Infrastructure Development in South Africa and Gauteng

Executive Summary

Infrastructure is critical for ensuring the effective functioning of an economy by stimulating economic growth and promoting employment. During periods of high unemployment and depressed economic growth, governments tend to fund infrastructure projects that are labour intensive. The infrastructural development of the 2010 Fédération Internationale de Football Association (FIFA) World Cup in South Africa made a large contribution to the recovery of the country out of the 2009 recession. Larger capital outlays for infrastructure development in the country have been from private business enterprises. The tertiary sector has consistently received higher infrastructure investments over the years, increasing from R72.6 billion in 1996 to R210.2 billion in 2011. The government has planned further infrastructural drive for 2012 and beyond in order to develop and improve rail, road, water, electricity, ports, telecommunication, schools and hospital infrastructure for the country.

Within the BRICS group of countries, South Africa has experienced the highest ranking in the infrastructure pillar in terms of the quality of overall infrastructure. The World Economic Forum Global Competitiveness Report for 2012-13 has ranked the country 58th for its quality of overall infrastructure. China was ranked 69th, India 87th, Russia 101st and Brazil at 107th place.

Some of the important infrastructural projects undertaken in the Gauteng province currently include, the hospitals revitalisation programme and the Schools Programme. The infrastructure projects that the municipalities of Gauteng will be embarking on include integration nodes in Ekurhuleni, expending the Rea Vaya Bus Rapid Transit (BRT) system in the City of Johannesburg and developing Industrial Development Zones in the City of Tshwane.
The social and economic benefits of transportation have motivated the government on all three spheres to actively participate in the development and maintenance of infrastructure. Some of the advances include the BRT systems in two metropolitan municipalities in the country; these are the City of Johannesburg and the City of Cape Town. With regards to the other metropolitan municipalities in Gauteng, the City of Tshwane has started with construction and Ekurhuleni has completed its route planning. The proposed development of the aerotropolis around the OR Tambo would advance infrastructure development and thereby create some form of an economic cluster within Ekurhuleni.

Although there have been improvements in infrastructure development in South Africa, there are still challenges that need to be addressed before the country can reach its infrastructure goals. Some of the challenges include funding of infrastructure investment, slow approval processes for projects and skills shortage in carrying out the actual job. However, there are also opportunities in investing and developing infrastructure namely, job creation, social development, economic efficiency and skills development.
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1. Introduction

Infrastructure forms the back-bone of any economy and when extensive and efficient, it is critical for ensuring the effective functioning thereof. The development of infrastructure includes the building of roads, ports and telecommunication, amongst others. This development has the potential of changing the physical, economic and social structure of a country with little or no reliance on international trade. This is a critical time to consider infrastructure development in Gauteng, South Africa and the rest of the world. The 2012 Medium Term Budget Policy Statement (MTBPS) has reiterated government’s plans to strengthen infrastructure investment developments in order to address growth constraints. Events relating to economic uncertainty globally are driving most countries to seek strategies to grow their economies internally. It is unlikely that exports will contribute as much to the Gross Domestic Product (GDP) with the Euro zone debt crises currently suppressing the demand for South African goods and services. Infrastructure development becomes one of the options to be pursued to enhance structural change of the economy in the country. The government is embarking on an infrastructure drive in order to stimulate economic growth and promote employment.

The Honourable President Jacob Zuma, in his 2012 State of the Nation Address (SoNA), mentioned how the exit of the country from the 2009 recession was assisted by the 2010 Fédération Internationale de Football Association (FIFA) World Cup infrastructure drive. According to the third quarter GDP statistical release by Statistics South Africa (Stats SA) in 2011, the economy contracted by 1.5 percent in 2009 and this was followed by a growth of 3.1 percent in 2010. There is a need for some level of economic certainty in South Africa and for efforts to address structural unemployment. To achieve these objectives, the government intends to focus on growing the economy internally, for example, the infrastructure drive that has been planned for 2012 and beyond. In the SoNA, the President announced that to direct the infrastructure drive, a Presidential Infrastructure Coordinating Commission (PICC) had been set up to coordinate and assist with infrastructure development on a national, provincial and local level. The extensive infrastructure drive will seek to develop and improve rail, road, water, electricity, ports, telecommunication, science & technology, schools and hospital infrastructure. These infrastructure development projects have the potential to clear bottle necks in economic growth, to reduce unemployment as well as to transfer skills to those who will be working on the various projects.

1 The Euro zone refers to a group of 17 European countries which share a common currency, the Euro. Amongst others these countries include Portugal, Italy, Greece and Spain. The listed countries are mockingly called the PIGS countries, as they are regarded as having brought disrepute to the Euro zone with their lack of fiscal management. This led the PIGS countries to experience sovereign debt crises. At times Ireland is also included and the acronym is then PIIGS.
Some of the current infrastructure projects that the province has already embarked on include the expansion of health institutions, development of an aerotropolis\(^2\) around the OR Tambo International Airport, a telecommunication project called the G-link, providing support to farms in the form of water tanks, irrigation equipment & generators, roads and public transport.

The global infrastructural overview section compares several indicators within the Brazil, Russia, India, China and South Africa (BRICS) group of countries. The infrastructure strategies and programs by selected leading regions like, China and India provide a benchmark for the country’s initiative to improve infrastructure. This paper provides comparisons of infrastructure development internationally, nationally and where possible at the Gauteng provincial level. This is in order to investigate progress made towards improving the provision of public goods such as health, education, energy, water & sanitation, transport and the telecommunication sector.

2. Global Infrastructure Overview

The Oxford Dictionary of Economics (2009) defines infrastructure as;

“The capital equipment used to produce publicly available services, including transport and telecommunications, and gas, electricity and water supplies. These provide the essential background for other economic activities in modern economies; the fact that they are not available or reliable is a characteristic of less developed countries (LDCs), and handicaps their development. Infrastructure services are generally either provided or regulated by the state.”

The Economist’s online dictionary, Economics A-Z (2012), describes infrastructure as “The economic arteries and veins”. The World Economic Forum (WEF)\(^3\) backs this definition of infrastructure as it argues that extensive and efficient infrastructure is critical for ensuring the effective functioning of an economy. With this definition in mind it is not surprising that the private sector and governments around the world focus on infrastructure development. The private sector stands to gain profits from directly participating in infrastructure development and benefits indirectly from its availability as this lowers operating costs of companies.

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\(^2\) The Ekurhuleni municipality defines an aerotropolis as a type of urban form comprising aviation-intense business and related enterprises. It is similar in form and function to a traditional metropolis, where there is a central city core and its commuter-linked suburbs. An aerotropolis has an airport city as its core and is surrounded by clusters of aviation-related enterprises.

\(^3\) The WEF is an independent non-profit international organisation that endeavours to improve that state of the world by engaging business, politicians, academics and other leaders of society to shape the world.
Infrastructure is also known in economic terms as gross fixed capital equipment or formation. Gross fixed capital formation is the addition of fixed assets less the disposal thereof. Fixed capital formation is fixed assets bought with the purpose to produce more goods and services and is used over the longer term. Gross fixed capital formation indicates the addition of fixed assets over a certain period such as a financial year.

During periods of high unemployment and depressed economic growth, governments tend to fund infrastructure projects that are labour intensive. According to Kangas (1997), the United States of America (USA) embarked on an infrastructure drive to pull themselves out of the great depression of the 1930s. Great economists, such as John Maynard Keynes, supported moves that increase spending on infrastructure development. His theory was that an increase in capital formation, through public works, during times when employment is low has a greater impact than when the country is near full employment.

Due to the global financial crisis of 2008/09 and the current global economic uncertainty which stemmed from the Euro zone debt crisis, GDP forecasts have been downgraded and unemployment levels have risen. Thus, countries like South Africa have embarked on infrastructure drives to counter these negative effects, as suggested by the theory. The national 2012 MTBPS, tabled by Finance Minister, Honourable Pravin Gordhan, forecasted infrastructure programmes by government to cost in the region of R3.2 trillion over the next 20 years, financed through a variety of options which include retained earnings and balance sheets of State-Owned Enterprises (SoE), supplementing the fiscus. An amount of R250 billion is said to be earmarked for implementation-ready projects in the immediate short term, next three years.

Europe, the second biggest trading partner of South Africa, plays a significant role that impact on the economic outlook of the country. Often when economic growth cannot be expected from the exporting of goods and services, countries look internally to expand their economies. Infrastructure development strives to increase employment and lay the foundation for future economic development by providing the veins for growth.

The rationale behind the targeting of infrastructure programmes by many governments and private companies alike is to facilitate and improve the movement of all goods and services. Such infrastructure determines the location of economic activity and sectors that can develop. It reduces the distance between regions, integrating markets with

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4 John Maynard Keynes was a British economist who advocated fiscal and monetary intervention by governments in the economy, especially during times of economic slumps. His dictums were very well received during the great depression of the 1930s and some of his endorsements still play a big role in the economic policies of many governments today.

5 The root cause of the financial crisis was in the subprime lending crisis in the USA when loans were granted to high risk borrowers. With interest rates steadily climbing, the resultant massive defaults in the mortgage market spiralled across the globe.

6 The current crisis emerged from the inability of Greece to service its debts. Portugal, Ireland, Italy and Spain have had their credit ratings seriously downgraded and also are running out of money to service their respective loans. Wealthier Euro zone nations such as Germany are now in the unenviable position of having to bail these countries out.
other countries and regions. Therefore, the WEF argues that improved infrastructure development has the potential to decrease income inequality and poverty. Well-developed transport and communications infrastructure networks are essential for less-developed communities to enable them to access economic activities and services.

Transport, including quality roads, railroads, ports and air transport, enable entrepreneurs to get their goods and services to the market places in a secure and timely manner and facilitates the movement of workers to their places of employment. Solid telecommunications networks allow for a rapid and free flow of information. Economies also depend on electricity supply that is free of interruptions and shortages so that businesses and factories can work unimpeded. To this end, the Global Competitiveness Index\(^7\) (GCI) has included an infrastructure pillar which measures the effectiveness of countries’ infrastructure.

Many discussions have been held around infrastructure development in developing countries, including South Africa. Some of the discussions\(^8\) in the country were about deteriorating infrastructure in municipalities. Economic efficiency in developing and underdeveloped countries is often hindered by lack of sufficient and quality infrastructure. Another topic of discussion regarding infrastructure development globally has been the financing of projects. It is argued that financing should be acquired in domestic currency, as this limits unexpected additional expenses that may occur due to exposure to volatile exchange rate markets. The most conventional way of achieving this is acquiring financing domestically. Other mechanisms could be by making agreements with international lenders that their loans be denominated in domestic currencies of countries that borrow the money.

The BRICS\(^9\) nations are in the process of setting up their own multinational development bank which will facilitate loans that will be denominated in the currency of the borrowing countries. Infrastructure development within BRICS is discussed further under sub-section 2.1.

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\(^7\) The Global Competitiveness Index (GCI) aims to mirror the business operating environment and competitiveness of over 140 economies worldwide. The report identifies advantages as well as impediments to national growth thereby offering a unique benchmarking tool to the public and private sectors as well as academia and civil society.

\(^8\) These infrastructure dialogues were hosted jointly by the Development Bank of Southern Africa, the South African Cities Network, the National Business Initiative, Performance Monitoring and Evaluation Department in the Presidency and Engineering News.

\(^9\) Jim O’Neill, Chairman of Goldman Sachs Asset Management, coined the term BRIC (Brazil, Russia, India and China) in 2001. These were the group of developing countries that he felt are most important to the world economy. These countries formalised their relationship with the first meeting of Foreign Ministers on the 16\(^{th}\) of June 2009. When South Africa was admitted into the group in 2010 the S was added to make the term BRICS.
Figure 1: Global Investment on Infrastructure, 2001-2010 & 2011-2020*

Source: The Economist, 2012
Note: * Indicates forecasts

Figure 1 shows investments that have been made globally in infrastructure development from 2001 to 2010 and projections from 2011 to 2020. The telecoms category had the largest share (37 percent) of global infrastructure investment in the 2001 to 2010 period. It is anticipated that in the 2011 to 2020 period, its share of global investment on infrastructure will reduce by 1.2 percent to US$646 trillion. Investment in water had the second largest share (33 percent) in the 2001 to 2010 period at US$576 trillion. This amount is forecast to increase by 34 percent, resulting in the category accounting for the largest share (37 percent) of the global infrastructure investment in 2011 to 2020. Infrastructure investment in transport will increase by 11 percent, while investments in telecoms are expected to decrease by one percent. Overall, it is expected that global infrastructure investment will increase by 19 percent over the latter ten-year projection.

2.1 Infrastructure Outline within BRICS

The incorporation of South Africa into the BRICS block will help the infrastructure campaign of the country by providing a platform whereby these other countries may give South Africa support on financing projects as well as technical expertise. The countries that are expected to contribute greatly to this investment include India. In its five year plan, which commenced in 2012, India is expected to invest US$1 trillion in infrastructure plan in its own country. This amount is double what the country had invested in its last five year infrastructure plan. China will be
in the second year of its five year infrastructure plan in 2012; the biggest project to be built is the 30,000 kilometre high speed rail system. Brazil will build its Açú Superport, an industrial complex connected to sea ports, which will make it easier to trade with China.

Within the BRICS nations, South Africa should look at Brazil and India more in particular when bench marking. This is because they are multi-racial, industrialised democracies beset by problems of poverty and income inequality. These countries have even set up a trilateral relationship in 2003 to find solutions to social and economic challenges that they face. Table 1 shows the rankings achieved by the BRICS countries in the infrastructure pillar\(^\text{10}\) of the GCI for 2008/09 to 2011/12. The highest ranking represents the highest quality of infrastructure and vice-versa.

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The total number of countries considered in the original ratings was 140 in 2008/09 and has grown to 144 by 2012/13; however, Table 1 only displays information for the BRICS grouping. This is due to the political relationship that has been formed for mutual economic and social benefits when South Africa joined the BRIC group of countries. The table indicates that South Africa has been leading the BRICS countries in terms of the quality of its overall infrastructure with a ranking of 46\(^{\text{th}}\) during 2008/09. In 2009/10, the ranking improved to 43\(^{\text{rd}}\). This coincided with the 2010 FIFA World Cup hosted in the country and which resulted in much improvement in the public transport infrastructure, stadia and accommodation. This increase in ranking was not sustained as the ranking of the country dropped to 56\(^{\text{th}}\) and 60\(^{\text{th}}\) for the financial years 2010/11 and 2011/12 respectively. In 2012/13 the ranking improved marginally by two place to 58. Even with the decline in rankings, South Africa had the most competitive infrastructure amongst the BRICS countries throughout the reviewed period. It is worth considering that in terms of population size and land area size, the country is the smallest, by large margins amongst the other BRICS countries.\(^\text{11}\) South Africa’s infrastructure services a much smaller area as well as far less population thus allowing infrastructure to be more concentrated thus possibly yielding better results.

\(^{10}\) The infrastructure component of the GCI is further broken down to transport infrastructure, fixed line subscriptions, mobile telephone subscription and the quality and quantity of electricity supply.

\(^{11}\) In terms of area size, the second smallest country is India with an area of 3,287,263 square kilometres which is almost three times South Africa’s 1,214,470 square kilometres. The second smallest population is that of Russia (142,517,670) which is also almost three times that of South Africa (48,810,427). For comparative reasons, numbers from the Central Intelligence Unit (CIA) were used which may contradict those of Statistics South Africa (Stats SA).
The ranking for China started at 58th in 2008/09. In 2009/10 it dropped to 66th and in 2010/11 there was a further drop to 72nd. By 2011/12, China’s ranking had improved to 69th and remained unchanged in 2012/13. The country maintained its second position amongst the BRICS countries throughout the reviewed period. Russia started the period in the third position with a ranking of 78th and progressively got worse each year to 86th in 2009/10 and eventually 101st in 2012/13. This country had the second lowest ranking for the BRICS region in 2012/13. India’s ranking changed marginally from 90th at the start of the period to 91st in 2010/11. It was in 2011/12 when there was a big upward movement in the ranking of India which moved to 86th from 91st the previous year. However, there was a marginal drop in India’s ranking in 2012/13 to 87th. Brazil started at 98th and in 2011/12, it received the worst score amongst the BRICS nations to rank 104th; this decreased further in 2012/13 to 107th. The main cause for the decline in Brazil’s ranking is due to the poor conditions of highways in that country as well as inadequate port facilities. With the infrastructure development currently taking place in preparation for the 2014 FIFA World Cup and the 2016 Olympic Games, Brazil’s ranking in the near future can be expected to improve.

2.1.1 Strategies by China and India

This section provides an overview of what China and India are planning for infrastructure development and is intended to provide a general benchmark of where South Africa is in terms of the management of infrastructure development. These are two selected countries within the BRICS mix.

**China**

China has over the years experienced high economic growth as measured by GDP averaging 10.6 percent between 2002 and 2011. The October 2012 World Economic Outlook (WEO) update of the International Monetary Forum (IMF) forecasts this economy to grow by 7.8 percent in 2012. The savings rate in China has also increased over the last 10 years.\(^{12}\) Savings has a direct relationship with investment. The actual savings, when invested in financial institutions are used by the institutions to loan to investors. The level of savings determines the amount of money that is available for loaning and therefore the price as well. According to the WEO, in the last nine years, savings in China have increased by 28.3 percent from 37.9 percent of GDP in 2002 to 48.6 percent in 2011. Investments have also grown by 27.4 percent within the same time, from 40.3 percent of GDP to 51.3 percent. The correlation\(^{13}\) coefficient between savings and investment over the nine years was a strong and positive 0.76.

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\(^{12}\) The Bank of International Settlements has attributed the surge in savings rate to structural changes in the economy, the share of agriculture to the GDP has fallen, urbanisation has increased and demographics of China have also shifted mostly due to the one child policy.

\(^{13}\) Correlation coefficient measures the nature and strength of a relationship between two series. If there is no relation relationship the value of the coefficient is near zero. A perfect positive relationship, meaning they move in the same direction, is 1 and a negative relation is -1. The relationship is said to be strong if it is less the -0.5 or more then 0.5.
The Chinese government has been investing much of their savings in infrastructure development projects which have translated into high economic growth. This was done to lay the foundation for further future growth. The Chinese Development Bank has played a vital role in infrastructure development for that country, both internally and externally. Some of the projects that have been financed through this bank include the Zhejiang Guohua Ninghai Power Plant, Fujian Petrochemical Refinery, the Kunming Changui International Airport and the Jiaozhou Bay Subsea Tunnel. The Bank had, at the end of 2011, invested US$1.1 billion in the Ethiopian National Telecoms Network.

India

According to the Business Portal of India for 2012, the government of India has a Cabinet Committee on Infrastructure which oversees public infrastructure development. The committee has categorised infrastructure development areas into sectors. These are highways, railways, ports, airports, telecom and power. Under the highway category, the government has prioritised the construction and widening of highways that connect the four main cities of the country being Delhi, Mumbai, Chennai and Kolkata. It has named this project the Golden Quadrilateral. A new rail network that is dedicated to freight movement will also be built. India is also in the process of privatising container movements which have until now been monopolistically conducted by a public entity. There is a 20-year perspective and a seven year action plan that are being developed for the 12 main ports of India.

3. Infrastructure Development in South Africa

According to a speech by then Minister of Transport, Honourable Sibusiso Ndebele,\textsuperscript{14} it is the mandate of the PICC to oversee the implementation of infrastructure projects that stimulate social and economic growth. The PICC was established in September 2011 to create a clearing platform for bottlenecks in the implementation of infrastructure projects within all the spheres of government.

In April 2012, the PICC held the Provincial and Local Government Conference where they set out the plans for South Africa. Targets have been set out for the PICC already by the New Growth Path\textsuperscript{15} (NGP), including the creation of 25,000 jobs by 2015. The NGP has identified five areas that have the potential of creating employment opportunities, also known as jobs drivers. Infrastructure is incidentally also the first “job driver” in the NGP.

\textsuperscript{14} This speech was made at the Infrastructure Development Cluster media briefing in Cape Town on the 28\textsuperscript{th} of February 2012 and is accessible from the Government Communications and Information website.

\textsuperscript{15} The NGP is the 4\textsuperscript{th} growth strategy of South Africa since the country became a democratic state. This growth strategy focuses on the restructuring of the economy so as to ensure that the growth is strongly linked to the creation of quality employment and eradicating inequality in South Africa.
This job driver has the potential to create jobs from the very skilled level through project design and management right down to the unskilled, like construction. Another target is that the PICC should assist authorities implementing infrastructure projects to have good management skills so that there is no under or misspending of allocations.

The PICC has been charged with developing a 20-year project framework, identify 5-year priorities and find ways to improve infrastructure links that will connect the rural and the poor to economic activity. It intends to address capacity constraints and improve coordination. This commission has also compiled an Infrastructure Book which contains over 645 projects that have been earmarked for implementation over this 20-year period in the country. In April 2012, the PICC had already identified 17 Strategic Integrated Projects (SIPs)\(^\text{16}\).

### 3.1 Investment in Infrastructure

Fundamental economics teaches us that there is an indirect relationship between interest rates and investment. This is because interest rates represent the cost of investing as many investments are financed by borrowed funds. The higher the general level of interest, the higher the cost of investing which might make investment unattractive. Domestic interest rates are just one of the factors that influence investment. Since South Africa participates in and forms part of the global economy, international markets and events around the world affect all economic activities including investment. Some of these may include the Asian financial crisis\(^\text{17}\) of 1997–1999 and the Russian\(^\text{18}\) financial crisis of 1998. As a component for calculating GDP, there should be a high correlation between GDP\(^\text{19}\) and investment. This section provides the sectoral analysis of investment made for infrastructure development.

\(^{16}\) These SIPs can be accessed from [http://www.info.gov.za/speeches/docs/2012/picc-presentation_120413.pdf](http://www.info.gov.za/speeches/docs/2012/picc-presentation_120413.pdf)

\(^{17}\) Before the crisis, Asia had a high economic growth, high interest rate and a fixed exchange rate. This encouraged foreign investment. However, shorter financing flooded the region and some of this money was used to finance long term capital projects. This resulted in the countries failing to meet their short term liabilities and the inability to maintain the exchange rate peg. This was met with panic by investors; the withdrawal from the region further aggravated the shortage of money.

\(^{18}\) Like the Asian crisis, foreign investors were at the heart of this crisis. Fear of the Russian government in devaluing their currency to meet debt liabilities, caused investor confidence to drop and to pull out their funds in large numbers. This affects the balance sheet of the country.

\(^{19}\) The formula for GDP is \( \text{private consumption}(C) + \text{investment}(I) + \text{government consumption}(G) + (\text{exports} - \text{imports}) \). Infrastructure is just one of the components that make up total investment.
Figure 2 shows the Rand value of investment in infrastructure by economic sectors from 1990 to 2011. The tertiary sector\textsuperscript{20}, has continually received the most investment in infrastructure. Between 1990 and 2011, tertiary sector investment in infrastructure has grown by over 191 percent, from R72.6 billion to R210.2 billion, an annualised rate (or geometric mean) of 5.2 percent. The likely impacts of the Russian and Asian crises are more evident in this sector. In 1999 investment in the sector experienced a decrease by 9.8 percent from R108 billion to R97.4 billion. The second highest level of investment came from the secondary sector\textsuperscript{21}. This sector grew by 145 percent from R47.4 billion to R116.4 billion over the reviewed period, an annualised rate of 4.4 percent. The primary sector\textsuperscript{22} has in recent history contributed the least to GDP, grew by 97 percent (3.3 percent annualised rate) with R26.9 billion being invested in 1990 and the R53 billion by 2011.

These high investment rates are an indication of how critical it is to have functional infrastructure to facilitate economic growth. The following figures will show the growth rate of investment within each sub-sector compared to GDP growth rates.
Figure 3: Primary Sector Infrastructure Investment & GDP, 1990-2011

Source: SARB, 2012

Figure 3 shows the growth rate of investment in the primary sub-sectors as well as that of the GDP. As theory suggests, there is a strong and positive correlation between investment in infrastructure in the primary sub-sectors and GDP as investment is a component of GDP. The output of the primary sector consists of commodities that are sold in international markets. As such, levels of investment are affected by international commodity prices as well as exchange rates, which are volatile. The Rand value invested in infrastructure by agriculture, forestry & fishing at the start and end of the reviewed period was R7.1 billion and R7.9 billion respectively. This translates to a total increase of 11.4 percent or a geometric mean increase of 0.52 percent for each of the 21 years. The biggest growth in investment for this sub-sector was in 2008, when it increased by 23.2 percent. This sub-sector is further affected by climate conditions and land redistribution programmes. The correlation between GDP growth and infrastructure investment in agriculture, forestry & fishing is a positive 0.6.

The mining & quarrying sub-sector started the reviewed period at R19.8 billion and ended at R45.1 billion; this translates to an absolute growth of 127 percent. The geometric mean increase rate is 4 percent over the 21-year period. The highest growth was recorded in 2006, when it peaked at 48.7 percent. The lowest point was in 1993 when investment contracted by 24.8 percent. Mining & quarrying is a sub-sector that is sensitive not only to international prices but also property rights. Debates about the nationalisation of mines in 2010 may be the reason for the reduced rate of investment in the same year, as the prevailing commodity prices should have supported higher investment. The correlation between GDP growth and infrastructure investment in mining & quarrying is a positive 0.5.
Figure 4: Secondary Sector Infrastructure Investment & GDP, 1990-2011

Figure 4 shows the growth in infrastructure investment in the secondary sub-sectors and GDP for 1990 to 2011. Manufacturing’s greatest dip was in 1991 when growth contracted by 11.7 percent during political uncertainty. The highest peak was in 1995 when investment grew by 20.6 percent as business confidence was increasing and sanctions were being lifted. In Rand value, manufacturing had the highest amount of money invested within the secondary sector. In 2008, R73.9 billion was invested in manufacturing which was the highest throughout the reviewed period, across the sub-sectors. The average amount invested was R45.3 billion for manufacturing. This pre-recession level of investment has not been reached.

In Rand value terms, the construction sub-sector contributed the least to the secondary sector investment. The average amount invested in construction throughout the reviewed period was R3.4 billion. Growth peaked at 32 percent in 2004. The second biggest growth rate was in 2008 which was mostly supported by the stadia construction for the 2010 FIFA World Cup.

The average that was invested in electricity, gas & water throughout the reviewed period was R16.9 billion. The growth in investment averaged 7 percent. The graph shows that there were sometimes successive years where investment growth was negative particularly between 1997 and 2001. Contractions of 3.5, 24, 18.5, 17.4 and 2.2 percent were experienced for each respective year. In 2008, when the country started to experience load shedding, investment in electricity infrastructure peaked at 44.3 percent. The load shedding period was a time when there was a significant appetite for electricity which forced Eskom to roll out scheduled electricity blackouts.
The 2008 encouraging figure of investment was however followed by a drop in growth by 2010; growth in investment was 1.6 percent. In Rand value the highest investment was in 2011 at R43.7 billion.

The correlation between GDP and manufacturing is strong at a positive 0.6. There is however a weak positive correlation with the other sub-sectors at 0.3 for both of them. The relationship between GDP and investment is not just one way, high economic growth stimulates savings which tend to be invested in financial vehicles such as infrastructure projects. This may explain the positive growth in investment in infrastructure during times of economic prosperity such as between 2004 and 2008.

**Figure 5: Tertiary Sector Infrastructure Investment & GDP, 1990-2011**

![Figure 5: Tertiary Sector Infrastructure Investment & GDP, 1990-2011](image)

Source: SARB, 2012

Figure 5 shows the growth rates of investment in the tertiary sub-sectors and the GDP growth rate. The wholesale & retail trade sub-sector invested R7.8 billion in infrastructure during 1990. By 2011, this had grown to R24 billion, meaning that for the 21-year reviewed period it had a 5.5 percent geometric mean increase. On average, this sub-sector had the smallest level of investment in the sector. Growth in investment was at its highest in 2004, when it grew by 28.6 percent. The lowest growth rate was in 2009 when growth contracted by 7.2 percent.

Investment in transport & communication averaged R32.4 billion, making it the second smallest investor in infrastructure within the tertiary sector. Throughout the reviewed period, its investment in infrastructure grew by 603.7 percent, meaning that the mean yearly growth was 9.7 percent. The R32.6 billion infrastructure investment in 1998 marked a rise in investment of 60.4 percent that year. This was, however, immediately followed by the biggest contraction, of 25.2 percent in 2000.
The finance & business services sub-sector had an average investment of R45.4 billion for the entire reviewed period and was higher than any other sub-sector in the tertiary, secondary and primary sectors. The geometric mean increase rate was 3.1 percent. The highest year-on-year growth was in 2004, when investment grew by 22.5 percent while the biggest contraction was at the beginning of the reviewed period, when investment contracted by 12.4 percent.

Government, social & personal services grew by 143.9 percent from 1990 (R23.1 billion) to 2011 (R56.2 billion) with a geometric mean of 4.3 percent. This sub-sector experienced the biggest growth in 2007, with a growth rate of 22.1 percent. Naturally, with the great uncertainty and political changes that were taking place in 1993, there was a great contraction of 8.5 percent.

**Figure 6: Infrastructure Investment, Public & Private Institutions, 1990-2011**

![Graph showing infrastructure investment by public corporations, general government, and private business enterprises from 1990 to 2011.](image)

Source: SARB, 2012

Figure 6 shows investments in infrastructure, in Rand millions, made by public corporations, general government and private business enterprises. Public corporations are state owned enterprises (SoEs) such as Transnet, Telkom and Eskom. According to the figure, during the reviewed period, private business enterprises invested significantly more in infrastructure compared with public corporations and general government. From 1990 to 2011, investment made by private business enterprises grew by a staggering 165.4 percent, from R91.8 billion to R242.9 billion. This peak in investment was in 2008, when it reached R257.3 billion. The financial crisis in 2009 can be partially blamed for the contraction of investment during that period. The annualised growth rate for the reviewed period is 4.7 percent.
The investments made by the general government were higher than those made by public corporations for most of the reviewed period, this changed in 2008. This was during the time when there was load shedding of electricity in the country and Eskom started to aggressively expand supply capacity. General government invested R31.7 billion in 1990 and the levels of investment grew by 45.1 percent in 2011 to R52.8 billion. In 2008, when general government was overtaken by public corporations, it happened to be the year when general investment was at its highest during the reviewed period, at R59.9 billion. Public cooperation investment grew the most, by 278.1 percent from R22.2 billion in 1990 to R83.8 billion by 2011. There is a steep incline in the level of investment from 2008, as represented on the graph.

The 2012 national MTBPS indicates that gross fixed capital formation by the public sector increased by 10.9 percent by the middle of the year. The SoEs included in this investment are, Eskom, Transnet and South African National Roads Agency Limited (SANRAL); they made up the largest chunk of beneficiaries at 95 percent.

### 3.2. Industries

This section provides an assessment of the telecommunications, electricity, transport and water infrastructure development. Telecommunications is seen as one of the fastest growing industries with ever improving technology. It facilitates information sharing be it social, political or economic. It is often credited with the acceleration of globalisation. South Africa has had electricity supply challenges and the electricity section will discuss plans by Eskom on addressing the issue. One of the benefits of transportation is that it allows for the movement of people and goods in order for them to conduct social and economic activities. Transport allows for international trade and for people to participate in any market they choose. Water is a basic human right and a need for all to survive as enshrined in the constitution of South Africa.

#### 3.2.1 Telecommunications

The telecommunications sector has seen phenomenal growth in the past decade. According to Loannides, Overman, Rossi-Hansberg and Schmidheiny (2007), the ever increasing levels of Information and Communications Technology (ICT) has led to a significant reduction in the transmission and communication information costs around the world. According to Williams, Mayer and Minges (2011), between 1998 and 2008, South Africa has received the largest investment within Africa in terms of telecommunications at US$18.1 billion. This investment can be linked to the increased access to telecommunication. Nigeria was second with an investment worth US$12.7 billion, then Kenya at US$2.9 billion. The table below shows how South Africa has performed in terms of access to communications, when compared with BRICS countries.
Table 2: Access to Telecommunications, BRICS, 2005-2010

<table>
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</table>


Table 2 shows the percentage of the population with subscriptions to broadband internet, cellular phones and telephones in BRICS countries. In all these developing countries, most people prefer to have subscriptions on cell phones as opposed to telephones and broadband. In 2005, Russia crossed the 100 percent mark indicating that for every person in Russia there was at least one cellphone subscription. This could also mean that a portion of the population has more than one cellphone subscription. Brazil crossed this line in 2010 and South Africa reached it in the same year. The reason for the popularity of cell-phone subscriptions compared to other subscriptions in the country may be linked to the lengthy processes of initiating fixed lines required for telephones and broadband internet subscriptions.

Research ICT Africa (RIA) confirms the phenomenal growth in the telecommunication industry in their ICT Access and Usage Survey of 2011. The survey has sampled 12 African countries, South Africa being one of them. This survey compares data from 2007/08 with that from 2011/12. The findings show that there was a 14.9 percent increase in the number of households in South Africa with access to the internet over the four-year reviewed
period. There was, however, a 15.4 percent contraction in the number of households with a radio appliance or access to radio. This could be related to the fact that more people are choosing to have a television, a category for which a 7.1 percent increase was recorded.

By 2014, South Africa is expected to have eight undersea communications cables. The most recent addition being the Africa Coast to Europe (ACE) cable; it is expected to come to service in the third quarter of 2012. This would make the number of cables available for service increase to five, with a further three planned lines still to come to service. Undersea cables provide broadband internet connectivity and are big infrastructure projects that can take up to two years to set up.

Some of the main service providers in the telecommunications industry in South Africa are Telkom, Vodacom, MTN, Cell C and Neotel. There are also ICT infrastructure companies such as Ericsson and Siemens.

### 3.2.2 Electricity

The supply of electricity and gas has the potential to improve the quality of life of households by empowering them with energy. It is also a large input for business, as much of the equipment that is used in many industries requires electricity to function. The WEF includes the quality of electricity supplied in its GCI. Below are the ratings for electricity access in BRICS countries.

*Figure 7: Electricity GCI Ratings, BRICS Countries, 2006/07–2012/13*

Source: WEF, 2012

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23 This refers to the number of people and businesses that have access to uninterrupted electricity supply.
Figure 7 depicts the ratings that BRICS countries have received for their quality of electricity as judged by the WEF. The best rating a country can receive is seven and the lowest is one. In 2006/07, South Africa was providing the second best quality of electricity supplied amongst the BRICS nations, with a score of 4.6 points. In the years that followed, the quality of electricity began to decline progressively. This continued until 2008/09, when it reached a trough of 3.4; at this point it was 4th when compared to the other four BRICS nations. After this trough, the quality of electricity supplied improved, but the country remained in 4th position.

Brazil had the highest average quality of electricity supplied over the reviewed period. China had the most consistent improvement; its score improved each year since 2006/07, to end at the top of the BRICS nations by 2012/13. India had marginal movement and remained the lowest throughout the seven years.

The provision of uninterrupted electricity supply forms the basis for economic growth, transformation and industrialisation of an economy. According to Stats SA, the electricity, gas & water sub-sector contributes negative 1.4 percent to GDP. Prior to 2008, South Africa's strong economic growth, industrial expansion and relatively low cost of electricity had led to demand outstripping supply. The country's current electricity generation capacity of 44,000 megawatts (MW) places it well ahead of other African countries, but the demand, which is approximately 37,000MW, leaves a very low reserve margin. To deal with this, Eskom has embarked on a massive programme to upgrade and expand the electricity infrastructure of the country.

South Africa is a coal-rich country with significant deposits in the north-east of the country, a belt of deposits stretching across the Free State, in Sasolburg, where coal is converted into petrol. There are also deposits through the southern part of Gauteng into Mpumalanga and in Limpopo provinces. According to Eskom (2012), 13 of the 21 power stations in the country are coal-fired, constituting 85 percent of the net maximum electricity generation. This is followed by gas/liquid fuel turbine stations at 5.8 percent, 4.4 percent from nuclear power stations, 3.4 percent from pumped storage schemes and 1.4 percent from hydroelectric schemes. Eskom claims that since 2005, it has embarked on its capital expansion programmes budgeted at R385 billion up to 2013. This amount is expected to grow to over R1 trillion by 2026. The company has argued that this expansion will likely more than double its electricity-generating capacity. In addition, a number of other projects under Eskom’s capital expansion programmes are being constructed. These include the refurbishment, maintenance and strengthening of its current operating plants at Komati, Grootvlei, Camden Arnot, Matla, Kriel and Duvha coal-powered stations.

This is from a publication “Shift performance, Grow Sustainability, Integrated Report” for the year ended 31 March 2012.
Eskom’s power stations depend on a steady, adequate supply of water of a certain quality, thus water supply infrastructure is also vitally important. Multiple projects have commenced involving strengthening the electricity grid, coal-transportation infrastructure and a possible construction of a second nuclear station. In this case, nuclear-site assessments and front-end planning have been conducted. South Africa’s only current nuclear plant, Koeberg, is situated in the Western Cape. On the renewable energy front, projects in the Western Cape such as the Sere wind farm and solar power projects are all in a development phase.

The map below shows the main electricity-generating infrastructure projects underway by Eskom. The information on the three projects, Medupi Power Station, Kusile Power Station and Ingula Pumped Storage Scheme, is sourced from Eskom’s Capacity Building website.

**Map 1: Electricity-Generating Infrastructure Projects by Eskom**

Source: Images from Eskom, 2012

**Medupi Power Station**
This power station is a coal-fired one in Lephalale, Limpopo province. Medupi means the “rain that soaks parched lands, giving economic relief”. Medupi will be the biggest dry-cooled power station in the world. The boiler and turbine contracts for Medupi were the largest contracts that Eskom has ever signed in its 86-year history.
The planned operational life of the station is 50 years and it comprises of six units\(^\text{25}\) rated in total at 4,788MW installed capacity. Construction started in May 2007, with the first unit scheduled to be operational in 2012. Units are scheduled to come into operation in 9-monthly intervals, with the last unit scheduled to start working by 2015. According to the 2010 Eskom fact sheet on Medupi, job creation is expected to peak at 8,000 direct jobs during construction. After construction only a few hundred jobs will remain at the actual plant. The GDP of the surrounding area of Lephalale is expected to increase by approximately 95 percent per year as a result of the construction activities. The power station is estimated to grow the GDP by approximately 0.35 percent per year. Approximately 40 percent of the project cost is expected to be spent locally.

**Kusile Power Station**

Kusile is also a coal-fired power station close to the existing Kendal power station in the Delmas municipal area of the Mpumalanga province. Construction for Kusile commenced in April 2008. This is the second most advanced coal-fired power plant project by Eskom after Medupi power station. The station will consist of six units each rated at approximately 800MW installed capacity and giving a total of 4,800MW. The first unit is planned for commercial operation in 2014. The other units will be working in approximately 8-month intervals with the last unit expected to be in commercial operation by 2018. Another interesting aspect to this project is that it will be the first power station in the country to have Flue Gas Desulphurization (FGD)\(^\text{26}\) installed. The FGD Plant is a totally integrated chemical plant using limestone as feedstock and producing gypsum\(^\text{27}\) as a by-product. According to the Honourable MEC for Economic Development, Environment and Tourism for Mpumalanga, Norman Mokoena, "direct construction employment is estimated at 10,000 jobs at peak, whilst on-going direct employment is estimated at 12,750 jobs, with a total of 51,000 people to be directly impacted on by the project."

**Ingula Pumped Storage Scheme**

Construction of this pumped storage scheme\(^\text{28}\) project takes place near the north-east region of Van Reenen’s Pass near the provincial boundary between the Free State and KwaZulu-Natal. A pumped storage site needs suitable dam sites relatively close together, and they must also have significant altitudinal differences and suitable geology to generate hydro-power electricity. The Pumped Storage Scheme consists of an upper and a lower dam, both of approximately 22 million cubic metres of water capacity. The dams, 4.6km apart, are connected by underground waterways, through an underground powerhouse which houses, four 333MW pump turbines. During times of peak

\(^{25}\) A single boiler or turbine is commonly referred to as 'unit'.

\(^{26}\) FGD is the current state-of-the-art technology used to remove oxides of sulphur (SOx), e.g. sulphur dioxide (SO\(_2\)), from the exhaust flue gases in power plants that burn coal or oil.

\(^{27}\) Gypsum is used in the manufacture of dry walls and ceilings.

\(^{28}\) Unlike coal power stations, a pumped storage scheme is an electricity storage system that consists of an upper and a lower dam. The dams are connected by underground waterways in an underground powerhouse. The water flows through the waterways according to the demands on electricity.
energy consumption, water will be released from the upper dam through the pump turbines to the lower dam to generate electricity. During times of low energy demand, the pump turbines are used to pump the water from the lower dam back up to the upper dam. At the peak of construction approximately 3,000 people will be employed.

During the construction of these three new-build projects, only a few hundred people will be employed for operational purposes. However, those involved in the construction phase will have acquired skills through formal and on-the-job training while working on these projects. During the course of construction, unskilled and semi-skilled labourers would have received formal and informal training and developed skills that will substantially improve their chances of finding new jobs. It is expected that after construction, about 59,600 indirect jobs will be created, the majority of which will be in mining.

3.2.3 Transport

A good transport system is essential for both the transportation of goods and people. There are different benefits associated with investment in a country’s transport infrastructure. Amongst others the benefits include, economic, environmental, community & social and the reduced traffic congestion. This section focuses on the economic benefits of investing in transport infrastructure and lists some of the recent projects in the country and the Gauteng province. Economic benefits include firstly, a boost to the freight industry’s competiveness. This refers to the reduced production and distribution costs, by lowering barriers to mobility, giving the manufacturing, retail and service sectors access to specialized and productive labour as well as diverse selection of raw materials. Transport also strengthens local, regional and national economies.

One of the recent interesting developments in transport has been Transnet taking delivery of the New Multi Product-Pipeline (NMPP) in January 2012. The NMPP is a fuel transporting pipeline and runs from KwaZulu-Natal to Gauteng. At the time of delivery it was only transporting one type of fuel. This fuel pipe is expected to reduce the cost of moving the goods from the coast to Gauteng. It would also reduce the number of trucks on the road as more fuel is transported through the pipe thus reducing congestion and emissions of carbon.

According to the Transnet Market Demand Strategy\(^\text{29}\) of April 2012, plans have been made to expand the rail, port and pipeline infrastructure over the next 7 years to 2018/19. This capital investment programme is estimated to cost R300 billion in order to increase capacity and meet market demands such as increasing coal, iron ore and manganese lines for exports, and create a leading logistics hub for the Sub-Saharan Africa.

\(^{29}\) This information is according to the Transnet Market Demand Strategy, April 2012 presentation.
The government also places high value on the transport industry as shown by the enormous 2012/13 budget allocation for the national and provincial departments. Out of the 43 projects totalling R845 billion, investment in transport and logistics infrastructure accounted for 31 percent, about R262 billion nationally. The transport sector is categorised into different transport systems and regulated by various bodies. The four categories of transport are the Road Transport system, Rail Transport System, Civil Transport System (Air Transport) and the Maritime Transport System (Sea Transport).

**Road Transport System**

This system of transport has different agencies that regulate certain aspects of the industry. Some of the agencies include SANRAL, the Cross-Border Road Transport Agency (C-BRTA), the Road Traffic Management Corporation (RTMC) and the Road Accident Fund (RAF). According to the SANRAL Act No. 7 of 1998, the agency is mandated to construct, maintain and finance the national road network, amongst other functions. The C-BRTA is charged with managing the cross border road transport business. The RTMC was established to improve the value of providing the road traffic services and to ensure safety and security on the roads, amongst other things. The RAF started operating in 1997 with the objective of providing compulsory cover to all users of the roads. These users of the roads include residents or foreigners and the fund protects them against injuries sustained or death arising from accidents involving motor vehicles within the borders of South Africa.

One of the recent road infrastructure development projects is the Gauteng Freeway Improvement Project (GFIP). The GFIP project had different stages to advance and implement new freeways of about 560km freeway network. The first phase was improving the 185km of the most congested freeways. The GFIP did not only focus on widening the freeway, but was also aimed at improving the bottlenecks at interchanges in the province.

According to the 2012 Estimates of Provincial Revenue and Expenditure (EPRE), a total amount of R342 million has been appropriated for the construction of roads in the 2012/13 financial year. This is expected to reach R630 million by 2014/15. The projects for the province include the upgrading of the Road R55, which will double the Old Vereeniging Road between Eikenhof & Walkerville. According to the City of Johannesburg’s Integrated Development Plan (IDP), the Johannesburg Road Agency (JRA) has received an allocation of R264 million in the 2012/13 financial year. Of the allocated amount, R18 million is for the resurfacing of the roads, R10 million for the maintenance of bridges, and R5 million towards the road reconstruction programme. The Full Term Report for Ekurhuleni (2006-2011), indicates that road backlogs in the municipality are estimated at R3.6 billion and a total of 485km of road has been built in the past four years. On development of roads infrastructure in the

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30 For further information on functions, powers and responsibilities of the agency, review Chapter 3 section 25(1) of the Act.
31 Note that this was not a FIFA World Cup project as it was already planned before the hosting right were awarded to South Africa.
CoT, the IDP reports that an amount of R178.6 million has been set aside for the construction of internal roads and about R55 million for the upgrading of roads in Mabopane.

**Rail Transport**

The lack of investment in the railway networks over the past decades has resulted in the decline of the rail sector. In an attempt to correct the decline in investment, the National Department of Transport has since commenced a process of developing an all-encompassing rail policy. The rail policy will concentrate on investment and new modern technology. According to the Development Bank of Southern Africa (DBSA)\(^{32}\), the prices of rail freight increases on average 4 to 5 percent more than that of road carriage costs. Information by SouthAfrica.info (2012), specifies that in order to improve the country’s rail infrastructure and rail services, the Passenger Rail Agency of South Africa (PRASA) is to spend R136 billion to upgrade and modernise train stations, and to also obtain 7,000 new trains. This process is anticipated to create 65,000 new job opportunities. The trains to be acquired are expected to be lighter and energy efficient. Components to build the trains would mostly be sourced domestically. PRASA is expecting the new fleet of trains by 2015 and about 500 and 600 couches would be acquired annually.

**Aviation Transport**

The South African Civil Aviation Authority (SACAA) was established according to the Civil Aviation Act no. 40 of 1998. It is a statutory body which controls and regulate civil aviation in the country, overseeing issues of safety and security in the industry. The Air Traffic and Navigation Services Company (ATNS) was established under the Air Traffic and Navigation Services Act no. 45 of 1993. It is responsible for controlling air traffic for about 10 percent of world airspace. Its core functions include the provision of safe and efficient air traffic and navigational and associated services. The Airports Company of South Africa (ACSA) is listed in terms of Airports Company Act no. 44 of 1993 and its core function is to facilitate the movement of passengers and goods. ACSA is a government owned public company, which owns and manages nine airports in South Africa.

Recent developments in air transport were the upgrading of passenger airports, strongly driven by preparations for the 2010 FIFA World Cup. ACSA also constructed a new airport in KwaZulu-Natal, called the King Shaka International airport and also upgraded the O.R Tambo and the Cape Town International airports by 2010. According to information by the Public Investment Corporation\(^{33}\) (PIC), these airports development projects had a total capital expenditure of approximately R19 billion.

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\(^{32}\) This information is from the document on "Infrastructure Inputs Monitoring Project 2012" by the DBSA.

\(^{33}\) The PIC got its name when the former Pubic Investment Commissioners was disbanded in 2004 (in Act No. 23 of 2004). It is a public fund management company which manages funds for different government institutions including Government Employees Pension Fund (GEPF) and Unemployment Insurance Fund (UIF).
**Sea Transport (Maritime)**

The South African Maritime Safety Authority (SAMSA) was established in April of 1998 in terms of the SAMSA Act no. 5 of 1998. It has a mandate of “ensuring the safety of life and property at sea, prevention and combating of maritime pollution from ships and contributing to the release of the full potential of the maritime industry in South Africa”. According to information by the Transnet National Ports Authority (TNPA), although the country has eight ports, there is no commercial vessel that is registered in South Africa because of the uncompetitive tax system. These taxes have led to the country losing its status as the gateway to Africa. The highest trade volumes occur through the Richards bay port and in June 2012, TNPA announced that it would be constructing a floating breakwater system in Richards Bay. This is an erosion-control structure which reduces waves by 70 to 80 percent and will make docking at Richards Bay much smoother.

The total capital investment on the Richards Bay through Transnet’s 7 year plan is estimated at R49.9 billion. For South Africa’s second busiest port, Durban, R38.5 billion is expected to be invested to increase capacity. An investment amount of R25.9 billion is expected to upgrade the three sea ports in the Eastern Cape, East London, Ngqura and Port Elizabeth. Saldanha and the Cape Town ports in the Western Cape are expected to receive an investment of R28.6 billion and R3.9 billion respectively under the 7 year Transnet capital investment programme.

The auto motor industry, which is one of the biggest users of ports for components as well as finished vehicles, has released a study in 2009, called “the South African Automotive Industry: A Reflection on the First Year of the Economic Crisis”. This study captures, amongst other issues, challenges that are faced by the automotive industry. One of the challenges mentioned is the unproductiveness of the country’s ports which slows down production, increases costs and thus limits economic activity and employment creation.

### 3.2.4 Water

With the democratisation of South Africa in 1994, more emphasis was placed on increasing access to water without giving the necessary attention to the sources of water. This is likely to lead to a water shortage in the near future. The most immediate solutions that the Department of Water Affairs (DWA) has identified are demand management as well as fixing the current infrastructure so that there is less wastage between the source and the final consumer. It is estimated that South Africa will need to invest R670 billion over the next ten years so that it will be able to meet its water demands, although only R332 billion had been budgeted.
The DWA has six projects which are under construction for the period 2011/12 to 2013/14. In terms of budget allocations, the biggest project which is still under construction is the phase 2A of the Olifants River Water Resources in Limpopo with an allocation of R3.08 billion. There are also 11 new projects that are to be initiated during this period. Of the new projects, the biggest will be the Mzimvubu Water Resource Project in the Eastern Cape which has been allocated R20 billion. This project is still in the pre-feasibility stage. The second largest is the phase 2B-H of the Olifants River Water Resources in Limpopo with an allocation of R13.11 billion. The Lesotho Highlands project’s allocation was the third largest at R7.3 billion as per the 2007 budget estimates.

The DBSA has released a report on the conditions of infrastructure in the country. Most of the information in this section is taken from this report. The main sources of water in the country are rivers and dams that rely on rainfall to keep them thriving. That means if there is drought, which has in the past lasted for up to 10 years, no new sources of water have been targeted to counter this risk. The sources of water are often far from where they are needed, the majority of the water supplies in South Africa are found in the east of the country. South Africa shares its four main rivers with its neighbouring countries. The four rivers are Limpopo, Inkomati, Pongola and the Orange River. There are 4,718 dams in South Africa, 305 are owned by DWA which account for 70 percent of the total dam capacity in the country.

According to the DBSA (2012) there are two main categories of water infrastructure in the country, namely, water resources and water services. Water resources infrastructure is the infrastructure that is needed to collect water, such as dams and these are usually placed near natural sources of water such as rivers. Water services infrastructure is further divided into regional bulk water service, local water & wastewater treatment plants and then internal treatment & reticulation networks. Currently 60 percent of the water is used by the agriculture sub-sector; municipalities and households use up about 27 percent.

The DWA is currently drafting its second water strategy in which it will include all stakeholders as they find ways to address the challenges faced by this industry. Some of the challenges include the lack of the necessary funding to ensure that there is sufficient investment in water infrastructure.

The economic spinoffs from massive infrastructure projects are beneficial to many communities in rural areas. One such example was the Lesotho Highlands Project, which according to the state-owned entity Trans-Caledon Tunnel Authority (TCTA), enabled hundreds of kilometres of engineered paved roads to be built in order to improve access to the different construction sites together with engineered unpaved feeder roads around the dams.  

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37 This is from a 2012 publication on *The State of SA’s Economic Infrastructure.*

38 TCTA was established to finance and implement bulk raw water infrastructure. The state-owned entity was formulated in terms of the Government Notice No 2631 in Government Gazette No 10545, dated 12 December 1986.
This road network continues to provide much improved communication for many villages in the mountainous interior and provides the Lesotho government with a source of income in exchange for water. Under the project, the Katse and Mashai dams generate approximately 276 MW of power. According to information by the Information Portal on Corruption and Governance (2010), this Lesotho Highlands Project, including the phase one to four, which will be completed by 2020, is estimated to cost US$8 billion.

4. Infrastructure Projects within Gauteng

This section focuses on the infrastructure projects by the Gauteng Provincial Government (GPG) and metropolitan municipalities (metros). The province hosts three of the country’s nine metropolitan municipalities namely, City of Johannesburg (CoJ), City of Tshwane (CoT) and Ekurhuleni. GPG departments that deal with infrastructure development, collaborate with the Gauteng Department of Infrastructure Development (GDID), which ensures that the physical structures are constructed. Some of the projects that GPG departments are undertaking include, the hospitals revitalisation programme, Gauteng Schools Programme, the William Nicol Road and the G-link Broadband Project. The G-link project was first announced in 2008 at the Gauteng ICT summit hosted by the GPG in June 2012. It was mentioned that at the completion of the project, 95 percent of Gauteng households would have access to affordable broadband internet connection at a speed of 5 mega bit per second.

4.1 Metropolitan Municipal Projects

This section discusses infrastructure projects that will be undertaken by the different metros within the province. Only the three categories of infrastructural developments are discussed in each case namely, health, road & transport and water & sanitation.

4.1.1 CoT Projects

The CoT is the third biggest contributor to the economy of Gauteng and has planned different projects that it anticipates will drive its economic direction. In his budget speech for the CoT, the Honourable Mayor Kgosientso Ramokgopa announced that as part of developing and creating beneficial economic regions, the city has just finalised the development of a “Zone of Choice”. This “Zone of Choice” is an Industrial Development Zone which according to the South African Revenue Service is defined as an industrial estate which is tailored for manufacturing and storage of goods to boost beneficiation, investment, economic growth and the development of skills and employment in the regions.
In this 2012/13 financial year, the CoT will be involved in several infrastructural projects that have been identified in the IDP for 2012 to 2016. In the strategic objectives of this IDP, the CoT aims to generate long-term economic benefits such as the creation of jobs and growing investment. It has also considered partnering with business and other government spheres to also grow skill development programmes. The IDP also indicates that employment will be created through some of the Expanded Public Works Programmes (EPWP). The projects will include the construction and improving of health facilities, road & transport systems, water & sanitation infrastructure, construction & improvement of libraries and provision of housing to the poor.

**Health**
- An amount of R16 million has been allocated for construction of a new clinic in Doornpoort.
- An amount of R13.5 million has been allocated for the construction of Gazankulu, a new clinic next to an informal settlement in Atteridgeville.
- An amount of R15 million has been allocated for the extension of Olivenhoutbosch clinic.

**Road & Transport**
- The project for the upgrading of roads from gravel to tar in Zithobeni and Ekangala has been prioritized and an amount of R50 million has been allocated.
- Construction of cycle and pedestrian paths at R8 million.
- The CoT has, in July 2012, started constructing its Bus Rapid Transit (BRT) system. The R2.6 billion project will stretch over 80km and will operate on 51 bus stations.\(^{42}\)

**Water & Sanitation**
- For the eradication of the flooding backlogs in Soshanguve South and Akasia, an amount of R56 million has been allocated.
- An amount of R90 million has been allocated for the storm water drainage system in Garankuwa.
- For replacement, upgrade and construction of water treatment works, an amount of R1.18 billion has been allocated.
- The upgrading of sewer systems to the value of R24.6 million.

**4.1.2 CoJ Projects**

The CoJ is the biggest contributor to the economy of Gauteng and is home to many historical townships in South Africa; including Soweto and Sophiatown. It is one of the most diverse municipalities in Gauteng in terms

\(^{42}\) The BRT information was sourced from the Engineering News website.
of economic and social activities. The 2011/12 IDP of CoJ mentions seven development strategies for the city. The infrastructure projects in the city will ensure that these development strategies are fulfilled. The seven strategies include supporting an efficient movement system, ensuring strong viable nodes and facilitating sustainable housing environments in appropriate locations. Some of the projects which the city will engage in include;

**Health**
- New clinics that will be constructed include the Deland Clinic, Mountain View Clinic, Slovoville Clinic and the Mpumelelo Clinic in Ivory Park. The construction of these clinics will take up a total of R17.6 million.

**Road & Transport**
- The CoJ is planning and expanding the Rea Vaya bus system in such a way that 85 percent of the residents are within 500 meters radius of Rea Vaya BRT. According to the transport Member of the Mayoral Committee, Ms Rehana Moosajee, by May 2012 the Rea Vaya ridership numbers had increased to 42,000 per day.

**Water & Sanitation**
- The main strategy that the city has for water management is to improve the sources that it already has, as it is not near any major water sources. The 2012/16 IDP indicates that 96 percent of its population has access to water and it intends to improve this to 100 percent.
- The project of processing of biogas from the sewage system to electricity has been allocated a budget of R34.8 million.
- The city has budgeted R10 million for the construction of a new water treatment plant in Lanseria.

### 4.1.3 Ekurhuleni Projects

This metro was formed in December 2000, as an amalgamation of nine towns and combined 11 administrations to unify all functions into a single municipal body. The 2011/12 to 2013/14 IDP of Ekurhuleni describes this municipality as having multi-nodal centers. The primary activity nodes are located within a 10km radius of the aerotropolis situated in Kempton Park and are inclusive of Edenvale, Boksburg, Germiston and Benoni. Hence, to ensure communal accessibility to these nodes, the main focus of Ekurhuleni is to integrate them predominately through the improvement and development of its transport infrastructure.

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43 Information is according to http://www.ekurhuleni.gov.za/about-ekurhuleni/history-of-ekurhuleni
Ekurhuleni has identified seven focus areas which are called physical development agenda and strategy. These focus areas will see the metro creating a clear city identity, spatial development, building roads & transport, service infrastructure, environment management, urban renewal and ICT infrastructure.

The aerotropolis will be in this metro as a collaborative effort between the Ekurhuleni metro and the Blue IQ. In its 2010/2011 annual report, the Blue IQ reported that the OR Tambo International Airport has been identified to be an Industrial Development Zone (IDZ). The Blue IQ also points out that this IDZ aerotropolis will have industries such as time-sensitive manufacturing, e-commerce fulfilment, telecommunication & logistics, hotels, retail outlets, entertainment complexes and offices for business people who travel frequently. The Ekurhuleni municipality has also started with industry and public consultations. They have also engaged field experts in research that have come up with papers recommending what models to follow.

**Health**
- The construction phase of several new clinics has begun, inclusive of the Slovo Park and the 1st Avenue clinics. The metro has allocated R48.3 million for these projects.

**Road & Transport**
- Construction projects for new storm water drainage systems, including that of Atlasville and Quinine, have been prioritized as R63.6 million has been made available for this purpose.
- For the maintenance of both roads and storm water drainage systems, R269 million was allocated.

**Water & Sanitation**
- Midblock water meter projects have been initiated for areas such as Tembisa and Daveyton for which the metro provided R13 million.
- A budget of R20.7 million has been allocated for the replacement of old meters.

5. Challenges and Opportunities in Infrastructure Development

According to Deloitte & Touch (2012)\(^44\), infrastructure remains the biggest obstacle towards Africa achieving its economic growth potential. Competitiveness and efficiency continue to be hampered by inadequate development in transport, communications, water and power infrastructure. The paper also points-out that about six of the world’s

\(^{44}\) This is information according to a document titled, “Addressing Africa’s Infrastructure Challenges”
fastest growing economies are situated in the Sub-Saharan Africa region. The table below lists some of the challenges faced by the country in developing its infrastructure.

Table 3: Challenges in Infrastructure Development

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>Funding remains a key challenge facing infrastructure investment. Most infrastructure projects are financed on loans and this has led to budgetary constraints in the majority of the projects.</td>
</tr>
<tr>
<td>Approval Processes</td>
<td>According to a KPMG survey of 2011, public sector officials have cited the slow approval processes as a challenge in spending infrastructure funds quickly and effectively.</td>
</tr>
<tr>
<td>Delivery Models</td>
<td>More delivery models and investment solutions make it difficult to identify the most efficient approaches.</td>
</tr>
<tr>
<td>Policy</td>
<td>In the absence of clearly defined policy directions, there is disinterest to initiate new projects.</td>
</tr>
<tr>
<td>Skills shortage</td>
<td>Skills shortage remains one of the biggest challenges facing most economies in Africa. In the case of South Africa, an example would be the welders from China working at current Eskom projects because the country lacks skill in these fields.</td>
</tr>
</tbody>
</table>

Source: SOAC Calendar, DBSA and Deloitte & Touch, 2012
Note: SOAC= State-Owned Assets Supervision & Administration Conference

Some of the opportunities of investing and developing infrastructure include, job creation, social development, economic efficiency and skills development as listed in Table 4.

Table 4: Opportunities of Infrastructure Development

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Job Creation</td>
<td>As in the example of Keynes mentioned above, infrastructure projects tend to be labour intensive and require both skilled and unskilled labour to implement them. The impact of jobs created through infrastructure projects tend to stimulate employment opportunities more during times of high unemployment, such as those being experienced in South Africa currently. The NGP says that infrastructure development has the potential to create 25,000 jobs by 2015. In the Ingula Pumped Storage Scheme, which is discussed in section 3.2.2, about 3,000 jobs were created at the height of construction.</td>
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<tr>
<td>Social Development</td>
<td>This is easily seen in the improvement of roads and public transport facilities especially in rural and underdeveloped areas. The improvement translates into mobility for the population so that they can access essential services. Through the construction of schools, hospital and clinics, government in all three tiers improves access to services and the quality of life for its citizens. Some of these social development projects are discussed in section 4.</td>
</tr>
<tr>
<td>Economic Efficiency</td>
<td>As per the definition in section 2; infrastructure provides the back bone of any economy. This is particularly true for improvements in rail and pipelines. When managed, these types of transportation modes have the capacity of moving bulk goods in a cheaper way for society. They have the potential to reduce road traffic and thus also limiting damages done on road surfaces by heavy trucks. They limit the amount of carbon emissions in the environment. Multinational companies often look at the state of infrastructure before investing in a country.</td>
</tr>
<tr>
<td>Skills Development</td>
<td>With the construction of roads, power stations and dams, expertise is brought in from different countries or sectors. People that are employed in infrastructure projects do gain work experience which they can then use in other employment opportunities or when starting up their own business.</td>
</tr>
</tbody>
</table>
6. Conclusion

The economic challenges that are faced by countries during this period of global economic uncertainty caused many of those countries to look internally for economic growth. History has shown that one of the most effective tools that can be used to promote growth internally is investment in infrastructure. Following the great depression example of the 1930s in the USA, a countercyclical approach by governments in the form of infrastructure investment has proven it can offset low economic growth. South Africa is no exception to this global economic uncertainty currently being experienced, as its economic performance correlates highly with global trends. Thus as the country engages in infrastructure development projects, this will create employment and translate into the multiplier effect to other industries in the economy. Once a construction project is completed it can leave long-term employment opportunities because the infrastructure requires maintenance and generally improves the efficiency of the market, facilitating long-term economic growth.

The South African government has many ambitious and necessary infrastructure plans across all sectors of the economy and different levels of government. To address the infrastructure challenges that are faced by the country, the PICC was established. The PICC has identified 17 Strategic Integrated Projects for South Africa which it hopes will not only change the physical landscape of the country but also change the quality of life for all South Africans.

South Africa’s infrastructure is ranked highest amongst the BRICS nations, thus a foundation for spring boarding potential economic growth has already been laid. The tertiary sector invests the most in infrastructure development and is also the highest contributor to economic growth in the country. Within the telecommunications industry, the public and private sectors are working together to improve access to this technology.

There had been underinvestment in electricity in the country and by 2008, demand exceeded supply. This led Eskom to aggressively invest in electricity generation capacity, leading to some big infrastructure development projects such as the Ingula Pumped Storage Scheme, Kusile and Medupi power stations. In the transport sector, there are many sub-industries, with government agencies that assist or are responsible for the running of such industries. These include state owned enterprises such as Transnet and PRASA, whose capital projects are set to improve on their respective infrastructure asset base. There are still challenges that are faced particularly by the rail and sea port sector which has very high capital costs.

Infrastructure plans by the GPG for the near future include Gauteng Schools Programme and the G-link project. Various metros have plans in place to build low cost housing, improvements and or construction of new libraries.
and local health facilities through their respective IDPs and infrastructure programmes. Of the metro municipal projects, one of the biggest is the development of the aerotropolis in Ekurhuleni.

Despite the challenges faced by the country in infrastructure development, the GPG believes that pursuing down this road will benefit the economy during these tough and uncertain economic times. The opportunities provide hope to both the unemployed, unskilled labour and entrepreneurs entering into the market. Market efficiency provided by good infrastructure creates an environment for further investment and incentivises participation by the foreign investors and the private sector.

7. List of References


