An Impact Analysis of Construction Sector on Economic Growth and Household Income in South Africa

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Master of Commerce in Economics at the Mafikeng Campus of the North-West University

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February 2014
DEDICATION

This thesis is dedicated to the memory of my loved Father: Kgowe Israel Mosenogi, to my son, Osenotse Mosenogi and daughter Warona Mosenogi.

APPRECIATION

I am grateful to the North West University for granting me the opportunity to study this Masters degree with their institution. My special thanks to Dr O. D. Daw for guidance throughout the research process. Thanks also to Mr. David Mosaka for guidance in using Social Accounting Matrix as a tool for analysis.

My special thanks to my Mother and the entire family for the support both financially and emotionally.

All praises and thanks goes to my heavenly Father for provision, protection and guidance in every steps of my life.

Joel Marumo Mosenogi
DECLARATION

I, Joel Marumo Mosenogi, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in fulfilment of the requirements for the degree Master of Economics at the North West University, Mahikeng Campus. It has not been submitted before for any degree or examination in this or any other university.

Joel Marumo Mosenogi

Signed at Mahikeng

February 2014
Abstract

Application of Social Accounting Matrix (SAM) in the study has enabled the insightful analysis of the relationship between construction industry, economic growth and household income in South Africa. Construction sector plays a key role in the economy as it results in infrastructure stock/capital accumulation which leads to increased economic social and economic activities.

Construction industry further contributes to employment, household income and economic growth. Activities in this sector shows that increased productivity in the construction industry will result in increased economic growth. Further increase or activities in this industry will absorb more of semi-skilled and unskilled labours more compared to highly skilled labourer within the sector.

High income household will benefit more from construction industry activities followed by medium income households with low income households benefitting less. Clearly, highly skilled labourers are occupants of high income households and the study therefore shows that though few labours is absorbed from high skilled labour market, they benefit more in terms of income.

However, noting the impact construction industry is able to make in the economy, further investment in infrastructure is encouraged as it results in more construction activities which have both the short to long term economic benefits to the country.
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<td>AIC</td>
<td>Advanced Industrial Countries</td>
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<tr>
<td>APC</td>
<td>Average Propensity to Consume</td>
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<td>ASGISA</td>
<td>Accelerated Shared Growth Initiative of South Africa</td>
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<td>BBEee</td>
<td>Broad Based Black Economic Empowerment</td>
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<td>CGE</td>
<td>Computable General Equilibrium Model</td>
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<td>CPI</td>
<td>Consumer Price Index</td>
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<td>DBSA</td>
<td>Development Bank of Southern Africa</td>
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<td>DWA</td>
<td>Department of Water Affairs</td>
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<td>EPWP</td>
<td>Expanded Public Works Programme</td>
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<td>GDP</td>
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<td>GEAR</td>
<td>Growth, Employment and Redistribution Policy</td>
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<td>GFCF</td>
<td>Gross Fixed Capital Formation</td>
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<td>GFIP</td>
<td>Gauteng Freeway Improvement Project</td>
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<td>GNP</td>
<td>Gross National Product</td>
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<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
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<td>JIPSA</td>
<td>Joint Initiative Programme on Skills</td>
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<td>LDC</td>
<td>Less Developed Countries</td>
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<td>MDG</td>
<td>Millennium Development Goals</td>
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<td>MPC</td>
<td>Marginal Propensity to Consume</td>
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<td>MTEF</td>
<td>Medium Term Expenditure Framework</td>
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<td>National Development Plan</td>
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<td>New Growth Plan</td>
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<td>Newly Industrialised Countries</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<td>NPA</td>
<td>National Ports Authority</td>
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<td>Regional Bulk Infrastructure Grant</td>
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<td>Reconstruction and Development Programme</td>
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<td>System of National Accounts</td>
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<td>South African National Roads Agency Limited</td>
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Chapter 1: Introduction

1.1 Introduction

In the year 2010 South Africa (SA) hosted one of the biggest sporting events in the world, FIFA 2010 Soccer World Cup. Preparation for this major event required a lot of efforts which to some extent involve proper planning and large investment in different areas including infrastructure. This has seen an increase in capital expenditure for the construction sector coupled with increased employment and household income.

However, for South Africa, this was neither the beginning nor the end of infrastructure investment; the trend has been there prior the 2010 Soccer World Cup and still continues today at an accelerated level. Though there are these developments, there are still challenges of both social and economic infrastructure in South Africa, more especially in rural areas. To alleviate such infrastructure backlogs, there is a need for government to increase its expenditure on infrastructure development, and to achieve such a state of development the construction sector has a vital role to play.

The role of the construction sector in the economy is vital due to its direct and indirect impact on development. The construction sector plays a key role in capital accumulation, creation of jobs and income to households, and it has the potential to bridge inequality in the economy. This study hence seeks to establish the
developmental role of the construction sector in the process of infrastructure
development.

It is also important to note that the driving force behind government investment has
been to eradicate poverty, unemployment and to achieve high economic growth.

South Africa still faces many challenges despite steady economic growth in recent
years since the advent of democracy. Increased unemployment and a widening
income gap remain at the centre stage of development dialogue across the globe
more especially in developing countries. While South Africa has maintained positive
economic growth since the 3rd Quarter of 2009 to date, unemployment rate
decreased to 24.90 per cent in the fourth quarter of 2012 from 25.50 per cent in the
third quarter of 2012. Unemployment rate in South Africa is reported by Statistics
South Africa which mentions that from 2000 until 2012, South Africa’s
unemployment rate averaged 25.49 per cent reaching an all-time high of 31.20 per
cent in March 2003 and a record low of 21.90 per cent in December of 2008. In
South Africa, the unemployment rate measures the number of people actively
looking for a job as a percentage of labour force.

According to StatsSA (2010/11), there is a largest increase in income in non-white
household, while Indian/Asian-headed household showed a 36,8 per cent increase
(an increase of R68 013), closely followed by black African-headed households at
34,5 per cent (an increase of R17 859). Households headed by coloureds saw a 0.4
per cent real increase or roughly R1 412 more. Despite this significant growth in
income in non-white households, there is still a tremendous gap between the
population groups. White-headed households on average earn more than 5.5 times the income of the average black African-headed household. Therefore, while the income growth trend shows very positive signs, income inequality remains a serious challenge for the country.

In an effort to curb unemployment, bridge income inequality, and achieve sustainable and equitable economic growth and development, the South African government has identified infrastructure investment as one of the key sectors that can assist the country achieve this goal, hence the decision by government to increase investment in infrastructure development. These investment decisions have been previously influenced by the Accelerated Shared Growth Initiative of South Africa (ASGISA-SA) and currently by the New Growth Path (NGP) with a long term vision emphasised in the National Development Plan (NDP).

The New Growth Path as the current economic policy of the country seeks to enhance growth, employment creation and equity. The policy’s principal target is to create five million jobs over the next 10 years. This framework reflects government’s commitment to prioritising employment creation in all economic policies. It identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa’s developmental agenda.

Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy.
The framework identifies investments in five key areas namely: energy, transport, communication, water and housing. Sustaining high levels of public investment in these areas will create jobs in construction, operation and maintenance of infrastructure (New Growth Path, 2010).

The new growth path sees the infrastructure programme as a trigger to build a local supplier industry for the manufacture of the components for the build-programme. Specific measures, particularly changes to procurement policy and regulations are identified to ensure that this is achieved. Risks include the still fragile global recovery; competition and collaboration with the new fast-growing economies; and competing interests domestically.

The New Growth Path (2010) identifies five other priority areas as part of the programme to create jobs through a series of the following partnerships between the State and the private sector:

- **Green economy**: expansions in construction and the production of technologies for solar, wind and biofuels is supported by the draft Energy on Integrated Resource Plan. Clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

- **Agriculture**: jobs will be created by addressing the high input costs and upscaling processing and export marketing. Support for small holders will include access to key inputs. Government will explore ways to improve working and living conditions for the country's 660 000 farm workers. The
growth path also commits the Government to unblocking stalled land transfers, which constrain new investment.

- Mining: calls for increased mineral extraction and improving infrastructure and skills development. It focuses support for beneficiation on the final manufacture of consumer and capital goods, which can create large-scale employment. It foresees the establishment of a state mining company concentrating on beneficiation and enhanced resource exploitation in competition with a strong private mining sector.

- Manufacturing: calls for re-industrialisation in the South African economy based on improving performance through innovation, skills development and reduced input costs in the economy. The document targets a doubling of South Africa’s research and development investment to 2 per cent of gross domestic product by 2018.

- Tourism and other high-level services: hold employment potential and the framework calls for South Africa to position itself as the higher education hub of the African continent.

Increased investment in infrastructure will with no doubt increase production in the construction sector. According to Dlamini (2011), the importance of the construction sector is not only related to its size but also to its role in economic growth. He argues that a sector this big could not but has an impact on the economy. Dlamini further argues that economic growth is about stimulating the economy. The government stimulates the economy to achieve growth so that this will help create jobs.
Increased economic activities require a corresponding sufficient provision of roads, and other infrastructure.

Output in construction sector result in capital accumulation. It is on these bases that the three models of growth are mobilised in this study. These growth models are the Harrod-Domar Model, the Endogenous Growth Model and the Solow Growth Model. If capital accumulation can result in growth or create enabling environment for growth, this should in one way or the other result in increased household income which will result in increased household expenditure and savings. In order to analyse the impact, the Social Accounting Matrix (SAM) will be used to determine direct, indirect and induced impact of the construction sector on economic growth and household income.

1.2 Problem Statement

Since the inception of the Reconstruction and Development Programme (RDP) and the Growth, Employment and Redistribution Policy (GEAR); infrastructure has always been at the centre of development. Furthermore, an increase in Infrastructure investment has been one of the ASGISA priority areas needed to achieve economic growth and reduce unemployment and poverty by 2015. According to Government Communication (2008:35), R482 billion was earmarked for expansionary public infrastructure expenditure for the years 2008 to 2011. Such a huge investment in infrastructure simply means more business and expansion of the construction sector.
Other programmes have been developed such as the Expanded Public Works Programme (EPWP), Industrial Development Zones and 2010 world cup taking its share of infrastructure investment. According to the Minister of Finance (Gordhan 2010: 20), further plans for infrastructure programmes for the 10-20 years are said to be underway in response to the long-term development challenges of the country.

Recently, there has been a slowdown in economic growth and increased unemployment which resulted in decreased household income globally and in South Africa. All these were caused by the recent global economic recession. The most important question to ask in the process of the accumulating infrastructure stock is what is the role of construction sector and its impact in the economy?

1.3 Aim of the Study
The study aims to determine the impact of construction on economic growth and household income in South Africa. The results of this study will therefore, help in policy formulation or adjustment of existing policies to ensure proper beneficiation targeting and equal distribution of construction sector economic spin-offs.

1.4 Research Objectives and Questions

While the construction sector remains the second largest contributor to economic growth and one of the key economic growth drivers in South Africa; direct and indirect impact of such growth contribution on economic growth, income to
households, poverty reduction and increased employment remain some of the constantly emerging developmental issues of concern internationally, regionally and nationally.

On the other hand, South Africa has a deliberate plan to increase infrastructure investment with the aim of accelerating economic growth and create jobs.

The objective of this is to:

*Analyse and assess the impact of construction sector on economic growth and household income in South Africa.*

**Research Questions**

- What is the impact of the construction sector on economic growth?
- What is the impact of the construction sector on household income in South Africa?
- Does the construction sector increase or decrease income inequality and economic growth in South Africa?

**1.5 Scope of the Study**

This research is designed to review relevant literature, develop an appropriate analytical framework using the Social Accounting Matrix and apply it to analyse the impact of the construction sector on economic growth and household income in South Africa.
There are two types of infrastructure which would give a broader view of construction activities in the economy.

Economic infrastructure is defined as an infrastructure that promotes economic activity, including roads, electrical lines and water pipes. Social infrastructure promotes health, educational and cultural standards of the population, which include schools, clinics, parks and statue (Development Bank of Southern Africa, 1998:4). These types of infrastructure are necessary and equally important for human survival and achievement of acceptable standard of living.

Household income is defined as a measure of the combined incomes of all people sharing a particular household or place of residence. Every form of income, e.g., salaries and wages, retirement income, near cash government transfers like food stamps, and investment gains.

Average household income can be used as an indicator for the monetary well-being of a country's citizens. Mean or median net household income, after taxes and mandatory contributions, are good indicators of the standard of living because they include only disposable income and acknowledge people sharing accommodation benefit from pooling at least some of their living costs.
1.6 Importance of the Study
This study will mainly assess direct, indirect and induced impact of construction sector on economic growth and household income in South Africa.

The study will provide an indication of whether the construction sector has reduced or increased the income gap between low, middle and high income household. As indicated above, the study will also simulate the direct, indirect and induced impact of the construction sector on all categories of household and economic growth.

It is against this backdrop that this study intends to contribute to the body of knowledge in the area of economic spin-offs of the construction sector in South Africa.

1.7 Plan of the Study
The study is organised as follows, chapter one introduced the study, outlined the problem statement, objectives and research questions and why is it important to undertake this study. Chapter two discusses trends and background in the South African economy focusing on economic growth, infrastructure in various sectors and Household income. Chapter three entails the theoretical foundation of the study where the topical issues regarding the study are discussed with reference to other similar studies, referring to recognised journals and periodicals, textbooks and other writers (researcher) and a critical approach or outlook on the work already done in the same field.
Chapter four discusses the research model background and specification in details, while chapter five reports the results of the empirical analysis and interpretation thereof. Finally chapter six provides study conclusions and recommendations.

1.8 Conclusion

The importance of construction sector in the development of every economy cannot be over-emphasised. This section provided clarity on the purpose of the research and justification of the chosen subject of the study. Chapters below will provide literature and analysis to address the problem statement and objectives outlined above.
Chapter 2: Background and Status on the South African Economy, Infrastructure, Construction Sector and Household Income

2.1 Introduction

To achieve high economic growth and increased household income, South Africa needs to create conducive environment for investment (both local private and Foreign Direct investment). One other way of ensuring such an environment is by developing proper infrastructure which can be achieved through effective participation of the construction sector as the producer of infrastructure stock. It thus remains difficult to decide on what to invest in if one does not know the actual state of infrastructure and infrastructure stock in a country hence this study also reviews the amount of infrastructure stock available in the country, the state of household income inequality and economic growth.

Statistics South Africa and the South African Reserve Bank have consistently kept updated data on economic growth and related variables while the Development Bank of Southern Africa (DBSA) has also kept updated data on infrastructure. It is on these bases that this section of the study attempts to give background and establish the status quo to these three key variables of the study.

2.2 Overview of the South African Economy

During the 1990s, the average growth rate was not much different to that experienced during the siege economy of the 1980s, at an unimpressive 1.4 and 2.1 per cent increase in real GDP per annum respectively. Nominal GDP growth during the 1980s was much higher than in the 1990s, but this was almost entirely due to the
much higher rate of inflation experienced in the former decade compared to the latter. Growth was much weaker in the first half of the 1990s than in the second half of the decade. From 1990 to 1994, the economy grew on average by 0.1 per cent per annum compared to the 2.6 per cent per annum growth achieved from 1995 to 1999. The relatively higher growth experienced over the latter half of the decade was achieved despite the disinflationary and alleged contractionary effects of the government’s GEAR programme (announced in 1996) on the economy (Hodge, 2009).

The GEAR policy was preceded by the Reconstruction and Development Programme (RDP) as introduced in 1994 after the advent of democracy. Key objective of the RDP was the provision of service delivery in areas such as housing, water and sanitation and free health service. Shortly after the introduction of the RDP, the Growth, Employment and Redistribution (GEAR) policy was introduced in 1996. As its name, GEAR aimed at achieving higher economic growth, creation of employment and redistribution of resources. Its growth target was 6 per cent by the year 2000 and to further ensure employment growth at the rate above the actual growth of economically active population. Inflation targeting, which was mainly led by the Reserve Bank, was to be maintained below 10 per cent.

According to Hodge (2009), for the period 2000 to 2007, the average annual growth rate rose to 4.3 per cent. It is worth noting that between 2000 and 2007, a new macroeconomic policy was introduced. South Africa introduced ASGISA coupled with JIPSA in 2005. ASGISA aimed at achieving economic growth rate of 4.5 per cent by 2009 and 6 per cent by 2014 and to halve poverty and unemployment by 2014.
These goals were to a certain extent influenced by the Millennium Development Goals (MDGs).

Recently, the South African government adopted a new economic policy termed “New Growth Path” (NGP). The New Growth Path set its target of creating five million new jobs by 2020. It is evident that one of the most common factors amongst all policies since 1994 to date has been job creation and economic growth. In the contrary, Hodge (2009) cautions that although growth and employment tend to move together over time, this relationship is not constant. He further indicates that on annual basis, since 1990 there have been five instances of ‘jobless growth’ which are 1993, 1994, 1997 and 2001.

Another key challenge facing South Africa is to be globally competitive and manage its fiscal resources effectively and efficiently in order to achieve the desired economic growth. The global economic and financial crisis is becoming more serious. The crisis and the accompanying slow and uncertain economic recovery will be with us for some years. South Africa’s growth is slowing and revenue collections will be negatively affected. The space within our fiscal envelope is narrowing. For example, we cannot borrow any more funds for consumption expenditure of government. The economy depends on investment, infrastructure and other forms of capital investment by government to sustain the minimal levels of growth we see presently. Job creation, which is a crucial priority of government is happening too slow (MTEF, 2012).
Considering the impact of the recent global economic crisis on employment and economic growth, the recent strikes in the mining sector have the potential to put more pressure on growth and employment creation prospects. According to TRADINGECONOMICS (2012), The Gross Domestic Product (GDP) in South Africa expanded 3.20 per cent in the second quarter of 2012 over the previous quarter. Historically, from 1993 until 2012, South Africa GDP Growth Rate averaged 3.26 Per cent reaching an all-time high of 7.60 per cent in December of 1994 and a record low of -6.30 per cent in March of 2009. The Gross Domestic Product (GDP) growth rate provides an aggregated measure of changes in value of the goods and services produced by an economy.

South Africa has a two-tiered economy; one rivalling other developed countries and the other with only the most basic infrastructure. It is therefore a productive and industrialized economy that exhibits many characteristics associated with developing countries, including a division of labour between formal and informal sectors and an uneven distribution of wealth and income. The primary sector, based on manufacturing, services, mining, and agriculture, is well developed. This page includes a chart with historical data for the South African GDP Growth Rate (www.tradingeconomics.com). Figure 1 below clearly depicts the trend in GDP growth rate in South Africa prior 2008 to 2012, 2\textsuperscript{nd} Quarter.
According to StatsSA, P0441, (2012), the largest contributors the quarter-on-quarter growth of 3,2 per cent were as follows:

- The mining and quarrying industry contributed 1,5 percentage points based on growth of 31,2 per cent;
- Finance, real estate and business services contributed 0,5 percentage point based on growth of 2,3 per cent;
- The wholesale, retail and motor trade; catering and accommodation industry contributed 0,4 of a percentage point based on growth of 2,8 per cent; and
- General government services contributed 0,3 of a percentage point based on growth of 1,9 per cent.

South Africa’s recent economic performance can to some extent be accredited to tighter monetary and fiscal policy. According to the SARB, Monetary Policy Review (2012), the year-on-year percentage change in the headline consumer price index (CPI) decelerated markedly from 6,1 per cent in April 2012 to 4,9 per cent in July before increasing to 5,5 per cent in
September. Since May, headline CPI inflation has continuously been within the inflation target range of 3 – 6 per cent. Over a course of the global financial and economic crisis, fiscal authorities have implemented a countercyclical policy that has been supportive of economic growth, and mindful of the need to avoid unsustainable debt and tax burden on future generations of South Africa. The fiscal stance is projected to adjust to a slower growth environment to rebuild fiscal space over the medium term.

2.3 State of Infrastructure in South Africa
The South African Government has previously resolved to increase investment in infrastructure development and the Minister of Finance in 2012 METF statement affirmed that. Infrastructure plays a critical role in attracting Foreign Direct Investment (FDI), stimulation of local economy and ultimately achievement of economic growth. According to Fourie (2006), the South African government has begun to ramp up economic infrastructure investment. He added that, this is an important policy shift and in line with the government’s aim of increasing economic growth to 6 per cent and halving poverty by 2014. It is worth noting that infrastructure is divided into different sectors such as Rail, Ports, Roads, Electricity, water and telecommunication amongst others.

In its report on The State of South Africa’s Economic Infrastructure: Opportunities and Challenges (2012), the DBSA provides a very insightful and useful state of economic infrastructure in South Africa. The DBSA report focuses on sectors such as Rail, Ports, Roads, Electricity, water and telecommunication. The information
presented below is therefore sourced from DBSA report on state of economic infrastructure (2012).

2.3.1 Rail Infrastructure
The network as shown below on figure 2, comprises almost 21 000 kilometres (km), although there are over 30 000 route km of track – allowing for the fact that some primary routes are double track, or more than double (particularly those tracks close to major cities). The core network consists of 13 000 route km of which some 2200 km are accounted for by commuter rail networks. The remaining 8000 km form the under-used branch line network. About 60 per cent of the network utilises electric power with the remainder being diesel. The commuter network is largely electrified. The inter-city tracks and some urban networks are owned by Transnet. However, the majority of the urban rail infrastructure is owned by the Passenger Rail Agency of South Africa (PRASA).
On the same note, the rail system in South Africa has a number of challenges. The central challenge to rail reform in South Africa is to be realistic in terms of both the financial and economic costs of policy aspirations. Furthermore, required policy, institutional and regulatory changes must be made to enable the rail sector to respond appropriately by prioritising investments in areas where rail has a comparative advantage and avoiding investments where no such advantage exists.

While actual users of rail may benefit from rail transport’s generally lower transport costs, the system does not lend itself to the establishment of new smaller and medium-sized enterprise.

Source: DBSA (2012)
Finally, the main determinant of the economic impact of transport infrastructure lies not in the quantity of investment deployed, but in the quality of spend. Furthermore, the quality of spend depends more on the ability of the different transport technologies to transmit general economic value than it does on the actual costs to user of the transport system. The evidence suggests that rail infrastructure investment does not transmit as much economic value as investment in paved roads.

2.3.2 Ports Infrastructure
South Africa has eight commercial ports: Saldanha Bay, Cape Town, Mossel Bay, Port Elizabeth, Ngqura, East London, Durban and Richards Bay. All these ports are owned by the National Ports Authority (NPA), a division of Transnet. As the nation’s ports planning authority, Transnet divides the ports into three groups: the Western, Central and Eastern ports, as illustrated in figure 3 below. The ports are linked by the corridors to the industrial and mining centres of Gauteng and Mpumalanga.
Commercial ports are a complex blend of physical infrastructure and operational services. Moreover, they function as one part of an intricate logistics framework within a commercial and economic environment. It is often necessary to draw a clear line between port infrastructure and that of the many port-related service industries that are often co-located with the port. Hence, it is not only the scale or physical capacity of the infrastructure that determines the effectiveness of the ports; rather, it is the efficiency with which they serve their users within an environment that measures their value in serving the national economy.

Such contextual matters are important. For example, in certain ports there may be a mix of public and private ownership and/or operation of the infrastructure; or the
port may depend for its effectiveness on support from adjacent storage facilities and transport links into its hinterland; or it may serve multiple customers or only a small number of large customers. These other, non-infrastructural aspects of ports' performance are vital in any consideration of the efficiency and effectiveness of ports infrastructure.

South Africa’s ports cover a wide variety of functions. Some of them focus almost exclusively on bulk commodities, such as ore exporting/petroleum importing at Saldanha. Others serve one major industry only, such as the off-shore oil industry in the case of Mossel Bay. Others may specialise in one cargo type, but also have facilities for a wide range of commodity types. Durban was previously the largest container handling facility in the southern hemisphere (overtaken in recent years by Jakarta, Indonesia). It is also the country’s largest petroleum handling port, with a wide range of dry bulk and mixed use cargo services.

The trade at all South African ports in the financial year 2008/09 can be summarised as follows:

- Richards Bay and Durban together account for over 65 per cent of all throughput;
- Richards Bay and Saldanha together account for 80 per cent of dry bulk trade (mainly ore);
- Durban and Saldanha together account for nearly 84 per cent of liquid bulk (mainly fuel);
- Durban and East London together account for 98 per cent of all vehicle imports and exports;
- Durban and Cape Town together account for over 82 per cent of all container trade.

Despite such gains and critical economic role these ports play in the South African economy, there are still challenges and some are infrastructure related. According to the State of Economic Infrastructure Report (2012), the challenges in the sector include inter alia, the need to:

- Revisit Transnet’s capital investment plans on the assumption that the ports sector is compliant with the Ports Act, both economically and institutionally;
- Identify the extent to which funds raised in the ports sector are being used to cross-subsidise other divisions within Transnet;
- Ensure that NPA manages the concessioning of port service and operations in a manner that is consistent with the ports Act, and
- Confirm whether the current (de facto) restriction of certain commodity types to certain ports is in the national interest.

2.3.3 Road Infrastructure
Roads can be classified into different operational systems, functional classes, or geometric types. These classifications are vital for communication among authorities and the general public. Different classification schemes have been applied for various purposes in different regions, and these vary from province to province. Roads are generally ‘numbered’ or ‘designed’ as being under the control of a specific
road authority. However there remain significant lengths of unnumbered or undesignated roads with no obvious ownership by any road authority.

As illustrated in table 1 below, South Africa’s total road network consists of approximately 154 000 km of paved roads and 454 000 km gravel roads, which are proclaimed as national, provincial or municipal roads. Un-proclaimed roads account for 140 000 km, or 33 per cent of the total gravel network of 593 000 km. The un-proclaimed roads are predominantly in rural areas. They have not been officially recorded in road inventories, and no authority is responsible for their maintenance and upgrading (SABITA, 2010). The total road network is in the order of 750 000 km in length.

Table 1: Paved and Gravel Roads in South Africa

<table>
<thead>
<tr>
<th>Road authority</th>
<th>Paved</th>
<th>Gravel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length (km)</td>
<td>%</td>
</tr>
<tr>
<td>National roads (SANRAL)</td>
<td>16 170</td>
<td>10.5</td>
</tr>
<tr>
<td>Provincial roads</td>
<td>48 176</td>
<td>31.3</td>
</tr>
<tr>
<td>Metropolitan (9)</td>
<td>51 682</td>
<td>33.6</td>
</tr>
<tr>
<td>Municipalities</td>
<td>37 691</td>
<td>24.5</td>
</tr>
<tr>
<td>Total proclaimed roads</td>
<td>153 719</td>
<td>100.0</td>
</tr>
<tr>
<td>Unproclaimed (estimate)</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: DBSA (2012)

The South African National Roads Agency Limited (SANRAL) is responsible for all national roads, comprising 11 per cent of the total paved network. The main function of national roads is to provide mobility to promote economic development and stimulate exports. In recent years, more and more provincial roads have been transferred to SANRAL due to the lack of capacity and funding from provincial road
authorities. SANRAL’s target is to increase its inventory from 16,170 km to 38,000 km by taking over provincial roads of national importance.

Provincial road authorities, who take the form of provincial departments of transport, are responsible for some 31 per cent of the total paved network. These roads primarily provide access and mobility within a region and support a range of economic and social functions via linkages between towns that are not situated on the national road network.

While the condition of South Africa’s roads has deteriorated due to over-utilisation of the condition of the primary systems as a result of higher investment over the past few years. It is, however, difficult to provide a reliable assessment, as there is limited capacity to assess the condition of South Africa’s road network. This gap is currently being addressed by SANRAL, the South Africa Local Government Association (SALGA) and the DBSA.

Table 2 below indicates the expenditure on roads between 2003 and 2010, as well as planned expenditure by transport authorities for the 2011 – 2013 MTEF periods. The data shows that in real terms, expenditure has increased since 2003, peaking in 2009. Expenditure is, however, projected to decline mainly as a result of reduced expenditure by SANRAL following the completion of the Gauteng Freeway Improvement Project (GFIP).
<table>
<thead>
<tr>
<th>Province</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
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<tbody>
<tr>
<td>North West</td>
<td>316</td>
<td>437</td>
<td>393</td>
<td>498</td>
<td>677</td>
<td>728</td>
<td>848</td>
<td>1131</td>
<td>1476</td>
<td>1692</td>
<td>1898</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>128</td>
<td>127</td>
<td>197</td>
<td>236</td>
<td>296</td>
<td>365</td>
<td>432</td>
<td>449</td>
<td>472</td>
<td>574</td>
<td>632</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>1314</td>
<td>1431</td>
<td>228</td>
<td>1369</td>
<td>1452</td>
<td>1610</td>
<td>1910</td>
<td>1713</td>
<td>1684</td>
<td>1777</td>
<td>1899</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>838</td>
<td>1180</td>
<td>1384</td>
<td>1622</td>
<td>1856</td>
<td>2360</td>
<td>4122</td>
<td>3530</td>
<td>3700</td>
<td>4099</td>
<td>4355</td>
</tr>
<tr>
<td>Limpopo Province</td>
<td>659</td>
<td>829</td>
<td>952</td>
<td>1152</td>
<td>1139</td>
<td>1442</td>
<td>1426</td>
<td>1487</td>
<td>1561</td>
<td>1916</td>
<td>1976</td>
</tr>
<tr>
<td>Western Cape</td>
<td>598</td>
<td>527</td>
<td>633</td>
<td>962</td>
<td>1285</td>
<td>1345</td>
<td>1393</td>
<td>2155</td>
<td>1627</td>
<td>1682</td>
<td>1769</td>
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<tr>
<td>Gauteng</td>
<td>559</td>
<td>519</td>
<td>595</td>
<td>610</td>
<td>658</td>
<td>1079</td>
<td>1447</td>
<td>1735</td>
<td>1534</td>
<td>1715</td>
<td>1766</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>479</td>
<td>450</td>
<td>607</td>
<td>723</td>
<td>688</td>
<td>993</td>
<td>1124</td>
<td>1035</td>
<td>1243</td>
<td>1437</td>
<td>1444</td>
</tr>
<tr>
<td>Free State</td>
<td>366</td>
<td>292</td>
<td>321</td>
<td>333</td>
<td>801</td>
<td>740</td>
<td>994</td>
<td>888</td>
<td>1079</td>
<td>1157</td>
<td>1197</td>
</tr>
<tr>
<td><strong>Total Provincial</strong></td>
<td>5257</td>
<td>5792</td>
<td>6374</td>
<td>7612</td>
<td>8844</td>
<td>10616</td>
<td>13940</td>
<td>14053</td>
<td>15587</td>
<td>16441</td>
<td>17628</td>
</tr>
<tr>
<td><strong>Growth rates yr/yr %</strong></td>
<td>34.7</td>
<td>10.2</td>
<td>16.2</td>
<td>20.0</td>
<td>27.9</td>
<td>2.6</td>
<td>0.8</td>
<td>10.9</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SANRAL</strong></td>
<td>1203</td>
<td>1291</td>
<td>1441</td>
<td>1753</td>
<td>3286</td>
<td>6119</td>
<td>13893</td>
<td>19225</td>
<td>17362</td>
<td>12539</td>
<td>12441</td>
</tr>
<tr>
<td><strong>Growth rates yr/yr %</strong></td>
<td>12.7</td>
<td>7.3</td>
<td>11.6</td>
<td>21.7</td>
<td>87.5</td>
<td>86.2</td>
<td>38.4</td>
<td>38.4</td>
<td>38.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Provincial</strong> and National (R million nominal)</td>
<td>6460</td>
<td>7083</td>
<td>8115</td>
<td>9365</td>
<td>12130</td>
<td>16735</td>
<td>27474</td>
<td>31165</td>
<td>31415</td>
<td>28126</td>
<td>28719</td>
</tr>
<tr>
<td><strong>Yr/yr change (5) %</strong></td>
<td>29.9</td>
<td>9.64</td>
<td>10.33</td>
<td>19.83</td>
<td>25.52</td>
<td>37.96</td>
<td>64.17</td>
<td>20.71</td>
<td>5.26</td>
<td>10.47</td>
<td>2.11</td>
</tr>
<tr>
<td><strong>CPI (in Year end-1 %)</strong></td>
<td>72.1</td>
<td>75.3</td>
<td>77.7</td>
<td>80.0</td>
<td>83.7</td>
<td>89.7</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total (Rm 2008)</strong></td>
<td>8960</td>
<td>9283</td>
<td>10097</td>
<td>11706</td>
<td>14922</td>
<td>18657</td>
<td>27474</td>
<td>27474</td>
<td>27474</td>
<td>27474</td>
<td>27474</td>
</tr>
<tr>
<td><strong>Yr/yr change (%) 2008</strong></td>
<td>19.16</td>
<td>3.61</td>
<td>8.77</td>
<td>15.94</td>
<td>23.80</td>
<td>28.74</td>
<td>47.26</td>
<td>47.26</td>
<td>47.26</td>
<td>47.26</td>
<td>47.26</td>
</tr>
</tbody>
</table>

*Source:* DBSA (2012)

It is anticipated that road infrastructure (construction, rehabilitation and maintenance) will continue to be funded by the public sector including public agencies and entities. The total public sector transport investment estimate for the 2011/12 to 2013/14 MTEF is R212 billion, accounting for 31 per cent of the total MTEF across all sectors. This is the second highest estimate after energy at 35 per cent. In addition, the Provincial Road Maintenance Grant (PRMG) was created in response to the maintenance shortfalls of the provincial road network. Its budget allocation was R6.457 billion in 2011/12; increasing to R8.259 billion in 2013/14. These funds, previously allocated to the Expanded Public Works Programme (EPWP), are being ring-fenced for road maintenance.
The challenges currently confronting the roads sector are not limited to a lack of funding. They are immense and complex. Despite increased funding for roads, resources allocated to roads infrastructure remains inadequate for eliminating the huge backlogs in maintenance over the next five to ten years – the backlogs are compounded by and the result of increased utilisation.

2.3.4 Electricity Sector Infrastructure
The electricity sector in South Africa is dominated by the national utility Eskom, which owns and operates most of the national electricity generation infrastructure and supplies 95 per cent of the country’s electricity requirements. The balance is supplied by municipalities and redistributors (4 per cent), as well as private generators (1 per cent). Electricity infrastructure comprises three sub-sectors which are generation, transmission and distribution, DBSA (2012).

In terms of generation, Eskom dominates the production of electricity, with a generation infrastructure comprising thirteen coal-fired power stations, as illustrated in Fig 3. These power stations (34 952 MW) account for 85 per cent of Eskom’s total net maximum capacity (41 194 MW, an increase from 37 764 MW in 2007). Most power stations are located in Mpumalanga, except for Lethabo and Matimba which are located in the Free State and Limpopo respectively.
Given that South Africa is facing electricity supply constraints, generation capacity locally or in neighbouring countries needs to be augmented to strengthen security of supply. This, however, requires investment in the necessary transmission infrastructure and improved regulation. As regards electricity distribution infrastructure, Eskom retails approximately 60 per cent of electricity sales in South Africa to 40 per cent of national consumers.

In 2005, Eskom commenced a capacity expansion programme which is expected to add approximately 17 120 MW to the current system capacity over the next seven years. The capacity expansion involves new coal-fired power stations, such as...
Medupi and Kusile, with capacity of approximately 4800 MW each, which will contribute 56 per cent to the capacity expansion mix. Furthermore, three old coal-fired power stations that were mothballed are now being returned to service, and will contribute 22 per cent to the capacity expansion mix. The Ingula pumped storage scheme (1330 MW) together with renewable energy projects (such as the 100 MW Eskom CSP project and 100 MW wind project) will contribute a further 20 per cent. The refurbishment of transmission infrastructure constitutes 2 per cent of the expansion capacity projects. Figure 5 below indicate the progress regarding Eskom building programmes.

Figure 5: State of Electricity Construction Projects in South Africa

![Figure 5: State of Electricity Construction Projects in South Africa](image)

**Source:** DBSA (2012)

One of the biggest challenges in the distribution sector is the need to achieve universal access to electricity, through the national electrification programme. This is recognised as a social infrastructure programme that requires subsidisation. The
intention is to accelerate this programme, with a target date of 2012 for 100 per cent access to electricity by households, schools and clinics. The level of electrification in South Africa currently stands at 73 per cent (3.4 million households remain without electricity).

Another challenge for electricity generation, transmission and distribution in South Africa is the ageing infrastructure. This is because some of the existing electricity generation infrastructure consists of power plants that were built in the 1950s.

2.3.5 Water Sector
The water sector infrastructure in South Africa comprises water resources and water service. Water resources infrastructure is developed to exploit the raw water resources in rivers in order to supply households, major industries (mines, Eskom) and agriculture with water. The government has set 2014 as the new target date for providing basic water supply and sanitation services to all South Africans. Over the current Medium Term Expenditure Framework (MTEF) period (2009 -2014), the water sector will continue to focus on the following:

- Meeting targets for the delivery of water supply and sanitation services to ensure 100 per cent access;
- Managing South Africa’s scarce water resources and supporting the development of bulk water resources infrastructure for long-term sustainability;
- Spearheading transformation in the water sector as regards water allocation;
- Improving the regular and institutional environment; and
- Curbing water losses by at least 50 per cent of the national average of 35 per cent.

There are two distinct types of water infrastructure which are water resources (bulk) infrastructure and water services infrastructure. They are discussed separately below.

### 2.3.5.1 Storage Dams

South Africa has approximately 4,718 dams which include those owned by the Department of Water Affairs (DWA) and those owned privately. The DWA owns approximately 305 dams with a total capacity of 29.2 billion m³ which account for 70 per cent of the total dam capacity in the country. Dams in South Africa are classified as large, medium or small. For the dams owned by the DWA, 32 per cent are classified as large, 24 per cent as medium and 43 per cent as small. Some 1 per cent of storage dams are not classified. More than 25 per cent of DWA-owned dams are located in the Eastern Cape and 15 per cent in Mpumalanga. The Gauteng Province, which is home to the largest percentage of South Africa’s population, has the lowest proportion (3 per cent) of DWA-owned dams.

### 2.3.5.2 Regional Bulk Infrastructure

Regional bulk water services infrastructure includes raw water abstraction, treatment works, reservoirs and distribution pipelines to supply water in bulk across municipal borders and over vast distances. Water Boards operate most of this infrastructure. In 2007 the DWA commissioned a Regional Bulk Infrastructure Programme (RBIP) in order to optimise economies of scale and fast-track the delivery
of sustainable water services to local communities, especially in rural areas. The programme is financed through a Regional Bulk Infrastructure Grant (RBIG). Figure 6 below illustrates the location and status of the current regional infrastructure programmes.

Figure 6: Water Sector Infrastructure in South Africa

Source: DBSA (2012)

The DWA is responsible for the management of regional bulk infrastructure fund for water services. Funding is channelled through the Regional Bulk Infrastructure Grant (RBIG). A review of the current implementation and funding requirements reveals the following:

- Expenditure 2007 - 2011
  - Capital – R1.4 billion
Feasibility/Implementation Readiness Studies  
(F/IRS) – R55 million

- Budget Requirement for 2011 – 2012
  - Capital – R1.65 billion
  - Feasibility/Implementation Readiness Studies  
  (F/IRS) – 89 million

- Total Expenditure up to December 2011:
  - Capital – R604 million or 35 per cent of the current budget
  - Feasibility/Implementation Readiness Studies  
  (F/IRS) – 12 per cent of the current budget

- 2011 -2018 project reviews reveal that:
  - 75 projects are in implementation/construction: R15.5 billion
  - 76 projects in (F/IRS) – R9 billion

The funding for bulk water resource infrastructure is largely commercial as it is driven by industrial/commercial demand for water. Where such projects include water supply for social needs, government grants are used to fund the social components. The government also supports the development of water resources infrastructure for domestic water supply where commercial options are not viable.

Figure 7 below illustrates the current challenges in the water sector value chain (in orange) and indicates the key stakeholders responsible for addressing them. From the figure 7, it can be deduced that there is a wide range of challenges in the provision of water for social and economic purposes.
Figure 7: Value Chain Challenges in the Water Sector in South Africa

Source: DBSA (2012)
2.4 Background on the South Africa Construction Sector

As argued by Dlamini (2011), the construction sector responded positively to the developments that took place in political circles and in the overall structure of the SA economy. From 1990, there was a steady growth in total construction output up to 1994 when the first democratic elections took place. This steady increase may be associated with confidence in the overall economy. As indicated in table 3 below, the construction sector has recorded positive growth over the period 2002 to 2011.

Table 3: Trends in Value Added/ Gross Domestic Product at Current Prices, (R Millions)-Construction Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>24120</td>
<td>26747</td>
<td>32039</td>
<td>38558</td>
<td>46158</td>
<td>56908</td>
<td>72221</td>
<td>86522</td>
<td>102801</td>
<td>120420</td>
</tr>
<tr>
<td>Per. Change</td>
<td>5.8</td>
<td>7.7</td>
<td>9.1</td>
<td>11.9</td>
<td>10.4</td>
<td>15.0</td>
<td>8.5</td>
<td>7.8</td>
<td>0.9</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: SA Reserve Bank (2012)

The sharp decline in annual change in the construction output (see Table 3) that SA experienced from 2008 to 2010 was in part a consequence of the global financial crisis. The SA economy has not reached its maturity yet, so it is to be expected that this trough will be reversed as economic recovery strengthens. The rate of economic recovery and the share of construction thereof remains an interesting subject for economists’ prediction.

Economic recovery in the Euro-zone and the US, as significant trade partners, continues to have major repercussions on the SA economy. During the global economic downturn, SA’s construction sector managed on the whole, to avoid some of the worst effects of the crisis, as a result of the many infrastructure projects that were being implemented, including those related to South Africa’s hosting of the
2010 FIFA world cup. However, the hangover from the world cup has caused a slump in construction activity (Dlamini, 2011).

Investment in the construction sector (including residential, non-residential and civil construction works) recorded an expansion of 0.9 per cent y/y for 2011Q4 and has improved from the negative growth rates that were recorded between 2010Q1 to 2011Q3. Total construction investment that took place in 2011Q4 amounted to R171,73 bn from R170,27bn in 2010Q4, Industry Insight (2012).

Figure 8: GFCF Total Construction (Y/Y Percentage Change) 2011Q4

According to Industry Insight (2012), Investment growth in civil works measured an increase of 2.3 per cent y/y in 2011Q4 improving from a 1.7 per cent y/y growth rate measured in 2011Q3. GFCF measured R110,36 bn in the fourth quarter of 2011, up
from R107, 89bn in 2010Q4, and increasing from R109, 65bn investment values recorded in 2011Q3.

The pace of contraction for investment in residential buildings has decelerated and has recorded the smallest contraction in investment in 17 quarters. GFCF in the residential sector for the last quarter of 2011 amounted to R24, 29bn from R24, 83bn in 2010Q4. Although the residential sector remains under pressure, there has been an improvement in demand for housing, specifically for smaller more affordable units, which is likely to enhance construction investment within the sector slightly (Industry Insight, 2012).

Non-residential investment has recorded an annual contraction rate of 1.3 per cent in 2011Q4 from the previous quarter’s decline of 2.6 per cent y/y. Non-residential investment fell to R37,08bn in the last quarter from R37,56bn in 2010Q4. Investment by general government grew by 3.1 per cent y/y in 2011Q4, escalating from the 1.1 per cent y/y increase measured in the 2011Q3. GFCF in monetary value inclined from R52, 24bn (2011Q3) to R53, 83bn (2011Q4). Private enterprises and public corporations recorded increases of 5.5 per cent y/y and 7.7 per cent y/y in 2011Q4 respectively. The total investment value for private sector investment amounted to R248, 15bn, while public corporations amounted to R86, 51bn in 2011Q4.

Of building type, civil construction works made the largest contribution to total GFCF of 28.4 per cent for the fourth quarter of 2011, from the previous quarter’s contribution of 31 per cent. The non-residential sector’s investment held a share of
9.5 per cent total GFCF, slowing from the 11 per cent contribution recorded in 2011Q3. Residential investment construction contributed 6.3 per cent to total GFCF, after a 7 per cent contribution measured in the third quarter. Of the total investment expenditure that took place in the construction sector, 64.3 per cent went into civil projects, 21.6 per cent was invested into the non-residential sector, while only 14.1 per cent of total expenditure was invested into the residential market (Industry Insight, 2012).

According to Quarterly Financial Statistics P0044, (a sample of formal businesses operating in the non-agriculture sector) profitability in the construction sector improved in the last two quarters of 2011, up 6.4 per cent y/y in 2011Q4, however slowing from a 15 per cent y/y expansion measured in 2011Q3. These profitability growth numbers came off a low base, but showed substantial improvement from the -44.4 per cent y/y and -81.3 per cent y/y declines in profit values measured in the first and second quarters of 2011 respectively. Profitability improved to an average estimated rate of 5.7 per cent in the second half of 2011, compared to an average of 1.7 per cent in the first half of 2011. Spending on capital expenditure (including buildings, improvement, plant, machinery, furniture and fittings and vehicles) fell by 40 per cent y/y in the 2011Q4, although spending on vehicles did increase by 25 per cent since 2011Q3.

In a long term perspective, Figure 9 shows a significant increase in the annual construction GDP between 2002 and 2011. This was the time when most of the major infrastructure projects related to the hosting of the 2010 FIFA World Cup.
started. This demonstrates an association between construction investment and economic growth. It is also important to note that this finding is consistent with economic growth theory, in particular, the endogenous growth models.

The growth in construction output reflected in Figure 9 below indicates that growth in the SA economy was pulling the growth that was experienced by the construction sector particularly between 2004 and 2008. Since economic growth leads to construction, policy – makers can keep track of the trends in the main stream economy and devise responsive policies that seek to respond to the economic conditions of the time (Dlamini, 2011).

Figure 9: Trends in the RSA Construction Sector (2002 – 2011)

Table 4 below shows the GDP contribution of the construction sector in the South African economy. Most importantly it shows the role that the sector plays in the formation of Gross Fixed Capital which creates an enabling environment for investment and ultimately economic growth and development. Interestingly, the
private sector shows to be leading in Gross Fixed Capital Formation (GFCF) in South Africa followed by Public Enterprises then Government.

Table 4: Macroeconomic Outlook for the Construction Sector

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>2.8%</td>
<td>2.6%</td>
<td>4.4%</td>
<td>4.8%</td>
<td>1.3%</td>
<td>1.4%</td>
<td>3.2%</td>
<td>2.7%</td>
</tr>
<tr>
<td>GFCF</td>
<td>-3.7%</td>
<td>-1.4%</td>
<td>0.2%</td>
<td>1.4%</td>
<td>2.4%</td>
<td>4.9%</td>
<td>5.6%</td>
<td>-</td>
</tr>
<tr>
<td>Residential</td>
<td>-6.9%</td>
<td>-6.8%</td>
<td>-6.0%</td>
<td>-4.9%</td>
<td>-7.8%</td>
<td>-3.8%</td>
<td>-2.2%</td>
<td>-</td>
</tr>
<tr>
<td>Non-Residential</td>
<td>2.1%</td>
<td>1.3%</td>
<td>2.1%</td>
<td>2.1%</td>
<td>-2.5%</td>
<td>-2.6%</td>
<td>-1.3%</td>
<td>-</td>
</tr>
<tr>
<td>Construction works (civil)</td>
<td>2.5%</td>
<td>1.7%</td>
<td>0.8%</td>
<td>0.4%</td>
<td>-0.1%</td>
<td>1.7%</td>
<td>2.3%</td>
<td>-</td>
</tr>
<tr>
<td>GFCF Private Sector</td>
<td>-4.4%</td>
<td>3.8%</td>
<td>5.2%</td>
<td>5.6%</td>
<td>5.3%</td>
<td>5.4%</td>
<td>5.5%</td>
<td>-</td>
</tr>
<tr>
<td>GFCF by Public Enterprise</td>
<td>3.5%</td>
<td>-0.7%</td>
<td>0.3%</td>
<td>-0.4%</td>
<td>2.7%</td>
<td>5.8%</td>
<td>7.7%</td>
<td>-</td>
</tr>
<tr>
<td>GFCF by Gov.</td>
<td>-10.9%</td>
<td>-8.2%</td>
<td>-3.3%</td>
<td>-0.8%</td>
<td>0.1%</td>
<td>1.2%</td>
<td>3.1%</td>
<td>-</td>
</tr>
<tr>
<td>Investment in construction as % of GDP</td>
<td>10.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: StatsSA and South African Reserve Bank (2012)

In Table 5 below, it can be deduced that the construction sector in South Africa contributes 3 per cent relative to total GDP. Compared to other sectors, the construction sector is still contributing less but just above Agriculture and energy sectors.
Table 5: Sectoral GDP, R Millions, 2011 prices

<table>
<thead>
<tr>
<th>Sectoral Classification</th>
<th>Rand Value</th>
<th>Construction GDP/Total GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Forestry and Fishing</td>
<td>41 553.00</td>
<td>2%</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>99 415.00</td>
<td>6%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>289 015.00</td>
<td>17%</td>
</tr>
<tr>
<td>Electricity, Gas and Water</td>
<td>34 749.00</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td><strong>58 241.00</strong></td>
<td><strong>3%</strong></td>
</tr>
<tr>
<td>Trade</td>
<td>234 630.00</td>
<td>14%</td>
</tr>
<tr>
<td>Transport</td>
<td>172 733.00</td>
<td>10%</td>
</tr>
<tr>
<td>Real Estate &amp; Finance</td>
<td>400 382.00</td>
<td>24%</td>
</tr>
<tr>
<td>General Government</td>
<td>258 405.00</td>
<td>15%</td>
</tr>
<tr>
<td>Personal Services</td>
<td>103 601.00</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 692 724</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


2.5 Background on Household Income in South Africa

The total factor payment which is compensation to employees in South Africa in 2011 prices, both in the private and public sector was R1 317 billion as depicted in Table 6 below. Of the total R 1 317 billion, R 913 billion factor income (remuneration of employees is earned in the private sector) in 2011 prices as published in the South African Reserve Bank Bulletin, 43 per cent went to whites, 10 per cent to coloureds, 7 per cent to Asians and 41 per cent to Africans.

Table 6: Compensation of Employees R Millions, 2011 Prices

<table>
<thead>
<tr>
<th>Sectoral Classification</th>
<th>Rand Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Forestry and Fishing</td>
<td>19 338.00</td>
<td>1%</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>92 163.00</td>
<td>7%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>213 157.00</td>
<td>16%</td>
</tr>
<tr>
<td>Electricity Gas and Water</td>
<td>25 834.00</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td><strong>44 028.00</strong></td>
<td><strong>3%</strong></td>
</tr>
<tr>
<td>Trade</td>
<td>154 587.00</td>
<td>12%</td>
</tr>
<tr>
<td>Transport</td>
<td>76 352.00</td>
<td>6%</td>
</tr>
<tr>
<td>Real Estate &amp; Finance</td>
<td>208 492.00</td>
<td>16%</td>
</tr>
<tr>
<td>General Government</td>
<td>385 265.00</td>
<td>29%</td>
</tr>
<tr>
<td>Personal Services</td>
<td>98 439.00</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 317 655</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Income data reflected above forms a larger portion of household total income in South Africa. According to Masemola (2012), South African households in the highest income group take home an average of over R2 million per annum compared to just over R28 000 for the poorest household. A selection of findings from the BMR research is presented below.

Of the R 913 billion compensation of employees in the private sector, 23 per cent goes into the manufacturing sector, 21 per cent into the Financial Sector, 19 per cent to the Wholesale and Retail Trade Sector and a meagre 4 per cent to the Construction Sector with the energy sector and Agriculture Sector receiving 2 per cent each relative to the total compensation.

Included in the total R44, 28 billion in terms of total compensation of employees in the Construction Sector, 34 per cent (R13.17 billion), went to the whites, 12 per cent (R4.62 billion) went to the Coloureds, 3 per cent (R1.2 billion) went to Asians and 50 per cent (R19.16 billion) went to Africans.

The total number of households in South Africa was estimated at just over 14 million in 2011 with the following data:

- These households had a combined income of about R2 trillion in 2011.
- About 22.4 per cent of total household income accrued to the emerging middle class, namely households with an annual income that ranges between R151 728-R363 930 per annum.
- The lowest income group (R0-R54 344 per annum) earned R196 billion in 2011, accounting for nearly 10 per cent of total household income.
The affluent group's total household income amounted to just over R200 billion. This represented just 10 per cent of total household income in the country.

Figure 10 shows the distribution of household income by income group.

**Figure 10: Distribution of Total and Percentage Household Income by Income group, 2011**

- **R372,224 billion per annum** (18.7%)
- **R444,719 billion per annum** (22.4%)
- **R351,320 billion per annum** (17.7%)
- **R212,492 billion per annum** (10.7%)
- **R208,694 billion per annum** (10.5%)
- **R200,302 billion per annum** (10.1%)
- **R196,450 billion per annum** (9.9%)
- **R351,320 billion per annum** (17.7%)
- **R54,345-R151,727 income per annum**
- **R151,728-R363,930 income per annum**
- **R363,931-R631,120 income per annum**
- **R631,121-R863,906 income per annum**
- **R863,907-R1,329,844 income per annum**
- **R1,329,845+ income per annum**

Source: Unisa (2012)

Construction industry concerns with two aspects of productivity. Firstly it deals with overall volume of the output in terms of construction works; secondly the output per unit of consumption of resources such as raw materials, manpower and financial inputs. Building up the capacity of the industry being one of the main areas of focus.
would need the introduction of efficient technologies and modern management techniques to raise the productivity of the construction industry. Enhancement of productivity will be required. Employing of trained workers, right type of professionals for execution of projects supplemented with project management consultants. The other aspect of productivity pertains to the manufacturing sector of building materials and components, where efficiency of resource utilization is to be upgraded by employing latest production technologies.

Clearly, there is a role played by the construction sector on household income in South Africa. Thought there is limited data showing direct household income as a result of the construction sector activities, data on employment within the constructions sector remains a clear indication and confirmation that construction sector plays a role in household income.

According to Industry Insight (2012), Employment in construction fell by 6.7 per cent q/q from 1,057,000 employees in 2011Q4 to 986,000 employees in 2012Q1. The sector also measured an annual decline in the number of employees when compared to the first quarter of 2011, with a loss of 45,000. In 2011Q1 a total of 1,031,000 people were employed in the construction industry.
Table 7: Labour Force, Construction by Province 2012Q1

<table>
<thead>
<tr>
<th>Province</th>
<th>2012q1</th>
<th>q-q% chg.</th>
<th>Y-Y % chg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WC</td>
<td>135</td>
<td>-6.3%</td>
<td>8.9%</td>
</tr>
<tr>
<td>EC</td>
<td>108</td>
<td>-12.9%</td>
<td>-10%</td>
</tr>
<tr>
<td>NC</td>
<td>19</td>
<td>0%</td>
<td>35.7%</td>
</tr>
<tr>
<td>FS</td>
<td>47</td>
<td>-4.1%</td>
<td>-16.1%</td>
</tr>
<tr>
<td>KZN</td>
<td>210</td>
<td>-12.1%</td>
<td>-7.1%</td>
</tr>
<tr>
<td>NW</td>
<td>46</td>
<td>-6.1%</td>
<td>2.2%</td>
</tr>
<tr>
<td>GAU</td>
<td>265</td>
<td>2.3%</td>
<td>-6.7%</td>
</tr>
<tr>
<td>MPU</td>
<td>64</td>
<td>-17.9%</td>
<td>-7.2%</td>
</tr>
<tr>
<td>LIM</td>
<td>92</td>
<td>-3.2%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>986</td>
<td>-6.7%</td>
<td>-4.4%</td>
</tr>
</tbody>
</table>

Source: Industry Insight (2012)

Provincially, the number of people employed in the construction industry declined in 7 of the 9 provinces on quarter-on-quarter basis. Mpumalanga reported the largest contraction in construction sector job loss of 17.9 per cent q/q from 78 000 in 2011Q4 to 64 000 in 2012Q1. The Eastern Cape followed with a 12.9 per cent q/q contraction in construction jobs to 108 000 in the first quarter from 124 000 in the last quarter of 2011.

Looking at employment numbers based on annual rates, the Free State reported the largest annual decline of 16.1 per cent y/y from 56 000 in 2011Q1 to 47 000 in 2012Q1. The Northern Cape measured a 35.7 per cent y/y expansion in construction employment growing from 14 000 in 2011Q1 to 19 000 in 2012Q1, Industry Insight (2012).

2.6 Conclusion

A clear understanding of the South African economy, Status of infrastructure development and construction has been outlined above. This section provides the basis for literature review and a clear point of departure for the entire study.
Chapter 3: Literature Review

3.1 Introduction
This chapter reviews the theoretical and empirical literature on Construction industry, economic growth and income. A number of studies conducted in fields mentioned above will be considered to inform the developments and work already done in the field of economic growth and household income globally and in South Africa.

There are two type of infrastructure which are economic infrastructure and social infrastructure. Economic infrastructure is defined as an infrastructure that promotes economic activity, including roads, electrical lines and water pipes. Social infrastructure promotes health, educational and cultural standards of the population, which include schools, clinics, parks and statue (Development Bank of Southern Africa, 1998:4). Construction sector activities take place to ensure the achievement of both social and economic infrastructure in any country.

3.2 Theoretical Foundation

3.2.1 The Harrod-Domar model
The Harrod-Domar model was developed independently by Sir Roy Harrod in 1939 and Evsey Domar in 1946. It is a growth model which states the rate of economic growth in an economy is dependent on the level of saving and the capital output ratio. If there is a high level of saving in a country, it provides funds for firms to borrow and invest. Investment can increase the capital stock of an economy and generate economic growth through the increase in production of goods and services.
The capital output ratio measures the productivity of the investment that takes place. If capital output ratio decreases the economy will be more productive, so higher amounts of output is generated from fewer inputs. This again, leads to higher economic growth.

The Harrod-Domar growth model gives some insights into the dynamics of growth. We want a method of determining an equilibrium growth rate $g$ for the economy. Let $Y$ be GDP and $S$ be savings. The level of savings is a function of the level of GDP, say $S = sY$. The level of capital $K$ needed to produce an output $Y$ is given by the equation $K = \sigma Y$ where $\sigma$ is called the capital-output ratio. Investment is a very important variable for the economy because investment has a dual role.

Investment $I$ represents an important component of the demand for the output of an economy as well as the increase in capital stock. Thus $\Delta K = \sigma \Delta Y$. For equilibrium there must be a balance between supply and demand for a nation's output. In simple case this equilibrium condition reduces to $I = S$. Thus,

$I = \Delta K = \sigma \Delta Y$

and $I = S$

so

$\sigma \Delta Y = sY$.

Therefore the equilibrium rate of growth $g$ is given by

$g = \Delta Y/Y = s/\sigma$
In words, the equilibrium growth rate of output is equal to the ratio of the marginal propensity to save and the capital-output ratio. This is a very significant result. It tells us how the economy can grow such that the growth in the capacity of the economy to produce is matched by the demand for the economy's output.

One of the shortcomings of the Harrod-Domar is the absence of labor which is a key factor of production.

### 3.2.2 The Solow growth model

The Solow growth model has become popular over the past ten years although it was developed in the 1950s. In 1989 the Solow growth model became the basis for a branch of macroeconomics that studies growth and first, the aggregate production function (which aggregates all factors of production and output):

$$Y = F(K, L)$$

- $Y$ = total output (total income)
- $K$ = capital stock
- $L$ = labor supply

The production function is put in per worker a term (which is similar to income per capita):

$$\frac{Y}{L} = F\left(\frac{K}{L}, \frac{L}{L}\right) = F\left(\frac{K}{L}, 1\right)$$

This gives equations for output per worker and capital per worker:
\[ y = \frac{Y}{L} \]

\[ y = \text{output per worker} \]

\[ k = \frac{K}{L} \]

\[ k = \text{capital per worker} \]

thus, output per worker \((y)\) is a function of capital per worker \((k)\):

\[ F\left(\frac{K}{L}, 1\right) = y = f(k) \]

The change in the capital stock is given by the equation:

\[ \Delta K = sY - dK \]

\(\Delta K\) = the change in the capital stock

\(s\) = saving rate

\(Y\) = total income (total output)

\(d\) = depreciation rate

\(K\) = capital stock

The equation for the change in the capital stock per worker:

\[ \Delta k = sy - (n + d)k \]

\(\Delta k\) = change in the capital stock per worker

\(n\) = the labor supply growth rate (or the population growth rate)
The capital stock per worker increases due to savings and decreases due to depreciation and an increase in the labor supply.

The production-function in the Solow model:

**Figure 11: Production Function**

Output (income) per worker is an increasing function of capital per worker, but output per worker increases at a decreasing rate (due to diminishing returns to a variable factor, which is capital here), this leads to the Solow growth diagram:

The savings curve (sy in the diagram) is the same shape as the production function but is scaled downward (because savings is equal to output multiplied by the savings rate, a constant between 0 and 1):

**Figure 12 A: Solow Growth Diagram**
A ray from the origin is drawn in for the factors of production retarding the growth of capital per worker (the term \((n+d)k\)):

**Figure 12 B: Solow Growth Diagram**

This graph demonstrates a steady-state for the economy:

**Figure 12 C: Solow Growth Diagram**

To the left of \(k_0\): if the capital stock is less than \(k_0\) then the \(sy\) curve lies above the \((n+d)k\) curve so the amount of savings per worker more than offsets depreciation and population growth—thus, there is an increase in the amount of capital per worker because savings more than make up for the loss of capital due to depreciation and population growth.
**To the right of** $k_0$: if the capital stock is more than $k_0$, then the addition to the capital stock by savings will not be enough to compensate for depreciation and population growth so the capital stock per worker will decline.

Thus, the amount of capital per worker will be driven to point A which is a steady-state equilibrium. This model has some counter-intuitive aspects:

- even though it is a growth model, the Solow model predicts a point at which no growth per capita occurs – at A the level of capital per worker is fixed at $k_0$ and output per worker is fixed at $y_0$.
- although the Solow model predicts a steady-state level of capital per worker and output per worker it is still used as a growth model under the assumption that countries' capital stocks lie to the left of $k_0$ (where growth occurs).
- Economies further to the left (low level of capital; low capital to labor ratio) have a longer way to go until their equilibrium steady-state than economies further to the right (high level of capital, high capital to labor ratio), so they may tend to grow more rapidly.

Aggregate growth still occurs:
- note that a steady-state does not mean the economy is static – if the population is growing then the total capital stock ($K$) is growing but at a rate just enough to replace depreciated capital and supply the growing labor supply with capital (capital per worker and output per worker in the steady-state remain the same).
• because the population is growing at rate \( n \), the total capital stock \( K \) is growing at rate \( n \) in the steady-state – however, output per worker remains fixed; population growth offsets the increase in \( K \) so that \( k \) remains constant.

Predictions of the Solow growth model (assuming that countries have the same underlying factors such as technology, saving rate, etc.):

• convergence – the Solow model predicts that countries at different levels of capital per worker and output per worker but the same saving rate \( s \), depreciation rate \( d \), and population growth rate \( n \) will converge to the same steady-state output per worker \( y \):

• A poorer country grows more rapidly than a richer country ceteris paribus (all other things equal):

• the further a country is from its steady-state, the more rapidly it will grow because there is a greater “gap” between capital formation \( sY \) and the amount needed to keep it constant \( (n+d)k \):

**Figure 12 D: Solow Growth Diagram with the “gap”**

\[ y = f(k) \]

\[ (n+d)k \]

\[ sy \]

The “gap” = the difference between \( sy \) and \( (n+d)k \)
Net increments to capital per worker \( (k) \) and capital \( (K) \) decline over time (the “gap” becomes smaller) as the economy grows toward its steady-state.

The empirical findings of this prediction are not supported if other differences among countries are not controlled for in the study (such as stability of the political systems, openness to trade, etc.); however, the empirical findings support this prediction if these differences are considered.

Conditional convergence — convergence does occur if other factors affecting growth are considered.

Thus if two countries have the same conditions in important respects, then it can be predicted that the poorer country will grow more rapidly than the richer country.

Studies using regression equations indicate that:

- The dependent variable is the rate of growth of output per worker \( (y) \) or GDP per capita.
- The independent (explanatory) variables are initial income, saving rate, etc.
- These studies use 1 observation per country (so about 100 observations total).
- These studies consider the rate of growth (measured by GDP per capita, etc.) over some period of time; earlier studies used the time period 1960-1985 but more recent studies use the period 1960-1995 (data before 1960 is not accurate enough or not available for enough countries).
- All studies find that if enough independent variables are included then initial income is a good predictor of growth in the direction expected (that is, a high initial income leads to a less rapidly growing economy).
Comparative statics (changing one variable and observing the effects) and the Solow model:

a change in the saving rate:

- If the saving rate is increased, it will lead to greater capital formation and quicker growth
- Here the saving rate increases from $s$ to $s'$ (but all the other variables stay the same) which shifts up the savings curve:

**Figure 12 E: Solow Growth Diagram with steady-state equilibrium**

- there is a new steady-state equilibrium – the steady-state level of capital per worker increases from $k_0$ to $k_0'$ and the steady-state level of output per worker increases from $y_0$ to $y_0'$
- Thus, if a country increases its saving rate, there will be a higher level of steady-state equilibrium capital per worker and output per worker
- if the economy is at equilibrium at capital per worker $k_0$, then an increase in the saving rate will cause a burst of growth in capital and in output per worker ($y$)
• if the economy is still growing (if it’s not at its steady-state level of capital and output) then an increase in the saving rate will raise the growth rate

• if the country lowers its saving rate then there will be a lower steady-state level of capital per worker and output per worker – a negative growth rate is also possible

• These outcomes assume that the saving rate \( s \) does not change from year to year

A change in the population growth rate:

• The population growth rate \( n \) retards growth because it slows the growth of capital per worker \( k \)

• \( n' \) is an increased population growth rate from the original population growth rate \( n \):

Figure 12 F: Solow Growth Diagram with change in Population

• A higher population growth rate lowers capital per worker, lowers output per worker, and lowers the growth of output per worker

• This prediction of the Solow model supports the intuition that rapid population growth is harmful to growth and development
The Solow growth model and environmental consequences of growth:

- in the steady-state of the Solow model, the total national output ($Y$) and the total capital stock ($K$) can increase even if there is no increase in capital per worker or output per worker.

- The Solow model was developed in the 1950s when there was less concern for the environment – the Solow model assumes that there are no negative consequences to the growth of an economy (here the economy is said to “grow” if there is an increase in the amount of total output, even if per worker output is constant).

- This model could be updated to adjust for the environmental carrying capacity

Technology and the Solow model:

- Because technology is improving, output per worker ($y$) can increase without an increase in the amount of capital per worker ($k$).

- Technological change can be thought of as the effective labor per worker increasing.

- The effective labor is defined as:

  $$\text{effectivelabor} = T \times L$$

  $T =$ level of technology and efficiency of labor

  $L =$ labor supply

- This modifies the production function used earlier:

  $$Y = F(K,L) \text{ Becomes } Y = F(K,T \times L)$$

- Even if the total labor supply ($L$) is constant the effective labor supply ($T \times L$) can be increasing if technology is improving.
• The rate of technological change is given the symbol \( \theta \) and can be considered increments to effective labor

• \( K \) now equals the capital per effective labor unit:

\[
k = \frac{K}{T \times L}
\]

The capital stock must grow to offset \( d, n, \) and \( \theta \) - thus, the rate at which capital must be replaced in order for \( k \) to remain constant is now \((n+d+\theta)k\):
However, capital per worker (the ratio $K/L$ as opposed to $K/TxL$) is growing at rate $\theta$; Even if the effective labor unit per worker is increasing over time, there can still be a steady-state; however, in the steady-state income per worker is increasing; the addition of technology to the Solow model moves away from the predictions of the earlier model (without technology) that there is no growth per worker at the steady-state; instead, growth can now continue indefinitely (which looks more like what's been seen in the past 150 years in industrialized countries).

3.2.3 The Kuznets Paradox
Keynes called the relationship between aggregate consumption and current disposable income the “propensity to consume.” He gave names to two measures of the sensitivity of consumption to income. The average propensity to consume (APC) is the ratio of consumption to income: $C/Y$; the marginal propensity to consume (MPC) is the amount by which consumption increases as current disposable income rises by a dollar, $\partial C/\partial Y$.

Both the average and marginal propensities are generally believed to be between zero and one. The Kuznets paradox is an empirical anomaly that relates to the relative size of these two measures.

The linear Keynesian consumption function, which dominated early empirical work, is written as

$$C_t = a + bY_t .$$  

(1)

The MPC in equation (1) is the constant $b$, since in a linear function the marginal effect (slope) is constant. The APC is $C_t /Y_t = (a + bY_t) /Y_t = b + a/Y_t$. How the APC varies as income changes depends on $a$. If $a > 0$, then the MPC < APC and people
spend a decreasing share of their incomes as incomes rise. If \( a = 0 \), then the \( \text{MPC} = \text{APC} \) and spending is a constant proportion \( b \) of income.

Empirical estimation of equation (1) by ordinary least squares with aggregate time series data generally yields a value of \( b \) in the neighborhood of 0.75 and a positive value of \( a \). Thus, early empirical estimates led to the prevailing wisdom that the MPC was less than the APC. A common interpretation of this result is that saving was a “luxury” good, whose share of overall income rises as people received higher incomes.

As argued by Parker (2010) However, in an oft-cited but unpublished work based on his detailed reconstruction of historical data on economic aggregates, Simon Kuznets pointed out that the share of income consumed seemed to remain constant over almost a century of data spanning the latter half of the 19th century and the first half of the 20th. If the \( \text{APC} > \text{MPC} \) as the OLS estimates of the linear consumption function suggest, then the share of income consumed should decline as income increases. Thus two kinds of empirical evidence seemed to lead to conflicting conclusions: short-run econometric studies found \( \text{MPC} < \text{APC} \) and long-run data showed that \( \text{MPC} = \text{APC} \).

Economists working on consumption models also sought evidence from cross-section studies of the consumption expenditures of individual households. This evidence seemed to support the short-run econometric studies, showing that high-income households saved a larger fraction of their income than lower-income households did (Parker, 2010).
The Kuznets paradox posed a challenge for theoretical modelers of consumption. Clearly the linear Keynesian consumption function was insufficient, since it could not explain why the MPC was less than the APC in the short run and across households; yet aggregate consumption was proportional to income over the long run. The early postwar theories that were devised with this paradox in mind eventually led economists to a model with very basic microeconomic roots. In the next two sections we examine briefly some mileposts on this path of theoretical evolution.

3.2.4 Relative-Income Hypothesis
One of the earliest attempts to reconcile these conflicting pieces of evidence about the consumption-income relationship was the relative-income hypothesis, described by James Duesenberry (1949). Although this theory has vanished with hardly a trace from contemporary macroeconomics, it carried considerable influence in the 1950s and 1960s. The reasons for its abandonment may have had less to do with its logic or conclusions than with its lack of conformity with assumptions that microeconomists commonly make about utility functions, (Parker, 2010).

The relative-income model was formulated in two variants: a cross-section version and a time-series version. These variants correspond to the cross-section and time-series aspects of the Kuznets paradox. In both variants, consumption depends on current income relative to some income standard that the household sets based on its own past income or on the income of other households around it. In the cross-section version, Duesenberry (1949) appealed to the idea of "keeping up with the
Joneses." He argued that a household's consumption would depend not just on its own current level of income, but on its income relative to those in the subgroup of the population with which it identifies itself. The household will attempt to align its consumption expenditures with those of other members of its group. Thus, households with lower income within the group will consume a larger share of their income to "keep up," while households with high incomes relative to the group will save more and consume less.

This hypothesis gained support from the observation that families with the same income seemed to consume systematically different amounts depending on the group to which they belonged. For example, survey evidence indicated that a black family with a given income would usually consume less than a white family with the same income. The relative-income hypothesis attributes this to the difference in their relative income within their respective groups. Because average incomes among whites were higher, the white family was presumed to consume more relative to its income in order to try to attain parity with other white families, while the black family feels less of this pressure among the group of black families. As income of both groups rises over time, the steeper "long-run consumption function," with the average household in each group tending to spend a constant share of its income over time.

The time-series variant of the relative-income hypothesis is very similar to the cross-section version. The main difference is that instead of comparing their income to those of other households, each household is assumed to consider its current
income relative to its own past income levels. A household that has in the past achieved income levels higher than its present levels would attempt to maintain the high consumption levels that it achieved earlier. Thus, when incomes fall, consumption would not fall in proportion. (Note that this is not totally inconsistent with our modern theory of consumption smoothing, though the basis for smoothing in the modern theory is the household’s average lifetime income, not the highest level of past income.)

The result of this behavior for aggregate consumption is called a “ratchet effect.” When incomes rise, consumption increases along the steeper long-run consumption function. However, when a recession hits and incomes decline, households reduce consumption less than proportionally and fall back along the flatter short-run consumption function. During the recovery, they increase steadily until they reach their highest attained level of consumption. After recovery, when incomes grow again, they increase further until the next recession, when they fall back to reduced consumption. Thus, consumption ratchets upward, staying relatively near its highest past value when income declines.

Although the relative-income hypothesis is quite successful in explaining the Kuznets paradox, it seems to have been relegated to the economic scrap heap. One important reason is that the cross-section variant involves interdependent utility functions in which one household’s utility depends not only on its own consumption activities but also on those of other households. This greatly complicates the problem of modeling consumption behavior. Instead of being able to model each
household's behavior in isolation, taking as given its income and market prices, one must model all households' consumption decisions together in a game-theoretic framework, taking into account how the behavior of other households affects each family's consumption behavior. Although modern developments in game theory have made such problems a little more approachable than they were in the 1950s, it is still a lot harder to build consumption models if utility is interdependent. Thus, the cross-section relative-income model may be described as "methodologically inconvenient" (Parker, 2010).

Another reason that economists tend to avoid models with interdependent utility functions is that the socioeconomic, "as good as my neighbor" competition that it implies conflicts with economists' favorite depiction of "Homo economicus" as a self-contained, rational, maximizing machine. Once one opens up the possibility of cross-person utility dependence, extension of that idea makes the model so general that it is consistent with nearly any imaginable behavior. Thus, in place of the set of testable propositions about consumption behavior that come out of the individual utility-maximization model, interdependent utility functions may leave theorists with an untestable model that can explain any behavior imaginable through some combination of interdependence, (Parker, 2010).

However, problems of intractability and conflict with economists' usual behavioral assumptions do not make a theory wrong. Ultimately, the abandonment of the relative-income hypothesis surely resulted partially, if not mostly, from the development of other, more attractive consumption models that were equally
successful at explaining empirical phenomena such as the Kuznets paradox. We now turn to these models, which form the underpinning of modern consumption theory.

3.2.5 Life-Cycle Model and Permanent-Income Hypothesis
Two initially distinct theoretical paths that eventually merged into one are the life-cycle model developed by Franco Modigliani, Albert Ando, and Richard Brumberg in the mid-1950s and the permanent-income hypothesis introduced by Milton Friedman (1957). Both models emphasize consumption smoothing, though they vary a little in how they are set up. Later work showed that both could be viewed as special cases of the general inter-temporal utility maximization model. Their relationship to one another is somewhat analogous to the Ramsey and Diamond growth models. The life-cycle model, like the Diamond overlapping-generations model, features a finite lifetime with a distinct period of retirement at the end. The permanent-income model, like the Ramsey model, has infinitely lived consumers.

- Life-cycle model
Modigliani’s model emphasized how saving could be used to transfer purchasing power from one phase of life to another. In early life, labor income is usually low relative to later working years. Income typically peaks in the last part of the working life, then drops at retirement. Consumers who wish to smooth consumption would prefer to borrow during the early low-income years, repay those loans and build up wealth during the high-income years, then spend off the accrued savings during retirement. Implicit in the life-cycle approach is the idea of a lifetime budget constraint that links consumption at various dates during the lifetime. The slope of
the budget constraint, which determines the tradeoff between period $t$ consumption and period $t+1$ consumption, is $-(1 + r)$, where $r$ is the real interest rate at which consumers lend and borrow.

The position of the budget constraint depends on the present value of lifetime earnings, which is usually simply called wealth. In terms of the modern utility-maximization model, wealth is

$$\Omega 0 = A 0 + \sum_{t=0}^T \frac{V_t}{(1+r)^t}$$

(2)

where $\Omega 0$ is the stock of wealth (human and nonhuman) as of time zero, $A 0$ is the value of current nonhuman (financial or physical) assets, $V_t$ for $t = 0, 1, 2, ..., T$ is the expected stream of real labor income over the lifetime, and $r$ is the real interest rate.

The early empirical tests of the life-cycle model were tests of whether wealth and the interest rate explained consumption better than current disposable income. Although some successful results were obtained, empirical work was bedeviled by the difficulty of measuring the stock of wealth accurately. In general, government statisticians are much more successful at measuring flows than stocks. Stocks are more difficult to measure for at least three reasons. First, because flows “move,” it is easier to count them (and harder to hide them) than stocks of assets that may “hide” in someone’s possession for many years. Second, income, sales, and expenditures are often taxed, which means that the government has good reasons for measuring these flows as accurately as possible.
The final reason that flows are easier to measure than stocks is that their value is usually easier to determine. Most economic variables are aggregated in terms of their dollar value. Each time a transaction occurs a dollar value is placed on the goods involved. Flows by definition involve current transactions and, thus, have a readily observable current value. Stocks may change hands relatively infrequently, which make it more difficult to assess their current market value. Prices are regularly quoted for assets that are traded on organized exchanges, such as stocks, bonds, and gold, which makes it easy to establish their value. For other assets, such as real estate, tax collectors make regular estimates of market value.

However, for a very large collection of assets, data collectors are forced either to use historical cost (the approach taken by accountants, which may drastically underestimate the value of structures and overestimate the value of such rapidly depreciating assets as computers) or to estimate market value based on whatever scanty information is available. The largest asset of most households in the economy is the earning power represented by the human capital of their members. Since historical cost is largely irrelevant here, this can only be estimated very cruelly by trying to guess at their lifetime stream of future wage earnings and place a capital value on it by standard present-value techniques.

The difficulty of measuring wealth makes it very difficult to perform a reliable test of the life-cycle model. The most common approach is to include as wealth only a limited set of assets whose value is relatively easy to measure. In terms of equation (2), this amounts to using only the “visible” part of the $A_0$ term and neglecting both
any unmeasurable components of $A_0$ and the potentially much larger unobservable summation of discounted future labor income. Since the appropriate concept of wealth is so much broader than the measures that are used in empirical applications, one would not necessarily expect a strong correlation between the measures used and consumption spending. Thus, the lack of robust statistical support for this version of the life-cycle model compared to the simple Keynesian function cannot be taken as a definitive refutation of the model.

- **Permanent-income hypothesis**

Rather than focusing on the life cycle *per se*, Friedman discussed the general problem faced by households when their income fluctuates over time, whether due to life-cycle effects, business cycles, or other factors. He considered infinite-lived households and distinguished between a “normal” level of income that they expect over their lives, which he called *permanent income*, and (positive or negative) deviations from that level, which he termed *transitory income*.

Similarly, Friedman distinguished *permanent consumption*, which is the part of consumption that is planned and steady, from unexpected or irregular spending or *transitory consumption*, such as unexpected medical bills or temporary college tuition expenses. Friedman argues that permanent consumption will be proportional to permanent income. Households will plan to spend in an average period a fraction (equal to one or slightly less) of their average lifetime income.
He further assumed that both permanent and transitory consumption are independent of transitory income and that transitory consumption in any period is independent of permanent income. Thus, consumption consists of a planned part that depends on permanent income and an unplanned part that is totally independent of income. Transitory consumption can be identified with the random error term in a consumption function regression.

The focus of the permanent-income model, then, is the estimation of the relationship between consumption and a measure of permanent income. In terms of the modern consumption model, permanent income can be thought of as the size of a constant annual flow of income that would have the same present value as the (possibly uneven) flow of income that is actually expected. If we know the future income path, we can calculate permanent income from the budget constraint as

\[
\sum_{t=0}^{\infty} \frac{Y_p}{(1+r)^t} = A0 + \sum_{t=0}^{\infty} \frac{Y_t}{(1+r)^t}
\]  

(3)

where \( Y_p \) is permanent income. It can be shown that \( Y_p = r \Omega \), where \( \Omega \) is the wealth measure from equation (2). This shows the close relationship between the life-cycle model, in which consumption is assumed to depend on wealth, and the permanent income model, where consumption depends on permanent income.

Early empirical estimation of the permanent-income model relied on the rather shaky assumption that future income could be predicted as a stable linear function of current and past incomes. Under this \textit{adaptive-expectations model}, permanent
income could be expressed as a linear function of current and past incomes. However, this model of expectations was often very inaccurate because it failed to distinguish between changes in income that people knew were permanent and those they knew were temporary, (Parker, 2010).

Although some supportive empirical results were reported, modern macroeconomists approach them with great skepticism.

- **Permanent vs. temporary changes in income**

  Parker (2010) argues that both the life-cycle and permanent-income models make similar predictions about the consumption effects of permanent and temporary changes in a household's income. In the life-cycle model, an increase in income that is expected to be permanent causes a large increase in lifetime wealth, since all future terms on the income side of the budget constraint rise along with the current term. Thus, consumption rises by about as much as income rises when the change is known to be permanent—the MPC out of a permanent change in income is near one.

  A temporary increase in income affects only the current term in the lifetime-income summation, so it causes a relatively small change in wealth. As a result, households that smooth consumption will spread the temporary increase in income over the rest of their lives, increasing consumption in the current period (and in each future period) by about $1/T$ times the change in income, where $T$ is the number of years left
in the household’s life. Thus, the MPC out of temporary changes in income is much smaller in the life-cycle model.

In the permanent-income model, permanent changes in income are changes in permanent income, and thus lead to large changes in consumption. Again, the MPC is near one. Temporary changes are transitory and, thus, have no direct effect on consumption. A one-time rise in income does raise lifetime wealth dollar for dollar, so it does have a small effect on permanent income: Since permanent income is the real interest rate times wealth, permanent income goes up by the interest rate times the amount of the temporary change in income. Thus, if (infinitely lived) households receive a one-time increase in income, they will consume the interest they can earn on that increase in the current year and in every future year. (Note that if an infinitely lived household consumed even a little of the principal each year in addition to the interest, it would eventually exhaust the principal and have to lower consumption.)

The life-cycle and permanent-income models explain the Kuznets paradox through the difference in the reaction of consumption to permanent and temporary changes in income. Recall that during long-run growth, Kuznets found that the MPC was quite high and equal to the APC. According to the life-cycle and permanent-income models, such changes are the result of long-run growth forces and are likely to be permanent. Thus, a high MPC and a proportional response to income are consistent with the predictions of the model.
Business cycles, on the other hand, are almost always quite short-lived. In response to temporary reductions (or booms) in their income, both models predict that households will try to spread the income reduction (increases) over their entire lives, lowering (raising) consumption only slightly. Thus, the flatter short-run consumption function with a smaller MPC results from the temporary nature of short-run fluctuations.

3.3 Infrastructure and Economic Growth
Many economists have presented evidence to prove the positive link or relationship between infrastructure development and economic growth in many countries. Aschauer (1989) and Munnell (1990) found a strong positive relationship between infrastructure and growth. In their study, Fedderke & Garlick (2008), when observing infrastructure development and economic growth in South Africa, concluded that based on both theoretical and empirical evidence, there is an existence of a robust positive relationship between infrastructure and economic growth. They particularly pointed out the following findings:

- Aggregate infrastructure stock and investment drive economic output;
- The driving relationship between economic output and infrastructure varies significantly across different types of physical infrastructure; and
- Infrastructure impacts on output both directly and indirectly, via increased private sector investment, improved productivity and rising exports.
In general, infrastructure reduces the cost of production and consumption, and makes it easier for participants in the economy to enter into transactions. Thus, if the efficiency of infrastructure is increased, there should be a concomitant improvement in growth performance, service provision and development outcomes. Overall, this should also result in improved economic competitiveness (DBSA, 2006). This clearly indicates that infrastructure stock is also an input towards productivity and ultimately, improved economic output. This is further supported by Serven (2010) who argues that, conceptually, infrastructure may affect aggregate output in two main ways: first, directly because infrastructure services enter production as an additional input, and second, because they raise total factor productivity by reducing transaction and other costs thus allowing a more efficient use of conventional productive inputs.

Leung and Tantirigama (2011) found a positive contribution from productive road infrastructure capital stock to GDP. They further concluded that if road infrastructure investment has not increased at the same rate as in recent years, total GDP from 2000 to 2009 would have been slightly lower in New Zealand.

According to Meyer et al. (2009), rural infrastructure serves many economic purposes. It creates an array of livelihood choices in commercial and small-scale farming. Most agricultural industries are bound to their locality, e.g. mills and cotton gins, dairies and fruit warehouse. A lack of infrastructure discourages complementary investment by the private sector in establishing labour-intensive, value-adding industries. In their study, Meyer et al. (2009) have highlighted a
number of infrastructural requirements that could enable growth in the agricultural regeneration which could ultimately contribute to economic growth of South Africa. These are:

- **Resources: Water and Energy**

Irrigation farming is currently one of the major consumers of electricity in agriculture. Approximately 50 per cent of the country’s water is utilised to irrigate approximately 1.3 million hectares of land. In commercial farming areas, 30 per cent is planted to intensive crops, 50 per cent to extensive crops (i.e. crops that are also grown in dry land conditions) and 16 per cent to pastures. Limited information is available on cropping patterns in the former homeland areas, which cover a total of 100 000 ha. Limited water resources and the high cost of schemes are the major constraints to new irrigation development in South Africa, estimated at 178 000 ha. The high cost of creating infrastructure emphasizes the importance of upgrading existing facilities and schemes where the primary water supply infrastructure is in position. The key to improved irrigation lies in more efficient use of water and the use of more cost-effective technology. Global warming and climate change are increasingly affecting natural rainfall patterns and therefore the available stock of water.

The competitive usage of water resources in a growing industrial sector, irrigation farming and forestry and residential use of a growing population are increasing the total demand of water. Scientists estimate that supply of the resource is diminishing. The challenge for government is thus indeed a huge one. Estimates by Wakeford
(2007) on the rate of depletion of traditional energy sources pose a similar challenge; the demand for the resource is growing, whilst the supply thereof is finite. According to Wakeford, 90 per cent of South Africa's energy sources are non-renewable. This has two major disadvantages: firstly, it continues to contribute to global warming and climate change; and secondly, continuous GDP growth depends on an infinite supply of resources. This means that, at some point due to fossil fuel and other non-renewable sources of energy becoming depleted, the economy is set to stop growing.

- **Hard Infrastructure: Roads and Railways**

The competitiveness of the agricultural sector largely depends on how efficiently it can transport its products to the markets. Investment in economic infrastructure (roads, bridges, dams, electricity, water etc.) has decreased 28 per cent of total fixed investment in 1987 to less than 23 per cent in 1994. South Africa's road and rail density compares favourably to world averages and is far better than the average for Africa. However, poor road conditions and uncompetitive rail transport are currently hampering the agricultural sector in attaining high levels of efficiency and competitiveness. In the first quarter of 2007, grain mills ordered 12,993 railway trucks for the transport of 571,892 tonnes of grain. South Africa rail operator Spoornet could only supply 9,501 railway trucks to transport 418,044 tonnes of grain. The country's road network has its own problems, with 72 per cent being older than twenty years (Rapport, 2007).

- **Institutional Infrastructure: Markets and Periodic Markets**
The attempt to assure food security and international competitiveness also brings infrastructural and marketing challenges. In many remote rural areas, food marketing costs are extremely high. The implementation of the Marketing of Agricultural Products Act of 1996 resulted in the deregulation of the agricultural sector. Producers were ill-prepared for operating under the new deregulated environment. As production volumes increase and new markets continue to develop, the shortage of logistic infrastructure capacity during peak periods is becoming more and more evident.

The development of proper working and wealth creating markets forms part of soft infrastructure provision and could be integrated with current rural and agricultural extension services, whether by means of periodic markets or not. The development of working markets could furthermore form part of local economic development strategies; markets are, after all, how it began and the reason why we currently have modern working economies.

Based on comparative analysis between Latin America and Asia, it was proved that under-investment in infrastructure has serious consequences for growth and competitiveness, particularly when such holding costs as inventory are taken into account. It is suggested that the availability or absence of the right infrastructure often influences the decisions of producers and consumers about where to live or work, whether to produce, and also what to produce. This in turn affects the ability of the economy as a whole to adjust to changes and external shocks (Leipziger, 2005). Clearly, various economic sectors require various types of infrastructure for
production while limited infrastructure has the potential to limit optimal productivity of different economic sectors.

While infrastructure has the potential to hamper or enhance productivity in various economic markets, the same remains with service delivery at local levels. Krugell, et al. (2009) in their study of local municipalities and progress with the delivery of basic services in South Africa concluded that urbanisation and densification may be required to improve the provision of capital-intensive network services. Evidently, development at local level requires capital development in order for the government at local level to achieve desired service delivery which may directly affect economic growth positively.

3.4 Construction Sector and Economic Growth
The latter section focused on the completed product ‘infrastructure’, its impact or relationship to economic growth while in this section we focus on the process of accumulating infrastructure which is construction.

Government continues to focus on social infrastructure expenditure through the development of social housing, hostels, schools and hospitals. However, the investment has moved away from new developments and has started focusing on servicing sites. Health sector developments have taken some priority with government understanding that the implementation of the National Health Insurance requires major transformation within the sector. Of the total construction expenditure that took place, according to the Databuild/ Industry Insight Database,
in the first quarter of (2012), the health sector received the largest portion of 29 per cent or R2, 5bn in construction expenditure

According to Industry Insight (2012), the number of SQM approved for new private sector non-residential developments increased by 7,1 per cent y/y to 2 620 259m2 (Mar 12-MAT) from 2 445 609m2 (Mar 11-MAT). It is hoped that the current upward trend shown in pipeline activity continues, which could provide some relief to the beleaguered building industry. The renovations market weakened throughout 2011, as the number of SQM approved for both the residential and non-residential sectors weakened. The number of sqm approved for renovations in the residential sector, contributed 33, 9 per cent to the total number of residential sqm approved in the twelve months to March 2012. The number of sqm approved for renovations in the non-residential sector, contributed 28 per cent in March 2012 to the total number of non-residential sqm approved.

Construction influences investment. Economic growth models since Harrod-Domar have shown the importance of investment in determining economic growth. More recently, both the Solow and endogenous growth models continue to attribute an important role to capital formation. It therefore follows that it is likely that construction can influence short-run growth. To test the impact of the construction sector on long-run growth, it is necessary to get more data on labour, capital and R&D statistics covering the periods under review.
Dlamini (2011) indicated that there is evidence of the existence of a very strong relationship between construction activity and economic growth. As an investment sector, construction has the potential to impact positively on short-run growth. Construction can thus be regarded as a major component of investment programmes, particularly for developing economies like South Africa.

It can be concluded that the generally sharp growth in construction share of GDP in the period leading up to the 2010 FIFA World Cup in SA resulted in a huge demand for additional resources in the form of material, plant and manpower. Whilst these were successfully imported to meet the schedule demands of the 2010 FIFA World Cup infrastructure projects, such a trend could not be sustainable for continuous economic growth, hence the sharp decline in construction share of GDP from 15 per cent in 2007 to 1.5 per cent in 2010. The importation of resources may be costly as these have to be paid for in foreign currency. The effect of foreign direct investment in this regard, would need to be explored further (Dlamini, 2011).

Construction is an important part of the development and modernisation process. While it is closely correlated with economic growth, it does not follow that providing incentives and increased spending on projects necessarily lead to economic growth. In the Keynesian sense, like in any other sector, increased spending in the construction sector does stimulate economic growth. The construction sector deals mainly with the provision of capital infrastructure, which has an impact on economic growth. The delivery of such infrastructure creates significant employment
opportunities for the population, which generates further investment in other sectors of the economy through the multiplier effect.

Considering the fundamental significance of the construction sector in employment creation, capital formation and its aggregate spill over effects, it is clearly an important sector in the economy. That does not mean that it drives economic growth. This makes it all the more important to identify the minimum necessary and sufficient conditions for economic growth. As economies develop from LDC status through NIC status to AIC status, construction sector spill over accrue to propel productivity in other sectors of the economy, most notably, the services sector.

According to Industry Insight (2012), Gross Fixed Capital Formation for the residential sector fell -2.2 per cent y/y in 2011Q4 based on constant 2005 prices, from R24,83bn to R24,29bn. The non-residential sector fell by 1.3 per cent y/y in 2011Q4, to R37,08bn from R37,56bn in 2010Q4.

GFCF in construction works rose 2.3 per cent y/y in 2011Q4, the highest growth rate over the past seven quarters. Investment in construction works increased to R110,36bn in 2011Q4 from R107,89bn in 2010Q4.

The annual growth of private sector fixed investment increased by 5.5 per cent y/y, from the 5.1 per cent y/y in 2011Q3. The private sector contributed 63.9 per cent towards GFCF in 2011Q4 from a 64 per cent contribution in the previous quarter. It is anticipated that the pace of private investment will slow.
GFCF by Public Corporations increased by 7.7 per cent in 2011Q4, compared to the 6.7 per cent y/y in 2011Q3. Public Corporation GFCF for the last quarter amounted to R86, 51bn. Public Corporations contributed 22.3 per cent towards GFCF in 2011Q4 from 22.1 per cent in the third quarter. The momentum is expected to remain stable within Public Corporations. Delays in the construction of Eskom power station came as a result of labour disputes, while design delays were as a result of certain critical civil designs which were not concluded timeously for construction. The construction delays experienced in the boiler area were attributable to structural steelwork design, manufacturing, logistics and construction. The controversial e-tolling by SANRAL has caused much debate amongst residents and various work groups. The calamity continues tarnishing SANRAL’s credibility. Transnet’s R300bn infrastructure development programme is said to be on track to meet its deadline, however possible delays due to the Euro zone crisis could occur (Industry Insight, 2011).

GFCF by General Government increased for the third consecutive quarter and recorded the largest growth rate in 10 quarters, to 3.1 per cent y/y. General Government contributed 13.9 per cent towards total investment in 2011Q4, from 13.8 per cent in the previous quarter. Outlook for further investment is embraced in the budget, where very low real growth rates are predicted.
Total GFCF (including machinery, transport equipment and transfer costs) increased by 5.2 per cent y/y for the fourth quarter of 2011 making this the sixth consecutive quarter of positive growth.

Figure 13: GFCF, 2011Q4

Gross Fixed Capital Formation 2011Q4
(% change, constant 2005 prices, annualised)

Source: Industry Insight (2012)

Figure 13 and 14 show the development trend on residential, Non-Residential and Civil construction and gross fixed capital formation of government, public and private enterprises respectively.
Figure 14: GFCF of Government, Public & Private Enterprises

GFCF of Government, Public and Private Enterprises (%change, constant 2005 prices, annualised)

Source: Industry Insight (2012)

According to Lopes et al. (2011), the construction sector is envisaged to play a powerful role in economic growth, in addition to producing structures that add to productivity and quality of life. Since construction is labour-intensive, when the sector is working at full capacity, large sections of the nation’s work force are active. Given such characteristics, can the construction sector be used to build our way out of the recession? Apparently not. Econometric analysis to test whether construction contribute to economic growth, concludes that construction activity follows economic growth.

As argued by Dlamini (2011), the construction sector cannot cause economic growth. What then are the minimum necessary and sufficient conditions for economic growth? Different standards are used in the categorization or classification of
economies. The World Bank classifies economies of countries as low income, middle income (subdivided into lower middle and upper middle), and high income. The main criterion for these is the Gross National Income (GNI) per capita. Authors such as Tan (2002) use this standard. Another common standard of categorization based on development stage of the country was used mainly by Bon (1992) and Crosthwaite (2000).

This standard is based on the perceived changing role of construction as economic development proceeds. It consists of less developed countries (LDCs), newly industrialised countries (NICs) and advanced industrial countries (AICs). The IMF classifies countries as developed or advanced economies and developing or undeveloped countries. The United Nations human development index also uses first world and third world classifications to denote developed and developing countries respectively. Although the criteria used to arrive at all these different classifications remain a contentious issue, they will be used interchangeably throughout this research.

Turok (2008) in his book on the evolution of the African National Congress economic policy, argued that the term developing countries implies that economic growth is the only way forward, while it is not necessarily the most beneficial. He continues to say the term third world implies the false notion that those countries are not a part of the global economic system. It is of interest to note that different writers use different classifications to try and understand the fundamental socio-economic status of the countries they may be dealing with at any given point in time.
Turin (1978) using time series analysis, examined briefly the place of construction in the world economy, its dynamic relationships with other major development indicators, the main technological problems facing the industry in developing countries and finally a set of broad policy issues. Turin’s work is based on his personal experience of construction in developing countries and on the results of research carried out by members of the Building Economics Research Unit (BERU) of the University College London. Turin’s sample was composed of 87 countries and spanned 1960-78. His findings on the relationship of construction and economic growth are that above a certain level of GDP per capita, construction accounts for an approximately fixed share of the national product.

Turin (1978) concluded that the share of construction in the national product and the value added in construction per capita grow with economic development. The construction sector exhibits unique features in terms of its significance, which need to be understood for their impact in economic growth.

As cited by Dlamini (2011), authors on construction economics such as Jackman (2010), Myers (2008), Hillebrandt (2000), Tan(2002), Bon (1992), Wells (1986) and Turin (1978) all emphasized the importance of the role that the construction sector play in economic growth. However, they seemed to base their work purely on the power of their argument, without reporting any empirical data or observations, and without analysis or questioning of their own ideas. It would appear that writers in
this area, generally, start with the assumption that the construction sector drives economic growth. It is very difficult to find anyone who questioned this.

Most governments believe that the construction sector plays a powerful role in economic growth, in addition to producing the structures that add to our productivity and quality of life. Policy-makers assume that the construction sector is a driver for economic growth. The linkages that the construction sector has with other economic sectors are not clear. Why is growth needed? Economic growth is about stimulating the economy. The government stimulates the economy to achieve economic growth so that this will help create jobs. Increased economic activity requires a corresponding increase in the provision of roads, and other infrastructure.

A double investment is needed if the jobs created are outside construction. In addition, international trade rules may obstruct direct subsidies to businesses, because that would create unfair market advantage (Dlamini, 2011).

3.5 Household Income in South Africa
Inequality has been a perennial feature of income and welfare in South Africa. The democratic transition of 1994 offered the opportunity not only of redressing imbalances in access to formal political rights. It also afforded the opportunity of redressing inequality of economic opportunities (Fedderke et al. 2004). The transition of economic opportunities should therefore be realised in increased household income coupled with narrowing gap of income inequality and wealth accumulation by the majority of citizens. In their study, Fedderke et al. (2004) concluded that
general finding of inequality changes based on expenditure data suggests that inequality in the South African population as a whole, as well as within racial groupings, has remained largely unchanged over the 1995 – 2000 period, in strong contrast to the implications that emerge from self-reported income.

In his study, Cullity (2004) emphasises the importance of addressing inequalities in every country. He argues that:

- Inequality as domination – imposing hardship on other groups;
- Inequality of political and legal status as a consequence of income inequality;
- Inequality as callousness: when others cannot meet their basic needs;
- Brute inequality: inability of a society to include all groups in welfare enhancement.

These are critical factors which can be as a result of income inequality which can simply be summarised as disempowering. Failure to achieve income equality can therefore result in many social and economic challenges in a country. In its policy brief paper, the Development Policy Research Unit at the University of Cape Town (2010) argues that it is unlikely that South Africa would be able to sustain higher growth rates, and so alternative policies are needed which would aid poverty reduction. One such policy that the South African Government has successfully implemented is the increased provision of social grants.

The Development Policy Research Unit at the University of Cape Town (2010) further concluded that the increased provision of grant income has helped to suppress the
increase in income inequality as shown by the large differences in the Gini coefficient and the GIC curve, when grant income is included and excluded as a source of income. The study continues to indicate that income inequality between race groups, rather than income inequality within race groups was the leading cause of increasing levels of income inequality.

The Income and Expenditure Survey (2010/2011) estimated total household income in South Africa to be R1.57 trillion for the period between September 2010 and August 2011.

Black African households, which we have seen above accounting for more than three quarters of the total numbers of households in the country, earned less than half (44.6 per cent) of the total annual household income. In contrast, white households make up only 12.4 per cent of the total number of households, but earn two-fifths (40.1 per cent) of the total income. Coloured households (8.5 per cent of the total number of households) earned 9.9 per cent of the total income while Indian/Asian households (2.5 per cent of all households) earned 5.4 per cent of the total annual household income.

The survey found that the average household income across all households was R119,542 per annum. This average was noticeably lower for black African households at R69,632, while the average for coloured households was R139,190. Indian/Asian households had an average of R252,724 per annum and white households had an average of R387,011.
In their study, Hlekiso T & Mahlo N, (2006) concluded that wage inequality persists in South Africa based on gender, race, education, industry and occupation, with education significantly stronger than the other determinants.

Leibbrandt & Levinsohn (2009) also argued that for the most part, this increase (increase in income) is evident across the distribution. This means that growth has been shared, albeit unequally, across almost the entire spectrum of income. This is especially true for the African group that makes up close to eighty per cent of the population.

One common emerging finding from all studies is that despite the growth in income across the country, there is no equally distribution of income across households and that has resulted in widening income inequality in South Africa.

3.6. Conclusion

As argued by Boote & Beile (2005), a literature review is an evaluative report of studies found in the literature related to your selected area. In this study, an overview of important empirical studies relevant to the different areas of this research has been presented above. Literature indicates that there is a positive relationship between construction sector, economic growth and household income.
4.1 Introduction
This chapter mainly explains the model adopted and used in the study. Due to the socioeconomic impact and multi-sectoral impact infrastructure investment has in different economic sectors and groups of the society, the basis for analysis in this study must be consistent and complete data set on all transactions among sectors and institution: consistent in the sense that for every income there should be a corresponding outlay or expenditure; and complete in the sense that both the receiver and the sender of every transaction must be identified. Therefore, the Social Accounting Matrix (SAM) is a simple and efficient framework to organise economic data in such a way. SAMs have also been used, like their homologue input-output tables, to assess the economic wide effects of an increase in demand for one sector or in external transfer to an institution, in which is known as “multiplier analysis” (Sadoulet and de Janvry, 1995).

Noting the nature of the study, Social Accounting Matrix (SAM) was found to be relevant and appropriate for this study as it would assist in assessing the impact of construction sector on economic growth and household income.

This section therefore discusses the background and theoretical foundation of Social Accounting Matrix and the application and advantages thereof.
4.2 The Social Accounting Matrix (SAM)

The SAM represents a static image of the social and economic structure of a country in a specific year, presented in the form of double entry bookkeeping. The SAM comprises series of accounts in which income and expenditure must balance. Each account consists of a row responsible for recording the details of receipts and a corresponding column that records expenditure in the form of a square matrix (Kinyondo, 2007). SAM is therefore a clear picture of all transactions taking place within the economy and the impacts of such transactions on one another which can be easily assessed through SAM.

A SAM elaborates on the linkages between SU-Tables and institutional sector accounts. According to Conningarh Economist (2007), the development of the SAM is very significant as it provides a framework within the context of the System of National Accounts (SNA) in which the activities of all economic agents are accentuated and prominently distinguishes. By combining these:

- Firstly, a SAM provides a frame work for organizing information about the economic and social structure of a particular geographical entity (i.e. a country, region or province) for a particular time period (usually one calendar year), and

- Secondly, to provide a database that can be used by any one of a number of different macroeconomic modelling tools for evaluating
the impact of different economic decisions and/or economic development programmes.

The data requirements for all economic models can always be expressed in the form of SAM. If it is not possible to express the data in this particular manner, the model will invariably be flawed, making its application in the model-building arena impossible. It is this particular characteristic of the SAM that has made it popular as the database of preference for multi-sector economic models that are used to assess the economic implications of policy changes (or shocks) that will have effects not only on macroeconomic aggregates such as GDP, job opportunities, the balance of payments, etc., but also upon the structure of the economy. As such, these models must have access to information about production, consumption, labour markets, and the functional of income and the composition of trade (Conningarth Economist, 2007).

A defining feature of multi-sector macroeconomic models is their recognition of the extent to which economic system are characterized by interdependency, in terms of which economic events that impact one sector will have repercussions that are experienced, to a greater or lesser extent, throughout the economy. As such, these models can be used to quantify the magnitude of these repercussions, and to assess the efficacy of alternative economic policies and development initiatives.
4.3 Theoretical Principles Underpinning the SAM
When economic agents in an economy are involved in transactions, financial resources change hands. According to Conningarth Economist (2007), The SAM provides a complete database of all transactions that take place between these agents in a given period, thereby presenting a 'snapshot' of the structure of the economy for that time period. As a system for organizing information, a SAM represents a powerful tool in terms of which the economy can be described in a complete and consistent way.

It is Complete in the sense that it provides a comprehensive accounting of all economic transactions for the entity being represented (i.e. country, region/province, city, etc.), and Consistent in that all incomes and expenditures are matched.

Consequently, a SAM can provide a unifying structure within which the statistical authorities can compile and present the national accounts. As an economic framework, SAMs are not limited to economic data only. Considerable effort has been devoted to extending the SAM to incorporate social, demographic and environmental information.

4.4 The Concepts of Circular Flow and Double-Entry Bookkeeping
The most basic principles underling a SAM are the concepts of circular flows and double-entry bookkeeping.
4.4.1 Circular Flow

The concepts of circular flows relate to a particular angle from which an economic system is viewed and traced. The various productive sectors (i.e. the ‘activities’) in the economy act as producers and sellers of goods and services (i.e. the ‘commodities’) to institutions such as households, enterprises and the government act as sellers of factors services to the various activities, who then become the purchasers of these factors (i.e. labour, capital, etc.).

Going one way around the circular flow involves tracing out the flows of goods and services (i.e. the commodity markets). Going the other way around; the circular flow traces out the flows of funds (i.e. the factor markets). Transactions with the RoW can take place through both the commodity and factor markets. Figure 2.1 presents a schematic representation of these flows.

According to Figure 8 a continuous flow of factor services exists from the factor markets to the activities in the economy, which in turn provides commodities (i.e. products/goods and services) to the commodity markets, from where these reach all of the institutions in the economy (i.e. households, enterprises and government). For their part, institutions provide factor services in factor markets, where activities act as purchasers (Conningarthen Economist, 2007).

The commodity market provides goods and services to two types of users. The first type of use includes the institutions, such as households, that use goods and services for purposes of final consumption (i.e. final goods). The second type of user is other
producers in the economy that use goods and services in their own production process (i.e. intermediate goods). In addition, both the factor and commodity markets can interface with the RoW.

4.4.2 Double-Entry Bookkeeping

The SAM captures the monetary value of economic transactions, and organizes them into a series of “accounts”. There are six major types of accounts that form the basis of a SAM:

- Activity Accounts that capture the value of products/goods and services produced in an economy
- Commodity Accounts that capture the value of products/goods and services trades in an economy
- Factor Accounts that capture the value of payments made to the essential factors of production (i.e. labour, capital, land, etc.
- Institutional Accounts that capture the value of transactions by business enterprises, household and government
- Capital Accounts that reflect savings and investments, and
- The RoW Accounts that capture the value of imports and exports

Table 8 on the following page provides a detailed description of these six accounts.
Table 8: The Basic SAM structure used in the CGE model

<table>
<thead>
<tr>
<th>Receipts</th>
<th>Activities</th>
<th>Commodities</th>
<th>Factors</th>
<th>Households</th>
<th>Enterprises</th>
<th>Government</th>
<th>Savings-Investment</th>
<th>Rest of the World (ROW)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities</td>
<td>Marketed outputs</td>
<td>Home-consumed outputs</td>
<td>Private consumption</td>
<td>Government consumption</td>
<td>Investment</td>
<td>Exports</td>
<td>Demand</td>
<td></td>
<td>Activity income (gross output)</td>
</tr>
<tr>
<td>Commodities</td>
<td>Intermediate inputs</td>
<td>Transaction costs</td>
<td>Factor income to households</td>
<td>Interhousehold transfers</td>
<td>Surplus to households</td>
<td>Transfers to households</td>
<td></td>
<td>Factor income from ROW</td>
<td></td>
</tr>
<tr>
<td>Factors</td>
<td>Value-added</td>
<td></td>
<td>Factor income to enterprises</td>
<td></td>
<td>Transfers to enterprises</td>
<td></td>
<td></td>
<td>Household income from ROW</td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td></td>
<td></td>
<td>Transfers to enterprises</td>
<td></td>
<td>Transfers to enterprises</td>
<td></td>
<td></td>
<td>Enterprise income</td>
<td></td>
</tr>
<tr>
<td>Enterprises</td>
<td></td>
<td></td>
<td>Factor income to government,</td>
<td>Transfers to</td>
<td>Surplus to Government,</td>
<td></td>
<td></td>
<td>Transfer to Government from ROW</td>
<td>Government income</td>
</tr>
<tr>
<td>Government</td>
<td>Producer taxes, value-added tax</td>
<td>Sales taxes, tariffs, export taxes</td>
<td>Factor income to government, factor taxes</td>
<td>Government, direct enterprise taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Savings-Investment</td>
<td></td>
<td></td>
<td>Household savings</td>
<td>Enterprise savings</td>
<td>Government savings</td>
<td></td>
<td></td>
<td>Foreign savings</td>
<td></td>
</tr>
<tr>
<td>Rest of the World (ROW)</td>
<td>Imports</td>
<td></td>
<td>Factor income to ROW</td>
<td>Surplus to ROW</td>
<td>Government transfer to ROW</td>
<td></td>
<td></td>
<td>Foreign exchange outflow</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Activity</td>
<td>Supply expenditures</td>
<td>Factor expenditures Household expenditure</td>
<td>Enterprise expenditure</td>
<td>Government expenditure</td>
<td>Investment</td>
<td>Foreign exchange inflow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: IFPRI (2002)
4.4.2.1 Activity Accounts

Production activities use raw materials and intermediate goods and hire factor services to produce commodities. The expenditures of activities include the purchase of intermediate commodities with the remainder being value added which is distributed to factors of production in the form of wage payments and of rent and in part payable to the government (i.e. a value added tax [VAT]). The receipts of the production activities derived from sales on the domestic market, exports and export subsidies received from the government (exports taxes to the government are noted as negative export subsidies).

4.4.2.2 Commodity Accounts

The commodity account represents a giant department store. It buys goods, from domestic producers and foreigners (imports) and sells them to demanders including exports. The commodity account Gross National Product (GNP) from the expenditure side.

4.4.2.3 Factors Accounts

Factors of production accounts typically include labour and capital sub-accounts. They receive income from the sale of their services to production activities in the form of wages, rent and net factor income received from abroad. In turn, these revenues are distributed to households as the labour income and distributed profits and to firms as non-distributed profits.
4.4.2.4 Institutional Accounts

Institutions include household (typically further broken down by socio economic groups), firms and the government. Households receive factor income, as well as transfers from government and the RoW (e.g. remittances). Households' expenditures consist of consumption on goods, transfer, and direct taxes with residual savings transferred to the capital account. Firms receive profits and transfers, and spend on taxes and transfers with their residual savings channeled into the capital account.

4.4.2.5 Government Accounts

The government account is distinct from administrative public activities included in the production activities' account. These public services (such as education) buy intermediate goods, pay wages and deliver public and administrative services. The government account per se allocates its current expenditures on buying the services provided by the commodities' account. Other government expenditures are transfers and subsidies to households and companies the remaining savings are transferred to the capital account. On the income side the government receives tax revenues from a variety of sources and current transfers from abroad.

4.4.2.6 Capital Accounts

The fifth account is a combined capital account. On the income side, it collects savings from households, companies, the government as well as foreign saving, and in turn, a channel is these aggregate savings into investment.
4.4.2.7 Rest of the World Accounts

Finally, transactions between domestic residents and foreign residents are recorded in the RoW account. These transactions include, on the receipt side the commodities’ account expenditures on imported final goods as well as intermediate goods and raw materials, factor payments and current transfers. The economy receives income from the RoW from export and factor and non-factor income earned. The difference between total foreign exchanged receipts and imports is by definition net capital received from abroad (Conningartha Economist, 2007).

4.5 Application of SAM

This section was drawn from Statistics South Africa, SAM (2004). Application of a SAM the matrices described by SAMs represent the linkages between two often-distinct worlds of statistics, economic statistics and social statistics. The integration of these distinct fields of statistics will enable more policy issues to be monitored and analysed in an interrelated manner. Above all, the linkage of income distribution issues to more macro-orientated objectives such as economic growth, low inflation rate and government fiscal balance comes within reach with a SAM.

A distinction can be made between the applications for producers and users of statistics. The first elaborates on the integration of basic data while the second elaborates on SAM as a tool for policy analysis. The analysis of the 1998 SAM provides the users with an integrated policy tool to analyse the socio-economic conditions of the population of South Africa.
A compilation of SAMs by which an optimal mix of top-down and bottom-up production methods is used, may lead to higher quality of those aggregates which can be produced along either route. It also signals inconsistencies in the basic sources, e.g. population census, household expenditure surveys, integrated economic accounts, etc. It is not the availability of these data per se that makes the difference, but the consistency and quality improvements reached through the process of statistical integration and the analytical framework that a SAM presents. In the absence of a SAM, users have to reconcile the data themselves as a starting point for an internally consistent analysis as well as ensure the consistency of the definitions of the definitions used.

The advantages of using a SAM can be summarized in terms of increased relevance, reliability and efficiency. The SAM increases the relevance of economic and social indicators because they are derived from a meso-level information system. As a consequence, their independence can be studied, more insights into causes and consequences of ‘best and worst practices’ are gained and the interaction between socio-economic policies in various fields can be analysed. Reliability is enhanced because the more that data are confronted at a meso-level, the more logical identities can be checked: components must add to totals, accounts must balance, and price and quantities must multiply to values. Efficiency is served by the application of uniform units, classifications and concepts throughout a statistical system. Among the advantages of such harmonization is a much easier matching of results from different surveys, which in turn yields more reliable outcome.
addition, international harmonization of classification is useful (StatsSA, 2004). The advantages and application of SAM can be defined as follows:

4.5.1 A SAM pinpoints gaps in the available data set and discrepancies in the survey concepts
It is in situations where basic information and other statistical resources are (very) scarce that is all the more important to make the best possible use of whatever data are available. Integrating outcomes of all kinds of costly censuses and survey into a consistent overall framework may increase both their relevance and their reliability. This applies particularly to household surveys and population censuses. Generally speaking, carefully acquired consistency at the meso-level leads to a higher degree of accuracy at the macro-level. Naturally, if there are too many gaps in the basic data, the reliability of (parts of) the SAM remains dubious. In this way, building a SAM will also pinpoint gaps in the available data set and discrepancies in the survey concepts. This should then have a streamlining feedback effect on both economic and social basic statistics. This report attempts to show the economic and social data for South Africa based on the population census, income and expenditure survey and integrated economic accounts.

4.5.2 A SAM serves as a benchmark data set
As the processing of censuses and surveys is very time-consuming and as the construction of a detailed SAM also tends to involve a substantial input of human resources, SAMs for South Africa have generally become available with a lag of serve as a benchmark data set, updated yearly, with the help of relevant indicators, to obtain the necessary timelines without giving up too much in terms of reliability. A
matrix framework is especially suitable in this regard in view of the availability of various updating and reconciliation algorithms that apply matrix algebra.

4.5.3 SAMs are suitable for use in a macro-economic teaching course
In view of their concise and conveniently arranged description of interrelationship between economic processes, their function as a systematic database for the joint derivation of monetary and non-monetary aggregate indicators and their close connection to flexible, economy-wide models of varying degrees of complexity, South Africa's SAMs are suitable for use in a macro-economic teaching course.

From an analytical point of view, the SAM also offers various new perspectives, particularly regarding the relationship between the distribution of income and economic development. SAM therefore focuses on income distribution according to twelve different percentiles for each of the four population groups in South Africa. The accounting structure implied by a SAM can be used for all kinds of analyses, through a somewhat more realistic "fixed price" analysis with income and expenditure elasticities deviating from one, to comprehensive, price endogenous Computable General Equilibrium models (CGE-models). The latter type of model, which is increasingly being used for policy making, implicitly or explicitly uses a SAM framework to calibrate the "base year situation". Moreover, the projections or simulations resulting from these kinds of models can again be cast into a SAM framework. From a national accounts point of view, SAM extensions are conceptual improvements. A SAM enables analysts using National Accounts data to incorporate other aspects in their analysis. For data provides, e.g. in the field of the social
statistics, the linking of their data to the system of National Accounts opens up new opportunities for their usage.

In comparison to the standard T-account, a SAM also records which (sub) sectors pay what to which other (sub) sectors. This feature allows a more thorough analysis of transmission mechanisms in the economy. For instance, in the South Africa SAM, where both non-financial and financial accounts are included, this can greatly facilitate an analysis of the impact of monetary policy decisions on the holdings of both financial and non-financial assets and liabilities. The capital and financial accounts provide the links between the real and the financial economy. If the accounts then also show which (sub) sectors have invested in which industries of the domestic economy and which (sub) sectors have invested abroad, the linkages between financial and real sector dynamics are better revealed.

4.5.4 Modelling
The SAM is comprehensive, disaggregated, consistent and complete data system that captures the interdependence that exists within a socio-economic system. Alternatively, the SAM can be used as a conceptual framework to explore the impact of exogenous changes in such variables as exports, certain categories of government expenditure, and investment of the whole interdependence socio-economic system, e.g. the resulting structure of production factorial and household income distribution. The South African SAM can be used to explore issues related to income distribution because of its finer desegregations of private household expenditure into relatively homogeneous social-economic categories that are recognizable for
policy purpose and exhibit stable characteristics. This type of disaggregation allows the SAM to be used to analyse the effects of government policies on income distribution (Conningarth Economist, 2007).

4.5.5 A SAM will lead to a more reliable description of inequalities among house groups
Since household surveys tend underestimate not only total incomes or expenditure, but also inequality among households both within and between population groups, a reconciliation of these sources with demographic statistics, SU-tables, wages surveys, profit and loss statements, government accounts, a balance of payments summary, financial data, etc., will lead to a more reliable description of inequalities among household group.

4.5.6 A SAM provides a dependable summary of “structural” poverty
It is rather hazardous to count the poor in order to measure poverty on the basis of national accounts. But on the other hand, a SAM which contains an elaborate classification of household may provide a dependable summary of “structural” poverty. It will identify subgroups in which the households are typically poor; it will show needs cannot be properly met in these groups; and above all, it allows for analyses concerning the causes and consequences of these circumstances. An example of the SAM’s use as a dependable summary of “structural” poverty can be found in Chapter 5 of the stats SA publication Measuring poverty in South Africa published in 2000.
4.6 Data and Data Sources
This section provides a base case scenario in regard to gender equality in broad terms of the South African economy as well as will specific reference to the construction industry. The Labour Force Survey for 2012 which is published bi-annually by StatsSA was used as a basis for sourcing the required data. In the following table, a picture of South Africa’s employment situation is presented.

Table 9: Workers by main Occupation

<table>
<thead>
<tr>
<th>Occupation Group</th>
<th>Men</th>
<th>Women</th>
<th>Total Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislators, Senior Officials &amp; Managers</td>
<td>725 000</td>
<td>337 000</td>
<td>1 062 000</td>
</tr>
<tr>
<td>Professionals</td>
<td>446 000</td>
<td>370 000</td>
<td>816 000</td>
</tr>
<tr>
<td>Technical &amp; Associate Professionals</td>
<td>736 000</td>
<td>842 000</td>
<td>1 578 000</td>
</tr>
<tr>
<td>Clerks</td>
<td>419 000</td>
<td>987 000</td>
<td>1 406 000</td>
</tr>
<tr>
<td>Service workers</td>
<td>1061 000</td>
<td>895 000</td>
<td>1 956 000</td>
</tr>
<tr>
<td>Skilled agricultural &amp; fishery workers</td>
<td>50 000</td>
<td>17 000</td>
<td>67 000</td>
</tr>
<tr>
<td>Craft &amp; related trades workers</td>
<td>1427 000</td>
<td>154 000</td>
<td>1 581 000</td>
</tr>
<tr>
<td>Plant &amp; machine operators</td>
<td>962 000</td>
<td>148 000</td>
<td>1 110 000</td>
</tr>
<tr>
<td>Elementary occupation</td>
<td>1710 000</td>
<td>1248 000</td>
<td>2 958 000</td>
</tr>
<tr>
<td>Domestic workers</td>
<td>39 000</td>
<td>874 000</td>
<td>913 000</td>
</tr>
<tr>
<td>Occupation not adequately defines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7 575 000</td>
<td>5 872 000</td>
<td><strong>13 447 000</strong></td>
</tr>
</tbody>
</table>

Source: Labor Force Survey, Q2, 2012

From the above table it is evident that of the total labour force of 13.4 million in South Africa, 44 per cent are women and 56 per cent are male. This represents a slight difference when total employment is considered broadly in South Africa. However important to note is that when a comparative analysis is made between various occupation groups, significant inequalities are evident. For instance with regard to the occupation category, legislators, senior officials and managers, women only constitute 32 per cent which represent a significant gap. This is the case with regard to the occupation groups; craft and related trade workers, skilled agricultural
& fisheries workers as well as plant and machine operators. From this table it is also evident that women are more predominant in the following occupational groups; clerks and domestic workers.

It is also important to provide a sectoral overview of gender composition in terms of the main economic sectors of the South African economy as shown in Table 10 below.

Table 10: Workers by Main Industry

<table>
<thead>
<tr>
<th>Main Industry</th>
<th>Men</th>
<th>Women</th>
<th>Total Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>436 000</td>
<td>201 000</td>
<td>637 000</td>
</tr>
<tr>
<td>Mining</td>
<td>306 000</td>
<td>52 000</td>
<td>358 000</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1 162 000</td>
<td>516 000</td>
<td>1 678 000</td>
</tr>
<tr>
<td>Electricity, Gas and Water</td>
<td>80 000</td>
<td>19 000</td>
<td>99 000</td>
</tr>
<tr>
<td>Construction</td>
<td>892 000</td>
<td>120 000</td>
<td>1 012 000</td>
</tr>
<tr>
<td>Wholesale &amp; retail trade</td>
<td>1 574 000</td>
<td>1 391 000</td>
<td>2 965 000</td>
</tr>
<tr>
<td>Transpor &amp; Communications</td>
<td>636 000</td>
<td>155 000</td>
<td>791 000</td>
</tr>
<tr>
<td>Finance &amp; Business Services</td>
<td>993 000</td>
<td>744 000</td>
<td>1 737 000</td>
</tr>
<tr>
<td>Community Services</td>
<td>1 494 000</td>
<td>2 676 000</td>
<td>4 170 000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>637 000</strong></td>
<td><strong>1 012 000</strong></td>
<td><strong>4 170 000</strong></td>
</tr>
</tbody>
</table>

*Source: Labor Force Survey, Q2, 2012*

From the above table it is evident that women in general are more economically active in terms of employment in the Community Services sector followed by the Wholesale and Retail sector and the Financial Sector. From the table above it can be deduced that a mere 2 per cent (120 000) of the total 5.9 million employed women are in the construction sector. On the other hand men are more active in the Manufacturing and Construction sector.
An important point to highlight is that when a comparative analysis is made in terms of men and women employed in the Construction sector, it can be noticed that out of the total 1.01 million people employed in the Construction sector in South Africa, 12 per cent (120,000) are women and 88 per cent (892,000) are men. This is abundantly clear that women are under-represented as far as this sector is concerned. In terms of a comparison among population groups, African women are dominant across the main economic sectors in terms of employment number with the exception of the agricultural sector.

Although in this section an emphasis was placed with regard to the actual employment numbers, the gist of the matter is on factor payments income. The total factor payment is compensation to employees in South Africa in 2011 prices, both in the private and public sector was R1.317 billion. Of the total R913 billion factor income (remuneration of employees in the private sector) in 2011 prices as published in the South African Reserve Bank Bulletin, 43 per cent went to whites, 10 per cent to coloureds, 7 per cent to Asians and 41 per cent to Africans.

On the other hand, of the total R4.36 billion factor income (remuneration of employees in the public sector) in 2011 prices as published in the South African Reserve Bank Bulletin, 33 per cent went to whites, 16 per cent to coloureds, 2 per cent to Asians and 49 per cent to Africans.

Of the R913 billion compensation of employees in the private sector, 23 per cent goes into the manufacturing sector, 21 per cent into the Financial Sector, 19 per cent
to the Wholesale and Retail Trade Sector and a meagre 4 per cent to the Construction Sector with the energy sector and Agriculture Sector receiving 2 per cent each relative to the total compensation.

Of the total R38.2 billion in terms of total compensation of employees in the Construction Sector, 34 per cent (R13.17 billion), went to the whites, 12 per cent (R4.62 billion) went to the Coloureds, 3 per cent (R1.2 billion) went to Asians and 50 per cent (R19.16 billion) went to Africans.

With the Department of Public Enterprise as well as parastatals such as Transnet and Eskom about to make massive capital expenditure on various infrastructure programmes worth trillions of rand in the medium to long term, it is imperative that government policy should address the under representation of women in the Construction Sector. This should not be done only in terms of income received from compensation, but in the form of BBBEE targets that will enhance broad based gender equality in the construction sector in South Africa. This should include more equity ownership, enterprise development, local content etc.

On the other hand, the construction sector relative to its level of development, accounts to more than 60 per cent of gross capital formation in most countries, and defines the physical infrastructure upon which effective growth and development is achieved. Construction activities extend beyond the erection of houses, hospitals, schools, offices and factories to civil engineering works such as roads, bridges and communication infrastructure. In fulfilling these roles, the construction industry
exerts enormous demand pressures on global natural resources. The environmental significance of such pressures come into play when some of these resources are depleted and non-renewable, bringing the construction industry in direct conflict with the physical environment.

4.7 Conclusion

In this chapter a model chosen for this study have been extensively discussed and justification thereof is presented. The model clearly make the organisation and analysis of data more accurate and has the capability to go beyond two explanatory variable under study by showing direct, indirect and induced impact of construction sector on the whole economy. Hence, in the subsequent section, a macroeconomic impact analysis will be conducted to demonstrate the benefits of construction sector in the South Africa economy.
Chapter 5: Findings of the Study

5.1 Introduction
In this section a macroeconomic impact analysis is presented to demonstrate the impact of construction sector on economic growth and household income in South Africa.

Partial General Macroeconomic Equilibrium Model based on a Social Accounting Matrix (SAM) is applied to calculate the socio-economic impacts. The model which has 2006 as a base year has been adjusted to 2010/11 prices and the discussion below is in real (inflation-adjusted) terms.

Economic equilibrium analysis has been used to quantify the direct, indirect and induced future income generating effects of South Africa’s infrastructure needs as contained in the National treasury’s Medium Term Expenditure Framework (MTEF) as shown in the table 11 below.

Table 11: Mega-projects under consideration, 2012 - 2020, R Billions, and 2011 prices

<table>
<thead>
<tr>
<th>Sector</th>
<th>Concept</th>
<th>Pre-Feasibility</th>
<th>Feasibility</th>
<th>Financing</th>
<th>Detailed Design</th>
<th>Tender</th>
<th>Construction</th>
<th>Ongoing Programmes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>0</td>
<td>5</td>
<td>18</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>Transport</td>
<td>310</td>
<td>0</td>
<td>78</td>
<td>17</td>
<td>12</td>
<td>88</td>
<td>8</td>
<td>71</td>
<td>584</td>
</tr>
<tr>
<td>Electricity</td>
<td>720</td>
<td>268</td>
<td>314</td>
<td>0</td>
<td>95</td>
<td>103</td>
<td>345</td>
<td>101</td>
<td>1946</td>
</tr>
<tr>
<td>Liqued Fuels</td>
<td>0</td>
<td>0</td>
<td>211</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>213</td>
</tr>
<tr>
<td>Education</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>185</td>
</tr>
<tr>
<td>Health</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>110</td>
</tr>
<tr>
<td>Telecommunication</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Human Settlement</td>
<td>0</td>
<td>0</td>
<td>78</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>78</td>
</tr>
<tr>
<td>Total</td>
<td>1082</td>
<td>268</td>
<td>653</td>
<td>196</td>
<td>109</td>
<td>196</td>
<td>374</td>
<td>328</td>
<td>3206</td>
</tr>
<tr>
<td>% total Expenditure</td>
<td>33.7%</td>
<td>8.4%</td>
<td>20.4%</td>
<td>6.1%</td>
<td>3.4%</td>
<td>6.1%</td>
<td>11.7%</td>
<td>10.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: National Treasury
Over the medium-term expenditure framework (MTEF) period, budgeted and approved public-sector projects total R844.5 billion. As announced in the State of the Nation Address, the Presidential Infrastructure Coordinating Commission will give new impetus to the planning and implementation of major capital projects, raising the level of investment spending and contributing to industrial and regional development. All public-sector infrastructure projects will be subject to rigorous assessment to determine their feasibility.

Not all of the R3.2 trillion of infrastructure projects under consideration (see Table 11) will be approved for implementation. Government will choose the most cost effective projects that provide optimal long-term benefits. Major infrastructure projects can take more than a decade to implement. Meeting the complex challenges of a diverse and geographically dispersed set of capital projects requires long-term planning, detailed analysis, and continual learning and adaptation. Government acknowledges that public-sector capacity to implement projects is presently inadequate, and is taking steps to strengthen planning and implementation capacity at all levels.

Important to note is that of the R3.2 trillion planned for capital expansion programmes in South Africa, 10.3 per cent (R374 billion) will be channeled to the Construction Sector.

This magnitude of expenditure will have profound backward linkages in terms of the construction sector. Any policies and initiatives by national government to stimulate
the construction sector, must also consider carefully the broader impacts in this sectors. The linkages can be explained in terms of direct, indirect and induced impacts.

The direct, indirect and induced impacts are defined as follows:

Direct Impacts – the direct impact refers to the effect of the activities that takes place on the construction site, as well as activities related to the production and installation of capital assets such as mechanical and electrical equipment that will form part of the investment project.

Indirect impacts - Impacts on all other industries that supply inputs to the construction sector in terms of, for instance cement, steel, bricks etc.

Induced impacts - Economic impacts due to the paying out of salaries and wages to employees who are employed by the construction sector. This impact also takes into account the salaries and wages paid out by the sectors indirectly linked to this sector due to the supply of inputs (materials) to them. These additional salaries and wages lead to an increased demand for various consumable goods that need to be supplied by various economic sectors.

The economic and socio-economic impacts of the construction investments have been measured in terms of contributions to;
- Gross Domestic Product (value added to the national economy),
- Employment creation (creation of new jobs (person years) during the construction phase of a project and the jobs created during the operational phase (production phase) and the average annual jobs\(^1\) created for skilled, semi-skilled and unskilled laborers),
- Capital utilization (use of machinery transport, equipment buildings and other social and economic infrastructure), and
- Income generated in low-income households (incremental income available to low-income households) as a specific measure of poverty alleviation.

Furthermore, additional government revenue generated by projects funded, directly and indirectly by the treasury, places the government in a position to spend more on social services. The nature and magnitude of this impact was also measured.

The economic model was not used in its standard form (Leontief inverse). Rather, multipliers were deduced from the standard model and then these multipliers were multiplied by Treasury’s funding intervention. The following multipliers were calculated:

- GDP multipliers
- Labor (total, skilled, semi-skilled and unskilled) multipliers
- Household income (total and low income) multipliers
- Capital utilization multipliers

\(^{1}\) Employment opportunities created during the construction phase divided by 20 (the assumed life-span of a project) plus the annual operational employment impact.
Social multipliers

5.2 Linkages with the economy

In terms of magnitude, construction activity is second only to agriculture. Its multiplier effect on the economy is one of the highest. To study the linkage of Construction industry with the economy, a SAM based approach has been used as a basis.

5.2.1 Backward Linkages

- Employment

One of the major components used for studying the effect of construction in the economy is employment. Employment, in the organized construction sector is about 1.2 million citizen years/year; however, after including employment in the unorganized sector, it is estimated to be over even more. The employment elasticity of construction with respect to GDP and growth rate of employment in construction is also seen to be high. Construction has high backward linkages, especially in the rural areas where it is a major employment generator. The following are the benefits of the construction sector:

- It absorbs rural/seasonal labour.
- It absorbs unskilled workers (in addition to semi-skilled and some skilled).
- It permits large scale participation of women workers.
- It supplements the workers seasonal income from farming.
- **Construction Materials**

The other major backward linkages of construction are with the building material manufacturing industry. Construction materials account for nearly two-third of average the construction costs. The major construction materials used in the Construction Industry are:

- Cement
- Steel
- Bricks / Tiles
- Sand / Aggregates
- Fixtures / Fittings
- Paints & Chemicals
- Construction Equipment
- Petrol / Other Petro-products
- Timber
- Mineral products
- Aluminium, glass, plastics.

Since most of the material is either manufactured locally, in cottage or small-scale industry, database available for quantifying the exact nature of linkages with construction is not very accurate. On the other hand, linkages of products like paints and petro-products would again be difficult due to their stronger linkages with other
sectors. However, it can be safely assumed that cement has very strong linkages with construction, followed by steel.

Almost 100 per cent of cement production is consumed in construction and about 60 – 65 per cent of steel production goes into construction. Based on the industry analysis of cement and steel industry’s linkage with construction and the inputs from the relevant industry associations, backward linkages of construction have been studied.

**Cement**

Cement is one of the largest inputs into the Construction Industry. In 1989-90 the total consumption of cement was 45.41 million tonnes, which increased to nearly 83 million tonnes by 1997-98. For the fiscal year 2000-2001, the consumption has been 101 million tonnes. The compounded annual growth rate for cement during this period was 7.68 per cent. For the period 2001-2006 the Annual average growth of consumption of cement has been 9 per cent with 132 million tonnes cement consumed in the year 2005-2006 (Source: Cement Manufacturers Association Reports).

**Steel**

Steel is the second largest commodity that is consumed in construction. In 1990-91 the total consumption of all types of steel was 144.6 lakh tonne, which increased to nearly 221.3 lakh tonnes by 1996-97. The compounded annual growth rate for steel during this period was 7.35 per cent, which is very close to the growth rate of cement.
(7.68 per cent) during the same period. The similar growth trends have been observed during the period 2002-2006.

- Other components

According to the table on components of construction costs, construction materials constitute the bulk of the cost, followed by construction equipment. The combined component of service sector in terms enabling and administrative cost is also very high followed by labour and financing costs.

5.2.2 Forward Linkages

The importance of construction in infrastructure, housing and other asset building activities and consequently in its forward linkages is very high. The component of construction comprises nearly 60-80 per cent of project cost of infrastructure projects like roads, housing etc. In projects like power plants, industrial plants, etc. the share, though lower, is critical.

The exact quantification of forward linkages of construction is again difficult as the effect is wide spread. But as the role and contribution of infrastructure in the economy is understood, it is not difficult to comprehend construction’s role in infrastructure building and economic development.

5.3 Data Source and Application of Methodology

More data was also sourced from national accounts and national economic outlook reports from the South African Reserve Bank (SARB). Collected data ranged from annual, quarterly and monthly output reports illustrating real and nominal figures.
As previously mentioned, the economic and socio-economic impacts consist of a construction as well as an operational phase. The methodology for the two separate components will be explained separately. Firstly the incorporation of the DBSA CORE system into the model is discussed, followed by the methodology to the construction as well as the operational phase.

The construction multipliers indicate the impact on various economic variables for each R1 million production in the economic sectors; the following steps describe the calculation of these construction multipliers.

This step involves translating R1 millions of funding to the specific economic sector to asset type. Although this asset type is according to the broad National Accounts classification, it consists of sub-details as stipulated below:

- **Building Construction**
- **Civil Construction**
  - Concrete Structures
  - Roads
  - Earth Works
- **Machinery and other equipment**
  - Mechanical machinery and Metal Products
  - Electrical machinery
- **Transportation equipment**
- **Research and development**
5.4 Macroeconomic Impact Analysis

Research Results

The Social Accounting Matrix (SAM) which is also referred to as an Input Output Model forms the basis for partial general equilibrium model and can be used, to quantify the direct, indirect and induced impacts resulting from innovation, research and development.

The I-O framework (for construction expenditure) and equations can be thought of as a simple model of the economy that captures the way in which economic sectors interact, both in terms of the flow of goods and services, and in terms of prices. Many I-O models are as simple as the following equation demonstrates:

\[ q = (I - A)^{-1} \times f \]

Where:
- \( q \) = Sectoral production
- \((I-A)^{-1}\) = Inverted input/output coefficients matrix
- \( f \) = Final Demand per sector/commodity

Using these basic mathematical relationships (also known as technical/economic coefficients), the so-called impact multipliers can be calculated. These are quite ingenious coefficients that can be used for various policy impact analyses.

This type of model application is used in the South African context for a multiplier analysis. They are relatively uncomplicated, and can be used for a wide range of
practical impact analysis purposes. Their main weakness is that, basically, they are of a comparative static nature.

The impacts of the various stages of construction funding commitments by treasury on the various economic and socio-economic variables are depicted in Table 12 below. The **R374 billion** expenditures on construction by treasury will have major multiplier effects on the South African economy. The economic impacts associated with such expenditure are assessed and estimated for the following dimensions (macroeconomic assessment criteria).
### Table 12: National Macroeconomic Impact, R Millions, 2011 Prices

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct impact</td>
<td>Indirect impact</td>
</tr>
<tr>
<td><strong>Impact on Gross Domestic Product</strong></td>
<td>R 6 935 R 10 485 R 12 046 R</td>
</tr>
<tr>
<td><strong>Impact on capital formation</strong></td>
<td>R 374 000 R 17 823 R 24 353 R</td>
</tr>
<tr>
<td><strong>Total impact on employment [job opportunities]</strong></td>
<td>63 094 103 461 82 952 247 508</td>
</tr>
<tr>
<td><strong>Skilled impact on employment [job opportunities]</strong></td>
<td>8 833 19 125 19 471 47 429</td>
</tr>
<tr>
<td><strong>Semi-skilled impact on employment [job opportunities]</strong></td>
<td>27 761 43 410 32 481 103 652</td>
</tr>
<tr>
<td><strong>Unskilled impact on employment [job opportunities]</strong></td>
<td>26 499 40 926 29 001 96 427</td>
</tr>
<tr>
<td><strong>Impact on Households</strong></td>
<td>R 20 689</td>
</tr>
<tr>
<td><strong>Low Income Households</strong></td>
<td>R 3 510</td>
</tr>
<tr>
<td><strong>Medium Income Households</strong></td>
<td>R 4 559</td>
</tr>
<tr>
<td><strong>High Income Households</strong></td>
<td>R 12 620</td>
</tr>
<tr>
<td><strong>Fiscal Impact</strong></td>
<td>R 8 820</td>
</tr>
<tr>
<td><strong>National Government</strong></td>
<td>R 8 172</td>
</tr>
<tr>
<td><strong>Provincial Government</strong></td>
<td>R 83</td>
</tr>
<tr>
<td><strong>Local Government</strong></td>
<td>R 565</td>
</tr>
<tr>
<td><strong>Impact on the Balance of Payments</strong></td>
<td>R 13 319</td>
</tr>
</tbody>
</table>

*Note: All Rand values reflected are expressed in Rand Millions*

The above results in Table 12 and of the analysis of this report can be summarized as follows:
5.4.1. Impact on Gross Domestic Product (GDP)
The impact on GDP reflects the magnitude of the values added to the South African economy resulting from the construction expenditure. Value added is made up of three elements, namely:

- Remuneration of employees,
- Gross operating surplus (which includes profit and depreciation), and
- Net indirect taxes

The findings of the study show that the average annual impact of the construction expenditure on the GDP of South Africa will amount to R29.46 billion in 2012 prices. Thus, each year, R29.46 billion of GDP will be generated consisting of remuneration of employees and returns on capital. The direct impact of construction sector on GDP will be R 6 955 (24 per cent), with indirect impact being R10 485 (36 per cent) and induced impact being R 12 046 (40 per cent).

5.4.2 Impact on Capital Formation
For an economy to operate at a specific level of activity, investment in capital assets (i.e. buildings, machinery, equipment, etc.) is needed. Capital, together with labour and entrepreneurship, are the basic factors needed for production in an economy. The effectiveness and efficiency with which these factors are combined influence the overall level of productivity/profitability processes, bearing in mind that productivity is affected by an array of factors of which appropriate technology and skill level of the labour force are two important elements.
The impact on capital formation associated with the investment and operation of all activities related to construction expenditure, was estimated to be R416 billion per annum. This implies that R416 billions of capital (productive capacity) is required on an annual basis to sustain all activities related to construction expenditure by public institutions and agencies. However, this is not an additional R416 billion each year, but rather the magnitude of productive capital stock that needs to be available on an annual basis. The simulation results indicate that direct impact on capital formation is R 374 000 (90 per cent), with indirect impact being R17 823 (4 per cent) and the induced impact amounting to R 24 353 (6 per cent).

5.4.3 Impact on Employment Creation
Labour is a key element of the production process. It is important to determine the number of new employment opportunities that will be created by the construction sector in South Africa. These employment opportunities are broken down into those created directly by a particular construction related project and those indirectly created and induced throughout the broader economy. Furthermore, a distinction is made between skilled, semi-skilled and unskilled labourers.

On an annual basis, construction expenditure sustains 247 508 job opportunities (direct, indirect and induced). The 247 508 jobs form a significant number that impacts positively on the South African economy in terms of job creation. An important factor to note is education or skills as a prerequisite to employment and better salary. Of the 247 508 total job opportunities, 47 429 are skilled laborers of
which 8,833 (19 per cent) is direct impact, 19,125 (40 per cent) is indirect impact and 19,471 (41 per cent) is induced impact on the labor market.

A total of 103,652 of jobs to be created for semi-skilled labourers constitute a direct impact of 27,761 (27 per cent), indirect impact amounting to 43,410 (42 per cent) and an induced impact of 32,481 (31 per cent) on the South African labor market. Finally on the employment impact, unskilled labourers will also have the opportunity to employment and earn a certain amount of income. The total impact on unskilled laborer market is 96,427 of which the direct impact is 26,499 (27 per cent), indirect impact is 40,926 (43 per cent) and induced impact being 29,001 (30 per cent).

5.4.4 Impact on Household Income
One of the elements of the additional value added (i.e. GDP) which will result from the proposed expansion is remuneration of employees, which, in turn, affects household income. The SAM measures the magnitude of changes that will occur to both household income and spending/savings pattern. As such, it is also important to highlight the impact of construction expenditure on the low-income households as this can be used as an indicator of the extent to which this project contributes to poverty alleviation throughout the economy.

The total impact on household income amounts to R20.69 billion of which R 3,510 (17 per cent) is earmarked for the lower-income households and R4,559 (22 per cent) for middle-income households and 12,620 (61 per cent) for the high income households. Thus, of the total income generated directly and indirectly through the
construction expenditure by public institutions and agencies, a significant percentage of it will reach the poor communities in South Africa. The impact on the low income households comes through the linkages that the construction expenditure by public institutions and agencies has with other sectors of the economy. Noting the high income inequality in South Africa, high income household steel receives the large portion of income generated from construction sector. These are households with high skills and which are well resourced to access business opportunities and employment in the sector.

A clear link can therefore be deduced from impact on employment, skilled labourers and household income. The impact on skilled labourers is high as well as impact on high income household, which clearly indicates that, high income households continues to earn more money due to skills they have and low income households continues to earn less because they are unskilled. Such a pattern has the potential to perpetuate inequality in society and undermines the potential of low income and unskilled laborers if there is no policy intervention to close that gap of inequality.

5.4.5 Fiscal Impact
The government is affected by large projects via either additional expenditure or subsidies, and the collection of direct and indirect tax revenue. Therefore, it is important to calculate the impact that a project has on the government accounts, which is referred to as the fiscal impact.
In the case of the construction expenditure, the national government will be directly involved in the form of additional government expenditure or subsidies to the project and therefore the national fiscal will receive additional income in the form of:

- Property income (in the form of interest, dividends and rent receipts and the surplus or deficits of government business enterprises);
- Direct tax (mainly personal tax and company tax);
- Indirect tax (including VAT that will result from additional household spending and customs and excise tax); and transfers

The annual fiscal impact will amount to approximately R8.82 billion per annum through direct and indirect taxes due to the activities related to construction expenditure by public institutions and agencies. All these additional taxes provide the government with revenues that can be used to improve the average quality of life of the average citizen in South Africa, in particular, education and health.

5.4.6 Impact on the Current Account of the Balance of Payments

The construction sector will have direct, indirect and induced impacts on the exports and imports of goods and services that will take place across all of the various economic sectors that are affected by this programme. Imports consist of direct and indirect material imports, as well as goods consumed by households that are imported as a result of the induced impact.
The impact on the Balance of Payments is a positive R13.32 billion per annum over the lifespan of the activities related to construction expenditure by public institutions and agencies.

5.5 Conclusion
In this section the Macroeconomic impact of infrastructure expansion programme was presented with specific reference to the construction sector in South Africa. In the next chapter concluding remarks are presented in terms of how the macroeconomic benefits could enhance economic growth and household income.
Chapter 6: Conclusion and Recommendations

6.1 Introduction

This study sought to analyse the impact of the construction sector on economic growth and household income in the South African economy. The study applied the Social Accounting Matrix for analysis to ensure that the direct, indirect and induced impact can be traced in the economy. The simulation results had shown the impact on GDP, Employment as a source of income to households which was further disaggregated in terms of skilled, semi-skilled and unskilled labourers; Household income also disaggregated in terms of low income, middle income and high income household. The results further showed the impact government fiscal revenue and balance of payments.

Taking such results into account, this chapter seeks to provide a comprehensive conclusion and recommendation which aims at advising policy and decision makers mainly in the public sector in terms of resource allocation and setting government priorities.

6.2 Conclusion

The importance of infrastructure development and maintenance in every economy cannot be over emphasised. Literature in chapter 3 has proved that investment in infrastructure has the potential to yield positive and long term results in the economy and the results of expenditure in construction sector activities has also showed the spill over effects on infrastructure development through indirect and induced impact.
As argued by Antonopoulos (2008), we must emphasize that this exercise serves as a hypothetical policy experiment and its aim is to identify orders of magnitude of economy-wide impacts should scaling-up be implemented. Many of the specific assumptions can be easily changed to reflect different initial conditions, as well as diverse objectives set by beneficiary communities, policy makers and other stakeholders at the national, provincial and municipal levels.

The results indicate the need for careful consideration of possible targeting. It may be the case that job rationing may be required, in favour of selected ultra-poor households.

The annual fiscal impact will amount to approximately R26.7 billion per annum through direct and indirect taxes due to the activities related to construction expenditure by public institutions and agencies. All these additional taxes provide the government with revenues that can be used to improve the average quality of life of the average citizen in South Africa, in particular, education and health.

The impact on the Balance of Payments is a positive R40.57 billion per annum over the lifespan of the activities related to construction expenditure by public institutions and agencies.

The results of the policy experiment report stem from a suggested budgetary allocation of approximately R374 billion. The proposed full-time, year-round jobs primarily reach unskilled workers that are members of ultra-poor and poor
households. Though the results had shown the impact on low income households and unskilled labours to be positive, the income gap and still remain high in favour of skilled and high income household which clearly indicates the continued income gap widening.

A positive impact on GDP to a magnitude of R 83 577 is shown in the result which confirms that infrastructure development/ construction activities are positively correlated.

On the basis of the findings of this study, it can be concluded that construction sector has a positive impact on economic growth and household income. Due to various levels of impact especially on employment and households, the following are recommended.

6.3 Recommendations
The study recommends the following:

According to ILO (2001), the image of the construction industry has suffered from these developments, not least in the eyes of its potential workforce. In much of the world, work in construction is not regarded as “decent work”. Lack of opportunities for training and skill formation contribute to the unattractiveness of a career in construction. Attracting new entrants is a major problem in countries where workers have alternatives (mainly, but not entirely, the richer ones). In both developed and developing countries difficulties are experienced in recruiting young, educated workers, as the quote at the beginning of the report makes clear. The inability of the
industry to attract workers and invest in training them has serious repercussions for the productivity and quality of construction products and hence for the ability of contractors to satisfy their clients' needs.

To elevate low and middle income households, there is a need for government to place more emphasis on skills development in a form of training and skills transfer for the unskilled and semi-skilled labourers in the country. Employment in this sector needs to be linked to different forms of training such as on the job training. Furthermore, government and private sector needs to partner in developing entrepreneurs from rural communities and both low and medium household income. The achievement of these recommendations requires clear policy directives which will guided the mode of operation in the construction sector.

These kind of intervention and others, will help government translates the impact of construction sector on economic growth into benefiting large population and close the income gap in the country.
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