

UNIVERSITY OF KWAZULU-NATAL

**ECONOMIC CHANGES AND GOVERNMENT POLICY  
ON THE DEMAND AND SUPPLY OF CIVIL ENGINEERS  
IN SOUTH AFRICA**

by

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## DECLARATION

With the signature below I, Rajeev R Sooklall, hereby declare that the work that I present in this thesis is based on my own research, and that I have not submitted this thesis to any other institution of higher education to obtain an academic qualification.



RR Sooklall - 205524355

28 September 2007

Date

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## ABSTRACT

University of KwaZulu-Natal

Abstract

### ECONOMIC CHANGES AND GOVERNMENT POLICY ON THE DEMAND AND SUPPLY OF CIVIL ENGINEERS IN SOUTH AFRICA

Rajeev R Sooklall

South Africa, still very young in its democracy, has undergone numerous changes, both in terms of government and its economy. The new government with its challenge of righting the wrongs that apartheid left behind has brought about sweeping policy changes. Amongst these changes, was the implementation of new strategies in government's expenditure regarding infrastructure development. In addition, to address the transformation issue of improving representation, job opportunities and income amongst the previously disadvantaged people, government brought about the Black Economic Empowerment (BEE) and the Affirmative Action (AA) policies. These changes have arguably had more of a negative impact than a positive one, especially concerning civil engineering professionals in both the private and public sector.

This dissertation discusses the above policies and the effects upon the demand and supply of civil engineers, technologists and technicians in South Africa. Since 1994 the South African government has steadily increased its budget towards infrastructure development. The recession during the seventies and eighties has created major problems with regards to secession planning which has resulted in the high skills shortage within this industry. The other factor that has contributed heavily to the skills shortage is the implementation of BEE and AA, as many civil professionals have left the industry or the country. The increase in infrastructure development in South Africa highlights the shortage of civil engineering professionals and the supply issues associated with perceptions within the industry coupled with the poor maths and science marks of matriculants not meeting the minimum university or technikon entry requirements.

The trend at eThekweni municipality shows that there are more technicians and technologists than engineers. The municipality is finding it difficult to employ engineers as there are few in the industry and that, private firms are offering them much higher salaries. The results of the research show that both job satisfaction and salaries are important issues for civil engineering professionals that are currently in the industry. In addition, a small percentage indicated their willingness to leave the country due to the high crime rate, safety for their family and high salaries being offered abroad.

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## TERMS AND ABBREVIATIONS

AA	Affirmative Action
BEE	Black Economic Empowerment (BEE)
DoL	Department of Labour
DPW	Department of Public Works
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
SAICE	South African Institute of Civil Engineers
ECSA	Engineering Council of South Africa
HSRC	Human Science Research Council
FDI	Foreign Direct Investment
IMF	International Monetary Fund
RDP	Reconstruction and Development Programme

## *CHAPTER 1*

### **LITERATURE REVIEW**

#### **1.1 INTRODUCTION**

Where have all our civil engineers, technologists and technicians gone? This is the question currently being asked by many South African consulting, construction companies and local government. The reason for this question comes in the wake of the 2010 Soccer World Cup being held for the first time in Africa, with South Africa being the host country for this great event. South Africa, currently in its 12<sup>th</sup> year of democracy was chosen to represent the African continent due to its relatively good infrastructure and political stability. However true this may be, the existing infrastructure does not meet current demand. With declining numbers of engineers, technologists and technicians and the structural changes in the economy, South Africa must increase their current infrastructure capacity to accommodate the 2010 Soccer World Cup event and for future infrastructure projects.

In light of the above, this research will address the South African situation regarding the reasons to why there is such a high decline in engineers, technologists and technicians. The demand for civil engineering professionals has peaked, however the availability of engineers, technologists and technicians is far below this demand. The research will critically analyse the reasons associated with the structural changes in the South African economy together with current government policies that have lead to civil engineering professionals leaving the industry and the shores of South Africa.

## **1.2 STATEMENT OF PROBLEMS**

The problem is a worldwide shortage of engineers, technologists and technicians, South Africa included. Research carried out by Steyn and Daniels (2003), showed a great fluctuation in the supply and demand of both Engineers and Technicians in South Africa. Indeed, according to Mazumdar and van Seventer (2002) and Fedderke, Henderson, Mariotti and Vase (2001), the South African economy has undergone a process of structural change in the last 30 years marked by two features. Firstly, the relative changes in the contribution of various sectors to the Gross Domestic Product (GDP), namely a reduction in agriculture and mining's share and an increase in the share of manufacturing and services. Secondly, the relative changes within sectors with respect to labour productivity and capital (and knowledge) intensity.

The research carried out by Steyn and Daniels (2003), illustrates the demand for civil engineering professionals declined recently and shifted partly towards a requirement for 'urban engineering'. These Engineers are now required to have skills relevant to large residential projects, and an understanding of the development of the built environment, including housing developments, transport and water treatment. In addition, there is a growing importance for technical knowledge in computer aided design (CAD), modeling and simulation, and project management skills.

Recently, Allyson Lawless former president of the South African Institute of Civil Engineers (SAICE), found in her research that only 11% of all civil engineering professionals are currently active in local government, with a mere 5% active in national and provincial government (Lawless, 2005). In addition, she acknowledged that the mass migration of 6000 qualified civil engineers out of the industry is at least partly due to a decline in civil projects over the past three decades, and remains adamant that transformation is behind the dearth of engineering skills in local government. She said that after transformation to democratic rule, many white engineers were offered lucrative retirement packages to make way for greater black representation. Unfortunately, there were not enough black skilled engineers with the necessary experience to fill in the void.

### **1.2.1 Overall problem statement**

#### **1.2.1.1 Characterisation of Manifest Problem**

The changes in the economy and government policies will impact on the demand and supply of engineers, technologists and technicians in South Africa. Currently South Africa is experiencing a great shortage of civil engineering professionals, especially in preparation for the 2010 World Soccer Cup.

#### **1.2.1.2 Formulation of Problem**

In an ideal world, these problems would not exist and there would be a balance in demand and supply. However, due to globalization and the structural changes in the economy (changes in growth); there has been a major shift in labour demand and supply in industries throughout the world. There are some countries where there is an over supply and under demand for professionals. While this situation is not evident everywhere in the world, many countries are experiencing immense shortages in skilled professionals, as is the case in South Africa. Current research by Lawless (2005) has shown a major decline in the number of practicing engineers, technologists and technicians in the South African market. The shortage in highly skilled civil professionals is being experienced in both Public and Private sector. The impact of these shortages can be seen in the failure of many municipalities in providing basic infrastructure to their area of responsibility. One reason that has contributed to this situation in the public sector is government policy on transformation, namely affirmative action (AA).

### **1.2.2 Subproblems**

#### **1.2.2.1 Decomposition of problems into sub-problems**

The issues raised above, are cause of great concern as the demand for civil professionals are critical for the successful implementation of infrastructure in South Africa. It is therefore imperative that strategies be developed to increase the supply of civil engineering professionals in South Africa to handle its current and future infrastructure growth. These strategies need to

look at the demand (from the industry) and supply (from institutions) of engineering professionals to address this shortfall.

To adequately address the issues around economic changes, the following sub-problems have been developed namely, the reasons that effect economic growth, changes in the infrastructure development, attitudes and cultural barriers in the public sector, and effects on the increase in boundary demarcation in Local Municipalities. The issues around Government Policy are as follows:

- matters associated with transformation, in particular, affirmative action;
- current policy regarding BEE and tender awarding to empowering companies;
- policy regarding the quality of education especially in the areas of mathematics and science.

### **1.3 OBJECTIVES**

This study will analyse the effects of economic changes and government policy on the supply and demand of engineers, technologists and technicians in South Africa.

To address these problems the following points will be used to investigate and provide solutions:

- to critically evaluate the effects of structural changes on the demand for engineers, technologists and technicians;
- to determine the reasons for the migration of engineers, technologists and technicians to other sectors and overseas;
- to critically evaluate the effects of technology on the demand for engineers, technologists and technicians;
- to compare the salary structures for future and current engineers, technologists and technicians;
- the strategic intent of local government and municipalities to implement measures to increase the supply and the retention of future engineers;
- to demonstrate how the current academic curriculum supports the changing skill requirements for future engineers;

- To evaluate national government policy on the supply of engineers, technologists and technicians.

## **1.4 CRITICAL QUESTIONS**

- How is the demand for engineers, technologists and technicians affected by economic change?
- How has the skills requirement for engineers, technologists and technicians changed?
- Does the labour market for engineers, technologists and technicians provide incentives to encourage students to study engineering?
- Are tertiary institutions responsive to changes in the nature of demand?
- Does the South African market offer engineers, technologists and technicians competitive incentives to retain and develop local technical skills?
- What are the reasons why engineers, technologists and technicians are leaving South Africa and/or the industry?
- What strategies are being developed to prevent the brain-drain of highly experienced civil professionals leaving the shores of South Africa?
- What are the implications of importing engineers, technologists and technicians from other parts of the world and are there any transfer of skills to local up and coming engineering professionals?

## **1.5 RESEARCH DESIGN**

- Once the literature survey is completed, a standardized questionnaire will be drawn up to evaluate research problems solved by other researchers.
- Obtain ethical clearance upon completing the literature review.
- Ensure a representative sample of respondents/ interviewees will be targeted.
- Obtain permission from the relevant authorities to access respondents, eg Engineering Council of South Africa, South African Institute of Civil Engineers etc.
- Conduct the actual research.



### **1.5.1 Ethical Requirements**

The ethical requirements for this research were obtained, by writing to the South African Institute of Civil Engineers (SAICE), and the South African Association of Consulting Engineers (SAACE) asking them permission for the use of their information.

### **1.5.2. Representative Sampling**

All the representative sampling and other information relevant to this research is to be obtained from the above mentioned bodies or questionnaires if the information is inadequate.

### **1.5.3. Data Analysis**

The Data Analysis for the research would be done using the SPSS and Microsoft. It will be used for the word processing, tables and graphs.

### **1.5.4. Limitation of the study**

A limitation of the project is that of the accuracy of the data, as once analysed would be used to make recommendations to all concerning bodies and the government. The other limitation is that the research may take long as additional information would be required to fully address the objectives of this research.

## **1.6 OVERVIEW OF DISSERTATION CHAPTERS**

### **1.6.1. Introduction**

The dissertation comprises of six chapters.

Chapter 1 : Literature Review – which covers previous research on:

- Structural changes in South Africa;
- Demand and supply of civil professionals;
- Strategic framework of local government & municipality;
- Staff retention strategies;
- Affirmative action;
- Black economic empowerment.

Chapter 2 : Economic changes in South Africa – which covers the following:

- The South African economy;
- Structural changes in South Africa;
- South African government expenditure.

Chapter 3 : Black Economic Empowerment and Affirmative Action:

- Black Economic Empowerment and the effects on South Africa;
- Affirmative Action in South Africa and its effects on the economy.

Chapter 4 : Demand and supply for civil engineers, technologists and technicians – which covers the following:

- The supply of civil engineering professionals;
- The demand for civil engineering professionals;
- The impacts on the supply and demand for civil engineers professionals in the eThekwin Municipality.

Chapter 5 : Survey Results – which covers the following:

- The analyses of the research questionnaires and the discussion on the current strategy at eThekwin Municipality.

Chapter 6 : Recommendation and Conclusions.

## **1.7 LITERATURE SURVEY**

### **1.7.1 Introduction**

The literature survey was conducted using the following websites:

- OPAC electronic database to identify relevant references using list of appropriate key words;
- NEXUS electronic database to search and identify completed research at other South African institutions of higher education;
- SABINET electronic database to search to identify books in print for interlending from the libraries of other SA institutions of higher education;
- Science Direct electronic database to search and identify electronic (PDF versions) of articles that have been printed in peer reviewed scholarly journals;
- Google's search facilities: Google Alerts, Scholar Google, Google Suggest, Google Print, etc.

## **1.7.2 Survey of literature that relates to the theoretical framework of the dissertation**

### **1.7.2.1 Structural changes in South Africa**

Since the advent of South Africa's first democratically elected government, the construction sector has been expecting a sustained revival within the industry. After experiencing the longest economic recession since the 1940s, which left the construction sector at perhaps a third to a half of its 1980 capacity, the industry now faces the prospect of vastly increased demand from both the public and private sector if the policy objectives of the new government are to be realized (Merrifield, 1996). The following is research that has been completed in this area of structural change in South Africa and the world.

One of the fundamental issues associated with the changes in South Africa is that of the education system. In the apartheid era many black South Africans were denied the right to a proper education. This has resulted in many of them being disadvantaged in bettering themselves and furthering their careers. The research by Heugh (1999) focuses on part of this issue as the research shows that curriculum and language-in-education policy changes which came into force in 1997, is unfortunately flawed both in the conceptualisation process and implementation strategy. The role of African languages, despite policy statements to the contrary, is not adequately addressed.

Research into the changes in education is highlighted by Harber (1998), illustrating two key principles behind these reforms namely greater equity and democracy. This article examined the tensions in South African's educational policy caused by existing policies favouring state initiated redistribution of resources and power on the one hand and the wider context of a mounting emphasis on limiting public expenditure and increasing private provision on the other. It raises the issue of whether South African education would benefit by borrowing from the World Bank to invest in human resources and argues that the potential dangers outweigh the potential benefits.

The research by Herbst (1990), focuses on the structural adjustment of politics in Africa. The structural adjustment programs currently being proposed by the World Bank and the International Monetary Fund (IMF) in Africa have important political consequences. The

research examines the long-term consequences of economic reform in politics, in addition how structural adjustment, if actually implemented, would affect politics in African countries. The paper finds that structural adjustment makes the political climate much riskier for leaders while weakening the central apparatus of the state on which rulers have long relied to stay in power. The implications of the analysis for donors are also discussed.

In addition to structural changes in education by the new government there are also structural changes that are being implemented in other areas. One such area is in management accounting in companies. The research covered by Luther (2001), illustrates that South Africa has undergone fundamental political and structural changes over the last decade, this has affected the operations of companies both directly and indirectly through associated market volatility. In addition the research introduces a new debate about which specific management accounting techniques are particularly influenced by structural change and uncertainty.

Another challenge associated with structural changes in South Africa is that of communication. This has a direct impact on the education system currently being adopted in South Africa. The research by Lowe (1987) looks at the intercultural communication needs which are viewed as fundamental for the promotion and sustaining of positive structural changes that will emerge post-Apartheid. The paper briefly reviews two programs in South Africa addressing the intercultural needs agenda. The effectiveness of this agenda can be seen in the changes happening in education which is becoming key for preparing South Africa for the global market.

#### **1.7.2.2 Demand and supply of civil professionals**

According to Paul Roux, CEO of the Engineering Council of South Africa (ECSA), there has been a distinct shortage of engineers in the country, and the growing number of emigrants is also contributing to the problem. He added that engineering professionals of all kinds are now highly sought after, accounting for 21% of the demand ([www.engineeringnews.co.za](http://www.engineeringnews.co.za)). A country with a thriving economy depends heavily on engineering professionals for the development of new infrastructure; the demand for civil engineering professionals in such an economic environment is very high.

There has also been an increase in engineering students at university and technikons. In particular, the faculty of engineering at RAU recorded a 10.46% increase in engineering students for the year 2003 from the previous year ([www.engineeringnews.co.za](http://www.engineeringnews.co.za)). The following is research that has been completed in this area of demand and supply of engineers.

Research carried by Kibuuka (1999) gives a brief overview of the concept of human resource forecasting and the evolution of human resources forecasting techniques as developed by international agencies such as the United Nations Educational Scientific and Cultural Organization (UNESCO), International Labour Organization (ILO), Organization for Economic Co-operation and Development (OECD) and the World Bank. The research illustrates the development of a non-linear dynamic model to project the demand, supply and the interaction between demand and supply of new entrant engineers to the South African labour market. The model was used to generate non-linear probabilistic projections of the supply and demand for the new entrant engineering skills using 1994 as the base year and a time horizon of 29 years. The implications of the probability projection results on the South African economy, demographics, education and labour market are also critically examined. The main findings of the research show, there is a remarkable projected decline in the demand for new entrant engineers to the South African labour market for both the upper and lower 0.3 percent, 43.3 percent, 27.2 percent and 68.3 percent probability intervals respectively. Conversely, the study predicts a considerable increase in the supply of new entrant engineers to the South African labour market under the four probability intervals. The findings also suggest that equilibrium between the supply and demand for new entrant engineers will be attained at the earliest in the year 2000 and latest in 2011.

The research recommends that the necessity in growth and job creation within the context of globalization and international competitiveness will lead to intensified pressures for more highly skilled workers. South Africa thus needs to adopt a national strategy to address the supply and demand for engineers. Although economic growth is very important for job creation, South Africa also needs to increase its production elasticity of employment through utilizing appropriate technology, the process of inward industrialization and restructuring of school curricula to focus on imparting entrepreneurial skills. The development of academic

support programmes to introduce an appropriately structured bridging year within higher education institutions will facilitate the progress of students from disadvantaged backgrounds.

The major conclusions of Kibuuka (1999) are that a low economic growth rate together with high population growth rates are the most important reasons for the high unemployment levels South Africa is experiencing. In addition to the low economic growth rates is the fact that even if the same growth rates as in earlier years could have been maintained, fewer employment opportunities would be created now than before. The labour absorption capacity of the economy is declining as well as the production elasticity of employment. The Growth Employment and Redistribution (GEAR) strategy should serve to empower more of the black majority since if South Africa is to realize the predicted increase in the supply of new entrant engineers, the skills base must come from the black community.

Further research carried out by Monk (1992) in the United Kingdom on economic aspects of requirements analysis using requirements capture and analysis (RCA) is viewed here as an economic process of information production. The concept of supply and demand between RCA clients and engineers are examined, together with a range of resource constraints on the production of requirements specifications. Resource constraints imply a need for allocative decision making. Implications of resource allocation models are discussed in the context of organizations' pursuit of corporate objectives. Two conclusions are offered: that the same managerial rationale applies to both RCA and corporate demands for improved information systems; and that there is a need for an economic theory of systems development. This research can be used to understand the theory that needs to adopt to balance the future supply and demand of civil engineers in the light of economic changes.

It is very difficult to forecast skilled manpower, however research carried by Verma (1984) in India considers skilled manpower forecasts as the essence of national or regional manpower planning. The research reviews the methodology used in the various exercises made for such forecasts — sometimes done right up to matriculation level — and attempted many realisation comparisons. Even for the high professional categories such as engineers, scientists and doctors it has found serious discrepancies. While it has tried to rationalise them and assessed their actual impact on educational decision-making, it had to take note of very serious data

constraints which make both supply and demand estimates difficult. The data situation in the predominantly agrarian Indian economy has therefore been carefully reviewed and suggestions for adjustments and improvements of data made.

Since occupational structures and their evolution are almost a *sine qua non* of a classical manpower requirements approach, the research takes a close look at the latest available data from the Census and other sources. It certainly found growth in occupational divisions 0, 1 and 2, but sometimes cannot separate the genuine growth from that due to the 'supply' effect. Despite all these limitations the paper notices that manpower planning activity continues to be favoured at practically all levels — national, State, regional or industrial. India having similar economic challenges like South Africa allows for this model to be used to analyse and compare forecasting for civil engineers in South Africa.

Economic changes do indeed play an important role in the demand and supply of engineering professionals in South Africa, especially with changes in government policy. The introduction of Build, Operate, Own and Transfer (BOOT) is one such government policy. The impact of BOOT researched by Hallmans (1999) states that the provision of public infrastructure and services has normally been the domain of national or local governments. This applies to the telecommunications, energy, transport infrastructure, water and wastewater, health sectors and to public buildings, ports, etc. Traditionally the government as the client has carried the responsibility for all stages of the procurement: development, planning, design, financing, construction, operation and maintenance.

The investment, operation and maintenance costs that were borne by the public and not necessarily recoverable by the way of charges from the ultimate beneficiaries: the public. However, state budgets are, as they have often been, limited and the capacities of public agencies are insufficient to meet demand. However, governments have a responsibility towards the public to supply basic needs with regard to infrastructure. Simultaneously there may be substantial amounts of money available in the banking system. As a consequence, in many countries around the world the participation of the private sector in development and delivery of public infrastructure is encouraged. The private financing of public projects offers new challenges and roles for all parties involved: contractors, consulting engineers, operating

companies, the financial sector, legal contract specialists, the international funding agencies and of course national and local governments. The research discusses the development of the privatization concept and the basic principles for using the method where the contractor takes larger financing and operation responsibility for the project and in return gets a long-term engagement with guaranteed return on capital. This concept should be considered especially with projects that relating to local municipalities and the roles that engineering professionals are to play.

The training and skills that are required by engineering professionals are important in the supply of them for current and future infrastructure work; therefore tertiary requirements are important in equipping them with these skills. Research carried out by Eckstein (1988) in Israel illustrates the problem faced by a university in optimizing the quality and quantity of engineers in the face of fluctuating enrollment. This problem is embedded within an equilibrium model that considers the dynamic rational occupation choice of high school graduates and the effect of the students and the universities' decisions on the current and future demand and supply for engineers. The explicit considerations lead to an estimable model that is capable of providing economic forecasts of the demand and supply for electrical engineers under various economic conditions. The estimated model uses aggregate data from Israel. The estimated parameters are consistent with the economic theory and fit the sample well. In particular, the model is capable of estimating the observed cyclical movements in the number of graduating electrical engineers in Israel. This can be used to predict the equilibrium number of civil engineering professionals required towards the end of the century.

The impact, more than anything is that of technology on the human resources requirements for companies in countries. Research regarding this matter carried out by Daniels (1993) examines the relative performance of policy indicators which directly measure innovative activity (such as patent output and expenditure and employed scientists and engineers in R&D) *versus* those measuring general efforts at increasing national levels of human capital. The large number of countries that were included, and the nature of the policy objectives that were adopted, have necessitated a highly aggregated approach using nation-wide attributes and trade in one broad technology intensive sector as the measure of demonstrated international competitiveness.



Simple correlation and multiple regression techniques are used to assess the association of four main sets of national attributes (indicators of direct innovative activity, general human capital development, physical capital formation and natural resource endowment) with technology-intensive trade performance.

The research suggests that policy indicators measuring actual innovative activity and physical capital formation have a much closer link to technology-intensive trade than the general educational effort or output indicators. “Demand-side” measures - which proxy the actual employment and application of resources for R&D purposes — demonstrate the strength of association required for reliable policy evaluation of real national differences in technological capability. The poor performance of the general human capital supply variables highlights the need for a careful consideration of the optimality of the allocation of substantial levels of scarce national resources to broad-based educational output. A number of other significant results concerning the link between technology indicators, technology-intensive trade and economic performance are discussed. This research can be used as a theoretical framework to analyse whether the demand for civil engineering professionals is limited to advancement in technology, ie less engineers required to complete work in a shorter period of time.

#### **1.7.2.3 Strategic framework of local government and municipalities**

In the last 30 years, the South Africa economy has undergone a process of structural change, marked by two features. First, there have been relative changes in the contribution of various sectors to the Gross Domestic Product (GDP), namely a reduction in agriculture and mining’s share of manufacturing and services. Second, there have been relative changes within sectors with respect to labour productivity and capital (and knowledge) intensity (Mazumdar and van Seventer, 2002). These two features constitute significant drivers of employment trends, and consequently affect the demand for engineers, technologists and technicians.

Of late, local government and municipalities have come under a lot of fire for not delivering on infrastructure requirement in their area of responsibility. The current reason for this situation is the lack of capacity, especially regarding the availability of skilled civil engineering professionals. The type of work for engineers, technologists and technicians has changed over

the past three decades, which has resulted in a decrease in the number of civil professionals. Research relating to above subject is as follows.

The research by Lundin and Skedinger (2006) states that decentralisation of decision-making in labour market policy may increase efficiency, since local authorities have first-hand knowledge about local labour market problems. The study examines the effects of a Swedish pilot programme in 1996, which strengthened the role of the local authorities in labour market policy in certain regions. The research indicates that there is no increase in geographical lock-in of the unemployed, but indicates that decentralisation seems to spur local initiatives in the form of projects organised by the municipalities and increase targeting on outsiders in the labour market. The latter result is consistent with the hypothesis that municipalities used their increasing influence in order to improve municipal budgets at the expense of the central government. The finding in this research can be used as a theoretical framework to address current issues and strategies that local municipalities should change or adopt to increase their capacity in infrastructure delivering. The planning by local municipalities of infrastructure would affect economic growth and the demand for civil engineering professionals.

One method to address capacity of local government would be to address the issue of performance management. The research carried out by Kloot and Martin (2000) states that local government has traditionally been concerned with measuring the delivery of primary objectives, such as service delivery, at the expense of secondary objectives such as the determinants of organizational performance. Current strategic management literature suggests that there should be a strong linkage between strategic plans and performance measures. This research reports on the performance management systems in local government using the four dimensions of the balanced scorecard: financial, community, internal business processes and innovation and learning. It shows how the focus in this system of local government has been on the results of council work, ie. financial performance and to a lesser extent on how the community views performance. Local government performance measurement pays much less attention to the determinants, or means of achieving long-term, sustained organizational improvement in internal business processes, and innovation and learning. Strategic performance management demands an approach that recognizes the importance of a focus on

both results and the means of achieving these results. The research suggested a framework for strategic and balanced local government performance measurement. This framework should be used to analyse and compare the current framework to encourage good fundamental financial control which would result in a greater number of projects being planned. This will in turn result in economic growth and in sustainable development and demand and supply of engineering professionals.

Additional research regarding strategic performance in local government carried out by McGill (1988) outlined the difficulty of the transfer to local government. It goes on to develop an alternative framework for planning for strategic performance in local government. A strategic planning system is introduced. The development of appropriate performance criteria is also outlined. The overall argument is an attempt (1) to build a forward momentum into the strategic concerns of local government, (2) to develop a client-based orientation for that strategic concern and (3) to encourage a managerial approach to strategic planning in local government McGill (1988, Pg 78). The theoretical framework can be used to explain current situations and future impacts on the demand and supply of civil engineering professionals within local government.

In addition, research covered by Rider (1983, Pg 75), on strategic planning in local government states that since decisions are made through the political process in local government, planners are being advised to modify their style of planning. Planners acknowledge the need to modify the practice of planning, but reforms are introduced within the framework of the comprehensive plan which continues to serve as the principal planning instrument. This results in internal conflicts within the planning process. The research proposes a planning system which is composed of a series of interacting building blocks. The planning process is molded to fit the management function and capability of those involved in the decision process. Plans are developed as management tools and the planning process accommodates the multiple centres which interact to produce a community's policies and strategies. The relevance of these strategies would need to be looked at and compared with current situations.

Recent research conducted by Stansel (2005) explores the relationship between government structure and economic growth. It uses the new metropolitan data to examine the relationship

between local decentralization and local economic growth. The results from the research indicated a negative relationship between the central-city share of the metro area population and economic growth and a positive relationship between both the number of municipalities per 100,000 residents and the number of counties per 100,000 residents and economic growth. The findings by Stansel (2005) provided support for the hypothesis that decentralization enhances economic growth. The theory behind this research would assist local municipalities in formulating strategies to encourage growth and sustain the demand of civil engineering professionals in the future.

Research carried by Faguet (2004) questions the responsiveness of decentralization to local needs. The research examines whether decentralization increases the responsiveness of public investment to local needs using a unique database from Bolivia. Empirical tests show that investment patterns in human capital and social services changed significantly after decentralization. These changes are strongly and positively related to objective indicators of need. Nationally, these changes were driven by the smallest, poorest municipalities investing devolved funds in their highest-priority projects. The findings contradict common claims that local governments are too corrupt, institutionally weak, or prone to interest-group capture to improve upon central government's allocation of public resources.

#### **1.7.2.4 Staff retention strategies**

South Africa generally has a high employment turnover, as many look for job satisfaction, financial freedom and better career prospects. This problem is quite evident in the engineering sector as many civil engineering professionals have left South Africa for better job opportunities overseas or left the industry for another that can provide growth and sustainable career development. To address the issue of supply of civil professionals it is vital to look at staff retention mechanisms, especially in cases of local municipalities. Research regarding the issue of staff retention is as follows.

The issue of labour turnaround has a negative impact in all industries. The research covered by Rowley and Purcell (2001) draws upon qualitative research carried out in the latter half of 1999 as part of a major project to provide evidence on skill deficiencies for the National Skills

Task Force. Case studies involved in-depth semi-structured interviews with owners, managers and staff in 21 establishments across five sectors of the hospital industry. The article sets out to shed light upon the causes and consequences of labour turnover in the industry, and the coping strategies and counter-measures of employers. It demonstrates that labour turnover is substantially within the control of management, and it has useful implications for practitioners. This research would be useful in determining principles that would enable the retention of civil engineers both in the public and private arenas.

Further research carried out by Gallon, Gabriel and Knudsen (2003) demonstrates that the training, recruitment, and retention of the most qualified professionals for the substance abuse treatment workforce is a crucial underlying strategy in the improvement of client care. This research would apply to municipalities as they provide a service to the people. The research recommends a more aggressive strategy if a quality workforce is to be maintained and improved. These strategies would shed some light on how local municipalities should deal with the high staff turnover issues within the civil engineering sector.

A case study relating to building capacity for urban management in Ghana may indicate what South Africa needs to consider to meet this challenge. The research by Laryea-Adjei (2000) examines the nature of these capacity gaps and analyses specifically the factors contributing to the low attraction and retention of local government staff: politicisation of the bureaucracy, excessive use of external experts, excessive state intervention in skill development and low remuneration of local government staff. In addition, the research critically reviews the then capacity building initiative: the establishment of the (new) Institute of Local Government Studies in Accra. Suggestions to improve capacity building for urban management in Ghana are offered. These include the need to prepare a coherent strategy to guide and co-ordinate stakeholder inputs in capacity building; to place training in the context of institutional development; and encourage the development and use of local expertise in donor assisted projects; and, promote merit-based remuneration of local government staff.

#### 1.7.2.5 Affirmative Action

Affirmative action has played a major role in the employment dynamics not only in South Africa but many parts of the world. Affirmative action by definition refers to steps that are taken not only to eliminate discrimination, but rather to discourage discrimination in employment, education, or contracting just to name a few. Affirmative action attempts to redress the effects of past discrimination as in the case of South Africa which was under apartheid rule. The underlying motive for affirmative action is based on the principle of equal opportunity. This ensures that all persons have the right to equal access to self-development. In other words, persons with equal abilities should have equal opportunities. Affirmative action is applied to selected groups who are targeted characterized by their race, gender, ethnicity, or disability status.

The application of affirmative action in India (termed as "reservation") focused mostly on undoing the caste discrimination. The situation however in South Africa is primarily race-based focus on gender-based discrimination ([www.wikipedia.org](http://www.wikipedia.org)). In South Africa the Employment Equity Act and the Broad Based Black Economic Empowerment Act aim to promote and achieve equality in the workplace, by not only advancing people from designated groups but also specifically disadvantaging others. By legal definition, the designated groups include all people of colour, white females, people with disabilities, and people from rural areas. The term "black economic empowerment" covers empowerment of any member of the designated groups, regardless of race. It is quota-based, with specific required outcomes. By a complex scoring system, which allows for some flexibility in the manner in which each company meets its legal commitments, each company is required to meet minimum requirements in terms of representation by previously disadvantaged groups. The matters covered include equity ownership, representation at employee and management level, procurement from black-owned businesses and social investment programs, amongst others ([thedti.gov.za](http://thedti.gov.za)).

The research carried out by Franchi (2003), investigated whether post apartheid society offers young adults new and different possibilities for constructing their identity, or whether 'race' still constitutes a central defining feature of their representations of *Self* and *Other*. The

findings indicate that while respondents rarely made overt use of 'racial', 'cultural' and national markers in their present and future self-articulated self-conceptions, their future identity aspirations and threats contained indirect references to an apartheid past and the transition to a non-racial democracy. In addition the language orientation across family, social and university life-contexts, was found to reliably distinguish between the self-reported and self-conceptions, with a desire to stay in South Africa.

Cultural attitudes also play an important role in the implementation of Affirmative Action Policy (AAP) within the public and private companies. Research by Combs and Nadkarni (2005), on the attitudes of employees in the United States and India illustrates culture influences AAP. The research shows that many leading Fortune 500 multinational corporation's (MNC) such as Microsoft, Lucent, 3M, General Mills, Dow Chemical Company and Eastman Kodak, expressed their strong support for affirmative action policies. Launching diversity initiatives influences the firm's ability to improve operational and managerial effectiveness across cultures by helping them better adapt to diverse domestic and global markets. According to Evan, Puick and Barsoux (2002) improved cultural ability promotes international trade, knowledge sharing and improved competitive advantage in a global market place. Therefore a critical issue in ensuring a diverse workforce is setting up *affirmative action plans* (AAPs).

The findings by Crosby and Van De Veer (2000) points out that affirmative action as a management tool fosters diversity and opens opportunities for effectively using a diverse pool of individual and collective talents. It is therefore especially challenging in the global environment when setting up AAPs. According to Jain, Sloane and Horwitz (2003) policies designed to address unfair discrimination in MNCs must be mindful of the degree of convergence and divergence of implementation strategies. Factors such as constitutional and legal frameworks, labor market attributes, and historical relations between ethnic and other groups are key factors that may enhance or inhibit effective affirmative action.

The Department of Labour in South Africa has set the following application for 'affirmative action. Affirmative action will ensure that qualified people from designated groups have equal

opportunities in the workplace. The Employment Equity Act applies to all employers, workers and job applicants, but not members of the:

- National Defence Force;
- National Intelligence Agency; and
- South African Secret Service ([www.labour.gov.za](http://www.labour.gov.za)).

In addition the provisions for affirmative action apply to;

- employers with 50 or more workers, or whose annual income is more than the amount specified in Schedule 4 of the Act;
- municipalities;
- organs of State;
- employers ordered to comply by a bargaining council agreement;
- any employers who volunteer to comply ([www.labour.gov.za](http://www.labour.gov.za)).

Affirmative action measures set out by the Department of Labour require employers to make sure designated groups (black people, women and people with disabilities) have equal opportunities in the workplace. Designated groups must be equally represented in all job categories and levels (*Based on Legislation in Section 15, of the Employment Equity Act*).

Affirmative action makes sure that qualified designated groups (black people, women and people with disabilities) have equal opportunities to get a job. They must also be equally represented in all job categories and levels of the workplace (*Based on legislation in Section 15, of the Employment Equity Act*). It also requires Employers to:

- find and remove things that badly affect designated groups;
- support diversity through equal dignity and respect for all people;
- make changes to ensure designated groups have equal chances;
- ensure equal representation of designated groups in all job categories and levels in the workplace; and
- retain and develop designated groups ([www.labour.gov.za](http://www.labour.gov.za)).



#### **1.7.2.6 Black Economic Empowerment**

As already mentioned, the implementation of Black Economic Empowerment in South Africa is the empowerment of any member of the designated groups, regardless of race. South Africa requires an economy that can meet the needs of all its economic citizens. The South African Government's objective is therefore to achieve an adaptive economy characterised by growth, employment and equity by 2014 by means of implementing Black Economic Empowerment measures.

‘Apartheid has systematically and purposefully restricted the majority of South Africans from meaningful participation in the economy. The assets of millions of people were directly and indirectly destroyed and access to skills and to self-employment was racially restricted. The accumulation process under Apartheid confined the creation of wealth to a racial minority and imposed underdevelopment on black communities. The result is an economic structure that today, in essence, still excludes the vast majority of South Africans’(www.thedti.gov.za, Pg 4).

Despite the economic successes and a broad range of state policy, strategy and programme interventions aimed at overcoming economic disparities, entrenched inequalities continue to characterise the economy and act as a deterrent to growth, economic development, employment creation and poverty eradication. Vast racial and gender inequalities in the distribution of and access to wealth, income, skills and employment persist. As a consequence, our economy continues to perform below its full potential (www.thedti.gov.za).

Societies characterised by entrenched gender inequality or racially or ethnically defined wealth disparities are not likely to be socially and politically stable, particularly as economic growth can easily exacerbate these inequalities. Therefore the medium- to long-term sustainability of such unequal economies is vulnerable. Accordingly, in South Africa, the socio-political and moral imperative to redress racial discrimination is also an imperative dictated by the need for sustainable growth (www.thedti.gov.za).

Good progress has taken place to undo the legacy of the past, however, the extent to which the economic success has been shared by all of our people is still inadequate. The introduction of a comprehensive and focused strategy for broad-based black economic empowerment is

therefore imperative. The policy includes the formalisation of partnerships and ‘charters’ with the private sector; the use of a ‘balanced scorecard’ approach for gauging success; and, an Act that allows for the formalisation of guidelines and codes and the establishment of an Advisory Council. In addition, new financial support measures are introduced and existing financial support is better aligned with the strategy. In general there is now considerable information available on the policy intention and approach of government ([www.thedti.gov.za](http://www.thedti.gov.za)).

#### **1.7.3.8 Survey of civil engineering labour market**

Previous research relating to the problem statement has been carried out by Steyn and Daniels (2003), in which they have evaluated the labour market of engineers. The structure of the research was focused on two key themes: the demand for engineers in the labour market and tertiary institutions and the supply of engineering skills.

The research evaluated other issues such as employment trends, occupational shifts and projected demands, including the responsiveness of tertiary institutions to changes in the structure of demand. In addition, the research explores how the tertiary education system has witnessed a reduction in the total number of engineering graduates, and looks at the declining number of eligible school leavers with appropriate maths and science qualifications to enter this discipline. This research also indicates that from the increased numbers of post-graduates that a higher order of skills is required in the labour market.

To contribute further regarding the education level and appropriate maths and science standards of school leavers in South Africa, research carried by Horak and Fricke (2004) illustrates that International benchmark studies confirm that school education of mathematics and science in South Africa is weak and suffers from systemic problems. It also stated that over the past decade there has been a decline in the number of civil engineering students which was inline with trends elsewhere in the world. However, there has been an upward swing of students in the Mechanical, Electronic and Computer Engineering disciplines.

Other research carried out by Merrifield (1998), reviewed the role of the South African construction industry in the delivery of infrastructure. It analysed the industry over the last 30

years to assess the ability to deliver infrastructure in terms of new government's stated policy objectives and identifies key structural weakness regarding infrastructure backlogs.

## **1.8 CONCLUSION**

This research will address the causes and the effects on the demand and supply of the engineers, technologists and technicians in South Africa, particularly focusing on the eThekweni municipality as a case study. The information for this research will be obtained from South African Institute of Civil Engineers (SAICE), Human Scientific Research Council (HSRC) and eThekweni municipality. Questionnaires that have been prepared will be forwarded to all civil engineering professionals and the information then used to achieve the objective of this research. The research questions will be used to fully address the objective of the research. In addition, a literature review is carried out to emphasis the past and current situation regarding the demand and supply of engineers, technologists and technicians in South Africa. The obtained data would then be analysed and compared with the data from the literature review to establish any relationships that affect the demand and supply of engineers, technologists and technicians. Recommendations and conclusions would then be drawn from the analysed data.

## CHAPTER 2

# ECONOMIC CHANGES IN SOUTH AFRICA

## 2.1 INTRODUCTION – THE SOUTH AFRICAN ECONOMY

### 2.1.1 History of the South African economy

In 1994 South Africa held its first multi-racial elections, which were won by the Africa National Congress (ANC). The new government was left with a huge task of trying to restore order to an economy harmed by sanctions, in addition, integrating the previously disadvantaged segment of the population into it. As of 2005, agriculture, that once dominated the economy, contributes only 3.4% to the country's GDP, while services now account for 65.1% ([www.wikipedia.org](http://www.wikipedia.org)).

Table 2.1 below shows the gross domestic product of South Africa at market prices estimated by the International Monetary Fund (IMF) with figures in millions of South African Rand ([www.wikipedia.org](http://www.wikipedia.org)). The table reveals a reasonable level of growth in the South African economy from the 1980's, with a decline in the foreign exchange rate. South Africa's unstable social and economic history has had a great role in leading to the weakening of the rand to its level of R6.36 in 2005.

Year	Gross Domestic Product in Rands at market value	US Dollar Exchange
1980	62,730	0.77 Rand
1985	127,598	2.22 Rand
1990	289,816	2.58 Rand
1995	548,100	3.62 Rand
2000	922,148	6.93 Rand
2005	1,523,254	6.36 Rand

Table 2.1 : South African Gross Domestic Product from 1980 to 2005 ([www.wikipedia.org](http://www.wikipedia.org))

South Africa has the most sophisticated free-market economy on the African continent. The country accounts for approximately 40% of all industrial output, 25% of gross domestic product (GDP), over half of generated electricity and 45% of mineral production in Africa. In addition, South Africa is by far the continent's most important source of foreign direct investment (FDI) with an average of US\$1 billion investment in 1994 (Ndlela and Nkala, 2003).

The South African economy experienced a decline in growth performance over the past four decades, falling from an average of 4.9% per annum for the period 1960 to 1975, 2.3% during the period 1976 to 1989, and to 1.3% during the 1990s. After experiencing an improved average real growth rate of 3.3% in 1995-1996, the economy underwent a sudden slowdown. In 1997 growth declined to 1.7%, and declined further to 0.5% in 1998 (Ndlela and Nkala, 2003). However, since September 1999 the South African economy experienced an upward swing in the business cycle, marking the longest period of economic expansion in the country's recorded history. During this upswing spanning from September 1999 through to June 2005, the annual economic growth rate averaged 3.5% as compared to the decade prior to 1994, where the economic growth averaged less than 1% a year ([www.southafrica.info](http://www.southafrica.info)). During 2000 and 2001, the South African economy grew by 3.4% and 2.2% respectively (Ndlela and Nkala, 2003). The economic growth rate for the period 2001 shows a discrepancy compared to that reflected in Table 2.2 below, as the real GDP for the period 2001 is shown to be 2.7%.

The negative growth rates recorded in the early 90s raise the consideration of better policies to ensure the achievement of a stable growth pattern. The decline in the growth rate also has a detrimental impact on the prevailing high-income distribution inequality, land redistribution problems and absolute poverty levels (Ndlela and Nkala, 2003). The economic growth rates reflected in Table 2.2 illustrate improvements in both monetary and fiscal policies, which has resulted in an exceptional economic growth performance.

<b>SA: SELECTED ECONOMIC INDICATORS</b>					
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Real GDP	2.7%	3.6%	2.8%	3.7%	4.3%
CPI	5.7%	9.2%	5.8%	1.4%	3.9%
CPIX	6.6%	9.3%	6.8%	4.3%	4.3%
Unemployment	29.5%	30.5%	28.2%	26.2%	25.3%
National debt (%GDP)	41.4%	37.1%	35.7%	35.8%	35.1%
External current account balance (% GDP)	0.1%	0.7%	-1.5%	-3.2%	-3.7%
External debt (% GDP)	26%	29.5%	22.4%	19.8%	19.1%
Gross reserves (in months of total imports)	2.9	2.8	2.2	3.1	3.7
Int. liquidity of SARB (in US\$-billion)	-4.8	-1.6	4.8	11.4	19.8
US\$ exchange rate (in rands)	12.13	8.64	6.64	5.64	...

Table 2.2 : South African selected economic indicators ([www.southafrica.info](http://www.southafrica.info))

According to the South African Reserve Bank, there is no sign of this period of expansion ending soon. The gross domestic product (GDP) growth rate was 4.8% during the second quarter of 2005 (compared to 3.7% in 2004 and 2.8% in 2003). In addition, consumer inflation has been on a downward trend since 2002, compared to 9.3% following the September 11 tragedy in New York. Consumer inflation averaged 6.8% in 2003 and 4.3% in 2004 compared to 9.8% in 1994 ([www.southafrica.info](http://www.southafrica.info)).

Prudent fiscal management resulted in South Africa's budget deficit falling from 5.1% of GDP in 1994 to 2.3% of GDP in 2004. The GDP fell to 1.6% in the first quarter of 2005, with the SA Revenue Service collecting a remarkable US\$3.5-billion (R22,26 billion using the R6.36 to the dollar exchange rate for 2005) more than expected. The source of this revenue windfall was not due to higher individual or corporate taxes, as both have fallen since 1994. It was due to the performance of the economy, consumer confidence, and increases in the number of registered taxpayers, from 2-million in 1994 to more than 5-million in 2004. The 2007 Budget

speech, provided for the first main budget surplus ever in South African history. It is anticipated that budget surpluses are expected in both fiscal 2006/07 and 2007/08, reverting to small deficits in the subsequent two years ([www.treasury.gov.za](http://www.treasury.gov.za)).

A growing economy means that there is an increase need for infrastructure development and therefore an increase demand for civil engineering professionals. The problem is that due to the past decade of stagnant growth and poor perception of the civil engineering industry many matriculants chose not to study civil engineering as it was considered to be a dead end job. With the increase growth in the economy, the need for civil engineers has created concern as there are very few experienced civil engineering professionals available to fill these positions.

## **2.2 STRUCTURAL CHANGES IN SOUTH AFRICA**

### **2.2.1 Introduction**

The South African economy underwent a large learning curve following the first democratic elections in 1994. The economic growth rate was declining and the new government had to face many challenges resulting from the legacy that apartheid left behind. As a result of increased unemployment, large scale redundancies and little prospect of positive growth in the corporate sector, government focused on facilitating the job creation potential of small, medium and micro-enterprises (SMMEs) To encourage SMMEs, government introduced the following policies, namely the Reconstruction and Development Programme (RDP) and the Growth, Equity and Re-distribution (GEAR) as a platform to support this initiative (Nasser, 2003). In addition to these structural changes of the RDP and GEAR policies, government in February 2000 announced that formal inflation targeting would be adopted in South Africa as the monetary policy framework (Van der Merwe, 2004). These structural changes are discussed in greater detail with particular focus on their impacts on the civil engineering industry.

### **2.2.2 The Reconstruction and Development Programme**

The South African economy was facing a serious structural problem at the end of the Apartheid era. The final two decades of the National Party's government at time had a particular

damaging effect on the economic climate, which resulted in stagnant economic growth, with the average over the entire period being 1.7%, and a declining per capita income averaging 0.7% annually, increasing unemployment, up from approximately 20% at beginning of the 1970's to about 30% by 1994 and a spiraling debt problem from less than 3% of GDP to more than 9%, and with total government debt more than doubled.

Before the 1994 elections the South African government was relatively isolated from global and continental trends. While structural adjustments programmes were opening most African economies, South Africa was excluded as a result of economic sanctions being imposed on the country due to the apartheid regime. In addition, globalisation pressured governments to move away from direct economic interventions, which resulted in the South African regime being shielded from extensive deregulation and privatization (McDonald, 2002).

Facing this "deep-seated structural crisis", the ANC-led government attempted to address this situation by putting together a policy framework that could begin to address the variety of problems being faced both economically and socially. In 1994, the RDP White Paper was presented to Parliament, identifying economic, social, legal, political, moral, cultural and environmental problems that the country faced. To move towards the alleviation of these sizable difficulties, it was established that a completely new macro- and socio-economic framework was required.

During the 1993/94 election campaign, the ANC brought about the RDP. After winning the first democratic elections in 1994, the ANC government adopted the RDP to improve the lives of the majority previously disadvantaged African people.

The RDP policy consisted of four principle concerns, namely;

- meeting basic needs;
- developing human resources;
- building the economy;
- democratising the state and society.



In order to address the transformation issues on all these fronts, the RDP framework required the following, it needed to be;

- people-centred;
- people-driven;
- innovative in the ways in which it combines growth and development;
- committed to continuously achieving overall coherence and unity of purpose.

The RDP's underlining aim was to understand the all-round and deep seated crisis into which centuries of colonialism and decades of apartheid have plunged the South African society ([www.anc.org.za.htm](http://www.anc.org.za.htm)).

### **2.2.3 The Growth, Employment and Redistribution Macroeconomic Policy Programme**

The RDP was an attempt to reconcile the vision of transformation. As mentioned above the RDP policy, was implemented in order to avoid a negative inflationary and balance of payments consequence which was aimed at redirecting government spending, rather than increasing it as a proportion of GDP. As a result of the RDP's satisfactory outcomes, government initiated the implementation of the Growth, Employment and Redistribution macroeconomic policy programme (GEAR) in 1996 by Minister of Finance, Trevor Manuel. The RDP was viewed has being further refined as the GEAR strategy, which aimed at operationalising the RDP in the context of the global environment within which South Africa exists (Jordan, 1997). Accordingly, Trevor Manuel announced that the GEAR strategy aimed to attain a growth rate of 6 percent per annum and job creation of 400 000 per annum by the year 2000. The policy was also meant to increase investment, especially Foreign Direct Investment (FDI), in the country to help achieve these ambitious goals.

The GEAR program was a integrated strategy based on the following, keeping the real effective interest rate stable at a competitive level, consistent monetary policy to prevent a resurgence of inflation, gradual relaxation of exchange controls, reduction in tariffs, appropriately structured flexibility within the collective bargaining system, and expansionary infrastructure programmes to address service deficiencies and backlogs. In addition the Fiscal

policy was to play a pivotal role, with the following objectives of “renewing the focus on budget reform to strengthen the redistributive thrust of expenditure and a faster fiscal deficit reduction programme to contain debt service obligations, counter inflation and free resources for investment” (Ajam, 2004).

The GEAR programme received wide-spread support from the business sector, and criticism from the labour movement (COSATU and the SACP) and NGOs (South African Council of Churches, SANGOCO), even though the government claimed no major shift in macroeconomic policy and that the GEAR policy actually underpinned the development goals of the RDP. The GEAR policy marked a turning point in economic policy ie “neoliberalism” triumphant over the state-oriented approaches of the RDP (Ajam, 2004, Pg 7).

The labour unions objected to the GEAR strategy on the basis that decreases in budget deficits would be detrimental to economic growth and job creation. The reduction in current government expenditure was viewed as weakening government’s commitment to reducing the social backlogs identified in the RDP. The “People’s Budget” delivered by COSATU identified “the current macroeconomic policy as a major obstacle to development” which aimed to “counter the deep budget cuts on public spending” arguing that budget cuts had compromised service delivery and the satisfaction of basic needs. This view however changed in the 2005/6 People’s Budget speech to which COSATU, stated that government’s fiscal policy stance since 2000 is characterised as “more appropriate”, “moving away from the restrictions and cuts of the late 1990s” and as being “more developmental”(Ajam, 2004, Pg 7).

The GEAR strategy had mixed success. It brought greater financial discipline and macroeconomic stability, but however failed to deliver in key areas. The major disappointment of the GEAR strategy was that formal employment continued to decline, and despite the ongoing efforts of black empowerment and signs of a fledgling black middle class and social mobility, the country's wealth remained unevenly distributed along racial lines. The desperately needed FDI and the economic growth rate also failed to materialise, as the initial target was not realised. The policy came under stringent fire from many critics, especially when growth slumped to only 0.8% (later revised even lower to 0.5% by Statistics South Africa) in 1998 ([www.wikipedia.org](http://www.wikipedia.org)).

The GEAR strategy had achieved one major success in reducing the fiscal deficit, which had reached over 9% of GDP during the 1993/4 fiscal year. The deficit has remained below 3% since the implementation of the GEAR strategy which has resulted in a remarkable improvement of South Africa's fiscal health. The Government's 2002 budget called for a moderate increase in spending to promote faster growth and poverty alleviation ([www.wikipedia.org](http://www.wikipedia.org)).

#### **2.2.4 Inflation Targeting and GDP growth**

In addition to the implementation of RDP in 1994 and GEAR in 1996, the Minister of Finance in the February 2000 Budget Speech, announced a policy of inflation targeting. The policy was a means of helping to bring consumer inflation down and under control, which had been running in the double digits for over 20 years. The South African inflation for 1998 and 2000 fell from 6.9% to less than 6.0% respectively. Using the inflation figure for 2000 as a maximum upper range, the target was set to keep CPIX between the range of 3% and 6% average per annum. In 2001 the rand's rapid depreciation led to increased inflationary pressure and the South African Reserve Bank missed the target during the course of 2002, with an inflation figure averaging 9.3% for the year. An improvement in the inflation figures was achieved in September 2003, with the CPIX inflation rate remaining consistently within the target range of 3 to 6%. The average annual rates of CPIX since 2001 were: 2001 - 6.6%, 2002 - 9.3%, 2003 - 6.8%, 2004 - 4.3%, 2005 - 4.3%. The success in keeping the inflation rate within the target range greatly assisted the government in decreasing the interest rate, which was cut by 500 basis points (5%) in 2003. The combined reduction of the interest rate for the period 2002 to 2006 was 650 basis points.

#### **2.2.5 Impacts of the structural changes on the demand for Civil Engineers**

According to Merrifield (1999), investment in infrastructure used to be an integral part of the South African development strategy, however in the late 1980s, the apartheid regime redirected resources into the security apparatus, which resulted in a decrease in infrastructure spending. The position of infrastructure development in our current economy is defined by the post-1994

government through its Growth, Employment and Redistribution (GEAR) strategy, a macroeconomic policy (Khosa, 2001).

There has been a slow decline in the number of civil engineering professionals (engineers, technologists and technicians) since the infrastructure development heydays of the 1960's and 1970's. The reduced demand by industry during the 80s and 90s, and reduced numbers of graduates has now resulted in a great shortage of civil engineering professionals. In addition, emigration, low rewards and engineering graduates that have been sought after by other industries such as the banking sector, have meant that personnel have left the market at a higher rate than those entering the market through tertiary institutions and immigration (Lawless, 2005).

In the developing world the lack of engineering capacity has negatively affected development. The African continent in particular suffers these effects as a consequence of poor infrastructure development and spending, which has resulted in stagnant or negative economic growth. Therefore, engineering professionals are fundamental to the development of both social upliftment and economic infrastructure. Both the RDP and GEAR policy has show the South African governments commitment towards eradicating poverty by encouraging economic growth and increasing employment. The increase in infrastructure spending from 2002 under the GEAR policy had drastically increased the demand for civil engineering professionals, especially for civil professionals with rural development experience. Inflation targeting policy has given government the much needed leeway of reducing interest rates and encouraging consumer spending, which has resulted in an increase in civil engineering projects. In addition, the government has increased infrastructure spending for the 2010 soccer world cup by building state of the art stadiums, airports and increasing the capacity of the current transportation infrastructure. The South African government's goal of maintaining its target of reaching a 6% economic growth rate by 2014 would lead to an increase in infrastructure development and therefore an increase in the demand for civil engineering professionals. The increase in demand for civil professionals is currently quite evident, the major hurdle now is in the supply of them. This issue will be covered in greater detail in Chapter 4.

## 2.3 SOUTH AFRICAN GOVERNMENT'S EXPENDITURE – 1997 TO 2007

### 2.3.1 Introduction

The analysis of the South African expenditure would give a good understanding of how the government allocates budgets towards their priorities, especially in light of their RDP and GEAR programmes. It is interesting to observe how the governments priorities changed, and what impact this played towards infrastructure development and demand for civil engineering professionals. Government intervention in many developing countries plays a major role in sustaining the economy, it is therefore a very challenging task when prioritising objectives and then allocating budgets for them, as there are many variables that can negatively or positively affect these outcomes. The two major variables that have an impact on the budget expenditure is the account deficit (predominately affected by imports into the country) and foreign exchange rates. The expenditure of the South African government towards infrastructure development showed a direct relationship for the demand for civil engineering professionals during the latter part of 2002.

### 2.3.2 Analysis of National Budget Expenditure

Table 2.3 shows the South African government's main expenditure spanning from 1997 to 2007. The analysis of the National Budget Expenditure is important with regards to the infrastructure development and the effects on the building and civil engineering industry. Government expenditure plays a major role in this sector, as it has a direct impact on the demand for civil engineering professionals and building artisans. The restriction of civil engineering and building projects develops a surplus of these technical people, who then are forced to change industries or leave the country and seek work abroad.

	Budget Allocation
1997	R40 billion for education; R20 billion for health services; R18 billion for social security and welfare; R4 billion for housing;

	<p>R30 billion protection agencies;</p> <p>R19 billion is spent on building the economy and supply side measures (Budget Speech, 1997).</p>
<b>1998</b>	<p>R19 billion towards welfare and social grants;</p> <p>R23 billion towards health services;</p> <p>More than R45 billion was allocated towards education;</p> <p>R3,5 billion towards housing programmes and subsidies;</p> <p>R1,6 billion towards capital spending on water schemes and related infrastructure, and increasing the budget to R1,8 billion in 2000/01;</p> <p>R685 million towards land redistribution and land reform;</p> <p>R500 million allocated towards poverty relief projects (Budget Speech, 1998).</p>
<b>1999</b>	<p>R1,0 billion for poverty relief and employment projects, which included community based public works projects, rural infrastructure investment and development projects managed by non-governmental organizations;</p> <p>R3 billion towards job creation programmes. This included spending on working for water, the municipal infrastructure programme, rural water supply and sanitation, community-based public works programmes, income-generating welfare programmes, training for the unemployed and employment services;</p> <p>R48,5 billion went towards education;</p> <p>R24 billion went towards health;</p> <p>R19,8 billion went towards welfare services and social;</p> <p>R23,5 billion went towards the building of prisons and towards justice (Budget Speech, 1999).</p>
<b>2000</b>	<p>R30 billion towards modernising defence equipment with a strategy to boost investment and exports;</p> <p>R1,1 billion more towards crime fighting;</p> <p>R272 million to be used for teachers' professional development and to support the culture of learning, teaching and service campaign;</p> <p>R 16,8 billion towards provincial welfare;</p> <p>R75 million towards the fight against HIV/Aids;</p>

	R1,2 billion towards poverty, jobs and development (Budget Speech, 2000).
<b>2001</b>	<p>R16 billion was proposed for provinces to strengthen social service delivery and other priority needs;</p> <p>R4 billion was allocated to the criminal justice sector for increasing personnel, additional vehicles and an improved salary dispensation for police;</p> <p>R7,8 billion was allocated for supplementary infrastructure investment and maintenance programme, with a portion allocated for flood damage repair in poor areas;</p> <p>R2 billion was allocated towards key administrative services, including the SA Revenue Service for improved tax administration and the Department of Foreign Affairs for its extended diplomatic responsibilities;</p> <p>And lastly R2,6 billion was allocated to support of local government restructuring and delivery of basic services (Budget Speech, 2001).</p>
<b>2002</b>	<p>R20,5 billion was allocated towards the provinces, which included allocation for child support grants and health issues such as HIV/Aids, TB and malaria;</p> <p>R6,8 billion was allocated towards local government to strengthen basic municipal service;</p> <p>R6,6 billion was made available towards criminal justice sector;</p> <p>R132,4 billion was allocated towards social spending;</p> <p>R59,8 billion was made available for education;</p> <p>Infrastructure and investment in economic development was broken down as follows;</p> <p>R950 million was allocated for Eskom's drive to electrify rural communities;</p> <p>R1 billion was allocated towards roads and rail services;</p> <p>R80 million for the hosting of the World Summit on Sustainable Development;</p> <p>R3,6 billion was allocated towards Water Affairs and Forestry to support rural water and sanitation infrastructure;</p> <p>R300 million was allocated towards the Post Office;</p> <p>R741 million was allocated for restructuring of the Unemployment Insurance Fund;</p>

	<p>R1,1 billion was allocated for development and job creation in rural areas;</p> <p>R700 million was allocated for infrastructure investment in support of rural and urban development (Budget Speech, 2002).</p>
<b>2003</b>	<p>R11,9 billion more was made available towards child support grant to children up to the age of 14;</p> <p>R38 billion more was made available towards provinces to improve roads, revitalise hospitals, purchase medicines and school books and enhance our response to HIV/Aids;</p> <p>R6,5 billion more was made available towards free basic services, investing in municipal infrastructure, rural water supply and sanitation and expansion of employment in community services;</p> <p>R2,7 billion more was made available for courts and police;</p> <p>R1,7 billion was made available towards higher education, and increased skills development funding;</p> <p>R1,9 billion more was made available toward land restitution and the land reform programme;</p> <p>R2,2 billion more was made available to Home Affairs’;</p> <p>R1 billion was allocated towards research and technology development;</p> <p>R1,3 billion was allocated towards peace-keeping missions and the New Partnership for Africa’s Development;</p> <p>R1,2 billion was made available for food relief projects (Budget Speech, 2003).</p>
<b>2004</b>	<p>R3,2 billion more went towards provinces and municipalities for the Expanded Public Works Programme and infrastructure development;</p> <p>R2,1 billion more went towards HIV and Aids treatment programme.</p> <p>R6 billion went towards broad-based Black Economic Empowerment Initiatives;</p> <p>R2,2 billion more was made available for municipal water, sanitation, electricity and refuse services;</p> <p>R19,7 billion went towards social grants, schools, hospitals and clinic services;</p> <p>R910 million more went towards restructuring of universities and technikons;</p>



	<p>R700 million more went towards land reform and R750 million for a new farmer support programme;</p> <p>R1,9 billion more was made available for more police personnel, vehicles and IT infrastructure in the fight against crime;</p> <p>R475 million more went towards improving the efficiency of the courts and for catering for the vulnerable groups;</p> <p>R1,1 billion more was made available towards Defence for peacekeeping operations in Burundi and the DRC;</p> <p>R850 million more went towards Home Affairs to improve services to citizens, especially in rural areas (Budget Speech, 2004).</p>
<b>2005</b>	<p>R22,3 billion was allocated towards social grants;</p> <p>R6,9 billion allocated towards providing for higher remuneration for teachers and social workers;</p> <p>R5 billion was allocated towards payment progression system to retain skilled police and to hire more police;</p> <p>R6 billion was allocated towards completing the land restitution process;</p> <p>R3,7 billion was made available for the delivery of municipal services and the rollout of free basic services;</p> <p>R7,4 billion was allocated towards stepping up education and health spending in provinces;</p> <p>R3 billion went towards community infrastructure, with R2 billion allocated towards housing projects;</p> <p>R3 billion went towards public transport infrastructure, with some being allocated towards the 2010 World Cup;</p> <p>R1,7 billion went towards water, sanitation and other municipal infrastructure;</p> <p>R1 billion was made available for roads, and</p> <p>R1 billion was made available towards revitalise further education and training colleges (Budget Speech, 2005).</p>
<b>2006</b>	<p>R3,5 billion was allocated towards national roads and rail infrastructure spending, and R7,1 billion towards national contribution to the Gautrain rapid</p>

	<p>rail project;</p> <p>R5,4 billion went towards expanding and equipping the police service and improvements in courts administration and capacity of the Justice Department;</p> <p>R3,1 billion is added to defence modernisation and infrastructure, R900 million as allocated towards foreign affairs capacity and the African Renaissance Fund;</p> <p>R3,3 billion when towards improved maintenance of government buildings;</p> <p>R2 billion went towards the Revenue Service and investment in government financial management systems (Budget Speech, 2006).</p>
<b>2007</b>	<p>R8,1 billion was allocated for the next three years to hire additional teachers, teaching assistants and support staff in schools and districts;</p> <p>R700 million was allocated for bursaries for teachers to encourage young people to train as teachers and to pursue careers in our public schooling system;</p> <p>R850 million more was made available to the National Department of Education in its adult basic education and training programmes;</p> <p>R2,2 billion more was allocated towards university sector to meet its objectives of increasing enrolment and producing more science, engineering and technology graduates. The further education and training sector received R600 million for bursaries for deserving students;</p> <p>R365 million towards new bursary scheme for social workers;</p> <p>R5,3 billion was allocated towards increasing remuneration for health workers and an increase in staffing levels;</p> <p>R1,7 billion was allocated for health programmes;</p> <p>R1 billion was allocated towards the hospital revitalization programme;</p> <p>R2,4 billion was allocated towards the police to further expand police numbers and invest in technology and forensic equipment;</p> <p>R2,3 billion was allocated towards better public transport for the World Cup;</p> <p>R2,7 billion more was made available towards the housing budget;</p>

	<p>R125 million was allocated to the Department of Public Works;</p> <p>R1,7 billion more was made available to the South African National Roads Agency and the Rail Commuter Corporation to upgrade roads, and stations in areas critical to the World Cup. In total, over R9 billion was allocated by national government for municipal transport, roads and precinct upgrading relating to the 2010 FIFA World Cup;</p> <p>R1,7 billion more went towards the promoting of industrial development, black economic empowerment and small business development (Budget Speech, 2007).</p>
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Table 2.3 : South African governments budget allocation from 1997 – 2007

The trend of the South African government spending spanning from 1997 to current in Table 2.3 focused predominately around poverty eradication, social development, education, employment and infrastructure development. It is interesting to observe that from 2002 the drive to increase budget on infrastructure became more emphasised calling for a greater increase of service delivery by municipalities. Sadly, due to limited numbers of civil engineering professionals many of the municipalities failed to achieve their objectives (Lawless, 2005). The demand for civil professionals has shown an increase from 2002, as the government increased their commitment towards infrastructure development to encourage economic growth and reduce unemployment.

## 2.4 CONCLUSION

The legacy that apartheid has left has created many challenges regarding the social issues like poverty, education and crime. In addition to these problems, the governments drive to increase the employment rate is always high on their agenda. It is for these reasons that much of the budget allocation lends to address these fundamental objects. The emphasis on rural development, meant that many of the well experienced civil engineering professionals that worked on the construction of national roads, dams and other large government projects either left the country or the industry due to lack of work. As a result of the downswing in infrastructure development, the number of these professionals began to shrink, which has now resulted in the current skills shortage of civil professionals.

With rural development still going strong, and the major hype around the 2010 world cup, which as resulted in the increase of large civil engineering projects like roads, building and stadiums, has brought about major challenges as South Africa do not have enough civil engineering professionals as a result of the 80s and 90s recession. The analysis of the government's expenditure shows that both the budget and the work is here. South Africa just needs to increase their capacity of civil engineering professionals to deliver the goods. This will inevitably lead to increased employment and GDP growth and reduce the income disparities currently facing its people.

## *CHAPTER 3*

# **BLACK ECONOMIC EMPOWERMENT AND AFFIRMATIVE ACTION**

## **3.1 INTRODUCTION**

The majority of South Africans suffer the effects of what the apartheid era has caused them. Due to the inequalities in education, skills and social development and land ownership many black people have been marginalised to equal opportunities in both the working arena and concerning business opportunities. In 1994, when the ANC was elected to rule the country, the new government implemented Black Economic Empowerment (BEE) and Affirmative Action (AA) as a result to address these inequalities.

The implementation of these policies brought about mixed results. Many from the minority group reacted by saying that these policies are apartheid in reverse. These policies, especially the AA policy led to many highly qualified individuals leaving the country, as they were unable to find work. On the other side of the coin, these policies opened an opportunity to enrich a small portion of people from the previously disadvantaged group. These were the lucky ones that were involved in the struggle against apartheid. Unfortunately, the majority of the black people still live in poverty, and lack the skills and education to better themselves.

The effects of the BEE and AA policy on the civil engineering industry will be discussed in this chapter. Although the BEE policy has not had such a damning effect on civil engineering professionals, it has had an impact on the supply of civil engineers within the industry, especially at provincial and municipal departments. The AA policy on the other hand has limited the placement of many well experienced civil engineers within the majority of municipalities and company's within the industry.

## **3.2 BLACK ECONOMIC EMPOWERMENT**

### **3.2.1 Background of Black Economic Empowerment**

The South African economy has performed well given its apartheid and colonial legacy and the current global downturn. Subsequently, South Africa has enjoyed 10 years of consistent growth since 1994. This growth, unfortunately, has not been shared equitably amongst all South Africans, and is considered inadequate to fulfill the requirements of a stable, integrated and prosperous society.

In keeping with this objective, the South African government implemented Black Economic Empowerment as a strategy to address the systematic exclusion of the majority of South Africans from full participation in the economy. The defining feature of apartheid was to severely restrict the access of black people within the economy. This resulted in the restricted wealth creation and imposed underdevelopment on the black communities to ensure that they were, in the main, just suppliers of cheap labour.

### **3.2.2 Impacts of the Apartheid**

The underdevelopment of black South Africans led to a progressive destruction of productive assets; the deliberate denial of access to skills and jobs; and, the undermining of self-employment and entrepreneurship. These policies restricted and suppressed wealth and skill endowments in black communities, thereby structurally inhibiting their participation in a legislatively race-based economy. The fact that black communities were afforded little access to technical and scientific teaching and learning further exacerbated the obstacles in our rapidly developing industrialisation process ([www.thedti.gov.za](http://www.thedti.gov.za)).

The structured exclusion of the black majority from economic power began in the late 1800s with the first dispossession of land and continued throughout the 20th century with the first Mines and Works Act, 1911, the Land Act of 1913, with the implementation of Apartheid laws after 1948. These systematic disempowerment policies not only resulted in a landless black majority with restricted access to skills development, but also deliberately prohibited black

people from generating self-employment and entrepreneurship. South Africans were systematically deprived of viable business opportunities in the following ways:

- Apartheid confined the majority of African people to homeland areas, which were not only the poorest in terms of living conditions, infrastructure and business opportunities, but also lacked a dynamic business infrastructure and environment.
- Racially segregated areas enforced through the Group Areas Act not only uprooted millions from their places of residence, but also led to large capital losses and virtually destroyed the fabric of black small enterprises.
- The drastic curtailment of property ownership rights of black persons made it impossible for them to acquire assets that could serve as collateral for loan financing; it also excluded black persons from the long-run process of capital accrual and growth ([www.thedti.gov.za](http://www.thedti.gov.za)).

### **3.2.3 Government Interventions to support BEE**

These impacts are still felt today, as many black South Africans still live below the poverty line. Since 1994 government embarked upon a comprehensive programme to provide a legislative framework for the transformation of the economy. These new laws have restored rights to land and tenure; have prescribed unfair discrimination, introduced specific active measures to overcome the distortions in the labour market and in addition provided new economic opportunities to historically disadvantaged persons.

Some of the new legislation implemented includes:

- The Promotion of Equality and Prevention of Unfair Discrimination Act;
- Extension of Security of Tenure Act; Restitution of Land Rights Act;
- Employment Equity Act;
- National Empowerment Fund Act;
- Competition Act; Telecommunications Act;
- Preferential Procurement Policy Framework Act;

- The Minerals and Petroleum Development Act ([www.thedti.gov.za](http://www.thedti.gov.za)).

Accordingly, the South African government defines BEE as “an integrated and coherent socio-economic process that directly contributes to the economic transformation of South Africa and brings about significant increases in the numbers of black people that manage, own and control the country’s economy, as well as significant decreases in income inequalities” ([www.thedti.gov.za](http://www.thedti.gov.za)). Therefore the BEE process includes elements of human resource development, employment equity, enterprise development, preferential procurement, investment, ownership and control of enterprises and economic assets ([www.thedti.gov.za](http://www.thedti.gov.za)).

### **3.2.4 BEE and the impacts on the civil engineering industry**

As mentioned already in the introduction, BEE has had a negative impact on the supply of black qualified civil engineering professionals into the working environment. The reason is simple, they start their own companies. The BEE strategy has led to many talented and well experienced black civil engineers setting up their own companies. This has resulted in a further shrinkage of the designated group pool of black engineers urgently required to fill the much needed positions in provincial departments and municipalities.

Unpublished observations show that BEE has made it possible for these black civil engineering professionals with companies to compete with many of the well established firms for big jobs with the opportunity of achieving exceptional high financial rewards. There have been cases of young black engineering professionals that have also chosen to embark on starting their own company. Upon being awarded the contract, they outsource this work to well experienced civil engineers (mainly white civil engineers who find it difficult to secure work). The doors of opportunity have opened for them to make substantially large amounts of money, and therefore it stands to reason that this situation will continue to occur, resulting in many of the vacant posts earmarked for black civil engineering professionals still being vacant. Government’s commitment to service delivery depends on highly skilled well trained civil engineering professionals, especially black civil engineers. The BEE strategy addresses the problem of bridging the gap regarding the wide income distribution amongst its people, however this



strategy tends to create problems in service delivery especially in the poor rural areas, as civil engineering posts in these municipalities remain vacant due to the limited numbers of black civil engineering professionals.

In addition, unpublished observations show that BEE has supported self employment to the already small group of black civil engineering professionals, and has negatively affected skills development and skills transfer as most of the work they secure is outsourced and done by other civil professionals. BEE has just made these black civil engineers good businessmen and not good civil engineering professionals.

The following analysis summarizes the above explanation. The implementation of BEE has led to increased opportunities for black civil engineering professionals. These black civil engineering professionals open their own companies as they are able to secure large volumes of work as a result of their BEE status. As a result of limited technical skills and expertise, they outsource this work to experienced white civil professionals which has led to substantial increases in black civil professionals earning income, with no technical learning or skills development being attained. Their lack of technical skill prevents mentoring and skills transfer to up and coming young black engineering graduates and therefore will result in the loss of technical knowledge. The impact reduces service delivery capacity and infrastructure development, which reduces growth potential of the country and employment.

### **3.3 AFFIRMATIVE ACTION**

#### **3.3.1 Justification for Affirmative Action**

During the apartheid era both government and business discriminated against certain groups of people, particularly against people of colour (black, coloured and indian), women and disabled people. The practice of good human resource management required that "the right person for the job" should be appointed. As whites received better school education and more white employees have been trained, it is obvious that whites will be preferred. This meant that disadvantaged people will never really get into the system (Koekemoer, 1998). The

government therefore implemented affirmative action as a means of introducing previously disadvantaged people into the economy with the aim of diversifying the work force.

According to Franchi (2003) South Africa's legacy of apartheid has created massive social and economic inequalities along racial and gender lines. This was illustrated in the under-representation of black South Africans and women in industry and the corporate world and at decision-making levels in the public service. One of the primary objectives of the post-1994 democratic government was to eradicate discriminatory employment policies and practices based on “race”, gender and disability, and redress current imbalances through a process framed in the 1996 South African Constitution.

The Employment Equity Bill (December, 1997) set out only to address discrimination in the formal labour market, such as participation in the labour force and central and occupational allocation of labour in terms of recruitment, promotion and training. The goal of transforming South African business organizations and Public Service from discriminatory structures to ones which reflect the “demographic composition and values of South African society as a whole” ([www.whoswhosa.co.za](http://www.whoswhosa.co.za)).

The continued focus on issues of “race” in South Africa can potentially lead to stigmatization of historically disadvantaged groups in society, and perceptions among historically favored groups that affirmative action leads to reverse discrimination, the current demographic weighting of disadvantage in South Africa make it a crucial necessity for affirmative action to focus on “race” in order to achieve equity across all levels of industry (Franchi, 2003).

### **3.3.2 South African Governments policy on Affirmative Action**

The South African government’s affirmative action policy ensures that qualified people from designated groups have equal opportunities in the workplace. The Employment Equity Act applies to all employers, workers and job applicants, but not members of the;

- National Defence Force;
- National Intelligence Agency; and

- South African Secret Service.

The provisions for affirmative action apply however applies to:

- employers with 50 or more workers, or whose annual income is more than the amount specified in Schedule 4 of the Act;
- municipalities;
- organs of State;
- employers ordered to comply by a bargaining council agreement;
- any employers who volunteer to comply ([www.labour.gov.za](http://www.labour.gov.za)).

The Employment Equity aim to protect workers and job seekers from unfair discrimination, and also provides a framework for implementing affirmative action. This framework makes provision for the designated groups (black people, women and people with disabilities) to have equal opportunities in the workplace, with equal representation in all job categories and levels (*Based on Legislation in Section 15, of the Employment Equity Act*) ([www.labour.gov.za](http://www.labour.gov.za)).

### **3.3.3 Affirmative Action – Advantages and Disadvantages**

The following points outline the advantages that Affirmative Action policy can have within society and human resources development. This information was obtained from [www.wikipedia.org](http://www.wikipedia.org). As the information on this website is not peer reviewed, it is advised that the information be used cautiously. It has been included to establish some sort of correlation to the findings in this research.

- Affirmative action makes it fair for all candidates by making up for existing racism.
- A diverse student body creates a better learning environment.
- Affirmative action can help right past wrongs.
- Affirmative action is an attempt to level the playing field for all groups.

- Affirmative action is not discrimination because it aims to overcome preferential treatment through inclusion.

The above points on Affirmative Action policy make sense when considering the past inequalities that existed in South Africa. However, the Affirmative Action policy does not create a win-win situation, as there are equally as many negative points regarding this policy. These points are as follows:

- It is unfair to judge applicants based on race;
- Affirmative action does not lead to true diversity;
- Affirmative action does not help the most disadvantaged minorities;
- Affirmative action calls into question the achievements of minorities;
- Affirmative action disincentives minorities to earn higher test scores;
- Affirmative action makes the members of former or present dominant groups pay for the mistakes of the past.

These arguments for and against affirmative action, share the biased views of black and white people respectively. These views are further emphasised by Koekemoer, (1998), with many previously disadvantaged black people embracing the affirmative action policy, and the white people considering this policy as a threat to them and their families. The demographics of South Africa are getting younger and blacker. There is an increase in the availability of black, coloured and indian young people in industry while many white executives and young adults emigrate to seek better opportunities in other parts of the world.

As a result of whites leaving South Africa, more jobs are becoming available which need to be filled by blacks, coloureds and indians. There are genuine efforts by some companies that are searching for "black talent" while others embark on affirmative action in order to meet government requirements. According to Koekemoer (1998), it is easier to appoint disadvantaged people at lower levels than at higher levels, with the result of visible appointments being made (for example, receptionists, switchboard operators, security guards,

even public relations executives). Many companies set out in search of people with good political connections, a black accountant, actuary, or consultant and appoint them to the board.

In addition, parastatals and large corporations have been actively involved in recruiting black talent and appointing them in senior positions. As a result these top executives have, however, become highly marketable and often embark on job hopping for more lucrative packages, subsequently making it extremely difficult to recruit and retain good affirmative action executives owing to the shortage of skilled and trained black, coloured and indian talent. A common complaint, however, by many corporations is that black graduates mainly come from the social sciences, and there are limited sources of business scientists, while qualified CAs, engineers and pharmacists are almost impossible to find. The low numbers of especially black engineers can be attributed to poor mathematics and science grounding, resulting in them not being accepted into tertiary institutions. To make matters worse, these corporations do not have the time nor the financial resources to recruit and train people in specialised skills because "the moment they're trained, they disappear" (Koekemoer, 1998).

Affirmative action is a very real threat to many whites in South Africa. Experienced, well-qualified teachers, clerks and executives were given early retirement packages to make way for affirmative action appointees. In addition, young white boys and girls are being told not to apply for bursaries or jobs because they are white. In fact, the perception exists that affirmative action is reverse discrimination which preferentially advantages blacks, coloureds and indians at the expense of whites.

Many white people feel that there is no future for them in South Africa, especially for the young people as they will find it extremely difficult to obtain jobs. This has led to the social trend of withdrawal by many white South Africans. As a result of difficulties in finding jobs white professionals and executives are starting family businesses, giving their children job and career opportunities. Many white people voiced their concerns regarding affirmative action and the effects on the economy and industry. According to Human (1993), the four points of concern are as follows.

### **Loss of expertise**

Many qualified, experienced staff are replaced by untrained, unqualified, inexperienced people who will go through the learning curve and make many mistakes at the expense of the company's shareholders or the country's ratepayers. This can often not be afforded.

### **The corporate soul is touched**

White shareholders, directors and senior executives apply accepted business principles of individual decision-making, cost effectiveness, high productivity, shareholders hold the power and have the say, etc., to mention a few. These Western business principles are now under threat by new management views such as participative decision-making (*Ubuntu*: involvement and participation of the people), higher fault tolerance, higher pay without corresponding increase in productivity, everyone to share in the profits and wealth of the company and the power of the people (key people or interest groups must first be consulted). This new management style has often frustrated many individuals and led to a new corporate culture and work ethic which many whites find unacceptable.

### **Reduction in service quality standards**

Customers more often demand fast, efficient service. Due to less qualified and experienced people being employed, the quality of service suffers, which is further complicated by "Africa time" in other words things taking place at a snails pace. Customers who expect fast feedback or service excellence experience frustration when nothing appears to progress or happen.

### **Underperformance owing to stress**

South Africans of all races experience high stress levels due to the current demands placed on them. Many white employees suffer from stress fearing unemployment. Affirmative action appointees have huge stress because of their disadvantaged social background. As a result they often receive less praise and more criticism and live separately from the team. Due to some of the high positions they occupy, their company's often have high expectations of them. They are less sophisticated and experienced in corporate politics and they often have a different approach to time, business and ethics, and they have different expectations. One simply cannot

put knowledge and skills into black people and expect them to function in a white world which remains fundamentally unchanged (Human, 1993). The main reason the South African government is struggling to adequately address the country's vast backlog of social infrastructure is a lack of capacity, and particularly a dire shortage of appropriate skills such as civil engineering professionals.

#### **3.3.4 Current situation in the Civil Engineering Industry**

The following are propositions to the reasons for the shortage of engineering skills in South Africa, the main ones being the historically low standard of mathematics and science teaching in state schools; a failure to market engineering as a career to attract the best students; an investment "strike" on the part of the state during the fiscally austere early 1990s, which caused many civil engineering professionals to emigrate or change careers; and the overzealous application of affirmative action policies ([www.dailytenders.co.za](http://www.dailytenders.co.za)).

To illustrate the reality of the situation the Democratic Alliance's head of research in Parliament, Gareth van Onselen, found that SA's six major metropolises have 732 civil experts between them, with not all of them even qualified engineers, serving a combined population of about 15,6-million ([www.dailytenders.co.za](http://www.dailytenders.co.za)). This is no surprise as many private engineering firms were warning of the long-term consequences of the weak education system and lack of public sector investment in infrastructure a decade ago. Many well established companies closed their doors as a result of there being simply not enough work to keep them going ([www.dailytenders.co.za](http://www.dailytenders.co.za)).

On a positive note the "old guard" civil experts, who have taken retrenchment packages from municipal posts resulting from often being sidelined, are willing and able to get back to work. In addition, the South African Association of Consulting Engineers (SAACE) is now working with the national government's provincial and local government department to support low-capacity local authorities. In addition, provincial government has also doubled the number of engineering bursaries it grants to 250 this year ([www.dailytenders.co.za](http://www.dailytenders.co.za)).

### **3.3.4 Effects of Affirmative Action on the Civil Engineering Industry**

The effect of affirmative action on the civil engineering industry and the overzealous application of employment equity legislation has worsened the skills crisis according to serving MEC Marius Fransman. He therefore called for a moratorium on the application of employment equity in professions especially where skills are scarce. This has been prompted by the realisation that service delivery will grind to a halt if something is not done immediately. His suggestion was rejected by Finance Minister Trevor Manuel and others in the ANC ([www.dailytenders.co.za](http://www.dailytenders.co.za)).

Trevor Manuel explained that the intent of the Employment Equity Act was “abundantly clear”, although “sadly abused” in practice. The trouble with affirmative action is the way it has been applied. It has become purely a numbers game for government and companies. The intended effect of AA was to involve previously disadvantaged applicants giving them preference, but not to the exclusion of whites and not without the skills requirement being taken into account. He therefore added that there is no need to scrap employment equity, and believes that it just needs to be applied fairly and sensibly, as it was intended ([www.dailytenders.co.za](http://www.dailytenders.co.za)).

### **3.3.5 Future strategies – should AA still be implemented**

The problem within the civil engineering industry regarding lack of capacity has been over emphasized. In light of the skills crisis, the Democratic Alliance (DA) presents a document which outlines the consequences of this crisis, in particular the affirmative action policy which has resulted in the skills shortage in the public service. According to the DA, there is substantial number of vacancies in government departments – 40 000 vacancies at national level coupled with the lack of proper expertise and experience means that service delivery, financial management and government’s programme of action are undermined. The end result would be that ordinary people do not receive the services promised to them.

One of the main concerns regarding the skill shortage is the failure of the institutions designed to equip South Africans with the requisite skills and training to be able to find a job and



compete in a globalised economy. These key institutions include: primary and secondary schools; tertiary education institutions; Further Education and Training Colleges (FETC); Sector Education and Training Authorities (SETAs) as well as those private bodies that train artisans.

This failure has been attributed by a combination of bad management, in particular in the case of the SETAs – inadequate funding or as a result of affirmative action, which has been responsible for removing an entire pool of experience and institutional knowledge from these institutions. They are failing to provide the necessary quality or quantity of skilled graduates. The DA believes that a great deal of the problem has to do with the way in which government conceptualises the country's skills crisis ([www.da.org.za](http://www.da.org.za)).

Certainly, there is a recognition that the government is simply unable to deliver properly because it lacks the capacity to turn policy into a reality. There has, in turn, been an effort to capacitate and strengthen existing educational institutions and to create new bodies – such as the SETAs - in an attempt to address the situation. The DA finds stubborn refusal by the country's national leadership to admit that, at the very core of South Africa's skills crisis, is the policy of affirmative action. Its tenets run against the principles of merit and quality and place race, rather than individual ability as the key criterion for selection, both inside and outside government ([www.da.org.za](http://www.da.org.za)).

The DA acknowledges, while the imbalances of the past must be redressed, affirmative action has to be seriously reviewed because it remains a major hindrance to the resolution of the skills shortage. This policy cannot and must not continue for an indefinite period, especially in wake of the current shortage of skills. In order to bring about the appropriate diversity it is key to ensure that black people are properly educated and skilled and they will, on merit, take their place in every area of our economy ([www.da.org.za](http://www.da.org.za)).

### **3.4 CONCLUSION**

It is obvious from the above that affirmative action is not only perceived as a real threat to white South Africans and business but also as an opportunity for blacks, coloureds and indians

to redress the inequality created by the previous government. Affirmative action should be managed properly. Affirmative action without training and development will be a disaster and will lead to frustration and lowering of standards. Affirmative action should be introduced without unduly jeopardising the career aspirations of competent white management and staff. To expect affirmative action appointees to perform well in a "white world" without adopting corporate cultures is a recipe for disaster (Keokemoer, 1998). Affirmative action does not mean that unqualified candidates are favored over qualified candidates. Affirmative action policies discourage discrimination against qualified minority candidates, and mandate inclusion.

In regards to the civil engineering industry, affirmative action has crippled governments ability to achieve their objectives of better service delivery and employment creation. The need to meet employment equity targets has led to job hopping by the limited numbers of black civil engineering professionals within the industry. The focus by government and civil engineering companies on representative rather than on the ability of individuals has been further highlighted and has resulted in very negative sentiments. The brain drain of young talented individuals is the result of the aggressive manner that AA is being implemented. In order to improve this situation, government needs to fundamentally focus on education, so that young black individuals can be equipped with the necessary skills to carry them through tertiary institutions and the industry. As there are not enough black engineers, technologists and technicians to fill in the vacant positions, qualified individuals that meet the job requirements should not be sidelined anymore at the expense of growth, development and unemployment.

## CHAPTER 4

### **DEMAND AND SUPPLY FOR CIVIL ENGINEERS, TECHNOLOGISTS AND TECHNICIANS**

#### **4.1 INTRODUCTION**

The debate over the lack of skills *versus* lack of jobs in the civil engineering industry has been a contentious issue. This is so for the following reason, it focused mainly on age, and the skill gap that exists between more experienced engineers and younger graduates. In addition, research by Allyson Lawless in her book '*Numbers and Needs*' regarding the skills shortage, explained that the current skills shortage plaguing South Africa has been exacerbated by Governments over eager transformation drive.

According to Lawless, (2005), many white engineers were offered retirement packages during the nineties to make way for more black representation. As these post become available, the previously disadvantaged individual (PDI) criteria was set for the new individual. It was later realized that there were simply not enough PDI enrolments let alone graduates to fill these vacant posts. This situation led to many experienced white engineers being left without employment, as a result many of them emigrated to other parts of the world or started their own companies. The effects of this transformation reduced the number of civil professionals in the industry, with the detrimental impact of not enough experienced civil professionals able to train young graduates. As a result of the governments transformation drive with the employment equity policy of affirmative action and black economic employment, mentorship of civil engineering graduates by older more experienced engineers, who pass on their institutional knowledge and experience, has been derailed. This has now left a shortage of these experienced civil professionals within the industry. However, the civil engineering professionals that are currently employed simply don't have the time to mentor young engineering graduates for future roles in industry, government and parastatals.

In addition, her findings indicated that the average working hours per week for civil engineering professionals in South African is 54 hours across all race groups. Many senior staff work between 60 and 70 hours per week which is substantially high considering a 40 hour week. This is not surprising, as the current number of civil engineers are doing almost twice their share of the work due to the limited number of civil engineering graduates and now due to the increase in infrastructure development. Shortages have been reported by the private sector, with 40% of all consulting companies complaining that they cannot find suitable trained staff (Finance Week, 2005). Using the above situation as a backdrop, the completed questionnaires received from civil engineers, technologists and technicians at eThekweni municipality will be used to gain insight into the current situation.

## **4.2 SUPPLY OF CIVIL ENGINEERING PROFESSIONALS**

Under apartheid, many disadvantaged institutions did not offer engineering courses. This situation still exists in some institutes, and therefore prevents well deserving students from pursuing a career in civil engineering. However, their key challenge as being around their ability to meet the transformation imperatives of the post-apartheid South Africa, which includes increasing the numbers of graduate engineers, technologists and technicians required by industry. According to Steyn and Daniels (2003), there are two factors that determine the number of matriculants entering the engineering profession. The first being the absolute number of matriculants that meet the minimum academic requirements, and the second is the attractiveness of the engineering profession. The number of suitable matriculants with good maths and science marks (ie maths and science on higher grades) have been decreasing in recent years which is leading to a reduction in the pool of individuals who qualify to enter the engineering field (Kruss, 2000). This is especially evident amongst the previously disadvantaged group, as this does little to improve transformation within the industry. The primary cause for this situation is the dearth of well-qualified science and mathematics educators, primarily in schools in disadvantaged areas.

The attractiveness of engineering to school leavers is based on perceptions and therefore difficult to assess. The Engineering Council of South Africa (ECSA) believes that perceptions

are affected by expected remuneration rates and employability (Steyn and Daniels, 2003). Remuneration rates for engineers are often below those offered by the finance professions in particular and therefore has led to a decline in recruitment numbers. According to Steyn and Daniels (2003) figures from ECSA, Table 4.1 and 4.2 below show the trends of enrolments for all disciplines in the engineering industry at universities from 1988 to 1998 and technikons from 1994 to 1997.

Engineering discipline	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Aeronautical	24	48	54	29	27	19	19	25	15	15	16
Industrial	80	92	107	115	139	108	88	88	98	99	105
Chemical	290	338	408	374	332	341	381	414	383	356	325
Chemical: Minerals processing	0	0	0	0	0	0	0	0	0	0	10
Electrical and electronic	883	721	657	638	682	657	685	750	755	778	750
Electro-mechanical	0	0	0	0	25	28	28	29	25	38	27
Control	0	0	0	31	27	0	0	0	0	0	0
Agricultural	26	22	18	18	24	28	11	18	31	20	18
Materials	10	18	13	18	10	17	14	5	5	9	5
Mechanical	455	588	631	587	540	544	485	476	427	429	448
Metallurgical	131	142	133	112	108	95	50	54	72	42	80
Mineral resource management	0	0	0	1	2	0	0	0	0	0	0
Mining	82	81	72	93	58	47	41	54	62	67	67
Civil	218	287	329	346	319	241	218	252	283	287	320
Other	0	35	60	88	0	276	0	0	1	0	0
<b>Total</b>	<b>1 900</b>	<b>2 315</b>	<b>2 420</b>	<b>2 382</b>	<b>2 271</b>	<b>2 121</b>	<b>1 878</b>	<b>2 185</b>	<b>2 137</b>	<b>2 141</b>	<b>2 147</b>

Table 4.1 : University engineering enrolments from 1988-1998 : ECSA (Steyn and Daniels, 2003)

Engineering discipline	1994	1995	1996	1997
Air conditioning and refrigeration	0	0	0	0
Chemical	544	505	818	817
Civil	836	1 458	1 795	1 833
Electrical	1 979	2 288	2 233	2 769
Electrical (HC)	1	183	718	277
Electrical (LC)	1	288	430	398
Industrial	97	308	227	167
Marine	0	0	0	0
Mechanical	1 287	1 659	1 866	1 700
Metallurgical	68	134	76	245
Mining	0	0	0	0
Other	0	28	92	0
<b>Total</b>	<b>4 611</b>	<b>5 845</b>	<b>6 255</b>	<b>6 294</b>

Table 4.2 : Technikon engineering enrolments – ECSA (Steyn and Daniels, 2003)

As the focus is on the civil engineering industry the percentage of enrolments in this field at university and at technikons were calculated and shown below in Table 4.3 and 4.4.

<b>CALCULATED ENROLMENT % AT UNIVERSITIES FOR CIVIL ENGINEERING</b>											
<b>Engineering discipline</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Total Enrolments	1999	2315	2420	2362	2271	2121	1978	2165	2137	2141	2147
Civil Engineering	218	267	329	346	319	241	218	252	263	287	320
% of Enrolments	10.9%	11.5%	13.6%	14.6%	14.0%	11.4%	11.0%	11.6%	12.3%	13.4%	14.9%

Table 4.3 : Calculated enrolment % at universities for civil engineering

<b>CALCULATED ENROLMENT % AT TECHNIKONS FOR CIVIL ENGINEERING</b>				
<b>Engineering discipline</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
Total	4811	6849	8255	8204
Civil Engineering	836	1458	1795	1833
% of Enrolments	17.4%	21.3%	21.7%	22.3%

Table 4.4 : Calculated enrolment % at technikons for civil engineering

The university enrolments for civil engineering have averaged 278 per year, while technikon enrolments showed dramatic increases during 1995, 96 and 97. The average ratio of university to technikons enrolments for the period 1994 to 1997 were calculated to be 1:4 in 1994 and 1:6 in 1997. According to Lawless (2005), from 1999 to 2002, a slow-down in enrolments and slight improvements in graduations took place in civil engineering. In 2002, the total enrolment for engineering was approximately 40,000, comprising of 20,800 enrolments at technikons and 10,200 enrolments at university. The graduations for 2002 were shown to be approximately 3,000 at technikons and 2,050 at university. These numbers are of concern as the supply of engineers, technologists and technicians is still very low in comparison to the demand for them. According to SAICE the ratio of civil engineers to total population by other countries to that for South Africa is very low Steyn and Daniels (2003). Table 4.5 shows the dire need for increase in supply of civil engineering professionals as South Africa is lagging behind amongst other developed countries.

<b>RATIO OF ENGINEERS TO POPULATION BY COUNTRY</b>	
<b>Country</b>	<b>Population per engineer</b>
China	130
India	157
Germany	217
Brazil	227
Japan	303
UK	311
USA	389
Argentina	453
Australia	455
Malaysia	543
Chile	681
Korea	2 135
South Africa	3 166
Tanzania	5 930
Zimbabwe	6 373

Table 4.5 : Ratio to engineers to population by country (SAICE)

The supply of young graduate engineers, technologists and technicians are affected by the following factors namely, matriculants possessing good mathematics and science marks, perceptions of the civil engineering industry (long working hours, below average salaries, poor to average career development), labour mobility, graduates being lured into other industries eg banking industry. Commenting in the Finance Week, John Sheath, marketing manager of the Cement and Concrete Institute, the shortage of graduate engineers, technologists and technicians is caused by the image of the industry. Sheath commented that civil engineering is not a very attractive industry for young people, considering that the average age of a consulting engineer in South Africa is 53 years. This illustrates that young people are just not being attracted to the industry (Finance Week, 2005).

Poor maths and science marks severely affects the likelihood of producing enough qualified black engineering professionals to meet future demand. However, there has been a dramatic increase in the number of black engineering enrolments since 1994 (Lawless, 2005). In 1994, 9 of the 10 enrolments at tertiary institutions including technikons were white students. In 2004, a reversal of this can be seen, with 78% of enrolments being black and only 22% being white students. In addition, the gender balance has also improved over this period, with women making up 25% of enrolments as opposed to 6% in 1994. This transformation at enrolment level is very impressive, however most of the black registration appears to be for the national

diploma at technikons. Although technicians are also desperately required, the ratio of technicians to engineers being trained seems to be out of proportion. Another reason for the low supply of both engineers and technicians is the high drop out rate. According to Lawless (2005), at university level, the dropout rate is in the region of 30%, while at technikons is approaches 50%. The reasons for this happening is listed below.

- There were few or no entrance criteria being applied or enforced, due to the campaign to increase previously disadvantaged students entering tertiary education in the late eighties and early nineties.
- Students that were registered had poor grounding in maths and did not have a command of the language of instruction.
- Institutions were not geared to offer these previously disadvantaged students supplementary courses to cope with tertiary education, which resulted in them not passing.
- The classes were too large to enable effective teaching or lecturing staff with inadequate qualifications were employed due to budget constraints.
- Few black students could afford tertiary education, unless they secure loans or bursaries.
- Insufficient opportunities to undertake work place training to meet technikon requirements for obtaining diploma, resulted in many drop outs (Lawless, 2005).

Another fact that affects the supply of civil engineering professional is immigration. According to Steyn and Daniels (2003), South Africa has been experiencing a brain drain since before 1994. During that period the flow of skilled immigrants into the country slowed tremendously in the post-apartheid era. It appeared that the primary reasons why skilled South Africans emigrate have to do with crime and violence, poor economic growth rates, the decline in public services in this country and the lucrative job opportunities overseas.

The research completed by the Bailey (2003) covered the immigration of professionals that are in the field of natural sciences, engineering and technology, medical science, agricultural sciences and social sciences. It found that many South Africans immigrated predominately to



the following five countries, namely United Kingdom, United States, Australia, Canada and New Zealand. Table 4.6 below shows comparative figure of emigration of South African professionals to the five major countries. During the nine years (1989 to 1997), South Africa lost 41 496 emigrants as compared to the 12 949 that was originally declared (Bailey, 2003).

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997
Australia (CSS & Stats SA)	312	291	198	189	358	274	308	420	310
Australia	558	479	295	213	353	610	765	686	1 122
New Zealand (CSS & Stats SA)	25	24	12	49	93	349	209	297	286
New Zealand	80	99	63	104	551	898	462	628	631
Canada (CSS & Stats SA)	94	85	63	69	136	224	173	170	118
Canada	327	227	213	243	407	677	421	315	421
United States (CSS & Stats SA)	58	68	89	81	153	216	235	254	258
United States	399	418	389	528	461	450	538	618	539
United Kingdom (CSS & Stats SA)	275	331	298	349	681	450	368	422	444
United Kingdom	2574	1408	1 760	1 518	2 068	1 782	924	2 508	2 417

Table 4.6: Emigration of professionals : Comparative figures for top destination countries, 1989-1997 (Bailey, 2003)

Over the past three decades the trend of emigration shows that many South Africans chose to move to Europe especially the United Kingdom, followed by Australia and North America. A small percentage chose to go to other parts of Africa, the Middle East and Central and South America. Table 4.7 shows the emigration of professionals by destination.

Country	1971-1980		1981-1990		1991-2000	
	Number	Percentage	Number	Percentage	Number	Percentage
Europe	9 835	56	6 281	45	5 421	34
Australasia	2 458	14	4 248	30	4 647	29
North America	1 952	11	1 814	13	3 109	20
Africa	1 896	11	833	6	1 791	11
Middle East	525	3	362	3	367	2
Asia	49	0	38	0	284	2
Central and South America	80	1	46	0	104	1
Indian Ocean Islands	20	0	27	0	123	1
Unspecified	723	4	378	3	71	0
<b>Total</b>	<b>17 538</b>	<b>100</b>	<b>14 005</b>	<b>100</b>	<b>15 887</b>	<b>100</b>

Table 4.7 : Emigration of professionals by destination across three decades (Bailey, 2003)

Further information shows the net gain and loss for the period 1988 to 1992 and 1994 to 2000. Data for 1993 was not available. Table 4.8 shows that prior to 1994, South Africa showed a net

gain amongst all skilled workers. The opposite is observed in the figures from 1994. The fundamental reason for this taking place was fear of safety and instability after the new government was voted into power.

	1988-1992					1994-2000				
	Immigrants		Emigrants		Net gain/loss	Immigrants		Emigrants		Net gain/loss
Skilled workers	Number	Percentage	Number	Percentage	Number	Number	Percentage	Number	Percentage	Number
Engineering and architecture	2 845	25	1 480	24	1 185	1 063	18	2 891	16	-2 867
Natural sciences	1 019	9	631	10	388	489	7	1 482	8	-405
Medical, dental and health services	1 546	14	915	15	631	754	11	2 559	15	-2 072
Education and humanities	2 155	20	1 779	30	376	1 805	27	5 547	32	-4 609
Legislative, executive and managerial	3 393	32	1 246	21	2 147	2 564	39	5 070	29	-3 244
<b>Total</b>	<b>10 758</b>	<b>100</b>	<b>6 831</b>	<b>100</b>	<b>4 727</b>	<b>6 676</b>	<b>100</b>	<b>17 540</b>	<b>100</b>	<b>-13 197</b>

Table 4.8 : Net gain and loss of skilled workers from 1988 to 1992 and 1994 to 2000 (Bailey, 2003)

## 4.2 DEMAND FOR CIVIL ENGINEERING PROFESSIONALS

Now that an understanding of the supply of engineers, technologists and technicians within the industry is established, the demand for civil engineering professional will be investigated. South Africa's transition to democracy in the last decade has liberalised the economy resulting in the increase in the knowledge intensity of all levels of production. These political and economic events have had an important impact on the demand of engineering professionals. Employment trends suggest that the demand for highly skilled occupations is growing faster than the demand for semi-skilled occupations. However, actual demand for highly skilled people could be masked by the impact significant emigration "brain drain" effect or by change in the organisation of work, where work is given to sub-contractors.

According to Steyn et al, (2003), the manufacturing and finance sectors are the largest and fastest growing in absolute terms. Table 4.9 below shows that the fastest decline sectors in absolute terms is transport, services (trade) and construction sectors.

Year	Agriculture	Mining	Manufacturing	Electricity	Construction
1998	-	-	11 975	4 243	7 338
1998	-	3 711	8 593	11 073	9 973
2000	-	5 199	10 561	2 077	5 869
Feb 2001	-	5 710	17 276	6 033	3 642
Sept 2001	685	3 082	20 983	3 243	5 308
Year	Trade	Transport	Finance	Services	Unknown
1998	4423	12 146	8 187	7 477	5 313
1998	599	4 021	20 634	9 118	-
2000	4335	10 647	29 446	5 352	-
Feb 2001	4 488	8 584	18 626	9 391	-
Sept 2001	6 134	6 068	16 186	5 181	385

Table 4.9 : Distribution of engineers by economic sector (Steyn and Daniels, 2003)

According to Steyn and Daniels (2003), the CEO of ECSA Paul Roux, attributes these fluctuations to the normal trends associated with business cycle within the economy and industry. A vast majority of engineers are using their skills indirectly in investment banking or in project management activities sponsored by large finance houses rather than directly in the industry. ECSA cites two possible reasons for this, namely that incentives for engineers to be employed, or stay employed in traditional engineering industries is low as a result of the relative poor remuneration rates. The finance sector is more capable of offsetting any real or perceived remuneration deficiency in this regard and therefore attracts engineers. The second reason is that the finance sector itself grew very rapidly during the 1990s in South Africa, and with the diversification of the Johannesburg Securities Exchange (JSE) and the proliferation of black empowerment companies, resulted in the need for individuals with competent analytical skills. This indicates that an engineering qualification is highly substitutable in the marketplace.

The demand for civil engineering professionals has declined recently, with the shift towards urban engineering. Civil professionals are now required to have skills relevant to large settlement processes. This includes an understanding of the development of the built environment, housing development, transportation and water treatment. In addition, an increase in traditional technical sophistication of traditional skills that reflect the importance of computer aided design, modeling, simulation and project management skills.

The ever-increasing workload and reduction in staff mean that the average capacity utilization within the sector is over 90%. Some companies have described capacity utilization as well over 100%, resulting in staff working significantly longer hours (Lawless, 2005). The major

consulting firms use national diploma graduates as CAD operators, technologists for design and production work, and engineers for strategic activities such as planning, marketing and general management. Emerging companies, however use technicians in both CAD and technical roles, and encourage these technicians to complete their B-Tech degrees. Technologists have increasingly being used in the specialist field as designer/draughting staff. In addition many companies are grooming technologists for senior management posts to later become associates, partners and directors.

The demand for civil engineering professionals are required by both the private & public sector. In the private sector, civil professionals are employed either by consulting engineering or contracting engineering firms. The distribution of civil professionals in the private sector is showed in Table 4.10 below.

<b>Industry Sectors</b>	<b>% of civil professionals per sector</b>
Mining	1%
Industrial	2%
Suppliers & manufactures	7%
Contracting - residential	8%
Contracting - non-residential	7%
Contracting - civil	17%
Consulting	56%
Miscellaneous	2%

Table 4.10 : Distribution of civil professionals in the private sector (Lawless, 2005)

According to Lawless (2005), the future demand estimates by consulting firms indicated the need for 10% more draughting staff in 2007 and 25% in 2010. The number of experienced structural steel and reinforced concrete (RC) detailers has declined to such an extent that consultants indicated that they would need 40% more detailers in 2007 & 80% in 2010 in anticipation of future large projects. This indicates that there is high demand for engineers, technologists and technicians as many consulting companies prefer to employ tertiary qualified staff to do this work.

South Africa's construction industry contributes 2-3% of GDP and is essential for growth in GDP, employment and poverty alleviation as contracting companies are the largest employers

in the industry. Table 4.11 shows the different type of contracting sectors and the respective number of employees, number of companies and the average company size.

<b>Type of contracting</b>	<b>Total number of employees</b>	<b>Approximate number of companies</b>	<b>Average company size</b>
Civil engineering	90 000	260	346
Non-residential	142 000	3 500	41
Residential	190 000	18 000	11
<b>Total</b>	<b>422 000</b>	<b>21 760</b>	<b>19</b>

Table 4.11 : Number of employers in the different contracting sectors (Lawless, 2005)

There has been a gradual decline in the employees in contracting since the 1970s and 1980s. The larger contracting firms employ fewer engineers than the consulting sector, with a larger number of technicians being used on site as supervisors and site agents. In the past artisans were trained to become foremen and supervisors. Due to the decline in the numbers entering the construction sector, contracting firms are using technicians as foremen and supervisors during their experiential training. The future demand in the contracting sector indicates the need for more engineering professionals (highly skilled staff) to supervise a largely semi-skilled workforce. As there is difficulty in attracting engineers in the construction sector, many contracting companies indicated that they need more than double the number of technologists over the next three years. They also indicated the need for technicians with an anticipated demand of just under 5% for the same period.

In regards to the public sector, most of the infrastructure development and maintenance was carried out by departments. Now, technical departments have become strategic, and only carry out projects that are designed and contracted by the private sector. According to Lawless, (2005) the demand for civil professionals in the public sector should have increased rather than decreased, as a result of the increase in area and population that councils are responsible for due to the new demarcations of 2000. Local government has been the major employer of civil engineering professionals, with engineers occupying key roles of city or town engineers and senior engineers and designers, while civil technicians were responsible for maintenance and operations.

The importance of civil engineering professional had been lost as a result of restructuring and the appointment of non-technical senior level of management in local government. This has resulted in many professional staff being offered early retirement and in some cases being replaced by non-technical decision makers, while others left the industry in extreme frustration. Research carried out in 2005 showed the following civil engineering statistics for civil professionals in the 284 local and district municipalities and metros. Table 4.12 shows Lawless, (2005) research findings.

<b>Municipalities</b>	<b>No. of municipalities</b>	<b>Professionals</b>	<b>Only one civil technician</b>	<b>Only young staff &lt; 35 years</b>	<b>Civil engineers</b>
Local Municipalities	237	79	42	38	45
District Municipalities	47	4	4	6	25

Table 4.12 : Civil professionals in local and district municipalities (Lawless, 2005)

In addition, the research showed only 381 engineers in municipalities nationwide, 369 technologists and 784 technicians. The future demand in local municipalities that have no civil professionals is estimated to be 156, with 543 professionals required in municipalities that do have staff to fill 40% vacancies. The demand for civil professional in metros is said to be in the order of 480 professionals to fill an average of 40% vacancies. In total, almost 1200 civil professionals are required to fill vacant posts in local authorities alone.

### **4.3 IMPACTS OF SALARIES ON THE DEMAND AND SUPPLY OF CIVIL ENGINEERING PROFESSIONALS**

Over the past decade salaries of civil engineering professionals in South Africa have deteriorated. In the early 1970s civil engineering professionals were one of the highest paid people, as they were in high demand. The supply of engineering professionals was steady, but lower than the demand for them. To elaborate more on this matter, economic theory would be used to illustrate the current salary situation of civil professionals in South Africa. Figure 4.1 below shows the market demand curve represented by  $D_0$  and the market supply curve



represented by  $S_0$ . The intersection of both these curves gives rise to the equilibrium market real wage represented by  $W_0$  and the number of labour hours required by the market represented by  $L_0$ .

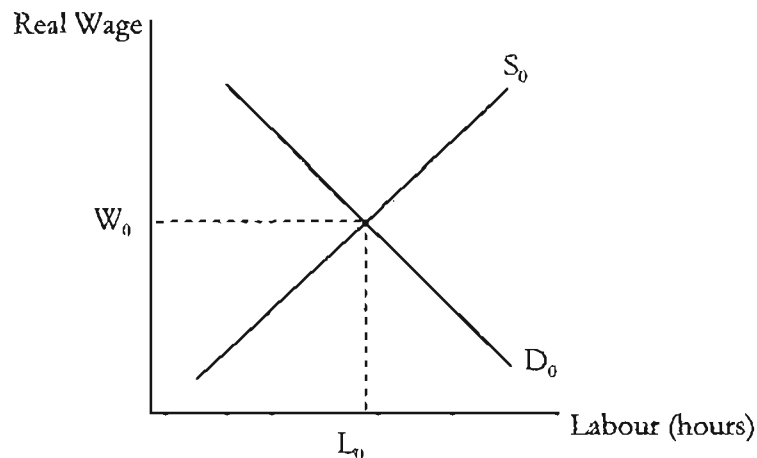


Figure 4.1 : Market supply and demand curve

A shift of demand and/or supply in these curves will lead to changes in the wage rate and the number of labour hours traded. The movement of these curves are influenced by the market, based on the economy and the growth potential of a country. Figure 4.2 shows what happens to the wage rate and equilibrium number of labour hours, *ceteris paribus*, the supply curve increases, ie shifts to the right. There is a decrease in the equilibrium wage rate as there is a surplus of labour at the old equilibrium wage rate, thereby placing downward pressure on wages until a new equilibrium is reached at  $W_1$  and an increase in the number of labour hours in the market  $L_1$ . However, if the supply curve decreases, *ceteris paribus*, ie shifts to the left, the opposite occurs. Figure 4.3 shows what happens when the demand curve decreases, *ceteris paribus*. A new and decreased market wage rate  $W_1$  and number of labour  $L_1$  would occur.

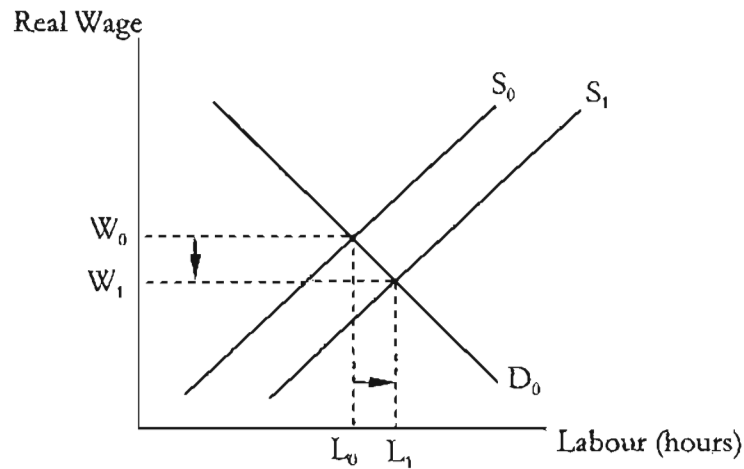


Figure 4.2 : Effects of a shifting supply curve on real wage rate and number of labour hours

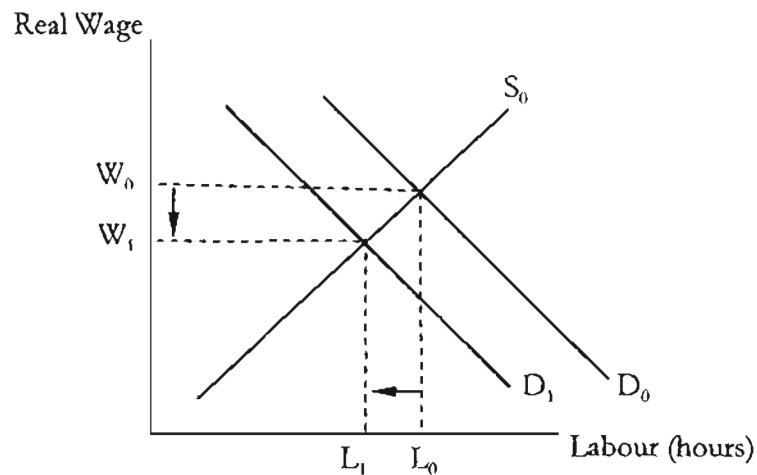


Figure 4.3 : Effects of a shifting demand curve on real wage rate and number of labour hours

During the past two decades, due to the decline in infrastructure development the civil engineering industry in South Africa showed a decrease in the demand for civil engineering professionals. This resulted in the dramatic decrease in the wage rate and lead to substantial decline in the number of civil professionals in the industry, as many left the industry or the country.



## 4.3 ASSESSMENT OF TECHNICAL STAFF AT ETHEKWINI MUNICIPALITY

### 4.3.1 Introduction

Using the above findings and trends experienced within the civil engineering industry, eThekweni municipality would be used as a case study to establish current trends and strategies within this local municipality. The information from the research questionnaires that were completed by civil engineering professionals within the eThekweni municipality will be used establish whether these trends have changed or not. To begin with, it is essential to look at the demographic profile within the municipality.

### 4.3.2 Age Profile of Civil Professionals within eThekweni Municipality

The age profile of the civil engineering professional within eThekweni municipality was categorised according to professional engineers, professional technologists and technicians. The total number of civil engineering professionals at the municipality is 110. Figure 4.4 below shows the number of engineers, technologists and technicians according to their grading level. Technicians occupy posts within grade 11 to 13 and show the largest number of the total civil professionals, while engineers and technologists occupy grades 14 upwards.

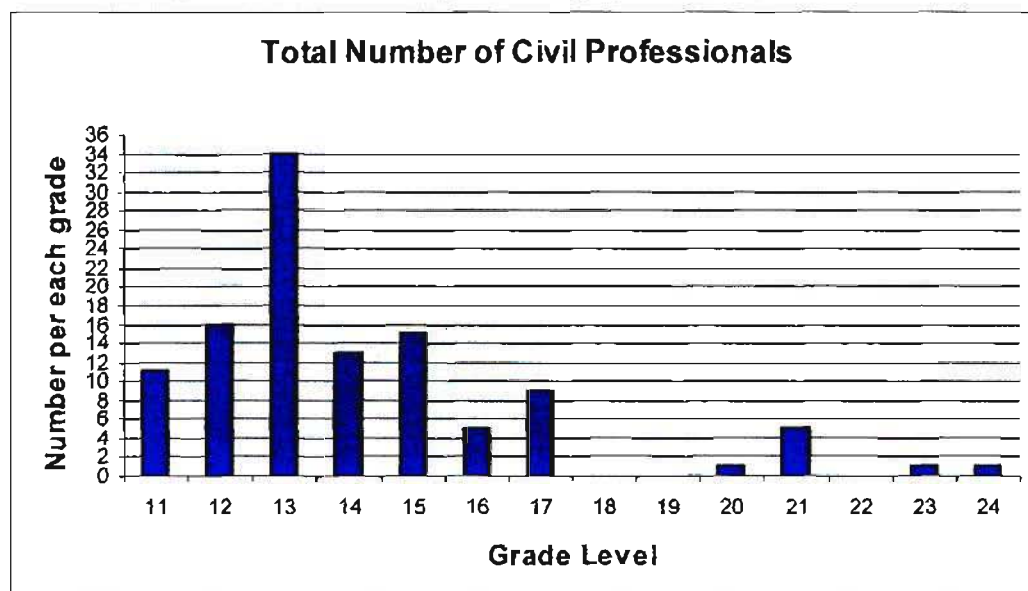


Figure 4.4 : Total number of civil professionals at eThekweni municipality (City Engineers, 2007)

The following Figures 4.5, 4.6 and 4.7 show the total number of professional engineers, professional technologists and technicians per each age group respectively.

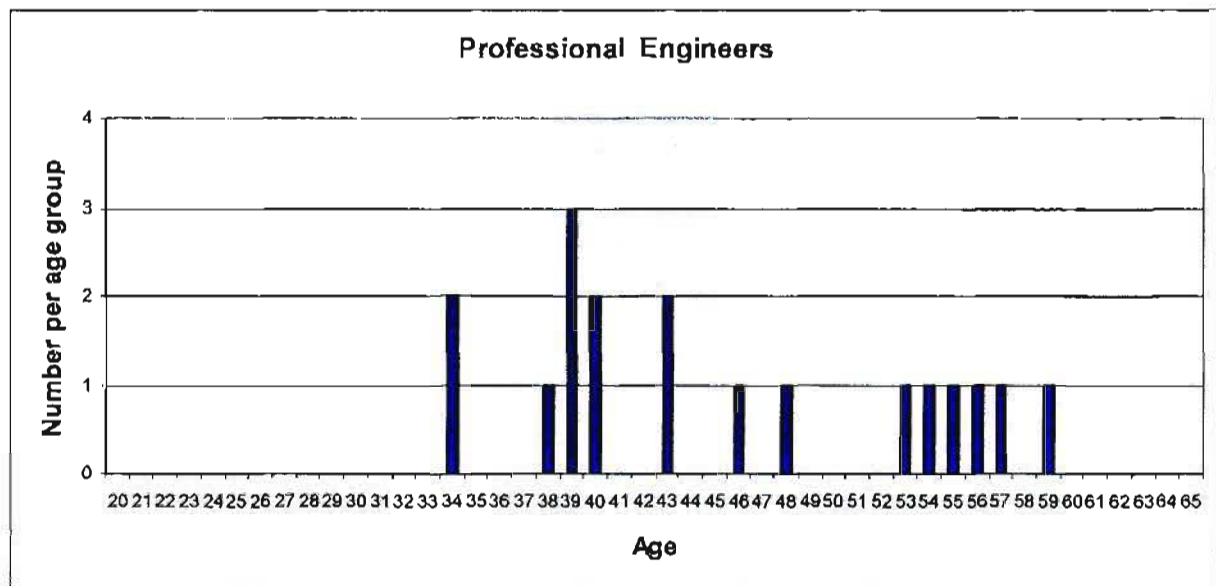


Figure 4.5 : Professional engineers at eThekweni municipality (City Engineers, 2007)

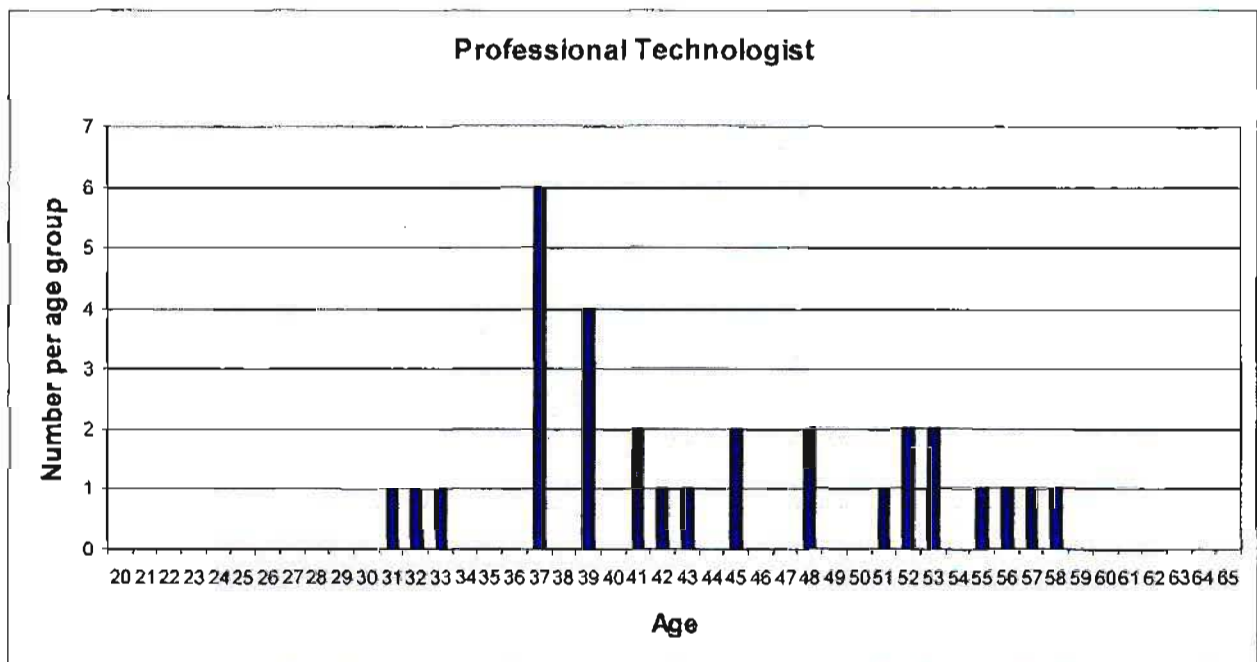


Figure 4.6 : Professional technologists at eThekweni municipality (City Engineers, 2007)

In keeping with the trend in Lawless (2005) research, eThekwin Municipality shows much of the professional engineers in their late 40s with the total number being 18. In addition, there are 8 engineers employed in council that are in progress in obtaining their professionalship. They have not being included in Figure 4.5. The same picture can be seen in Figure 4.6 for professional technologists with a large number of them being in the late 40s and upwards. Interestingly, there are a greater number of professional technologists, which totals 30 as compared to professional engineers at the municipality. This information confirms the difficulty of securing engineers as many of these posts are being filled by technologists. The quality of staff within the municipality will be investigated in chapter five when analyzing the research questionnaires.

As mentioned earlier, technicians play a vital role in maintenance and operations. Figure 4.7, shows a total number of 53 technicians being employed by the municipality. There seem to be a good spread of technicians over the age spectrum, with large numbers in the 21-31 year group and 50-61 age groups. This information illustrates the large availability of technicians especially in the younger age group, which will support succession planning and the transfer of skills and knowledge. This progression will also increase the number of professional technologists over time and further increase the number of technologists within council.

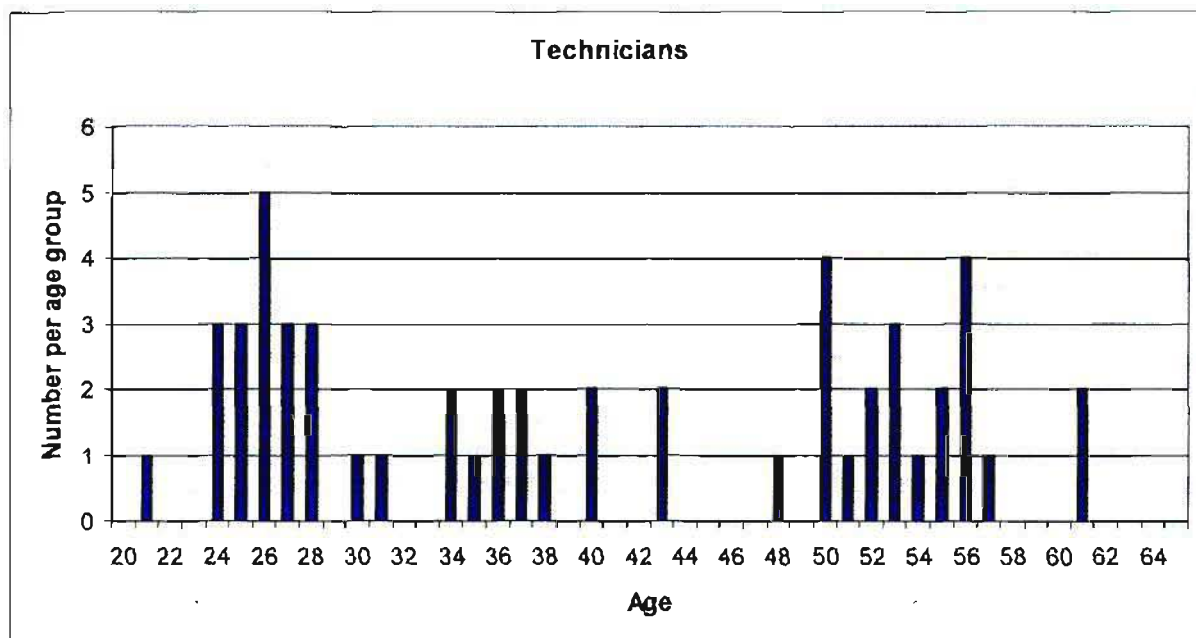


Figure 4.7 : Number of technicians at eThekwin Municipality (City Engineers, 2007)

The current ratio of engineers to technologists and engineers to technician within the municipality is 1 : 1.2 and 1 : 2 respectively. This effectively means that there is an equal number of engineers to technologists and double that of technicians at the municipality. Although these ratios look good, high vacancies at the municipality raises the issues regarding service delivery.

#### 4.3.3 Vacancies within departments at eThekweni Municipality

There are effectively five technical departments that employ civil engineering professionals at the municipality. They are as follows:

- Structural engineering;
- Geotechnical engineering;
- Coastal, stormwater and catchment management;
- Development engineering;
- Transportation engineering.

The structural engineering department is amongst the smallest of all the departments, with a total staff requirement of 16. Currently, there are only 6 positions vacant. Table 4.13 shows the vacancies within this department.

<b>Department : Structural engineering</b>	
Technician	4
Draughtperson/detailer	2
<b>Total Vacancies</b>	<b>6</b>

Table 4.13 – Number of vacancies within the structural department.

The geotechnical engineering department is a small department with a total staffing requirement of 40. Of the 40 posts 16 are filled with 24 still being vacant. Table 4.14, shows that most of the technical posts are filled, and more vacancies exist within the laboratory environment, especially regarding material testers.

<b>Department : Geotechnical engineering</b>	
Road Assessor	6
Material Testers	11
Laboratory Attendent	3
Technologists/Engineer	2
Technicians	1
GIS technician	1
<b>Total Vacancies</b>	<b>24</b>

Table 4.14 – Number of vacancies within the geotechnical department.

The coastal, stormwater and catchment management department has a total staffing requirement of 111. Currently only 54 posts are filled, that is almost 51% being vacant. Table 4.15 shows the posts and numbers of vacancies within this department. An equal and high number of engineers and technician posts are still vacant.

<b>Department : Coastal, stormwater and catchment management</b>	
Draughtspersons	7
Technicians	14
Technologistss	5
Engineers	11
Other (clerks/secretaries)	20
<b>Total Vacancies</b>	<b>57</b>

Table 4.15 – Number of vacancies within the costal, stromwater and catchment management department.

The development engineering department is smaller than the coastal, stormwater and catchment management department which as a total staffing requirement of 70. Currently only 43 of the 70 posts are filled, leaving 27 posts or 39% vacant. Table 4.16 shows the post and number of vacancies within this department.

<b>Department : Development engineering</b>	
Managers	1
Draughtsman	4
Technicians	18
Technologists/Engineer	0
Other	4
<b>Total Vacancies</b>	<b>27</b>

Table 4.16 – Number of vacancies within the development engineering department.

The transportation department has a total staff requirement of 92 posts. Currently there are 42 posts vacant. Table 4.17 shows the post and numbers that are still vacant. It is interesting to note that there are no engineer posts in this department, and that most of the technical staff currently employed and vacant are technicians posts.

<b>Department : Transportation engineering</b>	
Clerk/Secretary	5
Managers	1
Technicians	15
Draughtsperson	4
Clerk of works	3
Site assistants	8
Survey technician	3
Survey assistant	3
<b>Total Vacancies</b>	<b>42</b>

Table 4.17 – Number of vacancies within the transportation engineering department.

The analysis of the above department's vacancies put the number required by the municipality of engineers and technologists at 18 and 48 for technicians. The overall vacancies at the municipality stands at 48%. According to Benji Naidoo, human resources management at the eThekweni municipality, the reasons for these vacancies are twofold. The first being that as a result of the increase in the municipality's demarcation area, a greater part of the budget is being used to improve service delivery in these areas, therefore many of the posts are still vacant. The second reason is the municipalities grading structure. Salaries within the

municipality are set accordingly to this grading system and do not allow for a variable salary structure like in many consulting and contracting firms. Accordingly, the municipality experiences difficulty in retaining and or filling in posts as these individuals are offered much better salary packages than that offered by the municipality.

## *CHAPTER 5*

### **SURVEY RESULTS**

#### **5.1 INTRODUCTION**

Research questionnaires were initially e-mailed to respective civil engineers, technologists and technicians within the eThekweni municipality for them to print and complete. This method resulted in a low response to the questionnaire, and could have been caused by so called corporate laziness or that these individuals are just too busy resulting from their current work load. In order to increase the response rate, questionnaires were printed and presented personally to these civil professionals to complete them. A total of 54 questionnaires were received, and the statistical program SPSS was used to analysis the information. The information from the questionnaire was used to assess the following key issues, namely;

- the demand for civil professionals within each department;
- current skills and abilities of engineers, technologists and technicians;
- job satisfaction, salaries and the reasons for wanting to change careers;
- organizations ability to instill technical skills and relevant knowledge to engineers, technologists and technicians;
- the profile of individuals that have considered or that are considering leaving South Africa;
- impacts of Affirmative Action on current staff members in regards with career and growth development;
- perceptions regarding infrastructure development within KZN;
- and lastly positions in relationship to qualification of technical staff.



## 5.2 RESULTS

The following section illustrates the results of the above mentioned key issues. The information from these results would be used to compare the research covered by Allyson Lawless and establish whether the situation within the civil engineering industry has improved or otherwise.

### 5.2.1 Demand for civil professionals within departments

The demand for civil engineering professionals has increased predominately due to the South African governments increase drive in infrastructure development. With regards to question 18 which read “*In your department do you think that there are adequate technical staff to handle the current work?*”, the majority of the civil professionals indicated that more staff is required within their department. Results are shown in Table 5.1.

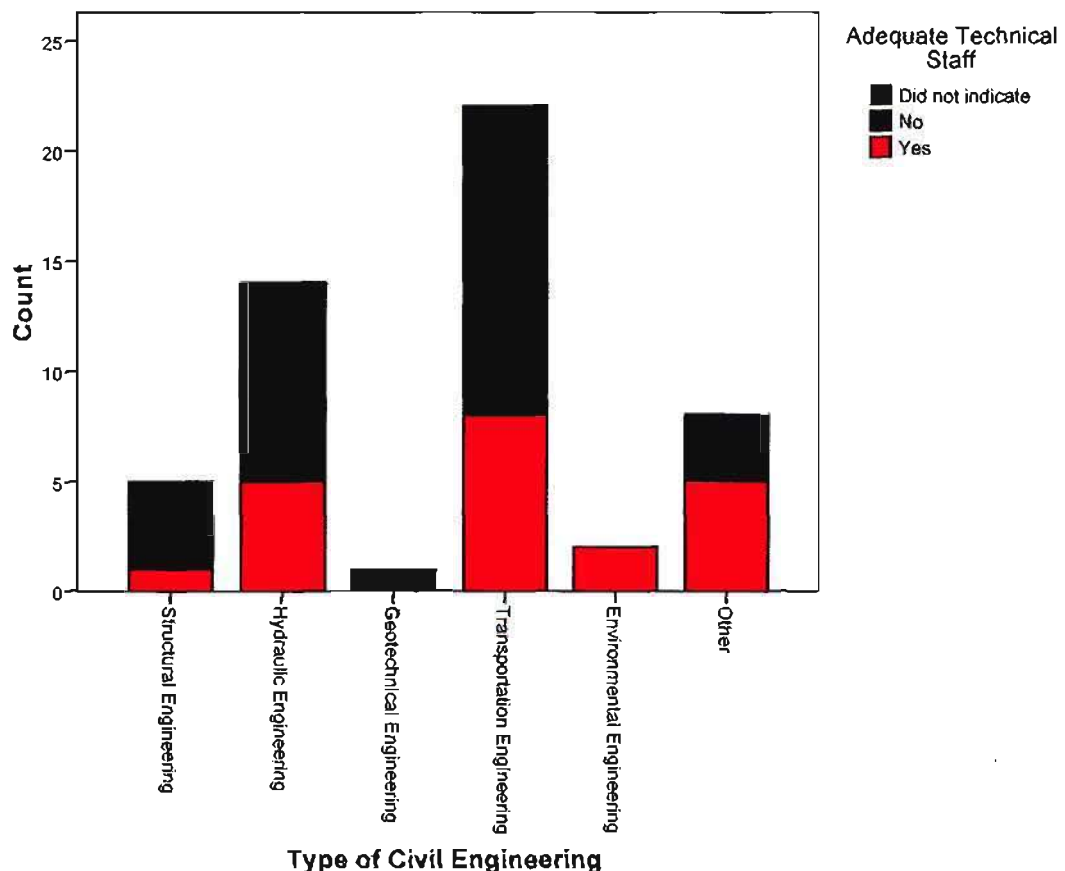


Figure 5.1 : The demand for more staff per department at eThekweni municipality (Author compiled – generated using SPSS)

		Completion of Projects or Tasks			Total
		Always	Often	Sometimes	
Adequate Technical Staff	Did not indicate	1	0	1	2
	No	14	11	4	29
	Yes	13	6	2	21
	Total	28	17	7	52

Table 5.1 : Cross tabulation of adequate technical staff and completion of projects and tasks.

Figure 5.1 shows that out of the 52 respondents, 29 (55,8%) indicated that their departments don't have adequate staff. Within these 29, only 4 (14%) of them indicated that they do not always complete their projects and task on time, this is shown above in table 5.1. There seems to be a discrepancy in this correlation, as one would expect a large number of the 29 respondents to indicate that they do not always complete their projects and task on time as a result of inadequate staff. These four respondents comprised of two divisional managers and one technician and graduate engineer each. This indicates that much of the staff are either working over time, or that these 4 staff members are doing most of the work in their department as possible reasons for this taking place.

### 5.2.2 Skills and abilities of civil professionals

With civil engineering projects, technical staff needs to have a good mathematics and technical skill grounding. This grounding is taught at universities and technikons. The analysis in this section will establish whether universities and technikons are providing the right training and skills to civil professionals. The following tables indicate the general perceptions that senior managers have on the skills and abilities of engineers, technologists and technicians at eThekwin municipality. These issues were addressed in question 7 which read, "*How do you rate the quality of engineers from universities with regards to their mathematical and technical skills?*", question 8 which read, "*How do you rate the quality of technologists/technicians from universities of technology with regards to their mathematical and technical skills?*" and question 12 which read, "*How do you rate the overall quality of current staff working under you, taking into account their technical, project management and communication skills?*". A total of thirteen senior managers responded, comprising of eleven divisional managers and two deputy heads.

		Quality of Engineers Maths & Technical Skills			Total
		Getting Worse	Worse	No Change	
Position	Divisional Manager	5	2	4	11
	Deputy Head	0	1	1	2
Total		5	3	5	13

Table 5.2 : Senior managers rating the quality of engineers

With regards to rating the quality of engineer's maths and technical skills, 8 (61.5%) felt that the quality of engineers are in range of worse to getting worse, with the remainder feeling that there is no change. This figure is a cause of concern as this indicates that the standard of education and course content being taught to graduates at universities are below industry requirements.

		Quality of Technologists and Technicians Maths & Technical Skills			Total
		Getting Worse	Worse	No Change	
Position	Divisional Manager	4	2	5	11
	Deputy Head	0	0	2	2
Total		4	2	7	13

Table 5.3 : Senior managers rating of quality of technologists and technicians

Table 5.3 shows managers rating the quality of technologists and technicians. In this case 6 (46.15%) of the 13 respondents indicated that the quality of technologists and technicians are worse to getting worse, with the reminder indicating no change. This suggests that technicians are maintaining industry standards.

		Rate of overall quality of staff				Total
		Bad	Fair	Good	Very Good	
Position	Divisional Manager	1	4	5	1	11
	Deputy Head	0	2	0	0	2
Total		1	6	5	1	13

Table 5.4 : Senior managers overall rating of staff

Table 5.4 shows how managers rated the overall quality of staff within their departments. In this case the two deputy heads give a rating of 'fair' regarding their staff, while 6 (54.54%) of the 11 divisional managers reflected a rating with a range of 'good' to 'very good'. The above analysis indicates that universities are producing graduates that are not adequately grounded, while

technikons are generally maintaining their quality of technicians and technologists. This may be because many universities are lowering their entrance requirements and to an extent their standards to increase the supply of black engineers into the industry. On a positive note, senior managers rate the overall quality of staff at the municipality in their department on the upper end of good on the scale of quality.

### 5.2.3 Job satisfaction, salaries and change of careers

It is possible to view job satisfaction and salaries as compliments or substitutes. As a compliment, as salaries increases, job satisfaction increases. As a substitute, someone could be very job satisfied but earn a low salary. The civil engineering sector is no different as many civil engineers accept positions for either one and seldom achieve both. The following analysis is to establish the reason why current staff would like to change their career, in light of their job satisfaction and salaries. Using question 17 which read, “*Do you enjoy your job at the municipality?*”, question 5 which read, “*What is your current gross salary per month?*” and question 25 which read, “*If you were given an opportunity to change your career from civil engineering, would you?*”, Table 5.5, 5.6 and 5.7 reflect the general feelings of civil engineering professionals regarding their job satisfaction, positions and salaries and the number of professionals wanting to change their career within the eThekweni municipality respectively.

		Job Satisfaction					Total
		Not too bad	Don't mind it	Good	Love it	Did not indicate	
Position	Technician	0	6	7	4	0	17
	Technologists	1	8	6	0	0	15
	Graduate Engineer	1	1	3	1	1	7
	Divisional Manager	1	1	7	2	0	11
	Deputy Head	0	0	2	0	0	2
	Total	3	16	25	7	1	52

Table 5.5 : Rating of job satisfaction within eThekweni municipality

The analysis of job satisfaction in Table 5.5 shows that 25 (48%) of respondents indicated that they enjoyed their job at the municipality with a rating of ‘good’. In addition 7 (13.46%) indicated that they loved their job. The remainder 19 (36.54%) fell in the range of ‘not to bad’ to ‘don’t mind’. From the above information it can be concluded that 32 (61.25%) of the

respondents have a high level of job satisfaction. We now focus on salaries in relation to positions being held at the municipality.

	Gross Salary per month				Total
	R10,000 to R15,000	R15,000 to R20,000	R20,000 to R30,000	Greater than R30,000	
Technician	9	3	5	0	17
Technologists	0	7	8	0	15
Graduate Engineer	0	2	3	2	7
Divisional Manager	0	0	3	8	11
Deputy Head	0	0	0	2	2
Total	9	12	19	12	52

Table 5.6 : Positions and salaries of civil professionals within eThekweni municipality

With regards to salaries a large proportion of the respondents fell in the R20,000 to R30,000 category range. As in many firms the higher salary range of greater than R30,000 is enjoyed by the divisional managers and deputy head's. According to Benji Naidoo, human resource manager at eThekweni municipality the discrepancies in salaries in the R20,000 to R30,000 range can be attributed to the period of employment and the skills of individual at the time of employment. The salary scales are considered to be market related, however due to current shortage of civil professionals within the industry, individuals are being offered much higher salaries, especially in the private sector. The focus will be now on analysing the number of respondents that indicated 'yes' to if they were given an opportunity to change their career and discuss some of their reasons.

It is interesting to note that over 60% of respondents indicated that they enjoy their job at the municipality, which represents a high job satisfaction rating. In addition, from the 9 technicians that earn a monthly salary between R10 000 to R15 000 per month, none indicated that they are dissatisfied with the jobs. It can be therefore suggested that technicians employed at the municipality support the substitute interpretation, as they enjoy their jobs although they are earning a low salary.

		Opportunity to change career		Total
		No	Yes	No
Position	Technician	15	2	17
	Technologists	11	4	15
	Graduate Engineer	4	3	7
	Divisional Manager	9	2	11
	Deputy Head	2	0	2
Total		41	11	52

Table 5.7 : Civil professionals wanting to change their careers within eThekweni municipality

Table 5.7 shows 11 (21.15%) of the 52 respondents indicating that if they were given the opportunity they would change their career. This information shows a direct correlation with regards to job satisfaction at the municipality, as a large proportion of civil professionals enjoy their career. The following are reasons that the 11 respondents cited as to why they would like to change their careers.

Words of Respondents	Salary	Otherw ise
I would like to go into business		✓
Salaries in civil engineering are slight less than other career paths such as IT and accounting.	✓	
Need a new challenge		✓
Civil engineering at the municipality is not challenging, you don't get to deal with "hard-core" civil project work in civil is mundane. A new career seems exciting and challenging.		✓
Although I feel my current work environment could be the main reason for me wanting to change my career, I am little bored with engineering work and would like to attempt something different which is faster moving more financially rewarding.		✓
The satisfaction of working in the council is not there any more.		✓
Not confident of ECSA ability to maintain professional status of engineers. Financial rewards to other industry is greater.	✓	
Poor status and salary compared with other professions, eg accountants, QS and lawyers.	✓	
I feel that there are better opportunities in other careers in terms of the amount of effort and responsibility you take on and the reward you receive for this effort. You also have a better opportunity to lead a more balanced lifestyle which I feel has become a very important factor in today's working environment.		✓
I would just like to see what the alternatives are.		✓
There seems to be an elite hierarchy system between university and technikon graduates in the civil engineering field which is totally unnecessary in a municipal environment. You are also going to be second best even if you produce better than a BSc graduate.		✓
<b>Totals</b>	<b>3</b>	<b>8</b>

Table 5.8 : Reasons to wanting to change their careers within eThekweni municipality

Table 5.8, shows the words of respondents to reasons for wanting to change their careers. The table also shows two columns, one for 'salary', as salaries is one of the key driving forces that individuals chose to change their careers and the other column for 'otherwise', which includes all reasons other than salaries for individuals wanting to change their careers. In this category many respondents cited job opportunities and no challenge as the main reasons to wanting to change career at the municipality. It can be concluded that 11 (21.15%) of the 52 respondents are dissatisfied with their jobs. This is due to low salaries (3 people) and job opportunities (including a lack of challenge in their current jobs) at the municipality (8 people).

#### 5.2.4 Mentoring within eThekwin municipality

Mentoring of junior staff is imperative to support session planning. Many if not all industries implement mentoring and training to maintain knowledge and skill within firms and the industry at large. Figure 5.2 below shows the rating of mentoring by civil professionals at the municipality.

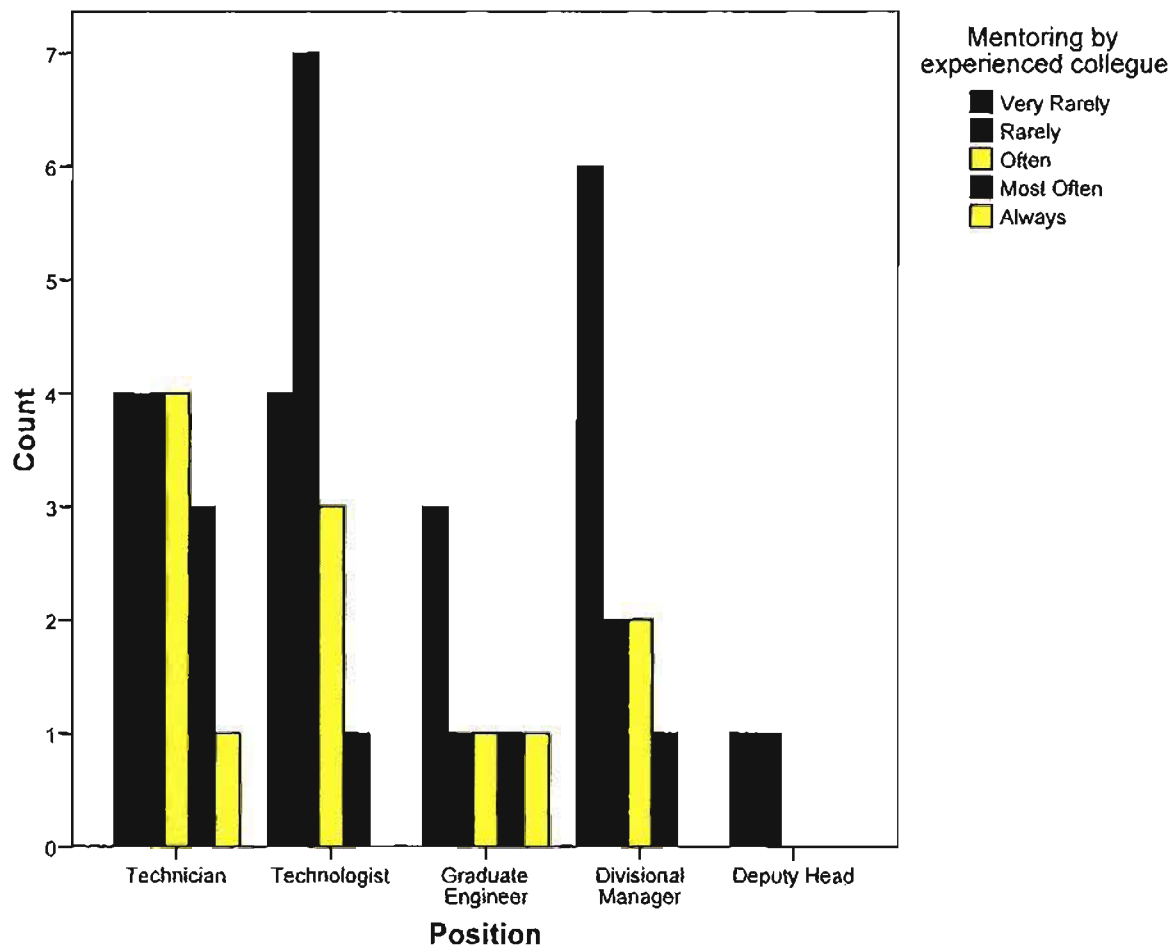


Figure 5.2 : Civil professionals rating on mentoring at eThekwin municipality (Author complied – generated using SPSS)

From the 52 respondents, only one did not complete this question. However 33 (63.5%) indicated that they ‘rarely’ or ‘very rarely’ did not require mentoring. This is more evident with the senior staff at the municipality, as it is suggested that they have the relevant skill and experience to carry out their work. The respondents that did indicate that they ‘often’, ‘most often’ and ‘always’ required mentoring was amongst the technicians totaling 9, technologists with 4,



graduate engineer with 3 and surprisingly divisional managers with 3. The transfer of skills and knowledge is passed down to younger professionals by older well experienced civil professionals. Figures 4.4, 4.5 and 4.6 shows adequate experienced engineers, technologists and technicians to render this mentoring. This mentoring can only be successful if these staff members remain with the municipality. Mentoring would encourage the transfer of skills and maintain secession planning.

### 5.2.5 Professionals leaving South Africa

The ‘brain drain’ phenomenon in South Africa has been evident from the early 90s. This section will establish the number of staff members that have considered leaving South Africa and the reasons for their decisions. The research will analyse the number of respondents that indicated ‘yes’ if an opportunity arose to leave South Africa and work overseas, using question 27 which read, “*Have you ever considered the option of leaving South Africa to work overseas?*”.

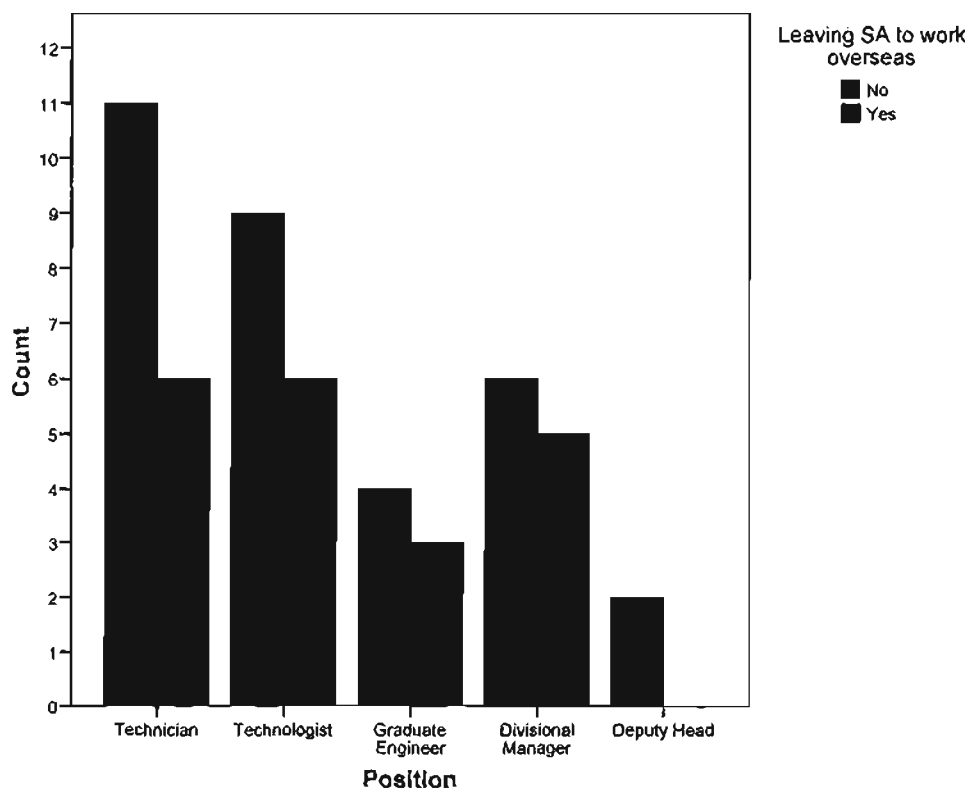


Figure 5.3 : Civil professionals that considered leaving South Africa  
((Author compiled – generated using SPSS)

Out of the 52 respondents, Figure 5.3 shows a total of 20 (38.5%) respondents indicating that have considered leaving South Africa. There is high number of technicians and technologists that have considered leaving with 6 each and surprisingly followed closely by division managers with 5 respondents and then with 3 graduate engineers. Interestingly, those that indicated they considered leaving was not limited to one specific age group. Table 5.9 shows representations from the whole spectrum except those in the 'greater than 60 years' age group. It is not surprising that those considered leaving falls in the '20 to 30 years' and '31 to 40 years' age group, as many young to middle age individuals are leaving South Africa subsequently.

	Leaving SA to work overseas	
	No	Yes
20 to 30 years	10	6
31 to 40 years	10	6
41 to 50 years	5	5
51 to 60 years	6	3
greater than 60 years	1	

Table 5.9 : Age and numbers of civil professionals that considered leaving South Africa.

The research now looks at some of the reasons that influenced these respondents to consider leaving South Africa. Out of the 20 respondents, only one did not provide a reason for this question, so therefore this respondent was removed from this part of the analysis. In addition, those that indicated 'yes' were predominately indian (10) and white (8) and a small number of blacks (2). The following were reasons for considering leaving South Africa.

1. high crime rate and safety of family;
2. unstable job security;
3. better job opportunities and experience;
4. higher income.

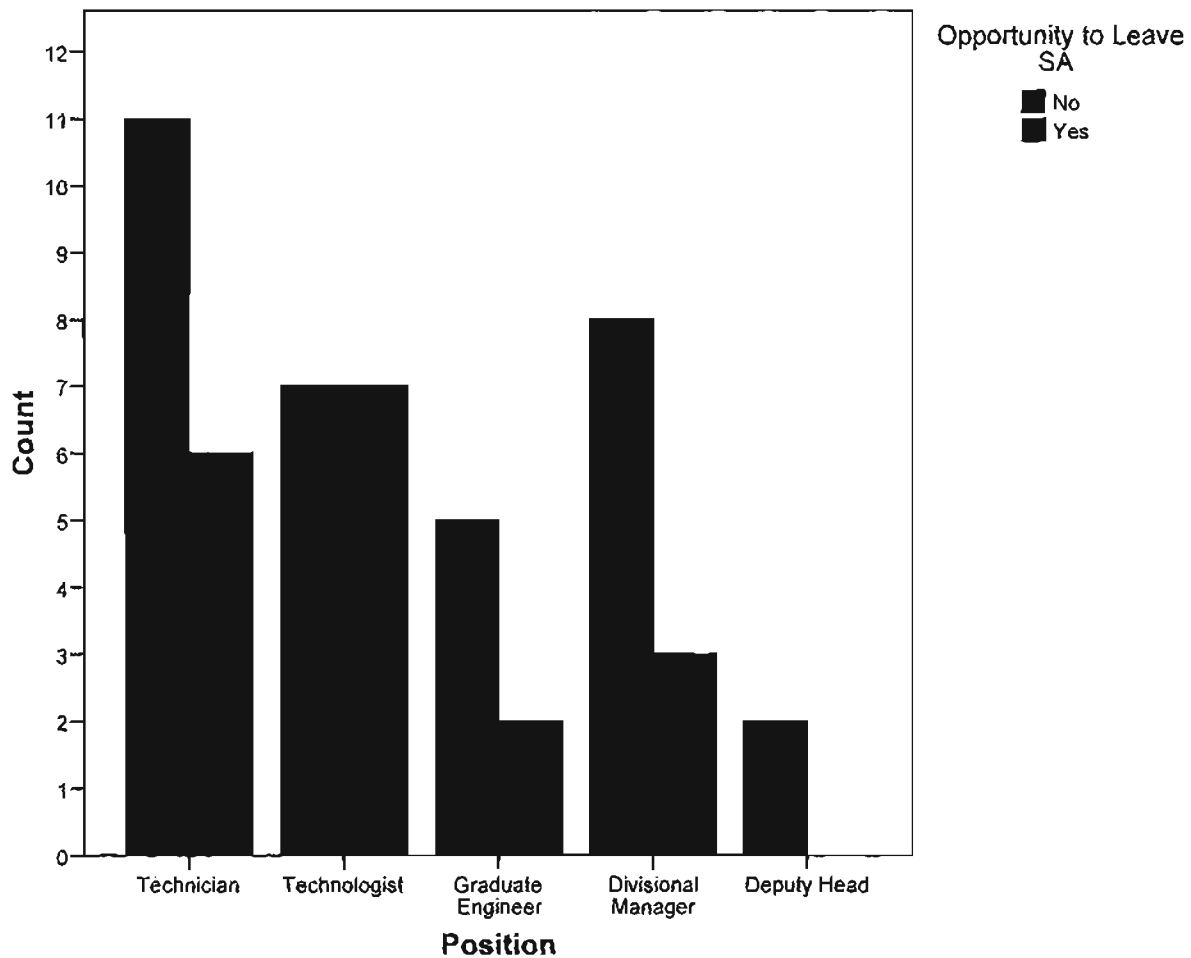


Figure 5.4 : Civil professionals that would leave South Africa if an opportunity arose(Author complied – generated using SPSS)

There has been a slight decrease as only 18 of the 19 that indicated that they have considered leaving South Africa, indicated that they would leave South Africa if an opportunity arose. Again, technicians, technologists and divisional managers predominately featured as those that wanted to leave. The reasons for wanting to leave South Africa were very similar to those listed above.

#### 5.2.6 Affirmation action on career and growth development

As discussed in chapter 3, affirmative action poses a threat to many white South Africans. The section analyses the effects affirmative action has had on civil professionals within our survey sample. Figure 5.5, shows the gender profile of respondents and their responses to the effects of

affirmative action on their career progression. As a result of no coloured individuals completing the research questionnaire, they are not represented in this analysis.

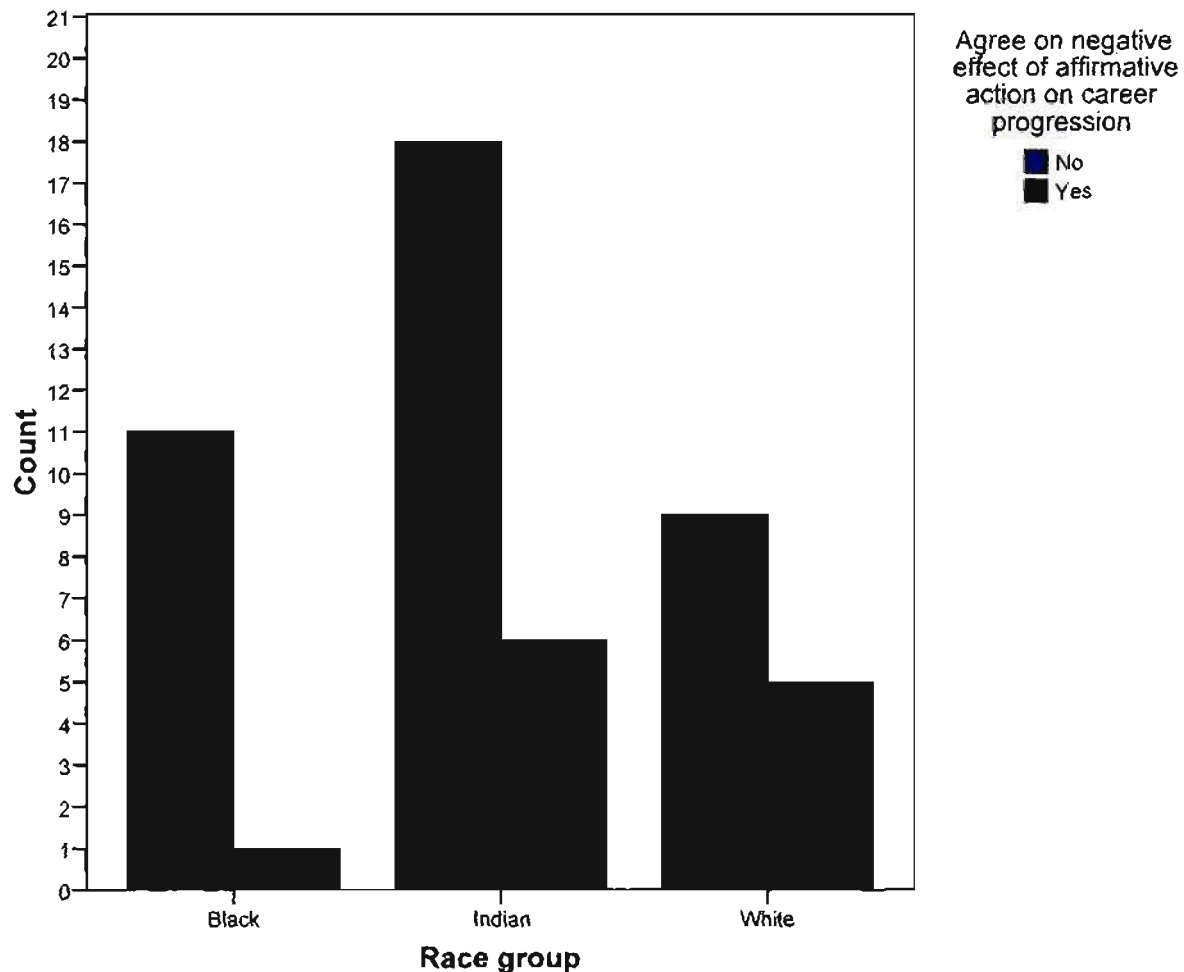


Figure 5.5 : Effect of affirmative action on career progression of civil professionals at eThekwiní municipality (Author complied – generated using SPSS)

Of the 52 respondents, 2 individuals did not respond to question 31 which read, “*Has affirmative action policy negatively affected your progression in your career in this municipality?*”. However, 6 Indians and 5 Whites indicated that affirmative action has had a negative effect on their career progression. Surprisingly, there was 1 Black individual that indicated ‘yes’ for this question. The Black individual did not provide a negative or positive response, but offered the following comment, ‘*The criteria used or the bases of progression are not clear. As a Black South African, you really do not know if you are really progressing because of your abilities or*

*because of the demographics'*. This comment raises a very vital and pressing point regarding the continued implementation of affirmative action in the municipality especially regarding black people and how they feel about their self worth and abilities in light of affirmative action. As only one black individual indicated this as a concern, future research regarding this matter would be valuable to assess the perceptions and views on affirmative action of black individuals only.

Table 5.10 below shows the views shared by both whites and indians regarding affirmative action on career progression at the municipality. Their views send very negative sentiments regarding the implementation criteria of affirmative action at the municipality. This information indicates that previously disadvantage individuals especially of black origin are being fast tracked into positions that they don't have the experience nor the skill to perform.

Words of Respondents	Merit	Otherwise
Priority is given to under representation in terms of race, gender and disability.		✓
The council is not looking at any other race rather than blacks to promote & educate.		✓
Most management posts are being given to people on colour than merit. I was refused about three posts thus far.	✓	
People with far less ability and unproven track record in senior positions.	✓	
White male says it all		✓
Application of EE, focus more on colour than on merit.	✓	
I am not black enough.		✓
Previously overlooked for manager posts in Dept. in favour of inexperience staff. Furthermore white staff at higher levels have stopped progressing hence no more senior vacancies occurring.	✓	
Progress to senior post has been affected by AA, although shortage of engineering skills has limited the impact of this, loss of technical staff due to premature promotion has impacted on service delivery and capacity to undertake work.		✓
Was sidelined for positions that were given to junior staff.	✓	
We were not white enough in the apartheid system and not black enough in this demoractic system - unfortunately we have to change the demographics of the apartheid system and we got caught in this 'cross fire'.		✓
<b>Totals</b>	<b>5</b>	<b>6</b>

Table 5.10 : Views of whites and indians regarding affirmative action on career progression.

Out of the 11 respondents, 5 indicated that with regards to promotions and job applications, the municipality gives a higher weighting on colour rather than on merit and abilities on performing the job. The other 6 indicated that being either indian or white disadvantaged them from progressing further in their career.

### 5.2.7 Infrastructure development within KwaZulu-Natal

Using question 33 which read, “Do you think government is doing enough for infrastructural development in KZN?”, most of the divisional managers indicated that government is not doing enough towards infrastructure development in KZN, while technician’s views were contrary to this. Of the 52 respondents only one did not complete this question. However 19 (37.25%) respondents indicated that they ‘don’t know’, 17 (33.33%) indicated ‘no’, while 15 (29.41%) indicated ‘yes’ to this question.

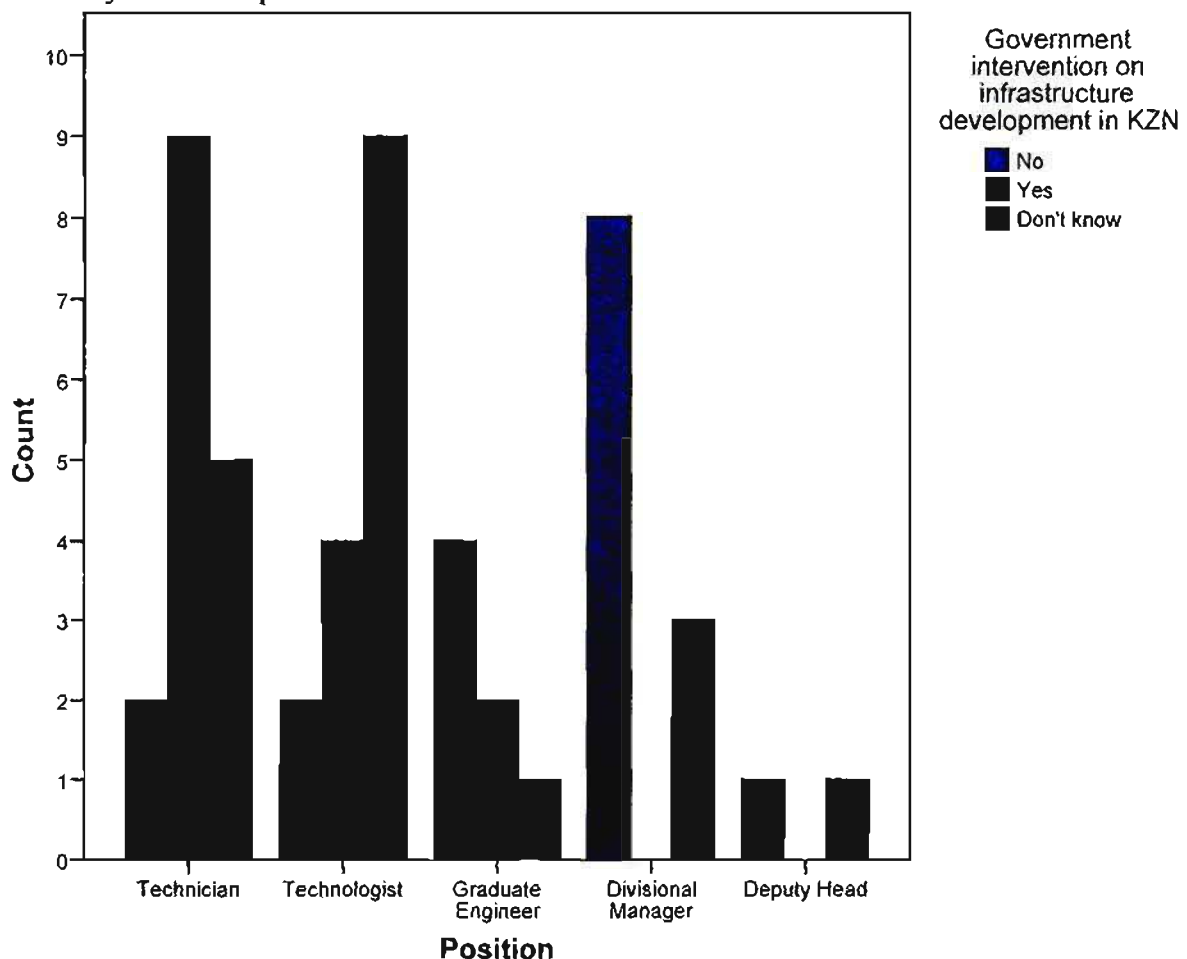


Figure 5.6 : Civil professionals view on government intervention on infrastructure development in KwaZulu Natal (KZN) (Author complied – generated using SPSS)

The implementation of infrastructure development is critical for economic growth and job creation. Table 31, therefore focuses on the views of respondents that answered ‘no’ to this question.

Words of Respondents
They don't have an idea on what's going on in this present time.
Due to its many policies like BEE, Affirmative action, etc
There is a perception that basic service delivery is still very slow. Electricity grid at its max.
More could be done with more skilled professionals and artisans. Lack of skills within government is hampering progress.
Funds are spend foolishly on items that are not necessities, should rather use the funds to upgrade the infrastructure.
Bigger emphasis on maths and science is required at school. Shortage of tech skills in govt. is resulting in poor decision making problem solving and proactive maintenance plans.
Due it's many policies like BEE, AA, etc.
More affordable housing required for residents, besides RDP housing, road infrastructure requires upgrading.
A lot of money is wasted on pointless things like 'Name Changes'.
To much red tape to access funds.
Major collapse of road infrastructure is taking place. Both water supply and electricity supply are failing at present. More prevalent outside eThekweni.
The combination of the technical skills shortage and AA results in mediocrity within government departments dealing with infrastructure development. Previously advantaged individuals are not even considered for short listing for technical posts and hence no longer apply for these posts.
The government is not doing enough to encourage technical skills to remain in this country nor to encourage skilled people to return.
There is more work that still needs to be accomplished and must try and move away from all projects consolidates and have permanent staff who are qualified and can deliver for our communities.
Housing of communities is still a major issue in KZN. We have excellent roadways, harbor and sporting infrastructure and the construction of the new airport (La Mercy) goes a long way to showing the commitment from government to development. However the railways are a shambles, and there is a lot of political infighting that is going on to decide what projects get approved. This to a very large extent is contributing negatively to governments ability to produce results.
Greater emphasis and focus needs to be put into the scarce skills areas. This has an impact on infrastructural development.
Not enough funding is set aside for efficient management and maintenance of the existing surfaced network. As a result, the backlogs in maintenance are large, with many roads in a poor to fair condition rather than in a good to excellent condition.

Table 5.11 : Views of civil professionals regarding governments intervention on infrastructure development in KZN.

Table 5.11, shows many different views of the 17 respondents that replied ‘no’ to question 33. However, the views of the 17 respondents indicate that ‘red tape’, poor priorities, government policies, education and scarce skills have contributed to not enough being done for infrastructure development in KZN.

### 5.2.8 Positions and qualifications at eThekweni municipality

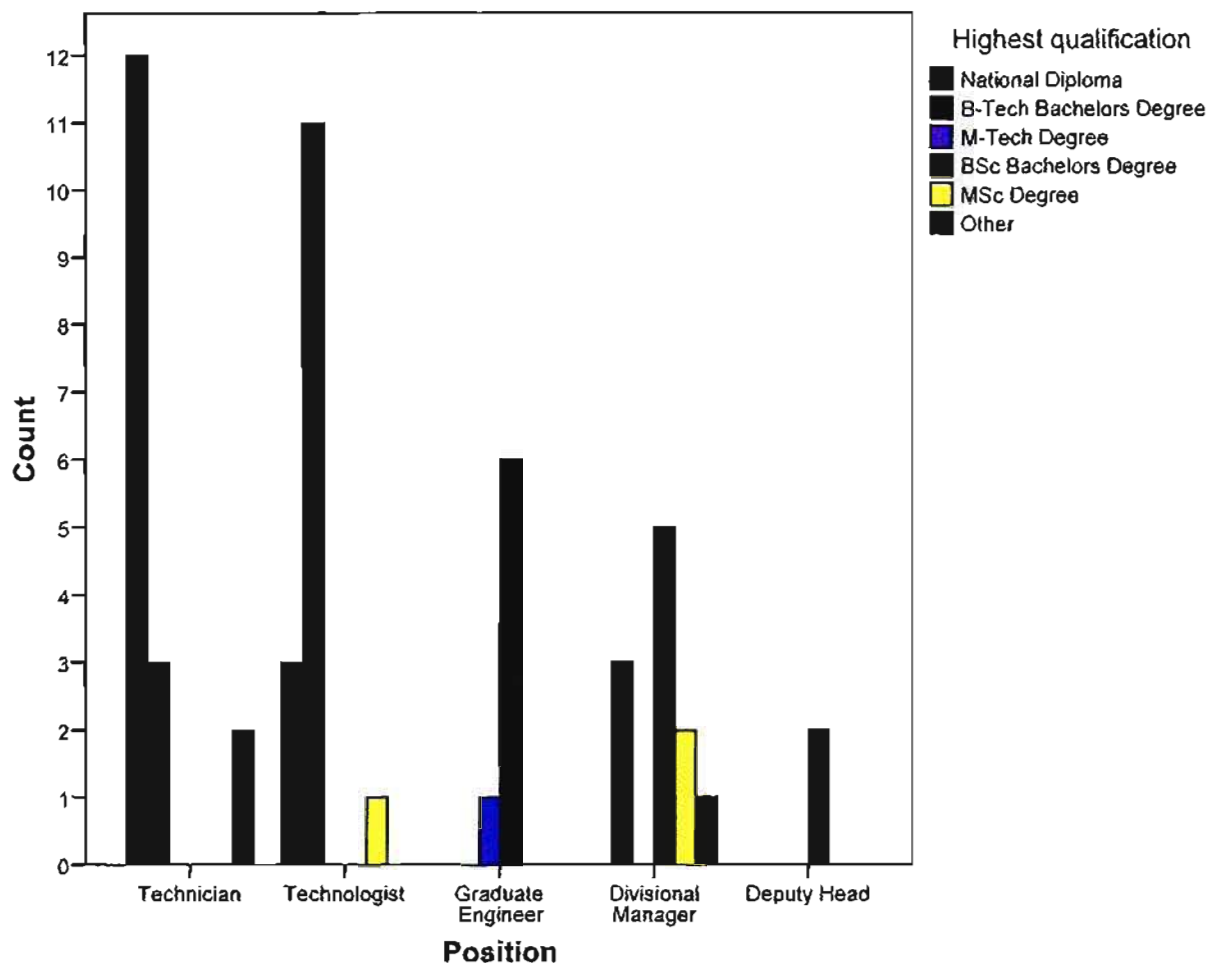


Figure 5.7 : Civil professionals view on government intervention on infrastructure development in KwaZulu Natal (KZN) (Author complied – generated using SPSS)

All 52 respondents hold some sort of technical qualification. These qualifications are important as it is a measure to indicate an individual technical knowledge. The higher the individuals technical knowledge and coupled with sufficient working experience the more senior the



person is considered. The trend at the municipality is in keeping with this statement, as many of the senior managers hold a minimum BSc bachelors degree obtained from a university. It is interesting to note that 3 of the 11 divisional managers hold B-Tech bachelors degree, with 1 holding a national higher diploma, which lends to the conclusion that their experience had a greater weighting on them being appointed to this position.

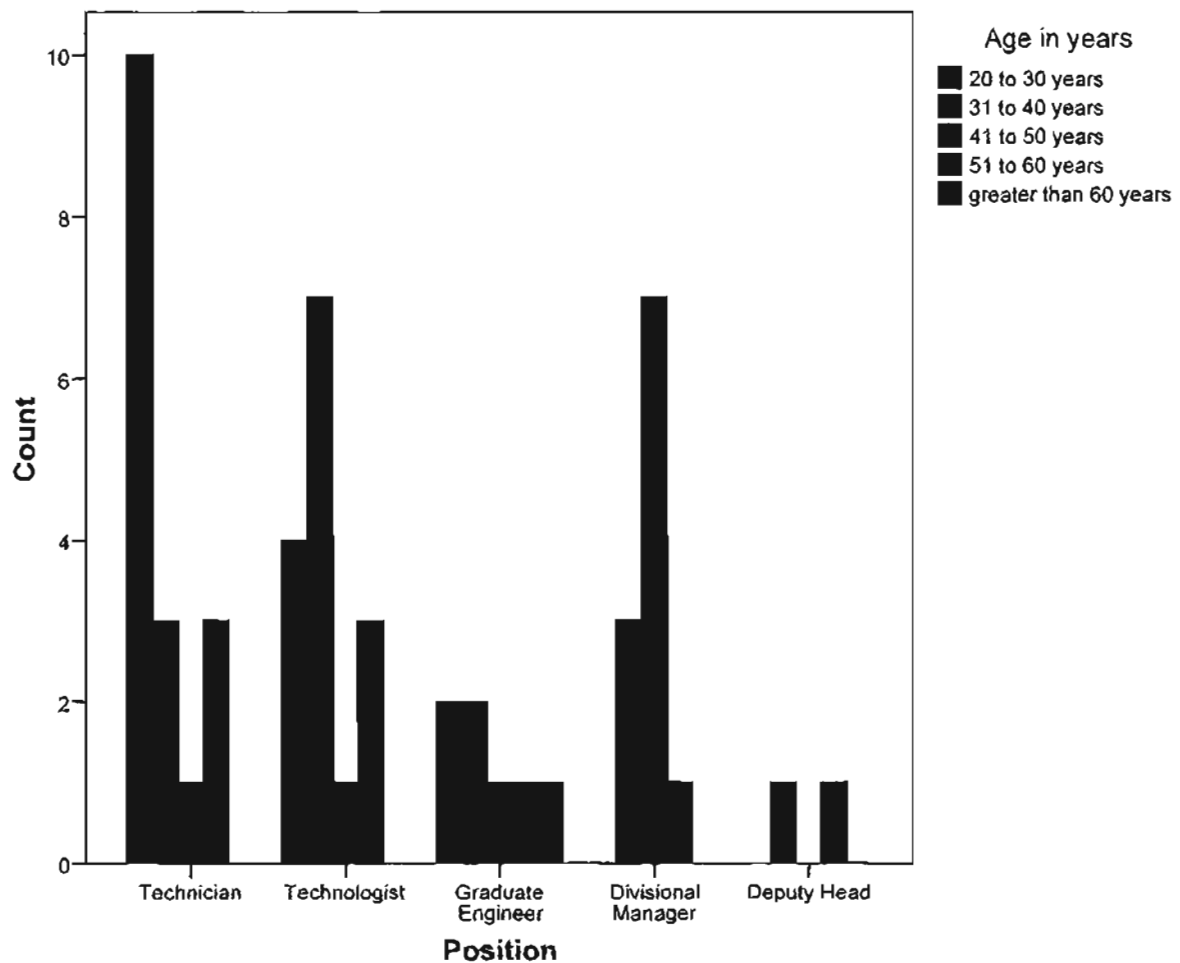


Figure 5.8 : Average age of civil professionals at eThekweni municipality. (Author complied – generated using SPSS)

Figure 5.8 shows the positions of individuals and their respective age in years. The trend at the municipality shows that a vast amount of technicians occupy the '20 to 30 years' age range, followed by technologists in the '31 to 40 years' age range. There is a wide spread of graduate engineers over all the age ranges; however the number of graduate engineers at the

municipality is of concern. This highlights the issue regarding the shortage of civil professionals from universities. Most of the divisional managers are in the '41 to 50 years' age range, while the two deputy heads fall on either side of the age scale, as one is in the '31 to 40 years'. This indicates that many of civil professionals are in the '20 to 30 years' and '31 to 40 years' age range which represents a good amount of young blood entering the municipality. Equally important, there is a good number of well experienced professionals available to transfer skills and knowledge to these younger graduates.

### **5.2.9 Conclusion**

The analysis of the data obtained from the questionnaires filled out by civil engineering professionals at the eThekweni municipality, show that 55.8% of the respondents feel that their departments don't have adequate technical staff. In addition, 61.5% and 46.5% of managers stated that the quality of engineers to that technologists and technicians range from 'worse' to 'getting worse' respectively. However, 78.5% of the respondents stated that they enjoyed their jobs at the municipality. The other 21.5% indicated that they would change their career if they were given the opportunity as a result of their current salaries and challenge of their jobs. The salary structure within the municipality is still determined on period of employment and skills of individuals. The retention of staff within the municipality is becoming more challenging as industry is offering individuals higher salaries due to the skills shortage of civil engineering professionals.

With regards to mentoring within the municipality, 63.5% indicated that they 'rarely' or 'very rarely' did not require mentoring. This was more evident amongst the senior staff at the municipality. Subsequently, 38.5% of the respondents indicated that they have considered leaving South Africa as a result of the high crime rate, unstable job security, better job opportunities and higher earning potential abroad. On the issue of affirmative action, 21.15% of respondents indicated that affirmative action has had a negative impact on their career and growth development.

## *CHAPTER 6*

### **RECOMMENDATIONS & CONCLUSION**

#### **6.1 INTRODUCTION**

This section makes recommendations and draws conclusions regarding demand and supply of civil engineering professionals, in light of economic changes and government policies in South Africa. Using the critical questions set out at the beginning of the dissertation, the following outlines the main findings and concludes with an outline of policies that should improve the situation within the civil engineering industry and ends with suggestions on future research.

#### **6.2 ECONOMIC CHANGES AND THE DEMAND FOR CIVIL ENGINEERING PROFESSIONAL**

The two economic changes that have taken place in South Africa are the RDP and GEAR. These policies have indirectly influenced government expenditure on infrastructure development. In addition, as a result of globalisation, the government has implemented inflation targeting to reduce the effects of inflation on the South African economy. These government interventions have lead to immense dissatisfaction amongst many in the construction and civil engineering industry. South Africa is unique has is has come a long way from the apartheid era, and therefore the challenge of improving the social inequalities of the past and also grow the economy.

As mentioned already in Chapter 2, both the RDP and GEAR has done little to improve economic growth, employment and the high income disparities amongst its people despite the redirection of resources intending to improve the economy. In order for any economy to grow, good infrastructure is required. South Africa has been fortunate with good infrastructure like roads, dams and rail just to name a few. However, the current infrastructure supported the

minority of people during apartheid. Currently South Africa faces a crisis in housing, water supply, electricity and roads and railways provision. For the economy to grow and government's aim of improving the social lives of the people, infrastructure development is a necessity. Government's current strategy has not improved the economy nor the lives of the vast majority of its people, therefore the author suggests the following points that should be considered to try to improve this situation. The decline in infrastructure development during the past two decades has led to a slump in the demand for civil professionals. Much of the demand for civil professionals is created by central government expenditure on infrastructure development which are normally handled by the private or the regional public sector. In addition, the business cycle also impacts on the demand for civil engineering professionals, as the demand for civil professionals dropped drastically during the recession.

Government therefore needs to look at ways to minimums these recessions as this would create a steady demand for civil professionals. The constant demand for civil professionals would mean that the economy is growing and would reduce the skills shortages and brain drain phenomenon from taking place in South Africa. Government needs to adopt a succession planning approach for infrastructure development, as this would lead to increased employment, economic growth, increase in tax revenue, increase in foreign direct investment and would assist in the reducing the income disparities. This is a challenge coming from the apartheid past, and therefore government and the private sector needs to allocate resources effectively when planning and implementing systems to achieve constant infrastructure maintenance and development.

Currently, South Africa is in a growth stage which has created a major demand for civil engineering professionals. Upgrades and construction of new roads, airports, railways and construction of stadiums for 2010 soccer world cup are just some of the projects currently taking place. Government needs to look beyond 2010 to sustain the current demand for civil professionals.

### **6.3 SUPPLY OF CIVIL PROFESSIONALS**

With regards to the supply of civil professionals, the government, ECSA and SAICE need to jointly work towards the following issues to improve skill shortages within the civil engineering industry. The structural deficiency in the education system needs to be improved. The country cannot lower the standards, in particular to the mathematics and science subjects to increase the intake of black students into institutions as this will only harm the performance of these individuals and the economy of the country. Government needs to recognise the importance of teachers and the part they play in grounding the youth. More emphasis needs to be placed on teacher training in math and science as this will pave the way for better skilled matriculants. This would aid in addressing the supply issues as this will create a bigger pool of matriculants wanting to study engineering. Students with better maths and science grounding would be able to complete their studies in the required time frame, which will increase the numbers of graduates into the industry. However marketing and changing the perception of the industry is equally important in increasing the supply of civil engineering graduates.

### **6.4 CIVIL PROFESSIONALS SKILLS REQUIREMENT**

The information from the research questionnaire that was filled out by civil professionals at eThekweni municipality showed that engineers lacked the skills required to perform their jobs. However, many of the managers felt that technicians and technologists performed better. It is important that graduates are equipped with the right skills and knowledge, as their performance on the job has impacts on the quality of work they produce, the duration to complete tasks and projects and on the financial outcomes of these projects.

The information from the eThekweni case study highlights the importance of institutions such as universities and technikons to provide the right caliber of graduates within the industry. Therefore, civil professionals not only need technical knowledge, but need to have grounding in project management, and have good communication and social skills as the civil engineering industry requires these individuals to be team players. With regards to technical knowledge most of the South African institutions rank with the best in the world, as many civil engineering

graduates are accepted in many overseas countries such as the United Kingdom, Australia, New Zealand and Europe.

In order to improve this situation, it is suggested that although technical knowledge plays a major role in the civil engineering industry, the soft issues such as social skills are becoming increasingly important as a result of integration in the new South Africa. In addition, graduates need to be highly computer literate, as more sophisticated design and modeling software packages are being developed. Thus far institutions have been providing relevant technical knowledge to civil engineering graduates, in keeping with the engineering projects in the 1970s. Institutions are maintaining this trend with a greater focus on urban engineering.

## **6.5 PERCEPTIONS REGARDING CIVIL ENGINEERING**

The general perception of the civil engineering industry has undergone a transformation from being one of prestige to one of non-importance as many civil engineering professionals share their dissatisfaction regarding salaries. In addition, civil professionals have complained about the high responsibility they have to bear for projects they work on, and therefore feel that the financial rewards do not measure up to the risk they carry. This perception is shared by many working civil engineering professionals, and therefore sends a negative message to young matriculants wanting to get into this industry.

Potential salary earnings are becoming an important factor for many young talented individuals when choosing a career. It stands to reason in this material world that financial freedom remains a high priority. The following is suggested to improve the interest of talented matriculants to enter the civil engineering industry. Perceptions cannot be changed over night, therefore the continuation of SAICE and ECSA's marketing of the importance of the industry plays a vital role. In addition, government needs to support this initiative to encourage the youth to be part of building the economy of South Africa. On a national level, the review of salaries of civil professionals needs to be discussed and increased to match the responsibilities that civil professionals carry. The setting of salaries are done by other industries as a strategy to maintain the status of their profession and reduce high staff turnover. The civil engineering industry needs

to do the same. Understandably, due to the decline in infrastructure development this was difficult to achieve, which is therefore more the reason to initiate this process now, due to the many projects on the go currently. The continuation of infrastructure development is imperative to bring about a change in the perception of the civil engineering industry and reduce the immigration of many civil professionals.

## **6.6 TERTIARY INSTITUTIONS RESPONSE TO CHANGE**

Due to the poor perception of the industry and interest shown by matriculants in the civil engineering industry, one observes institutions increasing their marketing drive via newspapers and journals to encourage these matriculants with good maths and science marks to pursue a career in civil engineering. To increase the number of students both the public and private sector are offering more bursaries to deserving students with financial difficulties. In addition, both industry and institutions are collaborating to equip graduates with knowledge and skills to suit the changing landscape of the civil engineering industry. The challenge facing institutions currently is the retaining of good lecturing staff as many of them are retiring or have deceased, with their positions being filled by young inexperienced staff. With the shortage of adequate skilled civil professionals and the current upswing in infrastructure development, lecturing staff are taking this opportunity of entering the working environment. This change is as a result of substantial increases in their earnings potential in the working environment compared to that of institutions.

The following suggestions are offered in light of changes that are taking place in the economy and the demand for civil professionals. The increase in demand for civil professionals will negatively impact on institution's ability to supply graduate civil professionals if the right caliber of staff at institutions are not employed and retained. This will have a detrimental impact on the quality of civil engineering graduates entering the industry, lower the standards within the industry, lead to poor infrastructure construction and result in high financial implications for projects. In addition, the economy and society will inevitable suffer the ill effects of poor infrastructure development.

Given the above scenarios, government therefore needs to support and promote the civil engineering industry as a 'life blood' of the economy. Institutions need to be provided with adequate staff and facilities to ensure that students get the best training and knowledge. Succession planning needs to take place to reduce the loss of knowledge from retiring academics. Government and the private sector need to deliberate on a regular basis to monitor and advise institutions regarding their requirements, so that adequate graduates are supplied into the industry.

## **6.7 SALARIES WITHIN CIVIL ENGINEERING INDUSTRY**

During the late 1970s, South Africa was on a major infrastructure drive, with the building of national roads, dams, bridges and railways. The demand for civil professionals was high at the time with a fairly good supply of young graduates mainly from universities. In addition, due to the large number of projects, many emigrants flocked to South Africa as a result of the job opportunities being offered.

During the 1980s and 1990s, the infrastructure development declined and many of the existing civil professionals were left without work. As the demand for civil engineering declined, many were faced with a decision to either leave South Africa to find work abroad or get into another industry. Salaries of civil engineering professionals reduced dramatically because of limited work and the surplus of civil professional that remained in the country. It can therefore be concluded that economic development in infrastructure creates a proportional demand of civil professionals.

The following suggestions are offered regarding the low salaries that civil professionals currently command. Both ECSA and SAICE need to put more effort on protecting the civil engineering industry and interests of civil professionals. These organisations need to set standard market related salary structures that are based on experience and qualifications of individuals. This would prevent the cost cutting by many firms currently taking place in the industry, which disadvantages many civil professionals from earning what they are worth. Maintaining a standard salary structure would therefore allow the industry to recognize the importance of civil professionals, remove the negative perceptions currently experienced by the industry, reduce



poor engineering practices and maintain the status that engineering professionals once commanded.

The increase in infrastructure development now in South Africa has created a high demand for civil professionals and has highlighted the skill shortages facing South Africa. This has now resulted in a dramatic increase in civil professional's salaries. The question now is, for how long can this be sustained? Once the supply of civil professionals exceeds the demand, salaries are likely to decrease, therefore a standard salary structure would prevent drastic salary fluctuations within the industry. The results from the research shows not only is job satisfaction and work challenges are important factors for professionals, salaries are becoming a significant factor for professionals. A small percentage of professionals however, at eThekweni municipality indicated that low salaries in the industry are encouraging them to change their careers which leads to the conclusion that many civil professionals enjoy their work at the municipality.

## **6.8 IMMIGRATION OF CIVIL PROFESSIONALS**

As mentioned in Chapter 4, immigration resulted predominately due to crime, the lack of job opportunities, poor salaries and the implementation of government's affirmative action policy. The results from the completed questionnaire by the staff from eThekweni municipality shows that the high crime rate and family security, unstable job security, better job opportunities and experience and higher income potential are the key motives for many leaving and wanting to leave South Africa.

Crime in South Africa is spiraling out of control and will lead to the destruction of the country if government continues to turn a blind eye to the effects of crime on the economy. For the economy to grow, a country needs educated professionals, as more young professionals plan to leave the country the growth of the economy will suffer. In addition, it will lead to loss in investment as the country invests a large amount of resources to educate and train these individuals.

With regards to the lack of job opportunities, the slow-down in infrastructure development meant that many civil professionals wanted hardcore engineering work such as construction of roads and bridges, dams, and water treatment plants. South Africa has been focusing more on urban engineering rather than on the above mentioned engineering, with a few getting the opportunity to be involved in this type of work. This situation has led to many young and old civil professionals wanting to leave South Africa to obtain this experience overseas. In addition, due to the low salaries in South Africa, many civil professionals leave due to the lucrative salaries being offered abroad. The affirmative action policy has mainly contributed to many white civil professionals leaving the country. Due to the skills shortages for civil professionals and the current scale of projects, government needs to be more realistic and make use of the talent pool of white professionals also, rather than applying the affirmative action policy too aggressively at the detriment of the economy.

## **6.9 RETENTION STRATEGIES**

The retention of civil professionals is becoming increasingly more difficult in light of the current skills shortage situation in South Africa. Most young professionals are looking for better job opportunities, larger salaries and recognition within the industry. The implementation of affirmative action and the search for black civil professionals by firms to meet government employment equity requirements has led to job hopping. In addition, BEE has increased the opportunity for black civil professionals to open their companies, resulting in a reduction in the pool of black civil professionals that need to be employed by the industry. Government therefore needs to reassess their policies in order to move the civil engineering industry into an equilibrium state, by implementing a moratorium on these policies, especially affirmative action. The standard market salary structure would also aid in reducing the high staff turnover rate. The other factor that encourages the high staff turnover is job dissatisfaction and poor progression within a firm. Once the salary issue has been satisfied, many individuals would shift the weighting to job satisfaction and progression. Therefore, firms need to rotate staff into the different facets of civil engineering and offer training to keep them challenged and to allow hard working individuals to progress quickly within the company.

In order to retain technical staff, eThekweni municipality is proposing to improve their training and mentoring program. Young civil professionals will be sent to different departments to gain experience and exposure in the different sections. In addition to this, career development plans will be drawn up to groom civil professionals for future management positions.

## **6.10 FUTURE RESEARCH**

The objectives of the dissertation have been adequately addressed, although it is recognized that a larger sample size would enable a higher level of confidence in the results from the questionnaires. The research largely correlates with the literature in particular Allyson Lawless and the Human Science Research Council (HSRC). The findings from Kibuuka (1999), Allyson Lawless (2005), and Gallon, Gabriel and Knudsen (2003) when compared to the results in this dissertation shows no significant change in the current trend for civil professionals. There is still a high demand and a low supply of civil professionals in light of increased infrastructure development. Government and industry needs to focus on education for the youth, increase salaries for civil professionals and succession planning of infrastructure development to improve this situation.

With regards to future research, the author proposes research on the general perceptions of affirmative action of black South Africans as this would gain insight into the effectiveness of AA in the country. This research topic was prompted by one of the comments from one of the survey respondents, a black civil professional. He seemed to challenge the conventional wisdom and suggested that AA may be hindering his personal progression in the industry. Whilst it only came from one person this may be an important issue waiting to be explored.

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## ADDENDUM 1: RESEARCH QUESTIONNAIRE

## ***PRIVATE AND CONFIDENTIAL***

### **VOLUNTARY QUESTIONNAIRE FOR CIVIL ENGINEERS**

**“Assessing the current shortage of Civil Engineers in the eThekweni Municipality”**

**Researcher:** Mr Rajeev Sooklall (Pr Tech Eng)  
Coastal, Stormwater and Catchment Management  
eThekweni Municipality : City Engineers  
Tel: (031) 311 7178  
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**Supervisor:** Dr Bruce Rhodes (PhD)  
School of Economics – UKZN  
Tel: (031) 260 1040  
E-mail : [rhodesb@ukzn.ac.za](mailto:rhodesb@ukzn.ac.za)

**Department:** Graduate School of Business  
**Institution:** University of KwaZulu-Natal

### **Note to the respondent**

The information from this questionnaire is to be used to fulfill the requirements for my dissertation towards an MBA degree. We require your assistance to assess the current shortage of Civil Engineers in the eThekweni Municipality. Although we would like you to help us with this survey, your participation is voluntary. If you choose not to take part in this survey, please forward the blank questionnaire back to the researcher. Your information in this questionnaire will remain private and confidential, and no one will be able to trace your opinions back to you as a person.

### **How to complete the questionnaire**

1. Please answer the questions as truthfully as you can. Also, please be sure to read and follow the directions for each part. If you do not follow the directions, it will make it difficult for us to conduct our project.
2. We are only asking you about things that you and your fellow Engineers should feel comfortable telling us about. If you don't feel comfortable answering a question, you can indicate that you do not want to answer it. For those questions that you do answer, your responses will be kept confidential.
3. You can mark each response by making a tick or a cross, or encircling each appropriate response with a PEN (not a pencil), or by filling in the required words or numbers.

*Thank you very much for completing this questionnaire.*

**1. Please indicate your gender?**

- ☐ Male  
☐ Female

**2. To address the equity issue, please indicate what race group you belong to?**

- ☐ Black  
☐ White  
☐ Coloured  
☐ Indian  
☐ Other (Please state).....

**3. What is your current age?**

- ☐ 20 to 30 years  
☐ 31 to 40 years  
☐ 41 to 50 years  
☐ 51 to 60 years  
☐ 60 years

**4. How many years working experience do you have?**

- ☐ Less than 5 years  
☐ 5 to 10 years  
☐ 10 to 15 years  
☐ 15 to 20 years  
☐ Greater than 20 years

**5. What is your current gross salary per month?**

- ☐ Less than R10,000  
☐ R10,000 to R15,000  
☐ R15,000 to R20,000  
☐ R20,000 to R30,000  
☐ Greater than R 30,000

**6. What is your current position at the municipality?**

- ☐ Technician (If you have ticked this box, please proceed to question 14)  
☐ Technologist (If you have ticked this box, please proceed to question 14)  
☐ Graduate Engineer (If you have ticked this box, please proceed to question 14)  
☐ Divisional Manager (If you have ticked this box, please proceed to question 7)  
☐ Deputy Head (If you have ticked this box, please proceed to question 7)  
☐ Head of Engineering (If you have ticked this box, please proceed to question 7)  
☐ Other (Please State) .....

*For the following questions, 7 to 13, please tick a box from the table that best represents your experience within the Municipality.*

**7. How do you rate the quality of Engineers from Universities with regard to their mathematical and technical skill?**

Scale	1	2	3	4	5
	Getting worse <input type="checkbox"/>	<input type="checkbox"/>	No change <input type="checkbox"/>	<input type="checkbox"/>	Getting better <input type="checkbox"/>

**8. How do you rate the quality of Technologist/Technicians from Universities of Technology with regard to their mathematical and technical skill?**

Scale	1	2	3	4	5
	Getting worse <input type="checkbox"/>	<input type="checkbox"/>	No change <input type="checkbox"/>	<input type="checkbox"/>	Getting better <input type="checkbox"/>

**9. How important are mathematical and technical skills in a persons ability to fill vacant positions?**

Scale	1	2	3	4	5
	Not at all <input type="checkbox"/>	<input type="checkbox"/>	Neither important nor unimportant <input type="checkbox"/>	<input type="checkbox"/>	Very important <input type="checkbox"/>

**10. How do you rate the mathematical and technical skills of current applicants (Engineers) in your Department?**

Scale	1	2	3	4	5
	Poor <input type="checkbox"/>	<input type="checkbox"/>	Satisfactory <input type="checkbox"/>	<input type="checkbox"/>	Excellent <input type="checkbox"/>

**11. How do you rate the mathematical and technical skills of current applicants (Technologist/Technicians) in your Department?**

Scale	1	2	3	4	5
	Poor <input type="checkbox"/>	<input type="checkbox"/>	Satisfactory <input type="checkbox"/>	<input type="checkbox"/>	Excellent <input type="checkbox"/>

**12. How do you rate the overall quality of current staff working under you, taking into account their technical, project management and communication skills?**

Scale	1	2	3	4	5
	Very Bad <input type="checkbox"/>	<input type="checkbox"/>	Fair <input type="checkbox"/>	<input type="checkbox"/>	Very Good <input type="checkbox"/>

13. How do you rate the availability of capital projects for Engineers, Technologists and Technicians?

Scale	1	2	3	4	5
	Very Low		Average		Very High
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. What is your highest qualification?

- ☐ National Diploma
- ☐ B-Tech Bachelors Degree
- ☐ M-Tech Degree
- ☐ BSc Bachelors Degree
- ☐ MSc Degree
- ☐ Other (Please State).....

15. What is your professional registration status with the Engineering Council of South Africa

- ☐ Candidate Technician
- ☐ Candidate Tech Eng
- ☐ Candidate Eng
- ☐ Pr Technician
- ☐ Pr Tech Eng
- ☐ Pr Eng
- ☐ Not Registered

16. What type of Civil Engineering are you involved in?

- ☐ Structural Engineering
- ☐ Hydraulic Engineering
- ☐ Geotechnical Engineering
- ☐ Transportation Engineering
- ☐ Environmental Engineering
- ☐ Other (Please State).....

17. Do you enjoy your job at the municipality?

Scale	1	2	3	4	5
	Hate it		Don't mind it		Love it
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. In your department do you think that there are adequate technical staff to handle the current work

- ☐ Yes
- ☐ No

19. Do you work well on your own to further your self development in your department?

Scale	1	2	3	4	5
	Very Rarely		Often		Always
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you need mentoring from a more experienced colleague to encourage your self development at the municipality?

Scale	1	2	3	4	5
	Very Rarely		Often		Always
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. What is your average working hours doing technical work, such as design, project management and site supervision?

- ☐ Less than 40 hours
- ☐ 40 hours
- ☐ Greater than 40 hours

22. Do you complete your projects/tasks in time?

- ☐ Always
- ☐ Often (If you have ticked this box, please proceed to question 23)
- ☐ Sometimes (If you ticked this box, please proceed to question 24)

23. If you have answered 'Often' for question 22, please state why?

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24. If you have answered 'Sometimes' for question 22, please state why?

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25. If you were given an opportunity to change your career from Civil Engineering, would you?

- ☐ Yes (If you have ticked this box, please proceed to question 26)
- ☐ No (If you have ticked this box, please proceed to question 27)

**26. If you have answered 'Yes' for question 25, please state why?**

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**27. Have you ever considered the option of leaving South Africa to work overseas?**

- ☐ Yes (If you have ticked this box, please proceed to question 28)
- ☐ No (If you have ticked this box, please proceed to question 29)

**28. If you have answered 'Yes' for question 27, please state why?**

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**29. If an opportunity arose to leave South Africa to work overseas, would you?**

- ☐ Yes (If you have ticked this box, please proceed to question 30)
- ☐ No (If you have ticked this box, please proceed to question 31)

**30. If you have answered 'Yes' for question 29, please state why?**

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**31. Has affirmative action policy negatively affected your progression in your career in this municipality?**

- ☐ Yes (If you have ticked this box, please proceed to question 32)
- ☐ No (If you have ticked this box, please proceed to question 32)



**32. If you have answered 'Yes' or 'No' for question 31, please state why?**

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**33. Do you think government is doing enough for infrastructural development in KZN?**

- ☐ Yes (If you have ticked this box, please proceed to question 34)
- ☐ No (If you have ticked this box, please proceed to question 34)
- ☐ Don't know

**34. If you have answered 'Yes' or 'No' for question 33, please state why?**

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## ADDENDUM 2: ETHICAL CLEARANCE

RESEARCH OFFICE (GOVAN MBEKI CENTRE)  
WESTVILLE CAMPUS  
TELEPHONE NO.: 031 – 2603587  
EMAIL: ximbap@ukzn.ac.za

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30 JULY 2007

MR. RR SOOKLALL (205524355)  
GRADUATE SCHOOL OF BUSINESS

Dear Mr. Sooklall

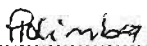
ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0411/07M

I wish to confirm that ethical clearance has been granted for the following project:

“Economic changes & government policy on the demand and supply of civil engineers in South Africa”

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years

Yours faithfully

  
.....  
MS. PHUMELELE XIMBA  
RESEARCH OFFICE

cc. Post-Graduate Office (Christel Haddon)  
cc. Supervisor (Dr. B Rhodes)