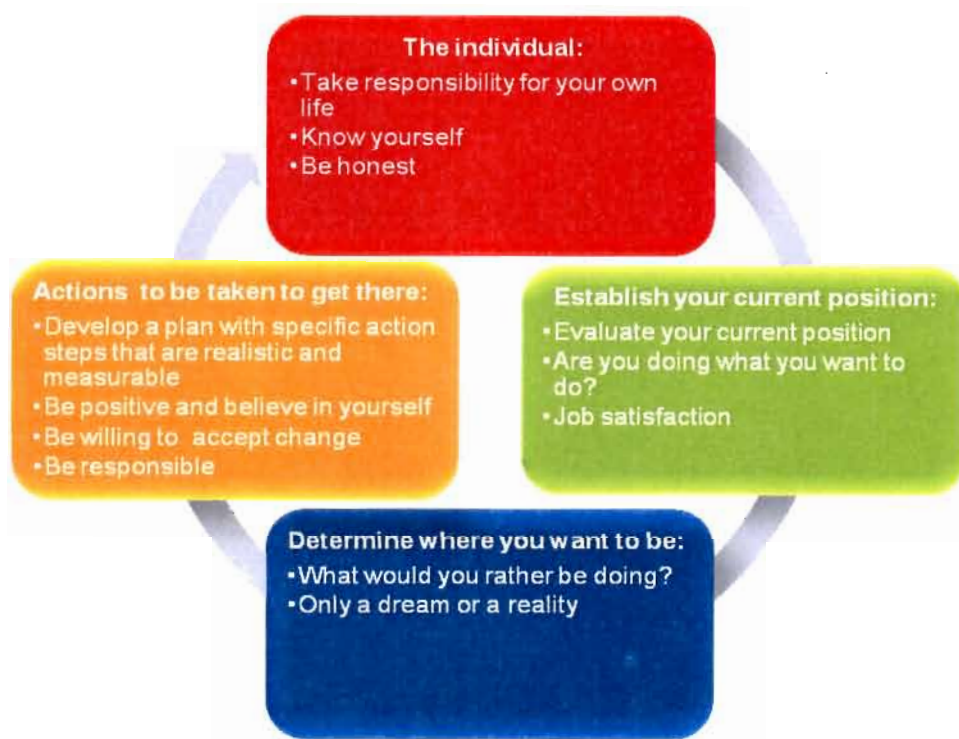
Once I had done an honest evaluation of my current situation, the next step was to decide what it was that I ultimately wanted to do. My ultimate dream was a career in aviation and the next step in the process was to develop a plan to make the change into this field in a responsible manner. I did not just leave my current job, but started to do my Private Pilot’s License (PPL) in my own time. Having completed my PPL, I am now building up hours and also studying to complete my Commercial Pilot’s License. Once I have reached this stage I will be able to pursue a full-time career in aviation.

#### **5.4 Re-engineering an engineering career**

Due to the dynamic environment that we live and work in a person must look at the “re-engineering of one’s career” as a continuous process.

The following is a generalised view for the re-engineering of an engineering career in a responsible manner.

**Figure 5.2: General process for re-engineering an engineering career**



Source: Author's own

The first step in the re-engineering process is for a person to realise that what you are doing is not really making you happy nor is it really what you should be doing. A person needs to take responsibility for his/her own career and future, and must realise that the choice to make the transition, from doing what you have to do to what you want to do, is your own.

The next step in the process is to evaluate the “now” and to decide whether this current job/career is what you want to do for the rest of your life. You need to evaluate to what degree you are experiencing personal fulfilment and job satisfaction in your current situation. An important question to ask at this stage is: Are you willing to continue like this for the rest of your life?

The third step is to decide what you really want to do. Can this dream job be a reality or would it stay only a pipe dream?

The next step is to develop an action plan to realise the dream. It is not always easy to leave the comfort zone and venture into a new career. Action steps should be put in place. It is not always possible to step into that dream job at once. Sometimes it is necessary to work at it for a while before the big leap can be made. It is important that your plan should consist of certain steps with achievable goals. One should believe it is possible and stay focused on the end result.

## **5.5 Summary**

This chapter is a summary of my career life and the choices I have made to get to where I am today. It was sometimes difficult to make certain decisions, because of the comfort zone that we so easily fall into. I learned, very early on, that to make a success of my career life I must take charge of it myself and should not depend on the school for career guidance.

## CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

*“People who consider themselves victims of their circumstances will always remain victims unless they develop a greater vision for their lives.”*

- Stedman Graham

### 6.1 Introduction

In the previous chapter the researcher presented his own experience as a case study. This chapter provides an overview of the study and describes the final conclusions and makes recommendations. The limitations of the study and implications for future research are discussed. The chapter concludes with recommendations, limitations, benefits and suggestions for further research.

### 6.2 Overview of the study

The primary objective of this study was to evaluate if the time and money invested in an engineering profession could be viewed as a sustainable investment in the event of an individual making a career change at a later stage in his/her working life.

Chapter one of this study defined the problem statement and the objectives of this study. The theoretical objectives and literature study were described in chapter two. In this chapter a comprehensive study was conducted on concepts such as the choice of a career, career management and career development. It was determined during the literature study that to have a fulfilling and rewarding career life, planning, developing and managing one's own career is an integral part of having the ultimate successful career. It was also noticed that to gain a fulfilling personal life and job satisfaction it is sometimes necessary to re-engineer one's career.

Chapter three describes the design of the experimental work that was conducted by the author. This includes the way in which the information was gathered, the size and choice of the population group, the evaluation of the information and the processing and testing of the analysis model. In chapter four the findings are described in detail, with the support of graphs and tables. In chapter five the researcher utilised his own experience as a case study.

### **6.3 Conclusions**

Based on the problem statement the primary objective of this study was to evaluate whether the time and money initially invested in an engineering profession is a sustainable investment in the event that an individual makes a career change at a later stage in his/her working life. The question then arises: If a person desires to change his career, how should he do this?

Taken the amount of money and time invested in an engineering career, as shown in the previous chapter, it is imperative that an individual makes the correct career choice in the beginning. Taking the fact that it is a highly paid job and “interesting” as motivators for the choice of career does not necessarily mean that the individual will be happy and successful in the pertinent choice. The education system should also provide more professional career guidance at school level for learners leaving school.

If a person decides to make a career change it must be done in a responsible manner. In the previous chapter the researcher plotted a general process that will assist a person to make a career change. The first and most important step starts with the individual – knowing oneself and the willingness to accept responsibility for oneself. The rest of the process consists of evaluating the current situation, establishing where you want to be in the future and finally taking the steps to reach the future position. It is essential that one must set

goals which are achievable in order to make a successful career change. This is a continual process which will allow a person to always evaluate both yourself as well as your current situation.

Regarding the secondary objectives:

- conduct a survey in order to determine why current students choose a career in engineering:
  - Information gathered by means of the student questionnaire indicates that the main reasons for their choice to study engineering is firstly because they are interested in it, secondly for money and thirdly because they enjoy it. The main reasons indicated by the engineers for their choice of career is firstly “passion and something they love to do”, secondly money.
- conduct a literature review in order to identify those factors that play a role in initial career choices:
  - During this research it was clear that various factors can influence a person’s choice of career. These factors include interest, self-image, personality, social background as well as influences from parents, teachers and career guidance experts. This research has shown that most of the students felt that they themselves were responsible for their career development at school level. Although the majority of students did discuss their career choice with their parents, only fifty five percent of the students did receive advice from a professional career guidance expert. More than half the students who formed part of this research project studied by means of bursaries – which can also be an influencing factor in the choice of career due to the cost of university education.
- identify the factors that play a role in subsequent career changes and choices:
  - During the literature study of this research it was found that it is important to be motivated by and satisfied with one’s career. From

the different motivation theories that the researcher studied for the purpose of this study, it is clear that individuals are motivated by different factors. According to the research, the first reason why engineers want to change their careers is because they have not achieved their goals. Locke's model of goal setting explains that working towards a goal is a key source for work motivation, as a result the non-achievement of goals can be very demotivating. Secondly they feel that they are not fully rewarded for the job they are doing. To a lesser extent, another reason is that they do not find their job personally challenging and satisfying. Job satisfaction refers to the enjoyment and fulfilment that a person receives from his or her job. One of the responses to job dissatisfaction is to "exit" – when a person looks for a new job. Although the majority of the students indicated that they are happy with their career choice, some did indicate that they would change from engineering to something else if they could. If possible these students would like to subsequently change their careers - the most preferred fields being medical, agriculture and chemistry. The fact that these students would like to change their careers indicates that they only started to explore their real career interests after starting their engineering studies.

- measure the perceptions of those individuals who are in the engineering profession with regard to their initial career choice and the amount of time and money expended on their original career choice:
  - Responses has shown that the majority of the respondents to the engineering questionnaire have invested between R100 000 and R200 000 in their careers. The average years to complete their studies are indicated as between 4 and 5 years, but in some cases it took longer due to part time studies.

## 6.4 Recommendations

It was determined during the literature study that to have a fulfilling and rewarding career life, planning, developing and managing one's career is an integral part of having the ultimate successful career. Based on the study it is recommended that career guidance should start very early in the child's life. From the results of this study it is clear that there is a big gap regarding career guidance at school level. Schools should spend more time and effort to give proper career guidance to pupils, especially before choices regarding subjects need to be made. Schools can also start to make information about professional career experts available to pupils. Exploration of career choices should be a positive undertaking for high school students. A thoughtfully constructed career choice process will provide a meaningful, productive and satisfying framework for making quality career choices. Some students did not begin to explore real career possibilities until after graduation. Tertiary education institutions should provide students with relevant information earlier in their studies. Institutions could be more proactive, giving students information that they could test and use in their daily studies and ultimately apply to their choice of career.

Although organisations can assist employees with career development it can only be done to an extent that will benefit both the employee and organisation. Once advice about career development is given, it remains the responsibility of the individual to take ownership of his or her own career. It was also noticed that to have this fulfilling personal life and job satisfaction it is sometimes necessary to re-engineer one's job or career. The research has shown that there are people in the industry who are contemplating a change in career. In order to choose a career that can be both challenging and rewarding, you should know your own passion and what it is that you really want to do.

To achieve all of the abovementioned the individual needs to be motivated, whether it is basic needs like eating and sleeping or higher needs like achievement or recognition.

### **6.5 Limitations of this research**

The two most important limitations of this study were:

- Only evaluating insights of students from the North-West University and engineers working for a petrochemical company.
- The target population for both the student and the engineering questionnaires are not fully representative with regard to race and gender and therefore only conclusions can be made.

### **6.6 Recommendation for further study**

Arising from this study the following opportunities for further research were identified:

- Future studies should concentrate on career guidance at school level in order for the learner to have a better idea and choice of what he can do and ultimately what he wants to do.
- The research should be extended to include additional tertiary education institutions as well as engineers working in other industries, because a more accurate statistical result might be achieved.

### **6.7 Contribution of this research**

The main contribution of this research is that it expands our knowledge of why individuals initially choose a career in engineering, time and money spent on this choice of career as well as the ultimate decision to change from a career in engineering to something else. By knowing that other individuals have made career changes from the engineering profession and why, will

encourage others to set realistic career goals and find challenging careers. The value, to the researcher personally, is that he has a better understanding of why he decided to change his career. Is it a real choice or is it only a pipe dream that will eventually fade away because of the challenges facing him in the future? The study also supports the opportunity for future research to investigate the importance of professional career guidance at school level.

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## **8. APPENDICES**

### **8.1 Appendix A: Student Questionnaire**

## MEMORANDUM

To: Academic student member:  
Faculty of Engineering  
North-West University, Vanderbijlpark

From: Marius Odendaal  
M.Eng (Development and Management)  
Faculty of Engineering  
North-West University  
CRCED – Vaal

Date: 1 August 2008

Re: **ANSWERING OF QUESTIONNAIRE BY STUDENTS**

Dear Sir/Madam

I am currently a Master Degree student at the North-West University, and my dissertation deals with career management. My research title is as follows: ***'Re-engineering an Engineering Career'***. As part of my research project, I need to collect information from the academia in order to validate my studies; therefore a questionnaire has been formulated to collect the necessary data. The successful completion of my research study requires your assistance – a few minutes of your time to complete the attached questionnaire is all that I ask.

The answering of this questionnaire should take you between 25 and 30 minutes and the outcome of this research study will be invaluable for future career management studies. The information that you will provide will be treated in **TOTAL CONFIDENCE** and your responses to the questions will be considered **ANONYMOUS**.

Thank you for the courtesy of your assistance.

Sincerely yours,  
Marius Odendaal

## STUDENT QUESTIONNAIRE ON CAREER MANAGEMENT

Please complete the questionnaire by simply writing or selecting the correct answer next to the question. If insufficient space is provided, please feel free to provide additional information on separate sheets, stapled to this questionnaire. In this event, please be sure to indicate very clearly the number of the item to which you are responding.

### SECTION A

#### PERSONAL AND BIOGRAPHICAL INFORMATION

Although the responses to the following questions will be treated completely anonymously, it would be very useful if you provided the personal details requested.

1	Your gender is?	Male Female	1 2
2	What is your current age?	18-24 years 25-29 years 30-34 years 35-39 years 40-44 years 45-49 years 50-54 years 55-63 years	1 2 3 4 5 6 7 8
3	What is your race?	Black White Coloured Asian	1 2 3 4
4	Where did you grow up?	Province:  Town:	
5	Number of children living in your home?	0 1 2 3 4 Other (Specify):	1 2 3 4 5
6	What is your father's highest qualification?		
7	What is your mother's highest qualification?		

8	Is your father employed?	Yes No N/A	1 2 3
9	If you have answered "Yes" to question 8, what is your father's occupation?		
10	Is your mother employed?	Yes No N/A	1 2 3
11	If you have answered "Yes" to question 10, what is your mother's occupation?		
12	How would you describe your relationship with your father?		
13	How would you describe your relationship with your mother?		

## SECTION B

### STUDIES AND CAREER INFORMATION

1	In what engineering field are you currently studying?	Electrical Mechanical Chemical Civil Metallurgy Other (Specify)	1 2 3 4 5
2	Do you have any other qualifications?	Yes No	1 2
3	If you have answered "Yes" to question 2, please explain		
4	Do you study with a bursary?	Yes No	1 2
5	If you have answered "Yes" to question 4, with who is the bursary?		
6	If you have answered "No" to question 4, who is paying for your studies		
7	Are you happy with your choice of study?	Yes No	1 2
8	Did you discuss your career choice with your parents/guardian?	Yes No N/A	1 2 3
9	Which career path did your parents/guardian suggest?		
10	Were you advised about studying engineering by a professional career guidance expert?	Yes No	1 2
11	In your opinion, who do you think is responsible for <b>your</b> career development at school level?	Yourself Parent Teacher Career counsellor	1 2 3 4
12	Why did you choose to study engineering? Explain		
13	If given the opportunity, would you change your career from	Yes	1 2

	engineering to something else	No	
14	If you have answered <b>"Yes"</b> to question 13, what would you prefer to study or do?		
15	What study year are you currently busy with?	1 year	1
		2 year	2
		3 year	3
		4 year	4

*I thank you for completing this questionnaire, your input is appreciated.*

## 8.2 Appendix B: Engineers Cover E-Mail and Questionnaire

Sir/Madam

I am currently a Master Degree student at the North-West University, and my dissertation deals with career management. My research title is as follows: '**Re-engineering an Engineering Career**'. As part of my research project, I need to collect information from the workforce in order to validate my studies; therefore a questionnaire has been formulated to collect the necessary data. The successful completion of my research study requires your assistance – a few minutes of your time to complete the attached questionnaire is all that I ask.

The answering of this questionnaire should take you between 3 and 5 minutes and the outcome of this research study will be invaluable for future career management studies. The information that you will provide will be treated in **TOTAL CONFIDENCE** and your responses to the questions will be considered **ANONYMOUS**.

Please click on the link below to enter the survey.

<http://intwww.sasol.com/SasolESurvey/loader.asp?http://intwww.sasol.com/SasolESurvey/TakeSurvey.aspx?SurveyID=86MJ85>

Please note that the closing date of the survey is the 19<sup>th</sup> of September. I would appreciate it if you could complete it by then.

Thank you for the courtesy of your assistance.

Sincerely yours,

**Marius Odendaal**

Telephone: +27 (0)16 960 5171

Facsimile: +27 (0)11 522 0645

Cellular: +27 (0)83 631 2800

Email: [marius.odendaal@sasol.com](mailto:marius.odendaal@sasol.com)

## Engineers Questionnaire on Career Management

### Section A

#### Personal and Biographical Information

1. Gender\*

- Female
- Male

2. What is your current age?\*

- 19 - 24 years
- 25 - 29 years
- 30 - 34 years
- 35 - 39 years
- 40 - 44 years
- 45 - 49 years
- 50 - 54 years
- 55 - 63 years

3. What is your race?\*

- Black
- White
- Coloured
- Asian

4. Are you single, married or divorced?\*

- Single
- Married
- Divorced
- Other

5. What is your highest qualification?\*

6. What is your present job title?\*

7. Please select the number of years you have been employed in the Engineering field.\*

- 1 - 3 Years
- 4 - 7 Years
- 8 - 11 Years
- More than 11 Years

8. How much money did you spend on your current career choice?\*

- R0 - R50 000
- R50 000 - R100 000
- R100 001 - R200 000
- More than R200 000

9. How many years did it take for you to complete your current qualification?\*

10. Do you think that the career you have chosen is what you would really like to be doing?\*

- Yes
- No

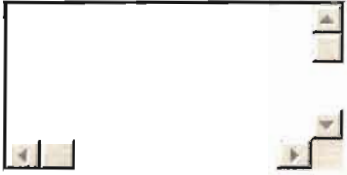
11. If your answer is No to question 10, please elaborate. If you answered Yes, please enter "Not Applicable" into this field and continue.\*

12. Do you have any other career interests? E.g. Education, politics, aviation

- Yes

No

13. If your answer is Yes to question 12, please elaborate. If your answer is No, please enter "Not Applicable" in this field and continue. \*



14. If given the opportunity, would you change your career from engineering to something else? \*

Yes

No

15. If you answered Yes to question 14, please explain what you would like to do? If you answered No, please enter "Not Applicable" into this field and continue. \*



## Section B

### Career Information

16. Use the following score (numbers 1 - 5) to describe how you feel about each of the statements below.\*

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I am happy with my career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned my career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I chose this career because I think I can make a lot of money.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I chose this career because I just wanted to study something.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I chose this career because I was influenced by my parents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I chose this career because I got a bursary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I chose this career because it is my passion and something I love to do.

I have achieved the goals that I have set for myself in the beginning of my career.

I think about doing something else.

I did plan for this career in engineering.

I only work because I have to earn a living for my family.

I find my job personally challenging and satisfying.

I am fully rewarded for the job I do every day.

I can change my career if I want to.

I can be successful if I change my career.

I am thinking  
of changing  
my career.



I am in the  
process if  
changing my  
career.



Done

Cancel