An Assessment of the South African Government's Gauteng Freeway Improvement Project (GFIP) Toll Road Strategy

RESEARCH REPORT

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Abstract

The South African government has decided to introduce an extensive toll road system in the Gauteng Province, to fund the road upgrades in the Gauteng Freeway Improvement Project (GFIP). This research report assesses the effectiveness of this funding strategy by analysing the social, economic and environmental impact of the GFIP toll road. The user pay principle is also interrogated to assess the fairness of the toll tariffs to be levied on different user groups. This study has found that the GFIP investment was an unstrategic investment in transport infrastructure. It is proposed that an integrated multi-modal transport strategy is developed, that prioritises the development of the railway system for freight cargo and public transport. As freight vehicles cause more than 99% of roads damage, it is proposed that toll tariffs are only applied to freight vehicles, to lessen the negative social impact of tolling. It is proposed that an independent transport regulator and a consumer council are established, to protect consumer interests, to ensure the independent review of toll tariffs, and to review future public-funded transport investments.

Acknowledgements

This report is dedicated to my beloved country South Africa, in the interests of building our democracy on the pillars of transparency, accountability and public consultation.

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I Definitions, Acronyms and Abbreviations

AFDB	African Development Bank
AICD	Africa Infrastructure Country Diagnostic
BOT	Build, Operate and Transfer
CSIR	The Council for Scientific and Industrial Research
DBFO	Design, Build, Finance, and Operate
DEAT	Department of Environmental Affairs and Tourism, South Africa
DOE	Department of Energy, South Africa
DOT	Department of Transport, South Africa
ETC	Electronic Toll Company (Pty) Ltd
Electronic Tolling	Payment of toll fees using electronic means and not cash. Also known as e-tolling.
Fuel Levy	A flat rate tax on fuel. Governments often use fuel levies to reduce the tax burden on their citizens.
GDP	Gross Domestic Product
GFIP	Gauteng Freeway Improvement Project
GHG	Green House Gas
GVM	Gross Vehicle Mass
IDP	Integrated Development Plan
IRPTN	Integrated Rapid Public Transport Networks

IRR	Internal Rate of Return
ITP	Integrated Transport Plan
JSE	Johannesburg Stock Exchange
JV	Joint Venture
MAE	Material Adverse Event
NATMAP	National Transport Master Plan
North-South Corridor	The North-South Corridor, also known as the Durban Corridor, links South Africa to rest of Africa. It is the busiest regional transport transit link in eastern and southern Africa and the most extensive corridor in the SADC region, linking South Africa with Botswana, DRC, Malawi, Mozambique, South Africa, Zambia, and Zimbabwe.
ORT	Open Road Tolling. A multi-lane free flow electronic tolling system that allows for tolls to be charged without vehicles having to stop or slow down. Overhead gantries will be fitted with toll collection equipment that recognises the electronic transponder (e-tag) in a vehicle. The toll fee will then be deducted from a user's registered e-toll account, or a bill will be sent to unregistered users.
PFI	Private Finance Initiative
PPP	Public Private Partnership
PRASA	Passenger Rail Agency of South Africa
REC	Regional Economic Community
ROI	Return on Investment
SADC	Southern African Development Community
SANRAL	South African National Roads Agency Limited
Stats SA	Statistics South Africa
TFR	Transnet Freight Rail

Tolling	Charging drivers a fee for the use of a road. Tariffs are normally charged for different classes and weights of vehicles.
Toll Road	Roads where drivers are required to pay a direct fee (toll) for the use of the road. The toll fees are used for the development and upkeep of the road.
UNFCCC	United Nations Framework Convention on Climate Change
User Pay Principle	SANRAL uses the term “user pay” principle synonymously with “tolling”. In the transport sector generally, “user pay” refers to individual users, or a class of users of a mode of transport paying a fee for the use of the facility that is proportional to the usage and maintenance costs to which they directly contribute.

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1. Nature and Scope of Research Study

1.1 Introduction

The Gauteng Freeway Improvement Project (GFIP) is the single largest national road project of the South African government in over twenty years. GFIP was launched by the South African National Roads Agency Limited (SANRAL) in 2007, to improve the national roads infrastructure in the Gauteng Province, reduce traffic jams, and broaden economic and social development opportunities (SANRAL, 2011a).

Through SANRAL, the South African Department of Transport (DoT) will be investing R55 billion in the project and SANRAL will raise a total of R29 billion in debt finance to upgrade and improve critical road networks. A user pay system was adopted to repay the debt financing of the project. SANRAL decided to implement an electronic open-road tolling system on completion of the GFIP towards the end of 2010 (SANRAL, 2011a).

However, the proposed pricing of the toll tariffs has led to an outcry from the public, business associations, trade unions, opposition parties and even from provincial and local spheres of government in the Gauteng province. The strategic wisdom of the entire project is now being interrogated, to the extent that the implementation of the tolling system has been put on hold, while the tariff structure is being reviewed through consultation with various stakeholders. On 23 October 2011, the Minister of Transport ordered SANRAL to also halt the planned toll road projects in the Eastern Cape and Western Cape Provinces, due to public pressure (Philp, 2011).

The Department of Transport and SANRAL are being accused of a lack of transparency and consultation on the decision to implement an expensive and complicated tolling system to fund the GFIP. Criticisms are also being levelled at the excessive construction costs of the roads development compared to World Bank statistics from other countries, the unnecessary cost of an expensive electronic open-road tolling and policing system and the pricing structure of the toll tariffs that is seen

to be excessive and abuses SANRAL's market power (The Road Freight Association, 2011).

Currently the GFIP toll road is one of the most hotly debated and criticised issues in the public domain in the Gauteng Province and concerns over planned toll roads are spreading to other parts of the country. The South African broadcaster focused on the public outcry over the GFIP toll road on the television programme Special Assignment on 10 November 2011, when the Deputy Minister of Transport, Jeremy Cronin, spoke out strongly about the lack of a government investment strategy in transport and SANRAL overstepping its mandate in this policy vacuum (SABC 3, 2011).

This makes it an interesting time to conduct this research project, which aims to delve deeper into the merits and criticisms of the GFIP toll road project and to critically analyse whether or not the tolling of road users in Gauteng is the best government strategy to fund the upgrade and development of national roads in the province.

1.2 Background and Importance of the Study

The Gauteng province is the economic heartland of South Africa, generating 38% of the country's economic activity. Gauteng has almost 47% of the country's vehicle population and almost 90% of freight cargo is moved by road (SANRAL, 2011a). With the Durban harbour being the largest and deepest port on the African continent, the Gauteng national roads form part of the very strategic North-South Corridor, also known as the Durban Corridor, which ensures that cargo freight is moved into the rest of the country and into the SADC region. The Gauteng freeways are integral to this supply and logistics network and are therefore of strategic importance for the South African and Sub Saharan economies (Department of Transport, 2010a).

The Gauteng province however, has developed beyond its infrastructural capabilities and the roads are unable to accommodate the increasing traffic demands. This has affected road users and the economy by excessive peak-hour traffic periods each morning, midday and evening, leading to limited family and leisure time and

decreased productive hours for businesses due to time wasted on the congested roads (SANRAL, 2011a).

SANRAL plans to minimise the congestion on the roads through the Gauteng Freeway Improvement Project (GFIP). In the first phase, 185 kilometres of the existing freeway network will be upgraded. A further 376 kilometres of upgraded and newly constructed freeways is planned during the lifespan of the project (SANRAL, 2011a).

In South Africa, the level of road investment has been growing at a rate of 16% per annum for the last five years. However, the country still has a backlog of R75 billion to restore its roads to a reasonable condition, and needs to spend twice what it currently does per annum to reinstate the network, of which 85% needs to be rehabilitated. The fuel levy currently collects R35 billion per annum which goes into the national revenue fund. The national treasury allocates R25 billion to subsidise public transport, primarily the passenger rail and bus systems (Copley, 2010). About R29 billion was allocated for road maintenance in 2010 (SANRAL, 2011a), while the DoT estimates a backlog of R149 billion (DoT, 2011b).

According to government policy, SANRAL has two revenue streams. The national treasury makes a budget allocation to SANRAL through the Department of Transport to fund non-toll roads, which make up 81% of the national road network. SANRAL is also allowed to apply the user pay principle to fund the toll road network, which makes up 19% of the national road network. In total, SANRAL manages about 16,150 kilometres of national roads. The provincial and local governments are responsible for developing and maintaining provincial and local roads (SANRAL, 2011a).

SANRAL was allowed to issue private bonds to fund the capital expenditure of the GFIP. The electronic tolling system will be used to implement the user pay principle, so that SANRAL can generate a revenue stream to service and repay the debt financing. A contract worth US$ 155 million for the installation and operation of the toll collection system was awarded to the Electronic Toll Collection Joint Venture in September 2009, as a public-private partnership (PPP). The joint venture includes

Kapsch Sweden, Kapsch Austria and a South African company, Traffic Management Technology. These shareholders have been incorporated into a company, Electronic Toll Collection (ETC), in a complicated shareholding structure that will be explained further in this research report (SANRAL, 2011a).

There is currently heightened public concern over the lack of transparency about perceived excessive development costs and the financial structure of the GFIP and tolling projects (RFA, 2011). The GFIP toll road return on investment (ROI) and cost-benefit analysis studies conducted will be further investigated and the views of various economists will be discussed in this report.

Public funding shortages, declining roads infrastructure, increasing traffic volumes and congestion on roads are global trends. The implications are increasing social and economic costs of time-delays on the roads. The potential social, economic and environmental impact of the GFIP toll road will be further examined in this research report.

The environmental implication of congestion is the rise in harmful carbon emissions that cause global warming and climate change. The need for the reduction of carbon emissions by reducing the number of cars on the roads is an important government objective (DEAT, 2004). The potential for the GFIP toll road to reduce peak hour traffic volumes by promoting car-pooling and the use of safe, affordable and available public transport will be assessed in this research report.

International best practices relating to road development funding strategies will be reviewed in this research report to find out what South Africa can learn from other countries, to assess if there are better alternative funding strategies than the GFIP tolling system and to discuss some of the benefits and pitfalls in commercialising public roads.

Historically, private commuters have subsidised business freight road users, who are primarily responsible for damaging the roads (DoT, 2010b). As SANRAL proclaims to be implementing the user pay principle, it is important to assess if this anomaly is addressed in its toll road tariff structure. This research report will look into whether or

not the toll road tariffs implement the user pay principle fairly, relative to the damage to the roads by freight operators and the economic benefit derived by different road user groups.

This background has provided an overview of the context of this research study and the importance of the research project within the current public need for answers about the GFIP toll road and has summarised the broad objectives of the study. The research problem and sub-problems are stated below.

1.3 Statement of Problem and Sub-problems

Problem Statement:

The researcher proposes to conduct a critical analysis of the tolling of road users, in the case of the Gauteng Freeway Improvement Project (GFIP), as a government funding strategy for the development of national roads.

Sub-problems:

1. The first sub-problem is to assess the potential social, economic and environmental impact of government implementing the user pay principle by tolling all national-road users in the Gauteng Province.
2. The second sub-problem is to assess if tolling is the best funding strategy for the Gauteng Freeway Improvement Project (GFIP), compared to other funding strategies that government can adopt, such as increased government funding through the National Revenue Fund, increasing the Fuel Levy, government borrowing from international infrastructure funds and privatisation of the roads.
3. The third sub-problem is to determine if the user pay principle is being fairly applied in the planned toll charges of the GFIP toll road, relative to the damage caused to the roads and the economic gain benefitted from using the roads, from a public-commuter versus freight-user perspective.

1.4 Research Objectives

The purpose of the research is to assess whether or not the tolling of road users in Gauteng is the most effective government strategy to fund the development of national roads in the Gauteng Freeway Improvement Project (GFIP).

The research objectives of this study, summarised in **Figure 1** below are:

1. To investigate the potential advantages and disadvantages of implementing the user pay principle by tolling all national roads in the Gauteng Province. This will include:
   - The potential social impact of the GFIP toll road in the Gauteng province;
   - The potential economic impact of the GFIP toll road on the Gauteng province, the national economy and the SADC regional economy; and
   - The potential environmental benefits of implementing the GFIP toll road.

2. To assess if tolling is the best funding strategy for the Gauteng Freeway Improvement Project (GFIP). This will include assessing other funding strategies that government can adopt, such as direct government funding through the National Revenue Fund, increasing the Fuel Levy, government borrowing from international funds and privatisation of the roads.

3. An interrogation of the implementation of the user pay principle, from a public-commuter versus freight-user perspective, to determine if the pricing of the toll tariff is being fairly levied on all users, relative to the damage caused to the roads and the economic gain benefitted by the different road user groups.

Figure 1: Research Objectives

1.5 Scope of the Study

The study will focus on the following aspects of the project, to limit it to the scope of an MBL research project:

In Scope:

a) The development of the Gauteng Freeway Improvement Project, development costs and financing structure;
b) The plans for the electronic open-road tolling of Gauteng national roads;
c) Funding strategies for national roads infrastructure development, including Public Private Partnerships, the Fuel Levy, allocations from the National Revenue Fund, borrowing from international funds and privatisation of the roads;
d) International best practices and experiences with regard to funding strategies for roads development;

e) The potential social, economic and environmental impact of the GFIP toll road; and
f) The transport user pay principle.

Out of Scope:

a) All other transport infrastructure investment projects;
b) All other South African toll road projects;
c) All other South African Public Private Partnership projects; and
d) Any analysis where time-based evidence and findings are required.

1.6 Assumptions of the Study

a) Given that the infrastructure for the open road toll collection has already been built at a massive cost and contracts have been signed by SANRAL with the Electronic Toll Company, it is assumed that the GFIP toll road project will not be cancelled. This assumption is despite the order by the Minister of Transport on 23 October 2011 to halt all toll road plans for further consultation.
b) It is assumed that all motor-vehicle owners in Gauteng will use and therefore be affected by the planned tolling of the Gauteng freeways in the GFIP network.
c) It is assumed that all freight operators moving cargo from the Durban harbour to Gauteng and into the rest of the SADC region will at some point use and therefore be affected by the planned tolling of the Gauteng freeways in the GFIP network.

1.7 Potential Benefits of the Study

Policy makers and affected stakeholders are currently grappling with questions and criticisms about the feasibility and sustainability of the GFIP toll road. The government and SANRAL, which in 2007 had plans to roll out the GFIP toll road strategy model to other parts of the country, have now been forced to review this strategy due to increasing public scrutiny and pressure for accountability, transparency and consultation (Smith, 2011).

The potential benefits of this research study will be to interrogate the effectiveness of the tolling strategy compared to other funding models available and international best practices. The intention of the researcher is to publish the research findings and make the report publicly available to interested and affected role-players, to assist them in reviewing the GFIP toll road strategy, in planning for the next phases of the GFIP development and perhaps even in planning for future road infrastructure development projects in South Africa.

It is the hope of the researcher that the critical analysis of the GFIP toll road strategy in this research report will provide some knowledge and information to policy makers, to assist them in arriving at the best strategies for funding much needed road infrastructure development in a country that has limited fiscal resources and many competing fiscal demands.

Ultimately, it is hoped that policy makers will recognise that roads need to be viewed within the broader transport system and all the different transport modes impact on each other. It is only by having a broader view of the entire transport system that investments can be properly prioritised to meet the social needs of our citizens and boost economic growth in our country in a sustainable and scalable way.

1.8 Possible Constraints to the Research

The first possible constraint to the research is the lack of availability of information from SANRAL on:

- The costs and financing structure of the GFIP;
- The Public-Private Partnership agreements; and
- The financial projections of the GFIP toll road.

Perhaps in the next few months, due to increasing public pressure for transparency, more information will become available. Without this information from SANRAL, the researcher will make use of financial projections and estimates prepared by various economists representing affected business associations.

The second possible constraint to the research is the lack of availability or willingness of key decision-makers to be interviewed for this research project. The public and media spotlight on the GFIP toll road may result in increased sensitivity and caution by government decision-makers to speak freely on this topic.

The third constraint to the research is the inability of the researcher to conclusively predict how the toll road will affect commuter behaviour. Without data collection over a period of time, starting when the toll road is implemented, it is only possible to speculate and arrive at educated guesses on the social, economic and environmental impact of the toll road.

1.9 Outline of the Research Report

Figure 2 below depicts a chapter outline of this research report:

Figure 2: Outline of the Research Report

2. Overview of the Gauteng Freeway Improvement Project

This chapter provides a brief overview of the GFIP project, specifically describing the extent of the infrastructure plans, the Electronic Open Road Tolling system to be used for toll collections, and the GFIP financial model, which is currently under intense public scrutiny.

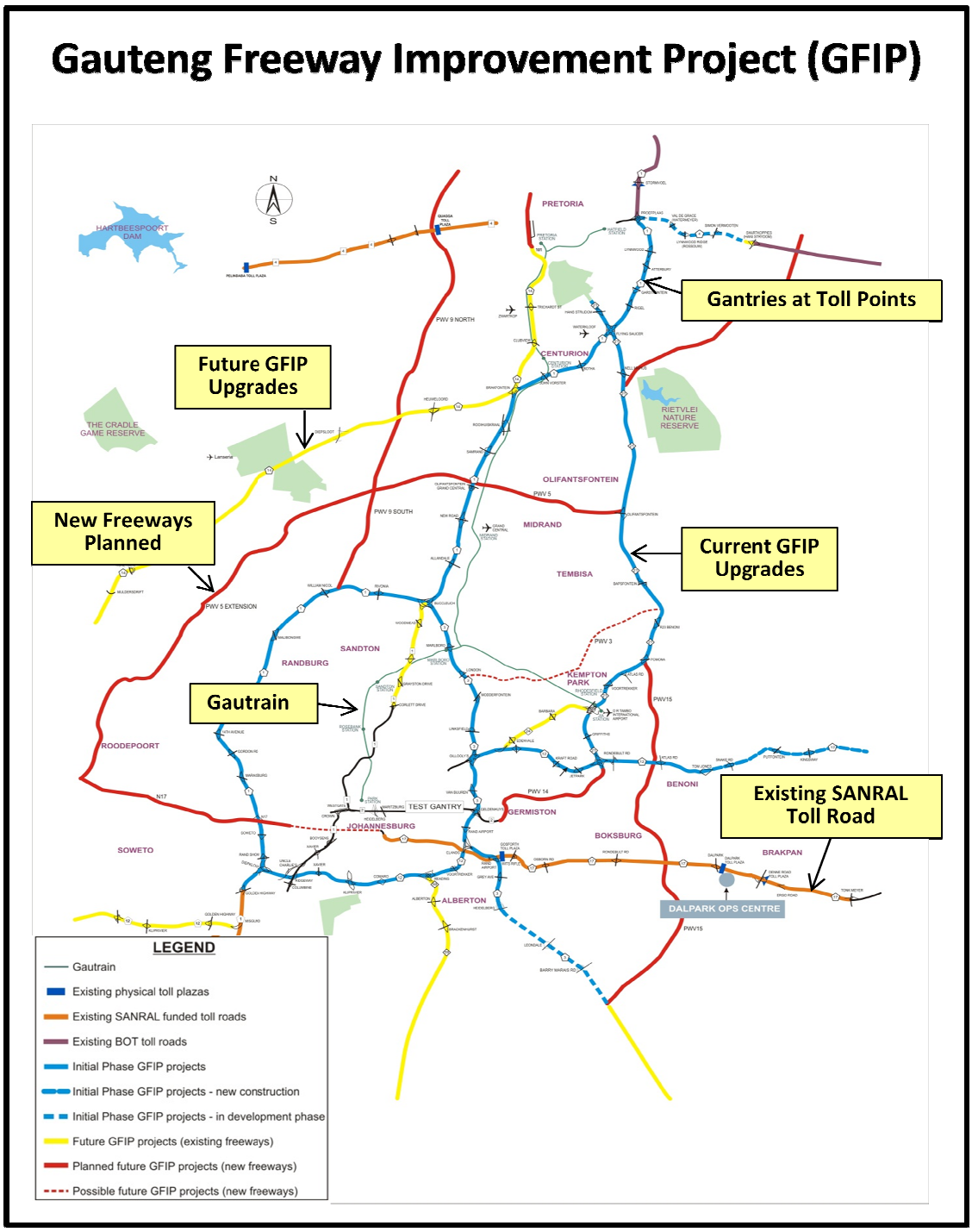
2.1 The GFIP Infrastructure Plans

The Gauteng Freeway Improvement Project (GFIP) was launched by the South African National Roads Agency Limited (SANRAL) in 2007, at an overall approximate cost of R20 billion, to improve the road infrastructure network in Gauteng and to alleviate traffic congestion. The GFIP involves the identification and removal of bottlenecks at interchanges by widening freeways to four lanes and the construction of new freeways. The project also includes the construction of new bridges and rebuilding several existing bridges (SANRAL, 2011a).

The first phase of the project involves upgrading 185 kilometres of the existing freeway network, initially scheduled for completion by 2010 and upgrading a further 65 kilometres of freeway, initially scheduled for completion by 2012. Further, new freeway sections will be developed, 34 interchanges will be upgraded and a few old bridges will be demolished and rebuilt (SANRAL, 2011a).

The second phase of the project involves the construction of 63 kilometres of freeway sections and the development of new freeway sections, expected to be completed by 2020. The final phase of the project will involve constructing 85 kilometres of new freeway routes and is scheduled for completion after 2020. The financial feasibility of the phase three developments is still to be decided (SANRAL, 2011a).

Map 1 below shows the GFIP plans. The map clearly indicates the existing SANRAL toll roads, the routes that are being upgraded and the future freeways sections that are planned. The 45 electronic toll points, where the gantries are located, are indicated by circles on the map. Electronic tolling is explained further on in this chapter. The Gautrain railway line is also indicated on the map below.



Map 1: Gauteng Freeway Improvement Project
Source: Adapted from DoT (2011d)

2.2 The GFIP Open Road Tolling Electronic System

SANRAL has decided to implement a user pay system to generate the revenues needed to service the debt it will be incurring on the GFIP roads development. To collect the tolls, SANRAL has decided to use Open Road Tolling (ORT), which is a form of electronic toll collection, except that in ORT systems the driver does not have to stop at a toll booth to pay the toll fees (SANRAL, 2011c).

Figure 3: ORT: The e-Tag
Source: ETC (2010)

Road users are required to have an e-tag transponder in each vehicle, as is seen in **Figure 3** on the left.

Figure 4: ORT: The Gantry
Source: ETC (2010)

In total, 45 electronic toll points are planned. At each toll point, overhead gantries are positioned 10 kilometres apart along the toll freeways. Various surveillance scanners on the gantries, as can be seen in **Figure 4**, will read the e-tag in the vehicle and verify the information from the e-tag by taking photos of the vehicle and running these through a very sophisticated database. The distance travelled is then calculated and the user is billed either through a prepaid contract or through an accounts billing system. If the vehicle does not have an e-tag, the owner of the vehicle will still receive a bill, similar to how traffic fines are received (ETC, 2010).

A contract worth US$ 155 million for the installation and operation of the tolling system was awarded to the Electronic Toll Collection joint venture (JV) in September 2009. The JV, highlighted in **Figure 5** below, includes Kapsch Sweden, Kapsch Austria and South Africa's Traffic Management Technology (ETC, 2010).

The Kapsch Group is one of Austria's leading technology corporations, with a presence in 38 countries. Kapsch has its head office in Vienna, Austria, was established in 1892 and employs over 3,000 employees globally. The Kapsch contract with SANRAL is to develop and manage the electronic toll collection systems for five years (ETC, 2010).

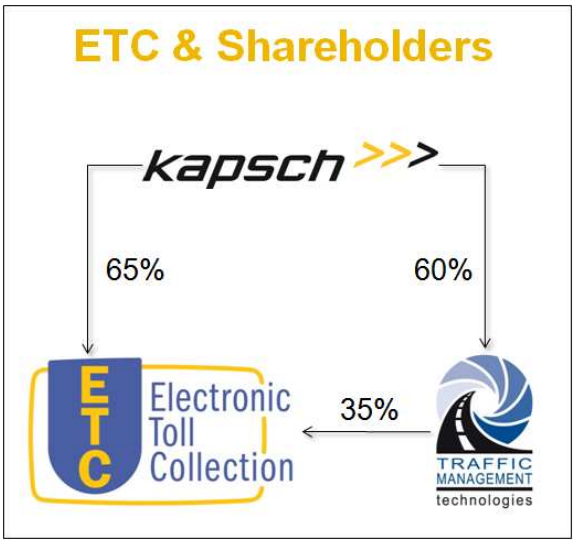


Figure 5: ORT: ETC and Shareholders
Source: ETC (2010)

The most important benefit of the ORT system is that it does not involve physical tolling booth, thus eradicating delays and increased vehicle emissions associated with stop-start driving (SANRAL, 2011c).

2.3 The GFIP Financial Model

SANRAL, in accordance with South African National Roads Agency Limited and National Roads Act, Act 7 of 1998, has two separate business areas, namely toll and non-toll operations. SANRAL reports and budgets separately for the two business areas and is not allowed to cross-subsidise. The non-toll roads, which are 81% of the national road network, are funded through government grants. The toll road network, making up 19% of the road network, is funded mainly through the capital market and receives income through toll fees (SANRAL, 2011a).

The GFIP was funded through bonds raised on the capital markets through SANRAL's Domestic Medium Term Note Programme. SANRAL issues bonds to investors at monthly bond auctions and the interest rate paid is determined in the capital market. Bonds trade in the market similarly to shares on the stock exchange, and prices and interest rates fluctuate all the time.

At the bond auctions, investors bid in relation to interest rates of Government bonds and their sentiment towards risks in the market. SANRAL has a guarantee from the national treasury for a total debt of R37.91 billion. The increased government guarantee provided for the GFIP led to a reduction in the cost of the debt. In addition, SANRAL may issue a total of R15 billion unguaranteed bonds, of which R10.5 billion have already been issued. As at June 2011, the total bonds issued by SANRAL amounted to R25.70 billion, details of which are available from the Johannesburg Stock Exchange (JSE) (DoT, 2011b).

The cost of phase one of the GFIP road works and the implementation of the electronic toll collection system has amounted to R17.4 billion. The GFIP debt repayment period is 20 years. It is predicted that the loans will be repaid before any major rehabilitation work is needed after 20 years of operation. It is assumed by the DoT that toll fees will also be used to finance the rehabilitation, upgrading, maintenance, operations and building of new freeways for the GFIP (DoT, 2011b).

The life of a toll road is normally calculated over 30 years and has what is known as a J-curve over the period, meaning that in the early years the toll road runs at a deficit due to the finance cost on the initial capital expenditure. As the borrowings are repaid, the profit increases and the toll road becomes a profitable asset (SANRAL, 2011a).

3. Conceptual and Theoretical Framework

In this chapter, the contextual background for the study is provided and the relevant and important economic, social and environmental issues that impact on this study are explained, as follows:

- The Economic Importance of Roads;
- The North-South Corridor (Durban Corridor);
- Gauteng Roads in the National Freight System;
- The Social Cost of Transport; and
- National Road Infrastructure Requirements.

3.1 The Economic Importance of Roads

The National Land Transport Strategic Framework states that the road network provides for the largest proportion of land transport. More than 70% of all freight and passenger movements take place on roads. A road network that is inadequate can therefore increase the cost of moving people and goods considerably (DoT, 2006).

The World Bank (2011) explains the linkages between transport and the economy, showing that a well developed road network gives people access to income-generating activities. Transport is part of the supply chain process in trade, manufacturing and production of goods and services. Improving the road network lowers the cost of production and logistics in delivering goods to the market. This stimulates internal and international trade, making a country more globally competitive, with faster economic growth and job creation (The World Bank, 2011).

Of the 15 SADC Member States, with a total population of 276 million and an estimated regional GDP of US$ 276 billion, South Africa is the largest economy accounting for 62% of the regional GDP, followed by Angola, which accounts for 16% of regional GDP. The road network in South Africa is by far the best developed in the SADC region, with the country dominating 47% of the total regional trade of US$ 110 billion in 2008 (SADC, 2010).

The SADC protocol on Transport, Communications and Meteorology (1996) states that the state of road transport infrastructure is an important factor constraining international trade in the SADC region. The World Bank (2011) shows how uncompetitive South Africa and other SADC countries are compared to developed countries because of the number of days it takes to import and export. Poor infrastructure conditions in the SADC region contribute significantly to the higher cost of imports and exports, and the evidence thereof can be seen in **Figure 6** below, where goods in South Africa take 35 days to import and 30 days to export compared to 3 and 6 days respectively in developed countries (The World Bank, 2011).

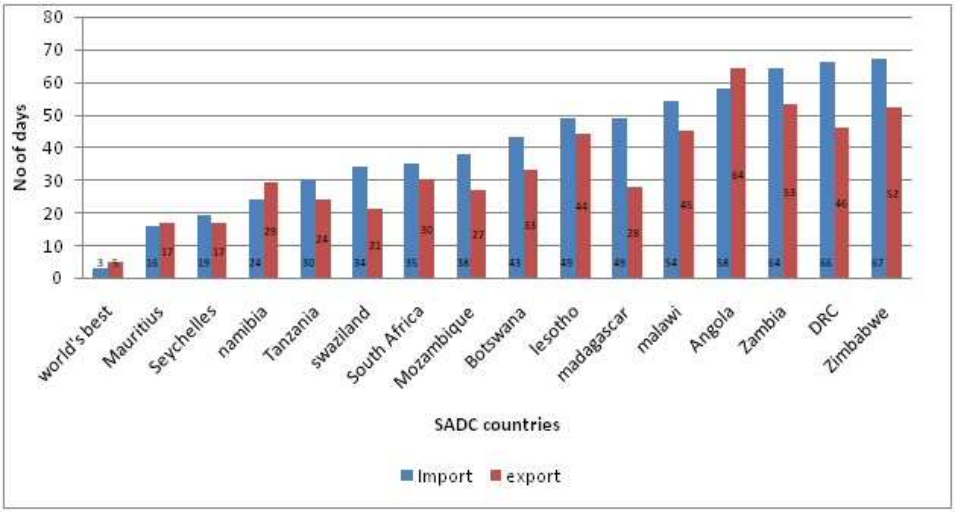


Figure 6: Time to import within SADC (days)
Source: The World Bank Group (2011)

In accordance with the Transport Protocol, most SADC countries have introduced Road Funds financed through general taxation, fuel levies and other charges. However, few of these road funds can meet the costs development and periodic maintenance and rehabilitation of the roads (SADC, 2010).

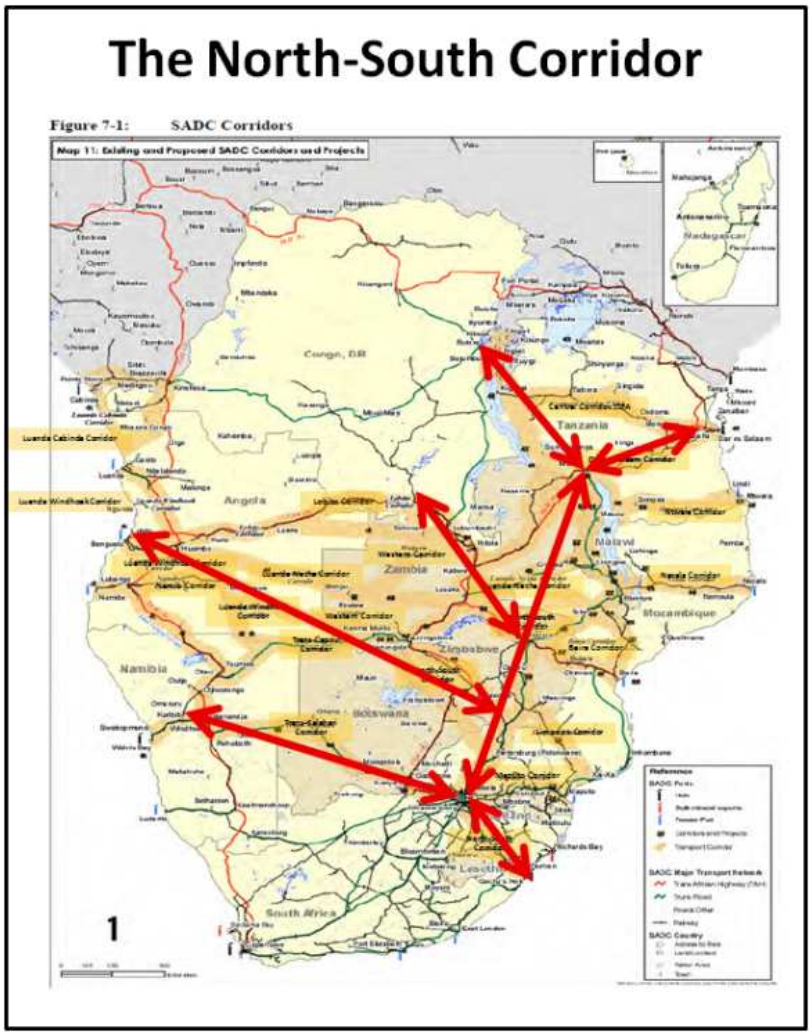
South Africa is a signatory to the United Nations Millennium Development Goals, which aim to eradicate extreme poverty and hunger, ensure environmental sustainability, and develop a global partnership for development (UNDP, 2000). Developing road infrastructure provides access to services that can aid in achieving these goals. The World Bank Report (2011), and the DBSA Infrastructure Barometer (2008) show that social and economic development is very closely linked to

infrastructure development. Infrastructure development is a major driver to reduce poverty, inequality and unemployment.

Recent studies by the African Development Bank, as part of the Africa Infrastructure Country Diagnostic (AICD), show that the lack of basic infrastructure has been a major factor in the disappointing economic performance of Africa over the last three decades. The report states that Sub-Saharan Africa needs to spend over US$ 93 billion annually on infrastructure (about 15% of the region's GDP), to support economic growth and achieve social and development goals (AFDB, 2011).

3.2 The North-South Corridor (Durban Corridor)

The North-South Corridor, also known as the Durban Corridor, seen in **Map 2**, is the busiest transport link in the region. It links the largest number of eastern and southern African countries, namely: Botswana; DRC; Malawi; Mozambique; South Africa; Zambia; and Zimbabwe. As depicted in **Map 2** with red arrows, it also interlinks to other corridors, including: Trans-Kalahari Corridor; Beira Corridor; Lobito Corridor; Dar es Salaam Corridor; and Nacala Corridor (DoT, 2010a).



Map 2: The North-South Corridor
Source: DoT (2010a)

This corridor is of strategic importance to South Africa for two main reasons. Firstly, South Africa is the largest African trading partner for most of the countries in the region. Secondly, the ports of South Africa, especially Durban, handle a significant proportion of transit traffic for the landlocked States in the region and are the busiest ports in Africa. The North-South Corridor falls within three Regional Economic Communities (RECs): SACU, SADC and COMESA (DoT, 2010a).

The Durban port handles 66% of regional dry and bulk cargo and 80% of container capacity. Importers and exporters in the SADC region prefer to use the Durban port, despite the long overland distances to Durban, because of the higher level of business confidence in the Durban port (DoT, 2010a).

The Durban port is also well connected by road and rail to City Deep, the inland container depot (or dry port) in Johannesburg. As stated in Chapter One, more than 70% of freight cargo in the Gauteng Province is moved by road. This shows the strategic importance of the Gauteng Freeway Improvement System for the provincial, national and SADC regional economy. Gauteng is the supply and logistics hub for South African and the entire SADC region (DoT, 2010a). Therefore, the business costs associated with the use of the Gauteng roads will have an economic impact for the entire continent.

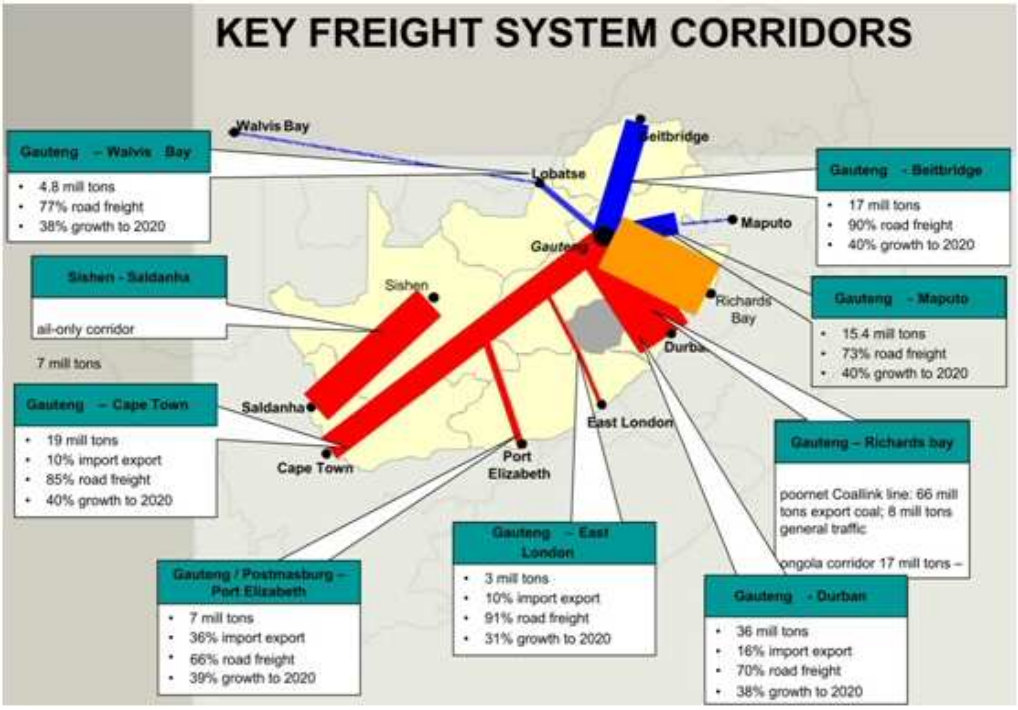
3.3 Gauteng Roads in the National Freight System

South Africa has adopted a National Freight Logistics Strategy, approved by Cabinet in August 2005. The main objectives of the strategy are to: lower the cost of doing business in SA; facilitate the seamless movement of cargo: improve cross border freight operations and infrastructure in SA, SADC and the Continent; and develop corridor strategies (DoT, 2007a).

The National Freight Logistics Strategy is an attempt by the Department of Transport to address the inability of the country to meet the demand for the movement of cargo at acceptable levels of price, quality and reliability. This Strategy aims to support national development strategies. While some elements of the freight logistics system

meets and even exceeds global standards, like the national roads network, there is a need for further improvement of national infrastructure and greater integration at a systems level (DoT, 2007a).

The key freight corridors are shown in **Map 3** below:



Map 3: Key Freight System Corridors
Source: DoT (2007a)

As can be seen in **Map 3**, Gauteng is central to all the national freight and logistics corridors, and to the Maputo, Beitbridge, Lobatse and Walvis Bay Corridors, which is crucial to the role that South Africa plays in exporting goods to its neighbouring countries from the Durban Harbour.

3.4 The Social Cost of Transport

South Africa is plagued by the sparse transport demand markets created by the legacy of apartheid, where people continue to live as far as 60 kilometres from their workplaces. The work trip is the most common trip in each household. The income and expenditure survey carried out by Statistics South Africa (2007), aimed at monitoring major cost drivers for households, identified transport as one of the costs

that has increased drastically from 1995 to 2005 for the lower income quartile, while the percentage of household income spent on other basic services of food and water, electricity and gas have decreased – refer to **Figure 7** below. Despite the government subsidies provided for the rail and bus public transport systems, transport costs remain a very high percentage of household expenditure, especially among the poor (Statistics South Africa 2007).

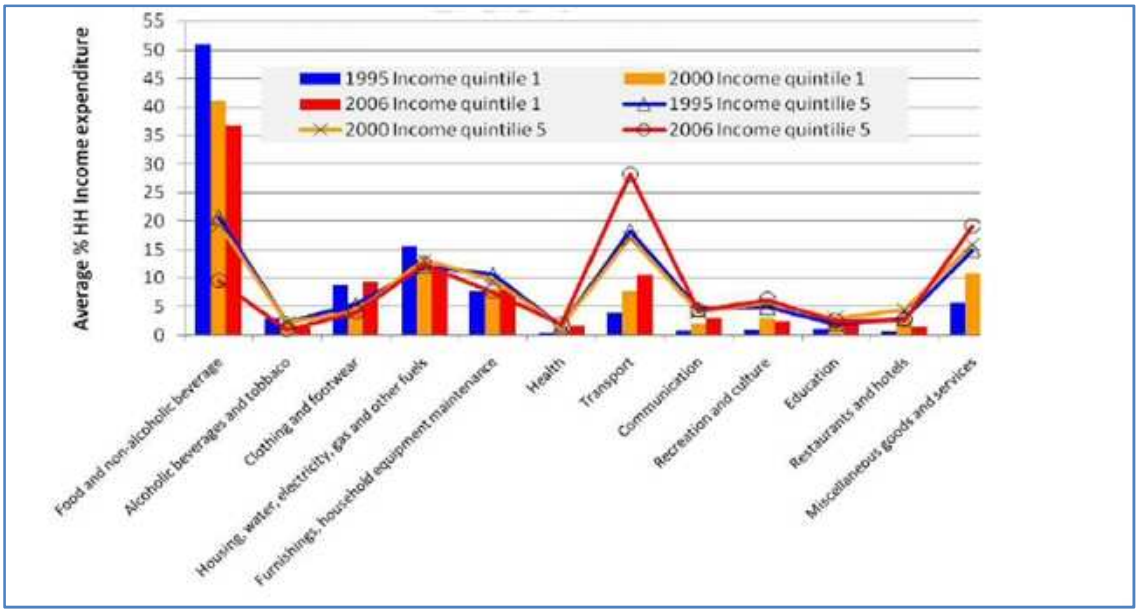


Figure 7: Household income expenditure changes in 1995 and 2005
Source: Statistics SA (2007)

The White Paper on National Transport Policy and Moving South Africa (DoT, 1996), set two important (but as yet unattained) targets. The first is the promotion of public transport over private car use, with a target of an 80:20 public transport to car-use ratio. The second was to set an objective of affordability, with a target of commuters spending less than 10% of income on transport.

The first National Travel Household Survey (DoT, 2003), showed that of the three modes of transport, taxis were the most accessible to 90% of households. Trains were the least accessible, with over 70% of households stating that the train service was either too far away or that there was no service available.

Transportation and its effectiveness have a major impact on the social and economic wellbeing of people, especially in the metropolitan areas in South Africa. Due to

congestion, travel times between home and the work place in the Gauteng metropolitan area extends up to 3 hours per direction of travel, resulting in less time spent with family, and wasted productive person hours. A study conducted by the University of Johannesburg shows that in many South African households at least one and often both parents are forced to leave home before their children wake up and only return home once their children have gone to sleep. The amount of time available by parents for the transfer of norms and values through the family is therefore limited, potentially leading to poor performance at school and increased involvement in criminal activities (DoT, 2011c).

3.5 National Road Infrastructure Requirements

South Africa has a reasonably modern and well developed transport infrastructure, which has declined somewhat over the last ten years, mainly due to insufficient investment and a skills shortage in the country. However, the road system is extensive and in relatively good condition (DBSA, 2008).

The transport sector is increasingly being seen as a key driver for South Africa's competitiveness in global markets and for economic and social development. The FIFA World Cup 2010 provided the motivation for government investing heavily in infrastructure (DoT, 2010b).

Road maintenance is the responsibility of the South African National Roads Agency (SANRAL) or provincial and local governments, depending on the classification of the road. According to SANRAL's 2010 Annual Report, South Africa's national road network consists of 16,170 kilometres of roads, depicted in **Map 4** below.
This network connects major cities, towns and rural areas, which supports economic growth and social development, and contributes to job creation (SANRAL, 2011a).

As mentioned in Chapter One, the rate of investment in roads is still half of what South Africa needs to rehabilitate the roads. The country still has an estimated backlog of R149 billion to restore the roads to a good condition, according to the DoT (2011b).

Map 4: South Africa's National Road Network
Source: SANRAL (2011a)

According to Self Regulation in the South African Road Transport Industry (2011), the current cost of logistics in South Africa is 15% of GDP and is a serious problem when compared to the USA and Europe at 8% of GDP. They quote the CSIR estimate that the deterioration of our roads costs the country R10 billion annually more than it should. It is also estimated that 60% of road damage is caused by overloaded freight vehicles. (Self Regulation in the South African Road Transport Industry, 2011).

The deteriorating condition of the roads in South Africa have been attributed to the following factors: (1) Significant infrastructure maintenance backlogs, mainly around funding and lifecycle and maintenance plans included in lifecycle costs; (2) Overloading and overuse by freight trucks, estimated to cost South Africa R650 million a year in destruction to roads, mainly because of the inadequacy and lack of competitiveness of the freight railway system; (3) Budget shortages in small municipalities, which survive largely on the Municipal Infrastructure Grant (MIG), which amounts to only about 10% of their required investment in roads and maintenance; and (4) A lack of long-term planning and budgeting in government systems, a shortage of trained and skilled people in the right places, including financial and project management skills, and management of issues of governance (Infrastructure Dialogues, 2010).

4 Literature Review

4.1 Introduction

According to Glaister and Smith (2009), in their article, 'Roads: a utility in need of a strategy', the most common reason given for the lack of new road development plans is that governments cannot afford it. The global recession has constrained public expenditure further and weaker capital markets have made it difficult for governments to attract private investment in infrastructure projects.

Flyvbjerg (2009) in his research paper, 'Why the worst infrastructure gets built', however, shows that infrastructure spending in 2008 was the most it had ever been as a percentage of global GDP. When the recession hit during 2008 to 2009, it was expected that infrastructure spending would decline but the opposite took place. Private sector funds declined, but hundreds of billions of public dollars were made available by governments for stimulus spending. America and China singled out investment in infrastructure as a key means to create jobs and keep their economies going. China earmarked US$ 586 billion in 2008 and America earmarked US$ 787 billion in 2009. India passed a US$ 475 billion plan, and the United Kingdom (UK), Germany, France, and many other nations made similar commitments (Flyvbjerg, 2009).

Flyvbjerg argues that with so much money in the pipeline for infrastructure spending, the efficiency of this spending can either alleviate the global financial crisis or make it worse. Infrastructure spending creates jobs, improves productivity and competitiveness, benefits consumers through higher-quality services, and can be environmentally beneficial (Flyvbjerg, 2009).

SANRAL (2011b) states that large numbers of direct and indirect jobs have been created as a result of the GFIP investment. They estimate 15,957 people were directly employed in the height of the GFIP construction in 2010 and will taper off to

1,100 people from 2012 onwards. It is estimated that 21,394 indirect jobs have been created in South Africa as a result of the GFIP. These indirect jobs will taper off to 8,700 in 2012 and will increase again to 14,323 in 2020 and 23,263 in 2030. Jobs created from business time savings is estimated to increase from 3,341 in 2011 to 7,851 in 2030 (SANRAL, 2011b).

The beneficial multiplier effect of government spending on infrastructure, in favourable tax and interest conditions, increases the GDP of a country. Inefficient government spending, however, does not create a multiplier effect but rather a drag on the economy, leading to higher inflation (Case and Fair, 2004).

The South African Auditor General told the National Parliament in October 2011, that wastage in government spending had risen from R13 billion in 2009 to R21 billion in 2010. He attributed this wastage to irregular expenditure and flawed procurement processes in government departments and state entities, with many cases of state employees or their close family securing government tenders (SAPA, 2011). This evidence of inefficient government spending does not stimulate the economy but does the exact opposite.

In this context, the review of the Gauteng Freeway Improvement Plan and the strategic wisdom of the tolling strategy to pay for it, takes on a greater significance, where a total of R25 billion has been raised in the capital market, and more than R17 billion has already been spent by SANRAL (DoT, 2011a).

It is already apparent, from the titles of the two articles mentioned above, that South Africa is not alone in having a questionable strategy for roads development. As will become evident in this chapter, even developed countries are having difficulties in arriving at a clear strategy for road development and maintenance – especially one that is integrated into the other modes of transport, most importantly rail.

The literature review sheds light on important issues for consideration, especially for South African policy makers and road planners. A scan of the most recent research conducted on road funding strategies has produced important areas of learning, which will be discussed under the following headings:

a) The Agenda for Commercialising the Roads
b) Second-Generation Road Funds
c) Governance and Institutional Reform
d) Roads Funding Strategies
    - Fuel Levies
    - Road User Charging or Tolling
    - Privatisation of the Highways
e) Risk Sharing and Financing
f) Accountability, Transparency and Public Control
g) The User Pay Principle
h) Road and Rail: Balancing the Playing Field
i) Climate Change and Implications for Roads Planning

4.2 The Agenda for Commercialising the Roads

The World Bank (1995) approximated that the 2 million kilometres of roads in the Sub-Sahara African region were mostly poorly managed and badly maintained. Road transport carries close to 90% of passenger and freight transport. 70% of the population on the African continent live in rural areas, where the only access is by road. Hundreds of billions of dollars are already invested in roads which were being eroded through lack of maintenance. The World Bank estimated that to restore only the economically important roads, African countries will need to double their roads expenditure for more than 10 years (The World Bank, 1995).

The solutions to these problems proposed by the United Nations Economic Commission for Africa (UNECA) and the World Bank is to strengthen financing and management of roads through commercialization - bringing roads into the marketplace and charging fees for usage (The World Bank, 1995). In order to achieve this, they propose the reforming of governance of roads in four basic building block areas, namely:

(i) Involve road users in the management of roads to create ownership and public support for proper funding and control of the roads agencies;

(ii) Ensure that a stable and sufficient flow of funding is secured;
(iii) Clarify roles and responsibilities; and
(iv) Adopt private sector management practices to strengthen management of roads (The World Bank, 1995).

4.3 Second-Generation Road Funds

The reforms towards the commercial management of roads, spearheaded by the World Bank, are gradually being implemented in a number of Sub-Saharan African countries, especially in the areas of establishing road management boards, securing a flow of funds through road tariffs and/or road funds, and privatising engineering services and road works (The World Bank, 1995).

However, Gwilliam and Kumar (2003) show that governments in Africa have adapted the commercialisation approach by earmarking specific tax revenues and/or fuel levies for roads development. They state that this approach is frowned upon by macroeconomists in the International Monetary Fund and the World Bank, as it reduces governments' fiscal flexibility and creates problems in governance of roads spending. Essentially the IMF and the World Bank would prefer greater privatisation and less government control over the roads.

In the past decade, more than 20 African countries have adopted a new model of road funds, or second-generation road funds, which combine general revenue taxes or fuel levies, as well as direct road user charges. Some see these road funds as an interim step towards complete commercialisation of the roads. However, Gwilliam and Kumar (2003) show that governments have still maintained their control over road budgets and spending. They argue that road funds in Africa have not undermined fiscal flexibility but have rather improved the administration of road funding and the condition of the roads, and should not be seen as interim measures towards complete commercialisation of the roads (Gwilliam and Kumar, 2003).

However, all of the road funds studied remain underfunded, limiting their ability to maintain and rehabilitate the road network in the respective countries. The exception

is Uganda, which has not created a road fund, but has allocated more maintenance funding per kilometre of road than any of its neighbours. Governments decide on the general revenue taxes and the road boards decide on the road user charges and manage these revenues, with strong representation from user groups. Input from road user groups is supposed to reduce rent seeking of the roads agencies and ensure users receive the quality of roads for which they pay (Gwilliam and Kumar, 2003).

Glaister and Smith (2009) believe that the government in the UK is not maintaining and developing the roads to meet the growing demand for roads capacity and should introduce direct road user charging instead of continuously underfunding roads through general revenue and fuel levy allocations. In Great Britain, there are currently 394,879 kilometres of road, compared to 15,795 kilometres of national railway used for passenger travel. The responsibility for roads is split between 82 local authorities and the Department for Transport (DfT), which uses the Highways Agency to maintain and operate 7,100 kilometres of motorway and major roads. There are no direct user charges for the road network outside central London, except for toll bridges, tunnels, and the M6 Expressway (Glaister and Smith, 2009).

The UK Highways Agency, an executive agency of the DfT, has delivery and management responsibilities for the strategic road network. However, its role is currently limited, as the DfT retains overall responsibility for the strategy of the strategic roads network. The Highways Agency is seen as a delivery body, both for the DfT in relation to the national network and for the Regions in respect of the regional network. The Highways Agency is wholly dependent upon government funding and does not have independent powers to borrow on the financial markets or generate a revenue stream from users. They serve as financiers rather than implementers by funding other agencies and local governments, and by outsourcing to private companies through tender processes. They also advise the DfT on policy issues such as overloading of vehicles (Glaister and Smith, 2009).

Similarly, all of the African road fund boards have limited power to collect and allocate resources to road maintenance, except in Malawi and South Africa. African road funds are underfunded to meet their maintenance requirements because the

government ministries control the fuel levy and not all of this revenue makes its way to the road fund. In Benin, Kenya and Zambia, the road fund boards propose the fuel levy to the relevant ministry (Gwilliam and Kumar, 2003). Despite these considerations, efficiency of roads management has improved because of the road funds. Better business practices and professional management have been developed. Gwilliam and Kumar (2003) believe that road funds based on the fuel levy should not necessarily be merely an interim step towards complete commercialisation of the roads but can be complemented by direct user charging.

4.4 Governance and Institutional Reform

Roads management in most countries in the world are constitutionally concurrent competencies among national, provincial and local governments as well as other management agencies or parastatals. This creates unavoidable management interface problems, competition for scarce resources and turf wars (Glaister and Smith, 2009).

Supporting one of the World Bank's basic building block areas for roads reform mentioned in 4.2 above, Gwilliam and Kumar (2003) believe that fundamental reform of the governance and even ownership of the roads network is needed. They argue that there needs to be greater clarity and division between the roles of national government, local government and new bodies that will own and regulate the assets. They analyse common indicators of structure, process and performance to assess the effectiveness of these road funds and the implications for future road funds, and conclude that the road funds in Africa are designed to be autonomous agencies, established by law with a clear regulatory framework.

Gwilliam and Kumar (2003) also believe that road funds must be guided primarily by road users, supporting another of the World Bank's basic building block areas for roads reform, namely, to create ownership and public support for proper funding and control of the agencies (The World Bank, 1995).

The composition of road fund boards differs across countries. In Ghana, Kenya and Zambia, the boards have more private sector representatives. In Benin and Ethiopia, the boards have more public sector representatives. Ethiopia does not have a road fund, but roads are maintained by budget allocations (Gwilliam and Kumar, 2003).

The road funds in Africa were established to move away from bureaucratic systems, attract professional management, and create businesslike processes. The aim was to commercialise the maintenance work, whereas in the past, the work would be performed by the public works department in government. Outsourcing this work to private sector contractors has led to cutting huge overhead costs within government and has also supported local business to grow their capacity and efficiency to deliver on roads projects (Gwilliam and Kumar, 2003).

As a result of the establishment of road funds, funding arrangements have also become more transparent and most African countries have financially audited processes. The capacity and effectiveness of private contractors has improved. Greater operational efficiency in contract management and disbursements has been shown to reduce roads maintenance costs in Ethiopia, Ghana and Zambia by between 10% and 20% (Gwilliam and Kumar, 2003). Despite these improvements in management and operational efficiency, corruption in government spending is a big problem. The former Nigerian President, Olusegun Obasanjo, estimated in 2006 that corruption cost African countries about 25% of its combined national income, about US$ 148 billion per annum (BBC News, 2006).

4.5 Roads Funding Strategies

4.5.1 Fuel Levies

Fuel levies remain the major source of revenue for African road funds, except in Ethiopia. In some countries, the fuel levy is a fixed percentage of the wholesale price, and in other countries, it is a fixed price per litre. The disadvantage of making the fuel levy a percentage of the fuel price is that revenues will fluctuate with changes in the

macroeconomic environment, making it difficult to plan with a fluctuating revenue base (Gwilliam and Kumar, 2003).

Earmarked road funds have been adopted by a number of countries, including New Zealand, Japan, and the USA. Under these funds, the basic expenditures on the highways network are funded by charges related to road use. This might comprise a fuel levy, collected directly from fuel companies or added on to the price of fuel per litre and paid into a road fund account, as well as a direct element of road user charging. In general, the fund is then managed by an independent board which would include representatives of road users (Glaister and Smith, 2009).

Glaister and Smith (2009) show that it is possible to have a combination of independent revenue and government support, as demonstrated by the case of the UK Network Rail. From April 2009, UK Network Rail received network grants from government covering 60% of its revenue requirement, with the remainder coming from track-access charges paid by train operators and property income.

Ideally, the fuel levy should be based on the maintenance requirements of the roads, as well as the capacity of the executing agencies to implement the projects. Most governments in Africa maintain control over determining the fuel levy and road user charges. However, Gwilliam and Kumar (2003) have found that much of this revenue does not reach the road fund, as governments determine what the spending priorities are and may decide to use a portion of the fuel levy collected to cross-subsidise other priority areas like education or health (Gwilliam and Kumar, 2003). According to the CEO of SANRAL, the South African government has spent more money on roads infrastructure than was collected by the fuel levy, although the Deputy Minister of Transport believes that this was due to the ambitious preparations for the FIFA World Cup (SABC 3, 2011).

4.5.2 Road User Charging or Tolling

Christine Brown (2005) investigates the evolution of financing arrangements for the provision of road infrastructure through public private partnerships (PPPs) in

Australia, in her article, “Financing Transport Infrastructure: For Whom the Road Tolls”. In Australia, road infrastructure projects have proven to be economically viable for private sector investment, with many such toll roads in Sydney and Melbourne. Private equity investors’ ROI is received through toll charges to road users (Brown, 2005).

Many countries have developed models, such as tolls, for encouraging the involvement of the private sector in the development of infrastructure, including France, Italy and Spain where networks of motorways were developed using build-own-operate-transfer concessions from the 1960s (Brown, 2005).

In Australia, private sector investment in infrastructure began in 1988 when the formal procedures and controls were first documented by government. Similarly in the UK, a system called the Private Finance Initiative was developed in 1982, providing mechanisms for public infrastructure to be jointly funded by government and the private sector (Brown, 2005).

Glaister and Smith (2009) argue strongly for direct road user charging in the UK, to provide the much needed investment to address the shortage of roads capacity. They state that while £40 billion a year are levied on road users through a fuel duty and vehicle licences, there is no relationship between what users pay, the level of service provided and investment in road capacity. There is significant underinvestment in British roads and, unlike the railway system, there is no adequate long-term strategy for roads development. As a result, roads in Britain are undersupplied and overpriced, despite a consistent growth in the demand for roads since 1950 (Glaister and Smith, 2009).

Proost and Van Dender (2011) also support this view and note that, in the absence of congestion pricing, the cost of a small increase in highway capacity can be greater than the benefits. Therefore, these road investment projects need to be subjected to a thorough economic analysis.

The railways in Britain carry about 7% of the national passenger miles and a similar percentage of freight tonne-miles. Most of the remainder of passenger and freight

transport rely on the roads. Households in the UK spend about 12% of all expenditure on ownership and use of cars, equal to the amount spent on housing and food, while expenditure on other transport is only 2%. Glaister and Smith (2009) believe that the only way new roads can be developed, is for governments to set the overall strategy for the road network and determine major investment priorities, while leveraging the demand for roads by the user to pay for these investments.

The business case exists in the UK for transport users to pay the true costs associated with their trips and there is potential for options such as road pricing to ensure better use of existing infrastructure. Some infrastructure projects offer very good returns and on average road schemes show benefits more than four times the costs. This will allow investment in new roads capacity, the needs in the UK estimated to be at least 600 lane kilometres a year until 2041, and will yield considerable net new cash revenues in the long term (Glaister and Smith, 2009).

Glaister and Smith (2009), also suggest shadow tolling as an alternative. This has been in common use in England for decades under the Private Finance Initiative, whereby a private provider maintains a road in return for an infrastructure service charge paid by government, dependent on the vehicle flow. This can be made transparent to users and has the advantage of relating the income to the performance of the road, with the implication that some demand risk is transferred to the enterprise.

Crafts (2009) also notes the decline in the UK roads infrastructure due to inadequate investment over the past few decades, despite the greater reliance of the UK economy on the roads network compared to other EU countries. Road traffic volumes in the UK are steadily increasing and congestion is becoming worse, leading to the increasing cost of time delays. The UK government has stressed the need for public investment to stimulate growth and commissioned a report in 2006 on the impact of investment in transport for productivity performance in the UK. The report found that by 2025 the congestions costs would amount to £24 billion per annum. The report concluded that the UK needs to increase its investment in transport infrastructure, and in the absence of widespread road pricing, it would need to build many more

roads. Based on projected traffic growth, the policy implication is that there is a stronger case for increasing public investment in roads infrastructure.

Crafts (2009) believes that the UK has developed well-established methods of cost–benefit analysis, where the benefits of transport are quantified on the basis of the demand or willingness to pay for transport and the reduction in the cost of transport arising from the investment. The UK Department for Transport is also beginning to recognise wider economic benefits than just transport benefits when appraising transport projects. These include firstly, productivity benefits for firms, such as easier access to suppliers and larger labour markets, secondly, positive impacts on business price-cost margins due to a reduction in transport costs and thirdly, having an improved labour supply as cheaper commuting allows people to access higher-paid jobs.

Crafts (2009) also states that besides the economic benefits of transport projects, there is also a positive impact on GDP due to increased business outputs and commuters' ability to earn more in better-paying jobs, while paying less for transport costs. He concludes that public investment in transport has positive implications for cost–benefit analysis; therefore, there is a case for greater UK investment in roads.

However, he believes that this should be implemented along with an efficient national road-pricing scheme, as road pricing reduces vehicles on the road. This is predicated on the government using this revenue well. Setting tariffs too high will increase government revenue but will leave motorists worse off economically. He suggests an alternative economic model for roads pricing that is based on social marginal costs. The social marginal costs analysis ensures that the road user is economically better off, and not worse off, because of the new toll tariffs. The social marginal costs are used to determine the appropriate level of investment in the roads (Crafts, 2009).

Toll roads are not popular with motorists and with some governments. Wallace and Hellums (2008) show that while the different states in the USA have used tolling since the 1700s to fund new roads, the federal government has long been opposed to tolling interstate roads. This position only began in the early 1990s when concerns

about congestion, the environment and lack of funding forced the federal government to consider allowing toll roads.

Crafts (2009) also states that road pricing is extremely unpopular with British voters. Congestion-charging proposals have been rejected in referenda in Edinburgh and Manchester, forcing the government to back away from promoting national toll road schemes. British voters see toll roads as an additional tax and they do not trust the government to design an efficient road-pricing scheme. Crafts (2009) believes that this fear was justified, as is evidenced by the flawed charging structure of the London Congestion Charge. The charge was more a revenue-raising measure by government, instead of having a cost-benefit based on economic efficiency.

A 2006 survey of toll roads in the USA showed more than 168 new toll projects under development in over 26 states, equivalent to 14,560 miles of lane capacity. Early toll roads were privately owned and operated, but the need for more highway capacity led governments to design, build, and operate toll projects. Ownership and control of toll roads began to shift from private hands to state control. The general lack of federal funds available for the creation of toll roads has led to alternative methods of funding and governance. Toll roads are now funded by a range of models from purely public to purely private (Wallace and Hellums, 2008).

Toll charges in the USA are based on a variety of models, defined by legislation. These include value pricing, or congestion or peak-period pricing, and charging tolls for vehicles wishing to use high occupancy lanes. The roads agencies in the states must meet various criteria relating to enrolling participants, electronic collections, managing demand by varying tolls and enforcement against violations. Revenues from old toll roads must be used for debt servicing, providing a reasonable ROI to investors, and operations and maintenance costs (Wallace and Hellums, 2008).

Legislation prescribes that new toll roads must specifically address congestion, reducing emissions, or finance expansion to reduce congestion. The trend of building new toll roads in the USA, however, may not continue to grow, due to the growing public resistance to toll roads (Wallace and Hellums, 2008).

In his 2011 State of the Union address, President Obama committed to creating jobs by rebuilding the country's ageing infrastructure. He proposed to fund this by attracting private investment for projects that are best for the economy, not politicians (Geddes, 2011). Geddes (2011) supports the formation of public-private partnerships (PPPs) to fund the roads projects. In PPPs, motorists become consumers, not just road users. As consumers they have more power to demand the facilities and levels of service that they need. Therefore PPPs have a customer-service focus that government-operated roads lack (Geddes, 2011).

Private investors make their profits in PPPs through toll revenue, which can be used to leverage large amounts of private capital to renovate and expand a country's transportation system (Geddes, 2011). Geddes (2011) believes that public funding will always be insufficient to finance the infrastructure needed. Higher taxes and higher government spending is not the best solution.

Advanced satellite tracking technologies, allow for open road tolling, which means that there are no toll plazas bottlenecks on the highways. Tolls can also be adjusted to reduce congestion by making tariffs higher during peak traffic periods. Congestion tolling leads to time savings for motorists, and reduces stress, saves fuel, and makes trip times more predictable. One of the key benefits of congestion tolling is the positive environmental impact. Carbon emissions are higher in heavy traffic and less congestion means less carbon emissions (Geddes, 2011).

Based on studies of the toll roads in China, Yang and Lee (2008) recommend that toll tariffs tolls should be kept as low as possible to meet project financing needs while maximising the economic benefits of the project. Future levels of the tariffs should also be as predictable as possible to reduce investor risk. Financial needs must be balanced against economic benefit in the cost-benefit analysis. This can be achieved in concession agreements that specify the initial levels of tolls permitted, that prohibit changes in toll levels within five years, and that ensure that toll changes are determined by the consumer price index. This approach limits the concessionaires' flexibility to adjust tolls, but it also ensures predictability for investors and road users (Yang and Lee, 2008).

4.5.3 Privatisation of the Highways

After the slump in private sector investment in public infrastructure in the UK during the 1970s, the public authorities tried to stimulate investment by involving the private sector in the creation of new infrastructure, through concession schemes, privatisation and contracting out schemes (Debande, 2002).

Similar to Geddes (2011), Debande (2002) believes that infrastructure projects that are financed and operated by the private sector have better project monitoring, productivity and managerial efficiency. Another benefit is that in case of cost overruns, the costs fall on the shareholders or lending institutions for privately financed projects, while in public ownership the public sector has to cover the extra costs. Public sector managed projects are often subject to changes in specification, allowing contractors to claim extra costs and inflate profits. The advantage of private sector management is that the lifetime costing of the asset is considered (Debande, 2002).

The public sector tends to follow higher technical standards of project design, while the private investor will try to achieve a balance between cost, financial return and risk. Concession schemes allow for the private sector being in charge of providing the capital assets and services. A concession scheme optimises the trade-off between the construction standards and the lifetime maintenance cost of a project, ensuring the lifetime costs of an asset are minimised while maintaining the required standards. This is a shift from the public sector's focus on output specification in private concessions (Debande, 2002).

In contrast, privatisation transfers the ownership of the assets to the private sector, with the public sector maintaining a regulatory oversight role in some sectors. Technological innovations have allowed user fees to be collected more efficiently and this supports the trend of privatisation. The public-private partnership is an example of a privatisation institutional structure. In a contracting out scheme, the private sector

is contracted by the public sector for the provision of services but the capital assets remain in the ownership of the State (Debande, 2002).

In Australia, a single stand-alone business that is financed and operated by the private sector has now become the predominant structure for the typical toll road PPP. This involves the investment of private capital to design, finance, construct, operate and maintain the toll road for a specific term, and the collection of revenues from users of the road. The contract normally obliges the private sector to finance, design, construct and manage the asset for a specific 'concession period', where after the management of the asset reverts to government (Brown, 2005). PPPs are also increasingly being formed in Europe and the UK to promote the development of new infrastructure. A special purpose company, called ''the project company'', is set up to develop the infrastructure, and the assets of the project revert back to the public sector at the end of the contract (Debande, 2002).

In Australia there has been increasing consolidation and investment by the private sector since 1995 and government policy indicates that privately operated toll roads are likely to become more common as a means of financing roads infrastructure. Over US$ 9 billion worth of Australian roads are managed and operated by private sector funds (Brown, 2005).

Glaister and Smith (2009) propose the full privatisation of a collection of highway assets, as another option in the commercialisation agenda. This can be achieved by the establishment of a low-risk, single-purpose company that is able to use low-cost bond finance and thereby reduce its financing costs. They propose learning from similar models established in the utility and railway sectors (Glaister and Smith, 2009).

Geddes (2011) believes that by using public-private partnerships (PPPs) the following benefits can be achieved:

- Transport projects can be achieved quickly and efficiently without increasing federal debt;
- PPPs can bring private capital and much needed jobs to struggling communities; and

- PPPs remove politics from the equation.

In PPPs the private investor assumes responsibility for the financing, design, build and operation of a transportation facility. They bear the upfront costs and risks and therefore are incentivised to make sure projects are completed on time and on budget. On the other hand, government funded projects, the costs and risks are borne by taxpayers (Geddes, 2011).

In the People's Republic of China about CNY2 trillion will be needed until 2020 to expand the network of tolled freeways from the present 41,000 kilometres to about 85,000 kilometres. The private sector is expected to fund most of these projects under a policy of corporatisation and privatisation. Corporatisation and privatisation is a policy instrument used in China to achieve two main objectives, namely, bridging the funding gap and managing the roads on a commercial basis to raise standards of efficiency and quality (Yang and Lee, 2008).

Yang and Lee (2008) investigate this policy approach adopted by China, especially relating to its suitability and effectiveness in the roads development. They conclude that the contract-based relationship between owner and operator in a corporatisation strategy can enhance efficiency and accountability. Privatisation benefits include attracting investment, delaying repayments allowing the government to use funds in other needed areas, and making the road users pay a significant amount of their road-related costs. Privatisation in China introduced more efficient management, flexibility of decision-making and a life-cycle approach to managing the roads assets. Risks are also allocated to the parties best suited to managing those risks.

The article examines whether the present strategy ensures value-for-money from investments, effectively secures private sector participation under the right conditions, and provides for transparency, accountability, and good governance.

Yang and Lee (2008) concede that China has successfully managed to rapidly develop an extensive network of good quality tolled highways. However, they have identified a few concerns in the areas of efficiency, transparency, accountability and

value for money. They make the following 5 practical recommendations to address these concerns, based on successes learned from other countries:

a) The need to separate owner and service-provider functions in a clearly defined contracted relationship, making the service provider more accountable in delivering against specified criteria. Projects in China do not follow this fully and the authors propose that enterprises in which the Chinese government has an interest should not qualify as concessionaires for toll roads.
b) Development, management, operations, and tolling rights for government loan-repaying toll roads must be based on a process of competitive bidding to promote efficiency, quality, economy for outsourced tasks as well as full project financing, delivery, and operation. Competition is most effective in ensuring the service supplier delivers efficiency, quality and performance.
c) A value-for-money test must be applied to all technical, management and financing processes.
d) Concession agreements must clearly define roles, obligations and measurable performance targets, identify and allocate all risks, and limit the renegotiation of contract deliverables and targets.
e) Creation of a transparent project planning and procurement process that allows interested stakeholders to interrogate performance and ensure compliance (Yang and Lee, 2008).

4.6 Risk Sharing and Financing

One challenge of privately operated toll roads in Australia has been the risk sharing between the private and public sectors, involving construction risk, operating risk, revenue risk due to traffic volume shortfall, financial risk, *force majeure* risk, regulatory and political risk, and environmental risk (Brown, 2005).

Pricing is a critical issue in the risk sharing arrangements and should correctly reflect the risks assumed by each party in the transaction. When investing, firms may face considerable uncertainty in the operating environment that affects both the cost of the project and the value of the completed project. Governments can reduce uncertainties by developing policy that encourages investment (Brown, 2005).

In the past the Australian government offered attractive contractual terms that reduced uncertainty to encourage private sector participation. The structure of early toll road agreements seemed to be tilted in favour of the private sector, with the existence of Material Adverse Event (MAE) clauses and the ability to significantly delay rent payments to the government. Risk sharing arrangements in Australia have evolved since then, with the private sector assuming more of the downside traffic risk while the government shares in excess toll revenue (Brown, 2005).

In PPPs, the payment comes from the public sector and in some cases from the users and is designed to cover the project costs and to provide a ROI. The debt is serviced by cash flows generated by the project, subject to penalty deductions for substandard service delivery and service performance. The process is designed around an appropriate risk sharing arrangement based on the allocation of risks to the party best able to manage them (Debande, 2002).

The main benefit of the UK Public Finance Initiative (PFI) concession approach is the transfer of responsibility for designing, constructing, financing and operating the infrastructure to the private sector. The private sector takes full responsibility for the risks inherent at each stage of the project. The roles of the private and public sectors are clearly defined with the public sector responsible for defining the service specifications and supervising the performance against the contract. The private sector is responsible for financing the capital cost and evaluating the financial risk of the project. The link between the risk profile and credit rating of the project ensures that the private concessionaire focuses on minimising risks. This allows both the public and the private sectors to concentrate on what they are best at doing. It also reduces project delays by discouraging the private sector from changing project specifications too easily (Debande, 2002).

The advantage of concessions, compared to other forms of private sector participation such as contracting-out or outsourcing, is that the construction and operation of the infrastructure is handled by the same operator. If the same entity is only responsible for building and selling the services and is only paid for successfully supplying services, then there are no incentives to reduce the costs of the services

provided. This contractual structure reduces cost overruns or the selection of inefficient technologies (Debande, 2002).

Flyvbjerg (2009) claims that all major infrastructure projects throughout history have shown a dismal performance record. He studied 208 projects in 14 nations on 5 continents over a 70 year period and found that cost overruns of 50% are common for major infrastructure and overruns above 100% are not uncommon. Demand and benefit forecasts that are wrong by 20 to 70 %, when compared with actual development are common. Cost overruns for bridges and tunnels are 33.8 %, for roads 20.4% and 50% of road traffic forecasts are incorrect by 20% or higher (Flyvbjerg, 2009).

Cost-benefit analyses and extensive social and environmental impact assessments are usually the main deciding factors for major infrastructure projects. If the costs are so radically under-estimated and the traffic forecasts over-estimated, the result is that the project will prove non-viable in practice, with a negative internal rate of return (Flyvbjerg, 2009).

Proost and Van Dender (2011) also believe that the majority of transport investments in the USA are not efficient. Decision-making regarding federal funding investments were based on elected representatives favouring their own constituencies, thus oversupplying of federally funded public works projects. It is estimated that for every dollar invested from the highway fund, an additional dollar is wasted and a large number of inefficient transport projects are funded.

Flyvbjerg (2009) gives two main explanations for cost overruns and benefit shortfalls in major infrastructure projects, namely:

a) **Psychological:** Psychologists call this the planning fallacy and optimism bias, where managers make decisions based on delusional optimism rather than on a rational perspective of gains, losses, and probabilities. As a result, they overestimate benefits, underestimate costs and overlook potential mistakes and miscalculations.
b) **Political-economic:** Due to political and organisational pressures, whether it is jockeying for positions, fighting for budget approvals or trying to win voter

and investor confidence, project promoters deliberately and strategically misrepresent the facts (Flyvbjerg, 2009).

Brown (2005) also recognises incorrect forecasts as one of the greatest risk areas impacting on revenues; however she attributes this to traffic volume volatility. She states that this risk can be reduced by the government granting options over the project's cash flows. An example is the case of the Australian M2 Motorway, where the investor, Hills Motorway Group, only has to pay government the concession fees in cash if the project achieves an after-tax internal rate of return of 12.25%. Until then the company can choose to issue promissory notes in lieu of payment and the government cannot request payment until either the end of the concession period or if the required rate of return is achieved. Other road projects, such as the Eastern Distributor and the Melbourne CityLink, had similar agreements governing the cash flows from the project (Brown, 2005).

By the end of 2000, the actual traffic for the Australian M2 was 48 % below the forecast in the Base Case Model. The Auditor General concluded that the government's Road Traffic Authority (RTA) may not receive any incentive cash flows or any base rent as cash until the end of the concession period. Deutsche Bank however estimated that the internal rate of return (IRR) will be reached in 2024. In this case Brown (2005) shows that the public sector bears a large portion of the revenue risk, especially when the IRR has been based on overestimated traffic volume forecasts (Brown, 2005).

104 international toll road case studies show that the traffic forecasts in the first year were overestimated between 20 to 30%. It is therefore unlikely that governments, whose cash claims are restricted to concession fees and incentive payments, will receive cash payments from the private sector early in the concession period. While the Australian government has reduced the revenue risk for the private investor, according to Brown (2005) the question remains as to whether the delayed concession fees amount to adequate compensation for the reduction.

4.7 Accountability, Transparency and Public Control

Accountability, transparency and public control in roads developments specifically and transport infrastructure projects generally are important themes that emerge in many research articles about investments in many different countries.

Transparency and Public Control

Flyvbjerg (2009) recommends two main measures of reform, namely improved governance and transparency and public control. The suggestions made in each area are very relevant to the GFIP toll road, and are summarised below:

(1) Improved governance:

a) The forecaster may be let off the hook too easily by being fired. Where forecasts are so grossly misrepresented lawsuits should be considered. The risk of being sued and even possibly having to spend time in jail will be a big deterrent to dishonest forecasters and decision-makers (Flyvbjerg, 2009).

(2) Transparency and public control

a) In order to achieve accountability through transparency and public control, the national government should not offer discretionary powers or grants to agencies or local governments as these discretionary powers can create perverse incentives.
b) Cost-benefit analyses must be shifted from promoters to more neutral ground, such as the Treasury, in order to reduce risks of agency problems.
c) Forecasts and business cases must be subject to independent peer reviews and independent audits.
d) Forecasts should be benchmarked against comparable forecasts.
e) For publicly funded projects, forecasts, peer reviews and bench-markings should be made available for public scrutiny, including the media. This should include all relevant documentation.
f) Public hearings and citizen juries must be organised to allow stakeholders and civil society to voice criticism or support of forecasts. This must be

factored into the project management plans and decision-making processes.

g) Scientific and professional conferences should be organised where forecasters present and defend their forecasts in the face of colleagues' scrutiny and criticism.
h) Professional and possibly criminal penalties should be enforced for managers and forecasters who consistently produce deceptive forecasts (Flyvbjerg, 2009).

Yang and Lee (2008) raise the need to improve reporting and transparency in roads projects in China. They state that government departments cannot be expected to implement measures to ensure accountability and transparency if they are involved as both owner and operator. These functions must be separated in the concessioning contract to make certain that the benefits of transparency are achieved, by ensuring that the operator performs according to the agreement. They also believe that is important for detailed project information to be made available and accessible to interested stakeholders, including the selection and awarding of the contract; operator obligations, performance targets, incentives and penalties, and finally information on the review of the operator's technical and financial performance.

Independent Monitoring and Reviews

As mentioned in the chapter above, incorrect cost and revenue forecasts are a major risk in road infrastructure projects. Flyvbjerg (2009) believes that in some cases the public is deliberately misled by government decision-makers and infrastructure planners who lie in the numbers. He makes a key recommendation to decision-makers, investors and voters: they should not trust the budgets, forecasts and cost-benefit analyses produced by promoters of major infrastructure projects. He recommends that independent reviews of the figures and risk should be carried out again and again, and institutional checks and balances must be implemented to enforce accountability (Flyvbjerg, 2009).

Gwilliam and Kumar (2003) have also found that if road funds do not have independent monitoring of the flow of funds, and the quantity, quality and cost of road projects, then there is usually a lack of transparency and explanation of how the funds are used by these road funds. A credible and independent technical auditing process is therefore necessary to monitor the quantity and quality of the work and ensure transparency and accountability. Except for Ghana, none of the African road boards assessed had such transparency systems (Gwilliam and Kumar, 2003).

An Independent Roads Regulator

According to Glaister and Smith (2009) the 5 principles of good regulation introduced by the UK Better Regulation Task Force are all absent in roads provision, namely, transparency, proportionality, targeting, consistency, and accountability. They argue strongly for an independent regulator to oversee roads agencies in a commercialised environment. They identify some of the basic regulatory framework characteristics, seen in privatisations of other utilities, which can also be beneficial in the roads sector, namely:

a) The establishment of independent economic regulators setting consumer price limits. Regulators undertake regular 5-yearly reviews of investment requirements, efficiency, and outputs, and set price limits, which provide incentives for companies to outperform over the next 5 years.
b) Regulators' main objectives are to protect the interests of customers and they must also ensure that companies are able to properly finance their functions.
c) In turn, companies operate under a licence, which defines a range of supply and other obligations, and conduct requirements (Glaister and Smith, 2009).

In general, these regulatory frameworks have delivered significant improvements in efficiency, product quality, and customer service standards, and have increased investment. Ofwat, the UK water regulator, claims that water bills in England and Wales are now 30% lower than they would otherwise have been, while leakage (a key indicator in the water sector) has been reduced by 35% since 1994/95. Regulators become the customer advocates for their sector-specific industries and protect the interests of vulnerable consumers, ensuring significant service improvements (Glaister and Smith, 2009).

Although these regulators are appointed by government ministers, they are independent with their mandate established in law. They are answerable to the courts rather than to ministers, and the extent to which they can be guided by government is defined in law. So while they have to be cognisant of important government policies, they cannot be dictated to by government (Glaister and Smith, 2009).

A Consumer Council for Roads

Road users pay for roads development and maintenance through fuel levies, general taxation and in direct user charges or tolling. They are therefore an important stakeholder in any roads project. If road users pay tolls they have an even more important status as service paying customers of the roads project. There is a strong case for introducing a Consumer Council for Roads or a Road Users' Forum, to provide an effective voice for road users and to hold providers of highway services accountable (Glaister and Smith, 2009).

A new consumer body for roads would also serve to strengthen the accountability of local authorities to road users. Such a body could also play an important role in helping to determine regional investment priorities and opening up the rather opaque processes under which development authorities draw up regional transport strategies (Glaister and Smith, 2009).

One issue for consideration is whether a consumer council could reasonably represent the interests of both car users and commercial road users, including heavy goods vehicles. Consumer bodies typically represent the interests of domestic customers (and passengers) and, in the utility sector, there are separate trade bodies for commercial organisations (Glaister and Smith, 2009).

4.8 The User Pay Principle

In South Africa, the railway has steadily lost ground to road transport for the moving of freight, while elsewhere in the world like in the United States, the railways have been growing from strength to strength. The reason for this is a regulatory anomaly that makes it cheaper for freight operators to truck their cargo rather than to rail it (DoT, 2010b).

Figure 8: Road Cost Drivers
Source: CSIR (2008)

Figure 8 shows a profile of a typical road operator's cost drivers (CSIR, 2008). The only contributions that a road transporter makes towards the development and maintenance of the road infrastructure of the country are in the form of a fuel levy, plus license and toll fees. The fuel levy, license and toll fees together account for less than 8% of operating expenses (CSIR, 2008).

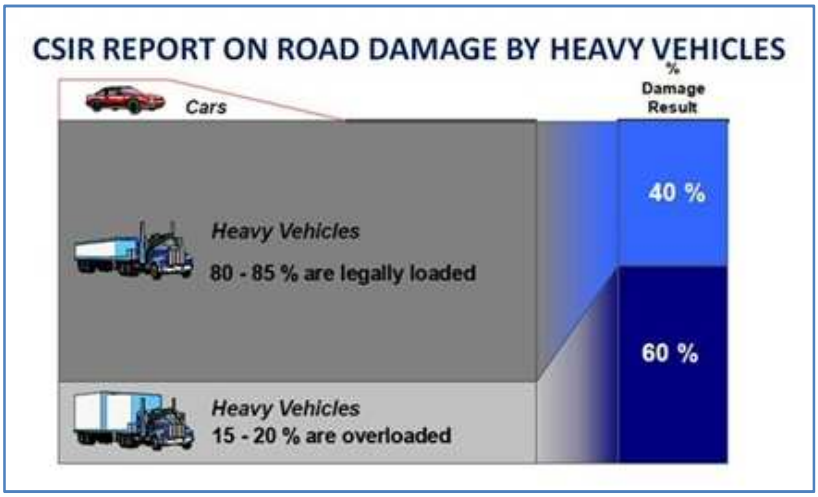


Figure 9: Road Damage by Heavy Vehicles
Source: CSIR (2008)

However, the damage inflicted on the road infrastructure can be attributed almost entirely to the heavy freight vehicles that traverse the road network, as can be seen in **Figure 9** (CSIR, 2008).

This is because South Africa's permissible Gross Vehicle Mass (GVM) is amongst the highest in the world – 118 tons higher than in the US – as can be seen

in **Table 1** below. So freight operators in South Africa cause 100% damage to the roads and only contribute 8% of their operating costs to the maintenance of the roads. In terms of toll fees, heavy trucks pay less than five times what passenger cars pay, but cause 100% more damage to the roads than passenger cars (CSIR, 2008).

MAXIMUM PERMISSABLE GVM

COUNTRY	GVM	PAYLOAD INDEX
TANZANIA	75	323
ZAMBIA	73	311
LESOTHO	69	288
RSA	57	218
ZIMBABWE	48.7	169
KENYA	46	153
ITALY	40	118
BRITAIN	38	106
USA	37	100
GERMANY	35	88
NIGERIA	32	70
SWITZERLAND	28	

Table 2: Maximum Permissible Gross Vehicle Mass (GVM)

4.9 Road and Rail: Balancing the Playing Field

This situation described in the chapter above creates an unequal playing field between road and rail, with regard to the provision and maintenance of road and rail infrastructure. Transnet Freight Rail (TFR), on the other hand, is responsible for providing and maintaining its own rail infrastructure. Transnet Freight Rail is the largest division of Transnet. It is a heavy haul freight rail company that specialises in the transportation of freight and maintains an extensive rail network across South Africa (TFR, 2011). The rail passenger services has been separated from Transnet and is run by the Passenger Rail Agency of South Africa (PRASA), with a 70% state subsidy of its operating costs (PRASA, 2011).

Rail cannot compete on an equal footing with road for the transportation of freight cargo, when freight operators make a mere token contribution to the provision and

maintenance of the road infrastructure, while they are billed 100% of the cost of maintenance of the TFR rail network costs, when using rail (DoT, 2010b).

The bulk of the cost of roads maintenance comes from the country's revenue fund for both toll and non toll roads. For passenger services, the user pay principle should actually be the "user contribution principle". There is a generally accepted understanding around the world that passenger services are not able to make a profit at an enterprise level and therefore have to be subsidised from the general tax base. As mentioned above, PRASA receives a 70% government subsidy (PRASA, 2011).

This unequal playing field between road and rail causes a host of problems. Because Transnet Freight Rail is not subsidised by government it cannot compete with road freight costs and therefore cannot generate the revenues it needs to grow and develop the railway system. Excessive amounts of freight cargo trucks on the roads lead to damage of the road network, contribute to congestion and increases the risk of accidents, especially for passenger cars who suffer the worst damage and mortalities in accidents with trucks on the road (DoT, 2010b). According to Professor Karl Peltzer (2008), in an article titled "The Road 'Kill' Factor", various studies show a higher crash involvement of buses, minibuses, lorries and trucks, than cars.

These factors, and the increasing need for energy efficiency, is prompting government to look for ways in which to move freight transport from road back to rail, and to make the rail network economically viable again. This could be achieved by implementing the user pay principle, where freight cargo operators pay the actual costs of using the road. Reducing the maximum Gross Vehicle Mass allowed on the roads will also force heavy loads and cargo containers to move off the trucks and onto rail again. This will radically reduce the costs of maintaining the roads infrastructure in the country (DoT, 2010b).

Proost and Van Dender (2011) state that road and air freight can be up to ten times less fuel efficient than rail freight and a hundred times less fuel efficient than waterborne freight. For this reason, one of the EU's main transport policy objectives over the past 15 years is to discourage the growth in road freight and encourage the growth in rail passengers. One of the stumbling blocks to achieving this objective, as

is also the case in South Africa, is the need to harmonise and standardise the rail system, to ensure a seamless flow of goods and passengers. The EU has been making huge investments in this area (Proost and Van Dender, 2011).

High speed rail may be the answer for long distance travel beyond 300 kilometres, while for shorter distances, conventional rail is preferable. High speed rail, like the Gautrain, requires large investments, large public subsidies and high volumes of passengers to be economically justifiable. The EU, China, and Japan have gone the route of a highly subsidised network of high speed rail. However, if environmental and energy concerns are important, then the more energy-efficient conventional rail is preferred (Proost and Van Dender, 2011).

4.10 Climate Change and Implications for Roads Planning

Rising Transport Carbon Emissions

The current global warming problem is related to changes in the concentration of greenhouse gases, which trap infrared radiation from the Earth's surface and thus cause the greenhouse effect. This effect is a natural phenomenon, which helps maintain a stable temperature and climate on Earth. However, human activities such as fossil fuel combustion and deforestation have led to an increase in greenhouse gas concentration, which causes an increase in the earth's temperature, a rising sea-level and the melting of glaciers. One of the major greenhouse gases, carbon-dioxide, comes from burning fossil fuels (US Department of Energy, 2007).

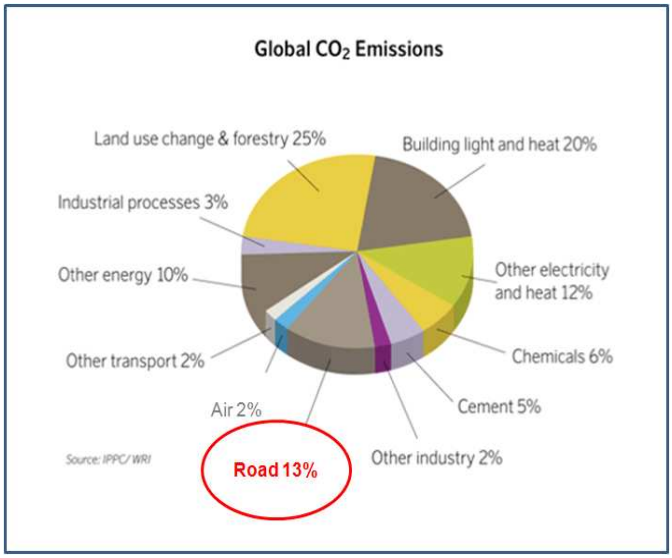


Figure 8: Global Carbon Emission by Sector
Source: The International Transport Forum (2010)

Figure 8 shows the contribution of green house gas emissions by sector (The International Transport Forum, 2010). Transport contributes 17% of global carbon dioxide emissions and 27% of the global total of greenhouse gas emissions. An estimated 72% of that total is caused by road and only 1.6% by rail. The International Transport Forum (2010) predicts that by 2030, transport energy use and carbon emissions will be about 80% higher than current levels.

Road Congestion and Carbon Emissions

Congestion on roads and the resulting carbon emissions is a serious problem. In the UK, over 50% of households use cars in all income groups, while the greater part of private spending on rail and the London Underground is by the higher-income households. The demands on the UK road network are likely to increase further in the long term between 2005 and 2041. In this period, it is estimated that incomes will at least double, the number of cars will increase by 44%, and road traffic demand will increase by 43% (Glaister and Smith, 2009).

According to Anas and Lindsey (2011), urban road transportation causes several major negative impacts. Firstly the costs of greenhouse gas emissions from motorised private and public vehicles are borne globally. Secondly, other air pollutants and noise from urban road transportation affect road users and others locally. Thirdly, the costs of congestion (time delays and extra fuel consumption), accidents, and infrastructure damage are largely borne by motorists collectively. Urban road transportation also causes water pollution, vibrations, and visual intrusion. Roads create a barrier to bicyclists and pedestrians. Moreover, when parking is underpriced, the time spent searching for parking, excessive use of land for parking, the contribution to the urban heat island effect, and problems of drainage can be significant in urban areas (Anas and Lindsey, 2011).

In developing countries, rapid income and population growth translates into the rapid growth of car ownership. The growth in car ownership is much less in developed countries (Proost and Van Dender, 2011).

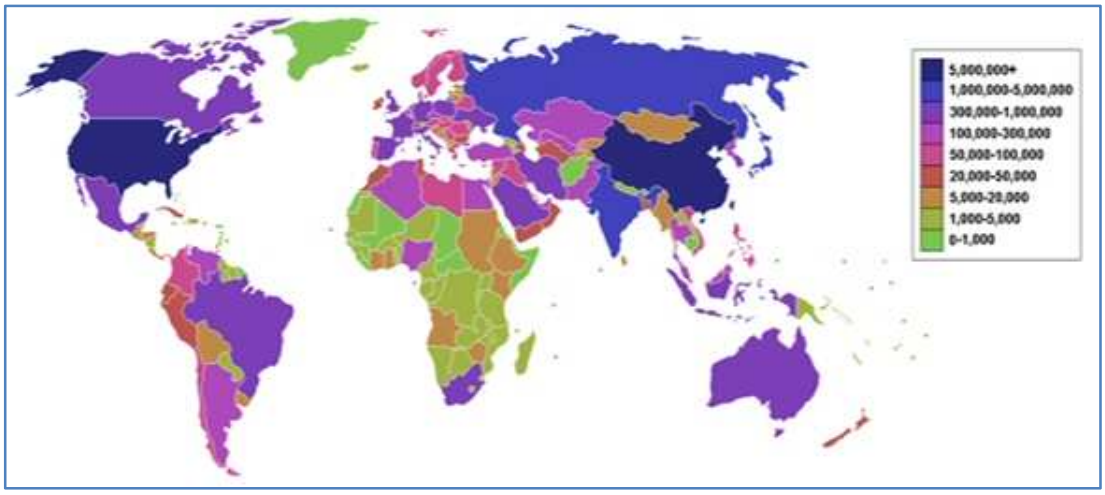
Congestion and Road Capacity

Increasing congestion and stop- start driving causes most carbon emissions and therefore, according to Glaister and Smith (2009), increasing road capacity will alleviate congestion and reduce carbon emissions. However Jeremy Cronin, the Deputy Minister of Transport, disagrees. He says research shows that widening freeways does not reduce congestion (SABC, 2011).

Supporting this argument, Proost and Van Dender (2011) state that Duranton and Turner (2010) have evidenced the fundamental law of road congestion - that transport volumes increase proportionally to highway capacity. This means that building extra capacity does not reduce congestion on the roads. The study conducted in US cities between 1983 and 2003 showed that passenger and freight traffic increased with greater roads capacity in a city. Cities with less congestion attracted people and resulted in greater volumes of road traffic (Proost and Van Dender, 2011).

Glaister and Smith (2009) believe that there is no direct correlation between growing traffic in the future and increasing carbon emissions, as road vehicles will become more fuel-efficient over time. They believe that eventually sources of power for road vehicles will become de-carbonized altogether. They also disagree that the need to reduce carbon emissions to achieve climate change objectives, will prohibit future road traffic growth (Glaister and Smith, 2009). Proost and Van Dender (2011) also believe that new cleaner car technologies are reducing carbon emissions, although they estimate that carbon free alternative technologies will probably not be available before 2040.

The world map **(Map 5)** below shows that South Africa is the biggest emitter of carbon dioxide in Africa (Underwood, 2008).



Map 5: Global Carbon Dioxide Emissions by Country
Source: Underwood (2008)

The United Nations Framework Convention on Climate Change (UNFCCC) is aimed at fighting global warming by stabilizing greenhouse gas concentrations at a level that does not endanger the climate system. The South African Government acceded to the Kyoto Protocol in July 2002, with a clear commitment to reduce greenhouse gases and developed a national climate change response strategy in order to fulfil the requirements of the UNFCCC (DEAT, 2004).

The transport sector accounted for about 19% of South Africa's greenhouse gas emissions in 2000 and is the most rapidly growing source of greenhouse gas emissions in South Africa. Being responsible for 1.6% of total global CO_2 emissions, South Africa plans to stabilize and reduce CO_2 emissions by 2025 (DEAT, 2004).

Policy Influence on Transport Modal Shifts

SANRAL states that traffic congestion leads to an increase of vehicle emissions and aims to reduce environmentally unfriendly vehicle emissions through the GFIP. They believe the GFIP toll road will encourage more people to take up the option of non-road based public transport such as the Metrorail and the Gautrain, and to set up more carpool systems (SANRAL, 2011).

Proost and Van Dender (2011) state that policies that advocate a modal choice of transport can reduce environmental impacts, but may not always be economically

attractive. In theory, a modal shift from road and air to rail and waterways can greatly reduce congestion and carbon emissions. However, experience in the EU shows that these modal shifts can only be viable with high spatial density demand, and does not always justify massive investments in these modes from an economic perspective.

Anas and Lindsey (2011) have found that where congestion pricing has been introduced, the transport volumes and carbon emissions decreased in the congestion pricing zone by 10 to 20%. However, congestion pricing mainly redistributed traffic over time and space, therefore it has no impact on total carbon emissions, so policies generally cannot address congestion and carbon emissions at the same time. They submit, however, that public policy is one of the three main drivers that affect passenger modal choice, with the other two drivers being income levels and user costs, including the cost of time.

4.11 Conclusion of Literature Review

The research studies and expert opinions presented in this literature review show that there are a myriad of views on how transport infrastructure generally and roads specifically should be developed, maintained and managed. These differing views are based on differing and often conflicting positions on economic policy.

Differing Public Policy Approaches

Some studies show that governments need to actively pursue and control social, economic and environmental outcomes through the implementation of public policy, legal and regulatory frameworks. Other studies show that governments should commercialise the roads completely as the private sector is more efficient and can provide better value for money in managing the roads. They prefer that governments and their roads agencies have the least influence over developing infrastructure projects and managing roads operations due to conflicts of interest, political interference and agency problems.

Differing Roads Funding Strategies

Similarly, there are many approaches presented for the funding of roads: using the general revenue funds; fuel levies; earmarked roads funds; and levying toll tariffs to provide a return on private capital investment. Many researchers advocate the privatisation of the roads to improve efficiency and transparency.

It is clear however, that the user will inevitably pay for the roads – either as individual or business taxpayers or through toll tariffs. The critical issue is how this money gets spent. Is it wasted by inefficient governments? Is it invested in socially and economically non-viable transport investments, or are the projects designed to achieve the most benefits and value for money from the public investment made? Are the roads project plans, agreements, financial projections and cost-benefit analyses cloaked in secrecy? Or is there complete public transparency and consultation?

Despite all the different positions and approaches presented in this literature review, five common themes emerge, on which all the experts seem to agree and raise as important. These themes are summarised as follows:

Efficient Governance Approaches and Systems

The first theme relates to governance and the need to find the most efficient approaches and systems to manage the development, maintenance and operation of roads. There is no one-size-fits-all approach, as different governance models best suit different situations and different types of investment projects.

Transparency and Public Control

Closely related to this, the second theme which has emerged is transparency and public control over investments of public funds in roads and related user charging. The lack of transparency and accountability to the public seems to be a common problem in many countries. Some of the more developed countries have well-established consumer councils, which represent the interests of different consumer groups. While the objectives of public consumers and business consumers may be different and sometimes opposing, a recognised and representative consumer council can be very beneficial in ensuring that the rights of consumers are protected and that they can exercise some influence over the roads systems.

Independent Transport Regulator

The third theme is the importance of independent reviews of the details of roads projects. Having independent expert reviews will ensure that non-viable infrastructure projects, based on other motivating interests, do not get built. A natural development of this theme is the establishment of an independent transport regulator, who is guided by public policy but reports to the legislature and therefore cannot be bullied by the transport ministry. This regulatory mechanism provides the checks and balances needed for commercialising the roads, ensuring that fair tender processes are followed and the rights of consumers are protected, especially with regard to the setting of toll tariffs.

Cost Benefit Analyses

The fourth theme to emerge relates to the cost benefit analyses conducted for roads development projects. There are many economic models that are proposed to measure cost-benefit analyses. What seems apparent from the literature review is that many large infrastructure projects are inefficient and not properly analysed. There needs to be a broader and more lateral view taken when these analyses are conducted. A narrow economic benefit or ROI analysis ignores the broader social and environmental impacts arising from these large infrastructure investments. The value for money analysis is also proposed as an additional analysis to be conducted to ensure that the spending is in line with international benchmarks. Independent reviews and greater stakeholder consultation can therefore strengthen the cost benefit analyses conducted, and should be welcomed, rather than avoided.

Environmentally Sustainable Transport Systems

The fifth theme that emerges from the literature review concerns the environment and the ever increasing carbon emissions from growing traffic volumes on the road, especially in developing countries. Greater traffic volumes mean more harmful carbon emissions. More traffic congestion also means more carbon emissions. It has emerged from some research that increasing roads capacity does not decrease congestion, but rather increases it in the long term. Implementing congestion pricing schemes does not necessarily decrease carbon emissions but spreads these emissions over time and space. While high speed rail is a solution, albeit a very

expensive one, it works best for long distance trips of over 300 kilometres, and moves passengers from more environmentally harmful air travel to high speed rail.

The massive investments required for high speed rail also requires large subsidies, large volumes of passengers and high pricing to ensure ROI. As a means of low cost public transport, conventional rail causes the least amount of carbon emissions and is the most economically and socially viable. Many countries and leading private investors such as Richard Branson and Warren Buffet have already identified that rail transport is a future imperative and are making major investments in rail infrastructure and services. Many experts have also recommended that rail-centric freight cargo, which causes the most damage to the roads and requires large numbers of carbon emitting trucks on the roads, must be moved onto rail.

5 Research Methodology

In this chapter the research methodology adopted in this study is explained in detail. The differences in research design approaches will be explained. The characteristics of qualitative and quantitative approaches were applied to the nature of this study, to select the best suited research design for the research problem. The sample selection is explained and the methods of data collection used are described. The research areas that guided the collection of data are highlighted and the data analysis methods used are discussed. Ethical considerations that were taken note of in this study are explained and, finally, the form that the results of this study have been presented in, is described.

5.1 Research Design

Research design is the overall strategy adopted for solving a research problem, thus the research design selected must be best suited to the research problem and the nature of the data to be collected (Leedy and Ormrod, 2005).

The most common approaches to research are quantitative and qualitative. These approaches can also be combined in various combinations. A two-phase design starts with either a quantitative or qualitative study and is followed by the other. A dominant less-dominant design adds a quantitative component to a qualitative study, or vice-versa. A mixed-methodology design uses both quantitative and qualitative techniques in the research study (Lee, 1999).

The type of data that will be collected to solve the research problem has an important bearing on the research methodology employed. The research problem determines the research design and methods to be used. Different questions lead to the collection of different types of information and different types of interpretations of that data (Leedy and Ormrod, 2005).

Before deciding on the best research design for this study, the differences between quantitative and qualitative research approaches had to be fully understood, in order to make an informed decision. In **Table 2** below, these differences are analysed in terms of the following areas:

1. Purpose of the research;
2. Nature of the research process;
3. Type of data;
4. Data collection methods;
5. Data analysis methods;
6. Communication of findings;
7. Advantages; and
8. Limitations.

The advantages and limitations of both quantitative and qualitative approaches are also highlighted in the table below. Finally, in order to apply the learnings about quantitative and qualitative research approaches to the study currently being undertaken, the characteristics of both research approaches were matched to the needs of this study, to arrive at the best research approach for each element of the research process.

The research design analysis conducted is presented in **Table 2** below as follows:

	QUANTITATIVE	QUALITATIVE	APPLICATION TO THIS STUDY
1. **Purpose of the research**	• Seek explanations & predictions • Establish, confirm & validate relationships • Develop generalizations that test and contribute to theory	• To describe and explain • Exploratory and interpretative • To build theory from the bottom up	• To describe and explain the GFIP toll road strategy • To interpret and analyse information about the socio-economic and environmental impact of the GFIP • To explore and understand theories, approaches and international best practices
2. **Nature of the research process**	• Concepts, variables, hypotheses & measurement methods are defined and do not change • Objective measurement of variables • Remain detached and reach unbiased conclusions	• Holistic process • Focus, design, measurement methods and interpretations develop and even change during the study • Researcher interacts with participants • Variables emerge from the data • Information, patterns and theories are context-bound	• Holistic research approach to the problem • Variables and themes emerge from the data • Subjective measurement of variables • Researcher interacts with participants • The data collected is context-bound
	QUANTITATIVE	**QUALITATIVE**	**APPLICATION TO THIS STUDY**
3. **Type of data**	• Numeric data • Representative and large sample	• Textual and image based – verbal (interview comments, documents, field notes) and non-verbal (drawings, photos, videotapes) • Informative, small sample selected	• The data collected in this study will be text and image-based, including: documents, interview comments, drawings and photos. • Small sample of informative people will be subjectively selected by the researcher based on their knowledge and relevance to the GFIP project. **The type of data to be collected in this research process best matches data in a qualitative approach**
4. **Data collection methods**	• Standardised instruments	• Loosely structured, non-standardised observations and interviews	• This research study will involve collecting a broad range of information about the GFIP project and other toll road projects around the world and analysing this information • Semi-structured interviews will be held. • The qualitative data collection methods are best suited to this study. **The qualitative data collection methods are best suited to this study.**

	QUANTITATIVE	QUALITATIVE	APPLICATION TO THIS STUDY
5. Data analysis methods	• Statistical analysis • Trying to maintain objectivity is important • Logical conclusions drawn from deductive reasoning	• Data analysis is more subjective by nature • Search for themes, categories and patterns – subjectively identified • Inductive reasoning used	• The observations made are not pre-defined but will emerge from the data collected. • The data will be subjectively analysed by the researcher • Inductive reasoning will be used by the researcher **The qualitative data analysis methods best suit this research study.**
6. Communication of findings	• Numbers • Statistics that reflect the norm and averages of a large group • Formal, scientific style, passive and impersonal voice	• Words • Personal voice • Literary style • Includes participants'' perspectives and quotes	• The findings of this research study will be presented in a written report. • The report will be written in a personal and literary style that will include the perspectives of the research participants. **The findings of this study will be communicated in the qualitative approach manner.**
	QUANTITATIVE	**QUALITATIVE**	**APPLICATION TO THIS STUDY**
7. Advantages	• More objective and unbiased • More easily generalized to other situations	• Can describe and understand complex situations • Assumes real world scenarios • Suitable when relevant theory and literature and insufficient	
8. Limitations	• Assumes a single objective world • Typically used to confirm and validate existing theory	• More subjective • Cannot easily be generalized to other situations	

Table 2: Research Design Analysis
Sources: Adapted from Leedy and Ormrod (2005) and Lee (1999)

As is evidenced in the analysis of the best research design in **Table 2** above, the research problem in this study is best suited to the qualitative research approach. The qualitative research methods that were followed in this study are further explained in the next paragraphs of this chapter.

5.2 Research Sample and Data Sources

According to Leedy and Ormrod (2005), qualitative research studies have many sources of data including:

- A selection of people;
- Text materials and documents;
- Audiovisual material; and
- Electronic records

Diamantopoulos and Schlegelmilch (2005) have identified two main categories of sampling procedures, namely:

- **Probability sampling:** every element of the population has an equal chance of being selected in the sample; and
- **Non-probability sampling:** the selection of the sample is at the discretion of the researcher.

This research study used the non-probability sampling procedure, which can be in any of the following forms:

- **Convenience sampling:** sample members are selected because they are available at the convenience of the researcher;
- **Judgemental sampling:** sample members are selected based on the judgement of the researcher on what constitutes a representative sample;
- **Purposive sampling:** the selection of a sample with a specific purpose or objective in mind;
- **Quota sampling:** the criteria for the selection of a sample that best represents the population is determined in advance and the selection of the sample members is based on these qualifying criteria (Diamantopoulos and Schlegelmilch, 2005).

In qualitative research, the selection of data sources is intentionally non-random and the sample selection is purposeful (Leedy and Ormrod, 2005). This research study used a combination of convenience sampling, judgemental sampling, purposive sampling and quota sampling, to select a sample that represents a broad range of

expertise, views and societal groups that have a role to play in the GFIP Toll Road strategy or that have an interest in the outcome of the strategy.

The sample selected for this study included primary and secondary sources of data, as described below:

5.2.1 Primary Sources of Data

Primary sources of data included interviews with individuals and available representatives from the stakeholder groups listed below. Primary sources also include stakeholders' documented positions papers, submissions and media statements on their organisations' views about the GFIP toll road.

Two social networking sites listed below under (E) Public Transport Operators and Interest Groups below were also analysed, as it offered comments, views and feelings of thousands of affected members of the public on how the GFIP toll road will affect their lives. Social networking sites like Facebook and interactive organisational websites offered an exciting new source of primary data.

A) Transport Experts and Academics

1. International Relations and Policy Expert: Dr Garth Le Pere (University of Pretoria)
2. Academic Transport Specialist: Dr. Bridget Ssamula (University of Pretoria)
3. Academic Transport Specialist: Prof. Johan du Plessis, Department of Transport: Supply and Logistics (University of Johannesburg)
4. Rail and Logistics Expert: Dr Leo Petkoon (Supergroup)

B) GFIP Toll Road Promoters

5. The Deputy Minister of Transport, Jeremy Cronin
6. The Director General of the Department of Transport, George Mahlalela
7. The Electronic Tolling Company (ETC) / Kapsch SA – Chief Operating Officer: Ben Theron
8. South African National Roads Agency (SANRAL)

C) Government and Agencies

9. The Chairperson of the National Assembly Portfolio Committee on Transport, Ruth Bhengu
10. Gauteng Provincial Government – Department of Transport
11. Ekurhuleni Metropolitan Municipality (EMM)
12. South African Local Government Association
13. The Development Bank of Southern Africa (DBSA) - Transport Specialist: Peter Copley

D) Private Sector

14. Business Unity South Africa (BUSA)
15. Road Freight Association (RFA)
16. South African Vehicle Rental and Leasing Association
17. Retail Motor Industry (Verbal Presentation)
18. SATSA, AfriForum and Johannesburg Chamber of Business
19. The Automobile Association
20. South African Road Federation (SARF)

E) Public Transport Operators and Interest Groups

21. Social Networking Facebook and Website: www.TollFreeGP.co.za
22. Social Networking Facebook and Website: www.NO2TOLL.co.za
23. South African Bus Owners Association
24. National Taxi Alliance
25. Mamelodi Commuter Forum
26. South African Commuters Organisation

F) Political Parties and Trade Unions

27. The Democratic Alliance (DA)
28. Afriforum/Solidarity
29. South African Communist Party (SACP)
30. The Freedom Front Plus
31. ANC Youth League
32. COSATU

5.2.2 Secondary Sources of Data

Secondary research sources included official records and documents, reports, studies and publicly available information from internet sources.

Information was searched for and collected on the following subject areas:

- South African Roads Policies;
- SANRAL / ETC / DoT Studies on the GFIP Tolling Strategy;
- DBSA Transport Research Reports;
- World Bank Transport Research Reports;
- Environmental Studies on the impact of transport on climate change;
- The socio-political impact of toll roads in South Africa;
- International examples of roads funding strategies;
- The socio-political impact of toll roads in other countries; and
- Media Reports on the GFIP toll road.

5.3 Method of Data Collection

This research study involved collecting a broad range of information about the GFIP project and other toll road projects from around the world and analysing this information.

Semi-structured, conversational interviews were held to allow for flexibility of discussion and follow-up questions. Interviews were held face-to-face and telephonically, depending on the preference and availability of the interviewee. The interviews were non-standardised, but key subject areas were identified in advance, as outlined in the next chapter. Specific questions were asked on the area of expertise or interest of each interviewee.

The researcher did not record each interview by dictaphone, as this may have led to the interviewee feeling uncomfortable and being more circumspect in sharing their

views openly and honestly. Notes were taken by the researcher during each interview and each interview was summarised and recorded in a written, minuted form.

5.4 Research Areas and Interview Questions

The five research areas listed below are based on the research objectives of this study. Under each research area, the interview questions and subject areas used for data collection are listed, as follows:

- **Economic Impact of the GFIP Toll Road**
  a) How will the GFIP toll road impact the SADC regional economy?
  b) How will the GFIP toll road impact the South African economy?
  c) What will the economic impact be on the Gauteng Province?
  d) How will the GFIP toll road impact the freight and logistics business sector?
  e) What are the outcomes of the GFIP cost-benefit analysis studies?
  f) What are the projected costs, revenues and profits expected from the GFIP toll road?
  g) Was the infrastructure spending by SANRAL efficient or inefficient?
  h) What should a realistic return of investment in the GFIP toll road be?
  i) Is the transport infrastructure investment being made in the right areas for best economic growth?

- **Social Impact of the GFIP Toll Road**
  a) What are the main concerns raised by members of the public on social networking discussion forums?
  b) What social impact will the GFIP toll road have in the Gauteng Province?
    - Better quality of life due to less time in traffic?
    - Increased poverty due to higher prices of goods?
    - Less disposable income?
    - More use of public transport?
  c) How affordable will the toll fees be to motorists?

d) What alternative forms of transport does the public have?

- **Environmental Impact of the GFIP Toll Road**
  a) Will the GFIP toll road reduce congestion and the resulting carbon emissions?
  b) Will the GFIP toll road promote car-pooling?
  c) Will the GFIP toll road cause people to relocate closer to work or use public transport, leading to a decrease in cars on the roads?
  d) Is government making an investment into the most environmentally-friendly form of freight and passenger transport?
  e) Does the GFIP investment create a perverse incentive to keep high traffic volumes on the roads to ensure a return on investment, as opposed to investing in less environmentally harmful forms of transport?

- **Road Infrastructure Funding Strategies**
  a) What are the best funding strategies available to government for developing and maintaining national roads?
  b) Why is the Fuel Levy not being increased to fund the GFIP roads development?
  c) Why is the GFIP funding not being allocated from the General Revenue Fund, as is the case with most other infrastructure investment projects?
  d) Are road funds the best mechanism to develop and maintain the roads?
  e) Is the commercialisation and privatisation agenda promoted by The World Bank the best approach for South Africa to develop and maintain our roads?
  f) Will Private Public Partnerships (PPPs) promote more efficient spending in infrastructure compared to government spending?
  g) Is there a need for an independent transport regulator in South Africa?

- **User Pays Principle**
  a) What are the planned GFIP toll tariffs and how are they being calculated?
  b) Are the toll charges being fairly allocated to the different road user groups?

c) Why are freight operators not being made to pay for the cost of maintaining the roads, as they cause 99.9% of the damage to the roads?

d) Why is there no significant investment in railways, both for freight and passenger transport?

e) Is the roads development plan part of an integrated transport strategy?
   - o A multi-modal approach to transport planning?
   - o Are demand-supply projections conducted?
   - o Are environmentally sustainable transport modes explored?

5.5 Data Analysis Method

In qualitative research, data analysis is more subjective by nature. The researcher made non-standardised observations, based on the interview discussion and analysis of the information collected. The researcher searched for themes, categories and patterns that relate to the research objectives of this study. These were subjectively identified.

The observations made by the researcher were not predefined but emerged from the data collected. The data was subjectively analysed by the researcher using inductive reasoning.

5.6 Ethical Considerations

The following ethical issues were taken into consideration in this research study:

a) Qualitative research is by nature dependent on the subjective reasoning of the researcher. There is therefore a danger of the researcher consciously or unconsciously influencing the outcome of the study to align to her subjective views and opinions. This will decrease the quality and reliability of the research findings of this study. This can be mitigated by the researcher remaining aware of this potential ethical problem. Every effort was made by the researcher to remain objective during the research process.

b) The desire for certain statements to be confidential or “off-the-record” by interviewees presented an ethical consideration for the researcher on whether or not to include such statements or views in the study. The researcher examined the problem on a case by case basis to assess if the information is absolutely necessary for the study. If it was, then the researcher included the information in the research findings, but protected the source of the information, thus respecting the trust relationship between the researcher and subject and protecting the subject. This is especially relevant where allegations of corrupt or illegal activities were made.

c) Confidential documents that are found in the public domain, such as on the internet, were used in this study. The researcher differentiates between company proprietary information and government information that is in the public interest. Company confidential information cannot legally be used without permission from the company, and to use these will be both unethical and illegal. However, in the view of the researcher, government information that is in the public interest and not protected by law, such as Cabinet documents, should not be confidential. Government is supposed to serve and be accountable to the citizens of the country. Therefore, where government documents on the GFIP that are marked as confidential have been sourced, the researcher had no moral problem in using these documents as public information, to promote accountability and transparency.

6 Research Findings

This chapter presents a summary of the important points raised in the interviews conducted and addressed by affected stakeholders who have documented their positions on the GFIP toll road. The findings have been organised into the following categories:

- Transport Experts and Academics Views;
- Government Stakeholder Views;
- Private Sector Stakeholder Views;
- Public Views on Social Networking Sites;
- Public Transport Operator Views; and
- Political Parties and Trade Union Views.

Finally, the research findings are summarised in 6.7 of this chapter for ease of reference, and to synthesise the main themes emerging from the research data collected.

6.1 Transport Experts and Academics Views

6.1.1 Interview with Dr Garth Le Pere, International Relations and Policy Expert: University of Pretoria

- The Gauteng roads infrastructure provides a critical linkage into the SADC heartland. One of the problems hindering economic growth in the region is that the transaction costs are very high compared to developed regions. The SADC Protocol is clear on the need to make the movement of goods and services smoother but countries are not yet willing to adopt a pan-regional mind-set. We need to suspend the fetish of sovereignty in SADC and adopt the universally accepted principles of building our regional bloc, in practice.

- The GFIP toll road is problematic in that it puts a break on promoting the larger aim of provision of regional goods. It puts a break on economic activity in SADC where our markets are already small.
- Transport infrastructure is a regional public good. Regional goods are for the general welfare of the country and the region. Creating regional public goods is the responsibility of governments and cannot be left to market forces and market driven capitalism. Using market mechanisms to drive the provision of regional public goods undermines development objectives.
- Tolling of roads should only be used as an absolute last resort. Infrastructure is a social cost. Government should rather use dedicated tax mechanisms to fund the roads and not place the cost burden on the user. This forces the business user into having to make a choice on whether or not they can afford to use the roads and if they do then they have to pass on the cost to the customer. This has a knock on effect of making our country and our region less competitive. It impacts negatively on intra-regional trade. In my opinion government has got it terribly wrong with the GFIP toll road plans (Le Pere, 2011).

6.1.2 Interview with Dr. Bridget Ssamula, Academic Transport Specialist: University of Pretoria

- In general, roads development and transport infrastructure has traditionally been the responsibility of the State and should not be left in the hands of the private sector.
- Transport infrastructure is a social and economic service and there are sufficient taxes and tariffs that go into the general revenue fund to cover the costs of infrastructure development and maintenance.
- The problem arises when Government cuts corners and does not spend the money required to maintain what infrastructure already exists.
- The GFIP was a very ambitious project and government probably got carried away by the preparations for the FIFA World Cup. The R21 road to the airport is a case in point. All it needed was one more lane, not three. The N1 did not fail. All it needed was expansion, not to be completely dug up and replaced.

- There was no need to spend so much money on so many roads all at the same time. The cost burden is too high for a developing country. The big bang approach should have been replaced by a phased-in over a few years.
- Why make the public pay? Government should be providing roads infrastructure as a service. People should have a choice on whether or not they want to pay. Tolling should not be enforced as a mandatory way to solve the maintenance problems.
- Corruption is definitely a driver of high costs.
- Government must get the money for roads from taxes and the fuel levy. There is enough money. The infrastructure spending needs to be prioritised properly.
- Poor people use the trains. There is commuter transport and public transport. Commuter services are dictating how people live their lives. It is not a proper service. People have no choice. Public transport is run by Local and Provincial government. But 80% of the Gauteng population use taxis as they are providing a more responsive service.
- More attention needs to be given to upgrading the public railway service for the majority of people who use it – not the rich, as is the case with the Gautrain.
- There is a need for better planning and prioritisation of the entire transport network – infrastructure and operations of road and rail services.
- So government is learning a good lesson in the GFIP. They have to learn how to consult with stakeholders and be transparent about their planning. This process is going to force them to plan the transport system better and with more effective integration across the three spheres of government (Ssamula, 2011).

6.1.3 Interview with Prof. Johan du Plessis Academic Transport Specialist: Department of Transport, University of Johannesburg

- Economic studies conducted by the freight transporters show the horrendous impact the GFIP toll roads are going to have on their operational costs, which they will pass on to their customers.

- The revised tariffs will be subjected to a lot of scrutiny. People are feeling the effects of the global recession, the high interest rates and the high unemployment rates. From a macro perspective, the consumer cannot handle any more cost of living increases, which is what the toll is going to be for all people in Gauteng.
- It seems as if the tolling of the main arteries of the roads network is the only real solution. Our country's secondary roads are in a very bad condition and state funding needs to be spent on fixing those roads.
- SANRAL's plans were acceptable before the FIFA World Cup as everyone was excited about SA being the host country. However the high tariffs are a big shock and will have to be drastically reduced, with a longer payback period for SANRAL loans.
- Corruption – no evidence to suggest that there was corruption in the roads development. This could be an area for further study (Du Plessis, 2011).

6.1.4 Interview with Dr Leo Petkoon, Rail and Logistics Expert: Specialist Consultant to Supergroup

- We have to take a realistic view. We cannot expect the very poor to have to pay toll fees. It is the States responsibility to provide infrastructure that makes the economy tick. Education, health, safety and security and infrastructure such as roads, water and communications is the responsibility of the State. It is therefore wrong to toll the roads.
- The sectors that are scoring commercially should pay for the road. Don't toll the commuters and public transport! It is criminal to toll motor-bikes and motor vehicles! They do not cause any damage to the roads, but they are easy targets for toll roads.
- Toll every vehicle over a certain weight of axle tonnage e.g. over 3 tons or 5 tons. CSIR studies show that these vehicles cause 100% of the damage to the roads. Overloaded vehicles cause 60% of the roads damage, so tolls on heavy vehicles should be relative to their weight. The reduction in their profitability will be very small compared to the profits that freight groups like Supergroup, Imperial, and

Rennies make. These trucks could have been tolled manually, eradicating the need to spend R6 billion on electronic tolling systems.

- Our investment in transport infrastructure is skewed. We need to be investing in rail to reduce congestion and to reduce carbon emissions. It is the cleanest form of transport. It will be the most effective form of public transport if the capacity and service was improved.
- If we want to avoid damage to the roads, move the freight onto rail. Bulk cargo such as coal, iron ore, steel, wood, cement and petrol (rail-centric cargo) should not be moved by road, but by rail. But rail needs to have investment in new locomotives for public transport and carriages for cargo. We need to invest money into our multi-modal transport terminals. We have huge cargo delays at the Durban Harbour at Bayhead and Point, and also in Cape Town, Pretoria and Johannesburg.
- National or Provincial Government should be responsible for rail infrastructure because the same bodies are responsible for the provision of the road infrastructure.
- In theory, based on the user pay principle anyone qualified or licensed operators can then make use of the road and rail infrastructure on a cost-based tariff. Rail and road transport operators would carry the real cost of providing and maintaining the infrastructure that they use as primary infrastructure on which to operate their equipment.
- Similarly, rail operators would pay for the provision and maintenance of the rail infrastructure. At this stage TFR pays for provision and maintenance of rail infrastructure while road operators make only a marginal contribution to the provision and maintenance of roads through licenses, tolls, levies and taxes.
- If government only paid Transnet Freight Rail's maintenance bill of about R5 billion per annum, it would make Transnet profitable. Transnet would then be able to be price competitive, providing cheaper and better freight service to freight operators, moving freight off the roads onto rail.
- Proposals:
    - Invest in rail.

- Create tax incentives for freight operators to use rail.
- Create toll disincentives for freight operators to not use the roads.
- Don't toll the public (Petkoon, 2011).

6.2 Government Stakeholder Views

6.2.1 Interview with Chairperson of the National Assembly Portfolio Committee on Transport, Ms Ruth Bhengu

- The DoT is not focusing on human development. It is more of a policy making department and sadly does not even implement its own policies.
- DOT has an arm's length approach and outsources most of its implementation to transport agencies. This contradicts the ANC's stated promise to cut red tape. Current practice rather tends to increase red tape.
- There is a gap between the DOT and the agencies in respect of the policies and their implementation. The time span from interpretation to implementation takes far too long. There is need for a branch in DOT that interprets policy that needs to be implemented in a 5-year term. Not hands-on, no strategic planning
- She talks about an integrated approach that should consider the transport nodes as common to all the modes of transport. The nodes and modes collectively represent the backbone of the transport industry in South Africa.
- We have not understood or appreciated what the role of transport is in respect of developing the economy. Roads and rail are the arteries of the economy.
- If one talks "economic development" only then can one justify the investment that the country must make in transport. Strategy should not be informed by cost recovery but rather by the long term benefits that accrue as a result of transport related strategy. There is no sense to try and justify the investment in Gautrain by means of ticket sales. On that basis it does not make money. That should not be how one measures the benefits of investment in transport infrastructure. It is rather a tool to help develop the country. It cannot be measured on the basis of a balance sheet – the government should see the bigger benefit. The same

argument would apply when evaluating the high speed passenger link between Johannesburg and Durban as well as between Johannesburg and Cape Town. The decision should be informed by the number of communities between Johannesburg and Durban and Johannesburg and Cape Town that could benefit directly and indirectly by this investment and who would have the opportunity to use the service.

- Railway branch lines (she is from Harding, a former narrow gauge line to Port Shepstone) create opportunities to attend schools, clinics and universities and technikons. It is important to appreciate the role that branch lines used to play and should still play in respect of human settlements away from big cities versus the slums that are prevalent at the outskirts of cities because of lack of rapid passenger services to and from families in rural areas.
- The question that one should be asking is whether the money should be spent on upgrading the slums or rather on the root causes of the problem such as inadequate, safe affordable transport between home and work. Fixing slums only brings temporary relief as they re-emerge soon after they have been cleared. The clearing of slums and the provision of some form of housing is worth more votes in a 5-year election cycle as it is more readily visible than investment in transport infrastructure which delivers sustainable long term benefits.
- Rural areas must be developed, like in China where they make use of rivers and high speed trains with significant subsidies on fares that passengers pay.
- Chasing numbers – houses delivered as opposed to the long term benefit of investment in rail transport and other similar infrastructure. The latter takes years to appreciate its value – not good for votes. The spin-offs are however mobility of people, reduction of fatal accidents and better land-use.
- Similarly the congestion on and consequential rate of accidents and pollution on roads can be countered by investing in rail infrastructure even though the latter appears to be expensive. 80% of all freight is currently on roads. This is not good for South Africa. There needs to be a balance between road and rail. This does not imply that all traffic can be shifted to rail but rather that the freight that is best suited to rail transport should be “encouraged” by various means to shift to rail.

- One needs to take a strategic view – invest more on integrated solutions. From a passenger perspective rail is an effective mass mover of people. It is cheaper, environmentally friendly and prevents consequential social problems like squatter camps and the like.
- There are opportunities that put SA in a favourable position such as its political stability. SA has recently been rated as the number 1 country for foreign investment. We should be the springboard for investment into the African continent. DoT needs to review the institutional arrangements of its entities – including Transnet. There is a need for them to have a common approach towards dealing with transport matters. The issue is whether they should report to Public Enterprises when they need to deal with the greater transport issues of SA. Performance should not only be measured in money terms. The measurement should never be "how much you are able to make". By measuring on the basis of the balance sheet transportation of people has suffered.
- The Moloto Corridor is an example where funds are being misdirected with good intentions. The bus subsidies that are being paid to transport passengers is R14 billion per annum or equal to R7,700 per person per month for people that are earning R3,000 per month. It would be better to invest in a decent rail system that moves masses of people safely and effectively instead of the many buses on the roads. It would also entice car users to make use of public transport. The macro economics benefits should be used as an important component of the tools of measurement – do not chase numbers (Bhengu, 2010).

6.2.2 Interview with Jeremy Cronin, Deputy Minister of Transport; and Interview by Special Assignment, SABC 3.

The SANRAL issue is a case of the tail starting to wag the dog – in respect of the controversial Gauteng toll project. SANRAL had mistakenly been permitted to determine priorities with regard to expenditure itself. This should have taken place at government level.

- We have made a huge mess. People have been driving on the road free of charge for a year. Engineers had gone with the flow. We have to respect them, but also ask questions.
- One problem is that SANRAL appoints consultants to conduct feasibility and impact studies. Consultants are then inclined to say what their client wants to hear. These directives must come from government.
- Politicians had failed and consultants doing viability studies should have known better. (The decision to levy tolls on the roads was taken long before Cronin and Minister Ndebele took over the Ministry of Transport)
- The University of Cape Town (UC) and international consultants Arup conducted research for the Gauteng project. Cronin called it “useless” research. He said there were other UC departments with far greater expertise, and why these had not been commissioned was unclear. He said Arup should have known that thousands of global studies have shown that traffic congestion is not resolved by widening roads. That aggravates the problem in the medium term, because better roads attract more vehicles.
- There should be a broader search for a solution. Trains and improved public transport, as well as good town planning, would in his view offer a better solution. In Gauteng most trips take place intra- and not inter-city, as shown by earlier research. The Gautrain is intended for inter-city passenger transport. To spend R20 billion on widening the freeways was, in his view, the wrong decision. It benefits only the middle class.
- Cronin said SANRAL chief executive Nazir Alli is, like Gautrain boss Jack van der Merwe, technically highly competent and able to present a good case. The two are very convincing but small rural communities do not have any Jack van der Merwes or Nazir Allis. Priorities need to be determined politically.
- DOT should take the lead and give guidance to DPE and other related entities. We need strategy, not events which are often driven by the agencies instead of the DOT.

- Relations with DPE in respect of Transnet seem to be improving. With regard to SOE's in general there are three distinct facets to consider, namely Policy, the Regulatory aspects and the corporate interest.
- The strength of Transnet is in its massive balance sheet which enables it to "borrow" internationally and locally. It can fund investments in Transnet Freight Rail (TFR). It is not in SA's interest for TFR to collapse. TFR, for the same reason needs some form of government oversight.
- There is no doubt that SA needs a good rail system. This would imply a regulatory framework where it is able to compete fairly with other modes. Transnet has embarked on a major recapitalisation program. Our technology is still from the 1950's. The Chinese are keen to jump in and fill the technology gap. This has a downside of which one must take note. They are keen for resources and in return they expect us to buy their technology including their modern rail technology. When it comes to manufacturing, they want to supply the equipment to refurbish Metro Rail and TFR. The thing to consider is to what extent it would favour local job creation. There are sufficient volumes in terms of work to capitalise on economies of scale.
- One should think carefully about the current eagerness to buy high speed train system from China. Bombardier from Canada as well as the Germans and French can supply similar technology and are to invest in factories in SA. We must guard against ad hoc initiatives, like the monorail system that Malaysia tried to sell to Johannesburg. Such decisions should be taken within a broader national framework.
- On the topic of climate-change, three things were mentioned at the outset: technical interventions to help address the climate-change concerns; the use of alternative fuels as sources of energy and the degree of pollution created in transport and the relative contribution of the different modes and technologies to pollution.
- With public transport it is important to begin with cities. Land use management is a major source of concern. Commuter transport has two daily peaks. For the rest of the day the capacity is parked and idle. The problem is that the focus is on providing housing instead of creating human settlements. Aspects like travel

demand management, funding of public transport and insufficient devolution of power to provinces and cities, need to be addressed.

- Similarly there should be a focus on development corridors. China is deploying a network of high speed rail corridors to address their own domestic problem. In South Africa our problem is not a lack of development but rather one of skewed development.
- In South Africa we should leverage the mining capital by insisting on beneficiation of minerals as a condition to granting mining licenses. We cannot simply allow extraction and pumping out of resources. Capital gained from leveraging mining financial power should be reinvested in infrastructure projects.
- Funding needs to be addressed in respect of transport infrastructure
- Finally the issue of leadership within the DoT and South Africa's leadership in the region needs to be addressed (Cronin, 2010) and (SABC3, 2011).

6.2.3 Interview with the Director General of Transport, George Mahlalela

- **From Policies to Implementation:**
  The big question for the DoT is how to translate its mandate from policies and plans into implementation. The work of the DoT has been based on disjointed projects without having a long-term strategy vision. The DoT has also been good at regulating the industry but bad at implementing its policies and having a clear strategy on what it wants to achieve in the transport sector. The DoT has excellent policies and plans in place but they have not been implemented. The challenge for the DoT is not to understand the sector – we already have a good idea of what the challenges are and what needs to be done. The challenge is to be able to drive an effective implementation agenda.
- **Translating the Mandates:** A big shift is needed in terms of how the DoT interprets its mandate and that of the transport agencies.
- **Public vs Private Sector Roles:** The DoT has been blurring the role of the public sector and the private sector and as a result there have been many lost opportunities for development in the transport sector.

- **Investment Strategies:**

  Investment in transport is a big space that has yet to be defined. We can learn a lot from the investment models that are working and not working around the world and especially on the Continent. The DoT needs to become the centre for managing the investments in transport in South Africa, the region, on the Continent and in the South-South programmes.

- **Growing the Transport Industry:** The DoT needs to take responsibility for growing and developing the transport industry. The DTI cannot do this as the DoT creates and drives the corridor developments.

- **Technology:**

  South Africa can use technologies already developed elsewhere in the world to leapfrog the development backlogs. If we try to catch up by developing our technologies we will be left further behind. There is no need to recreate highly advanced technologies that already exist.

- **The Rail Renaissance:**

  There is a quiet revolution taking place in the world around rail. Rail will save capitalism from itself, in terms of global warming and greenhouse gas emissions. The strategy needs to define what our national interests are in terms of rail and who our strategic partners should be. We need to be careful to not fall into the trap of importing unsuitable technology and partnerships that do not achieve our national interests.

- **SADC:** We need to play a greater role in defining the transport networks and infrastructure needed in the region. We need to reposition our country and create the institutions necessary with the DoT at the centre to drive these infrastructure development programmes (Mahlalela, 2010).

6.2.4 Ismail Vadi, MEC for Transport, Gauteng Provincial Government. Budget Vote Speech, 6 July 2011.

- Welcomes the release of the "Gauteng Freeway Improvement Project – Steering Committee Report", which recommends a 20% reduction in the proposed toll tariffs. Constructive pressure from organisations in civil society and the public hearings contributed to this review of the tariffs. This was an important exercise by a democratic government in listening to the plea of its citizenry. The Minister of Transport must now confer with the Premier of Gauteng and make a determination on the final tariffs.
- Two further steps, still need to be taken. Firstly, a decision must be taken in respect of the remaining phases of the GFIP. Should we proceed with these phases?
- Secondly, these phases are presumably based on the user pay principle. If this principle is to be reviewed, the question must be posed: How do we fund the next phases of the GFIP, given the limited fiscal resources at our disposal and the competing demands on the fiscus?
- In the light of the public concerns regarding the implementation of Phase 1 of GFIP, the Department would initiate a proper, public consultative process in respect of any implementation of the remaining phases of the GFIP. A key area for such consultation is how best to fund such critically needed road infrastructure. In this regard, the Department will host a consultative forum within the next three months so as to receive input from the public and interested stakeholders on how best to approach the remaining phases of the GFIP (Vadi, 2011).

6.2.5 Submission on the GFIP by the Ekurhuleni Metropolitan Municipality (EMM)

- Tolling has an impact on EMM road infrastructure due to diversion of traffic. Traffic diversion will result in:
  - Increased congestion
  - Damage by heavier vehicles

- Increased travel time on lower order roads
- Air pollution
- Maintenance cost of roads
- Increased accidents and associated costs

- Lack of integration between different transport systems and the impact they have on one another is a problem in transport planning.
- Double taxation will increase the Gauteng inflation figures (skewed inflation) and will lead to labour unrest.
- EMM is not ready for the implementation of tolling due to lack of communication and information regarding fleet users.
- Recommendations:
  - Study be done to determine impact of tolling on the municipal road network
  - SANRAL to assist with funding in the form of a subsidy to assist EMM with shortfall of R250m per annum maintenance fund and
  - CAPEX requirements to be determined
  - Fuel levy to replace tolling
  - If not – all EMM vehicles should be zero rated (PMG, 2011).

6.2.6 Submission on the GFIP by the South African Local Government Association (SALGA)

- New freeway expansion in roads is not sustainable in the long term to provide solutions to traffic congestion. Government needs to manage growth of road traffic through the introduction of public transport
- Local municipalities anticipate an escalation in the amount of vehicles that will use their roads because of the new tolling system and diversion of traffic will put a strain on the municipal network.
- The users pay for new infrastructure method is based on the US, UK and Canada principle, however in these countries the execution of user pay principle was followed with viable alternatives.
- Local authorities should be reimbursed for the diversion of traffic in full, and these costs should have been included

- Open up alternative routes for those users who own a car, but where public transport is seriously lacking.
- Return to basic public transport planning, not stand-alone services such as Bus Rapid Transport (BRT) and Metrobus. Establishment of the Gauteng Planning Committee as soon as possible for integrated transport planning.
- Route selection should be based on a comprehensive network for the entire province.
- Use taxis on a tendered contract system, if necessary.
- Plan extended radial services that would connect with PRASA, and other existing public transport services (SALGA, 2011).

6.2.7 Interview with Peter Copley, Transport Specialist: The Development Bank of Southern Africa (DBSA)

Infrastructure Funding:

- The World Bank is number one in terms of infrastructure funding. China is number two. In terms of road and rail we should try to fund our own infrastructure 90:10 government to private sector. We can try to push for 80:20. The Maputo Corridor has 20% private sector investment – a 17:83 debt equity ratio.
- We should try to do the same for rail. For rail to be effective it has to be over 2000 kilometres – need to concession railways over long routes.
- The World Bank responded quickly to Eskom's funding request - they are also influencing Eskom's strategy in the right direction. Nazir Alli has already been doing everything according to World Bank standards on roads.
- China owns 20% of Standard Bank – this is a source of big money – the willingness is there. The EU is sitting in the middle. The African Development Bank is renowned for being too slow. They are focusing on the north. The ADB regards the DBSA as its partner in the south.
- DBSA has an international finance division that talks to the WB and the ADB.

- There is a reluctance of the private sector to invest in infrastructure – too capital intensive and the ROI is too long-term. Investors find the following markets attractive: Asia; America; Energy; ICT.
- Other funding sources: Can partner with equipment manufacturers and lease the vehicles / trains; Increasing the fuel levy
- Value Capture: This is a strategy that needs exploring. Government did not need to pay a cent on the Gautrain if they leveraged the growth of property prices along the Gautrain routes.

Moving to Carbon-Low Emissions: Can tap into carbon reduction funds – difficult but we should be talking about these strategic issues.

Public Private Partnerships:

- PPPs are not working except in Maputo. We only do PPPs when our backs are to the wall and when government cannot do the project itself.
- Government has to provide decent rail infrastructure and a decent signalling system – it can outsource the trains.
- OECD says PPPs must happen

Rail:

- Rail is attracting investor attention: Warren Buffett paid US$ 44 billion (his biggest acquisition yet) to buy American rail freight titan Burlington Northern Santa Fe, while selling his much smaller shares in two other railroads, Union Pacific and Norfolk Southern. Burlington Northern comes armed with 40,000 employees, 6,700 locomotives, and access to hundreds of thousands of freight cars. Basically a good old-fashioned business with real revenues and real assets.
- Andrew Shaw + the DPE: In the new financial year the Department plans to introduce private sector participation in rail through operating concessions on the branch lines network. The successful implementation of the branch lines strategy will result in a viable secondary network that can feed the core network with freight flows. Branch lines are important – it is in our national interest to integrate the rural areas into the economy.

Transport Policy:

- There is policy confusion – DPE and DoT are both driving transport policy. We have too many transport policies – we have never cleaned up the cupboard.
- The DoT does not have the necessary skills and subsidies are not being used efficiently

Challenges:

- Effective regulation needed in SA and in the region
- Institutional capacity and memory: Need to protect this in the DoT and the Agencies
- Finance for infrastructure
- Private Sector: They can do anything if you let them and talk to them openly and frankly
- Political: SA is a province of the region and needs to view its role in the region in that way.
- Corruption: Greg Mills: "Why Africa is Poor"
- Lack of Strategic Planning in the region – bullet train or bicycles? What strategic plans are underpinning this?
- Moving to carbon-low emissions: Can tap into carbon reduction funds – it is difficult but we should be talking about these strategic issues.

6.3 Private Sector Stakeholder Views

6.3.1 Interview with Ben Theron, Chief Operating Officer: Electronic Tolling Company (ETC) / Kapsch SA

- On 26 October 2011 the testing of the ORT system has started. The tolling should have started one year ago. The delays do not affect ETC negatively as they receive a management fee and have targets for the number of e-toll users they register – their payments are not based on toll revenues collected.
- The ETC employees are getting jittery though with all the delays so they have to manage that closely. The only other challenge is dealing with the media frenzy.

- ETC has eight and five year contracts for different parts of the toll collection system. However the chances are slim to zero for replacing them with similar skills on the open market when these contracts expire.

On the toll road strategy:

- SA needs to review the way we spend money, when and what on. We already have a lot of taxes for transport – open and hidden from the fuel levy, to vat to licence fees. We waste a lot of money. We should design a more efficient transport system.
- Corruption is a problem. Some believe we are spending about 5 times more to develop a kilometre of road.

Stakeholder pressure:

We can learn a lot from this pressure. When government wants to implement a new project that impacts on everyone, they need to consult widely and well in advance. There needs to be transparency about the plans and the costs (Theron, 2011).

6.3.2 Submission on the GFIP by Business Unity South Africa (BUSA)

- Lack of consultation
- Concerned about tariff cost, traffic administration cost and tariff structuring.
- Believe that current tariff proposal will weaken competitiveness and job creation.
- The loan repayment terms needs to be investigated.
- Look into using the fuel levy and vehicle licensing to fund the GFIP project.
- Problem with SANRAL's funding model and financing - want structured bilateral interaction on policy co-ordination level (Presidency) through jobs summit task team.
- Promote Parliamentary scrutiny of SANRAL (BUSA, 2011).

6.3.3 Submission on the GFIP by the Road Freight Association (RFA)

- The RFA supports the user pay principle and the open road tolling. They however do not support the high tariffs.
- Not sufficient information forthcoming, believe that the process should become more transparent
- Government should consider other methods for funding besides open road tolling
- According to cost estimations undertaken by RFA they believe the proposed tariff structure is too high
- The operator cost will drastically increase and this will ultimately affect the consumer
- The freight industry will be the hardest hit and they will not benefit from the off-peak discounts given the times that they conduct their business
- Information needs to be provided as to why the ring-fencing levy for transport was stopped. GFIP should be funded from the fuel levy
- When planning, Government need to reference BRIC (Brazil, Russia, India and China) countries not just the Euro and USA
- Rail can be used as an alternative for freight transport but fall short for door to door deliveries

Proposed solutions:

- A tariff rate of 12c/km is more affordable and reasonable.
- SANRAL should renegotiate the loan for an extended payment period.
- The establishment of an independent economic regulator for transport.
- The use of the fuel levy for road infrastructure (RFA, 2011).

6.3.4 South African Vehicle Rental and Leasing Association (SAVRALA)

- The car rental industry contributes about R1,5 billion to the fuel levy
- The user needs to be put at the heart of transport policy
- There are concerns about lack of transparency on alternative funding source
- Public transport alternatives are very limited currently

- More meaningful, transparent and regular consultations must be in place between transport stakeholders and Government
- The density and location of toll gantries is aggressive
- There are unresolved issues for the industry on the direct and secondary admin costs, related to open road tolling
- Toll costs will be passed directly onto leasing and car rental customers
- SAVRALA in dispute with SANRAL on the payment terms for outstanding fees

Proposals:

- The fuel levy needs further exploration, as it has less of an administrative burden and a precedent of ring-fencing has already been established (Transnet Fuel Pipeline)
- Alternative funding models and opportunities must be explored (e.g. reduced accident costs, compulsory third party motor insurance, etc)
- Improved enforcement of existing laws and regulations will bring in more revenue (unlicensed vehicles, the cost of accidents)
- The introduction of compulsory third party insurance
- Introducing greater efficiencies in the system will save money. An example is the AARTO process that is costing the industry a lot of money due to the administrative burden (SAVRALA, 2011).

6.3.5 Retail Motor Industry (RMI)

RMI members are relatively small businesses and will be hit hard by open road tolling as they have 40 other laws to comply with, which is an added administrative cost.

The E-tag is of concern as one cannot transfer the tag from one vehicle to another. Also if a sales representative is out with a client (test drives) who becomes responsible for such tolling cost (RMI, 2011)?

6.3.6 SATSA, AfriForum and Johannesburg Chamber of Business

- They are conducting an impact assessment study to be finalised by early April, which will be submitted
- No transparency on the actual costs, the tariff or the process. Need for transparency on public spending.
- Felt that these funds should have been covered by fuel levies. Multiple taxation - motorist will now be taxed up to 5 times.
- The economy will be affected as there will be a cost increase in products.
- A regulatory mechanism for the transport sector is necessary, e.g. NERSA
- Debate needs to be widened from just public funding, to also include public spending (PMG, 2011)

6.3.7 The Automobile Association (AA)

- The AA does not support urban or peri-urban tolling as it is an additional, indirect tax.
- The AA suggested the following:
  - Equitable user pay model through Fuel levy.
  - Establish dedicated road fund where roads budget is ring-fenced.
  - Renegotiate repayment of loans if necessary.
  - Use portion of fuel levy to fund loan.
  - Dedicated road fund ring fenced for ongoing road funding.
  - Direct Treasury contribution through MTEF where required.

Due to the current lack of clarity on the GFIP toll road, the AA recommends that its Gauteng members delay acquiring the e-tags. Poor road conditions account for about 10% of annual road accidents, which is more than double the global norm. About 14,000 lives are lost and 219,000 serious injuries sustained annually due to road accidents, which is a heavy burden on the economy (AA, 2011).

6.3.8 South African Road Federation (SARF)

SARF supports the GFIP and the associated e-Toll project as they believe that the GFIP will ensure a world class freeway network, and will reduce peak hour volumes and reduce travel times. The tolling of the road network is the only viable option to raise the funds for the roads due to other budgetary demands. Ring-fenced funding from tolling will pay for construction cost, upgrades and operational and maintenance costs of the roads (PMG, 2011).

6.4 Public Views on Social Networking Sites

6.4.1 Social Networking Facebook Page and Website: www.TollFreeGP.co.za

This website and Facebook page has been set up by the Democratic Alliance. They claim to have over 20000 supporters. The number of members on their Facebook site is 6561. They are mobilising the public to stop the GFIP Toll Road for the following reasons:

- Higher prices – it will hurt everybody as it will push up prices of everything transported on the highways, including food on which the poor are most dependent.
- Jobs lost – it will push up the costs of business, so companies will lay off workers or even move out of Gauteng.
- Local roads will suffer – many motorists will use municipal roads instead, increasing congestion and pushing up rates to pay for their maintenance.
- No public transport alternative – not enough attention has been paid to convenient, fast and cheap public transport in Gauteng.
- Little public consultation – these tolls were decided without real public consultation.
- Expensive and complicated e-tolling system – this system costs almost as much as the highways (R14 billion), and there will probably be lots of fraud and billing problems.

- A tax on tax – it is outrageous to pay 14% VAT on tolls which are a form of tax.
- Car rental firms will be hit – the average car renter will pay an extra R32 a day, which will hit tourism.
- No transparency – much information on costs is still being kept secret, including the terms of the controversial e-tolling contract with a foreign company.
- One tax too many – it's enough, everything is going up and this is one tax too many (Democratic Alliance, 2011).

6.4.2 Social Networking Facebook Page and Website: www.NO2TOLL.co.za

This website and Facebook page has been set up by a group of concerned Gauteng citizens that have formed a task force to deal with the urban highway tolling system. They raise the following problems on their website about the GFIP toll road:

- We already pay a fuel levy and personal tax; our companies pay tax; we pay vehicle licence fees, as well as VAT, to the government for the provision of services and infrastructure. Where does all that money go? Why do they need more?
- Most people are already struggling with dramatic cost of living increases, why should they suddenly pay more? Can they afford it?
- All delivered goods (including fuel) will increase in price, as the toll fees once again will be passed on to the end consumer irrespective of socio-economic class.
- Many people who won't be able to afford the tolls will be forced to take alternative routes through the suburbs, increasing congestion, municipal road degradation, as well as other problems such as safety and crime in previously quiet suburbs.
- The roads will benefit us, but not the toll fees.
- If we don't oppose these tolls, what other schemes does the government have in mind to get their hands on even more of our hard earned money? Where will it end?
- What about all the money that has been lost and wasted due to wasteful spending and lavish living by government officials? Do they intend to use motorists to fund their lavish lifestyles?

- Why has so little been done to curb rampant corruption? Who is going to benefit from these tolls?
- If we allow these Gauteng urban toll roads to be implemented, the same funding method will also be used in other provinces of South Africa. Take a look at the "Impact" link and decide if you can afford to do NOTHING (Slapgap Designs, 2011).

6.4.3 Individual comments posted:

Both websites and Facebook pages mentioned above allow for members of the public to post their views. Hundreds of comments and opinions have been posted on these websites on the following main issues:

- Many people raise the increasing financial hardships they will face by having to pay the GFIP toll fees.
- Many people raise concerns over the lack of transparency by government about the GFIP project.
- Many people have a problem with the electronic toll collection system, saying it is far too expensive.
- Many people raise suspicions about government corruption and are concerned about government wasting taxpayers' hard-earned money.

6.5 Public Transport Operator Views

6.5.1 South African Bus Owners Association

- Commend the visible improvement on our freeway through the GFIP, but the tariff is unaffordable.
- The impact will also be felt by the tour/charter/bus industry at large, some of whom will not have any discounts applicable.
- Methodology used to determine the tariff was not transparent.
- Part of money collected on fuel levy to be used in financing road construction.
- Improvement in public transport needs to be in place first.

- Households are already indebted and face high household expenses related to annual food and electricity increases, public transport increase will be an added burden
- Recommendation: The industry should be exempt from paying toll fees (PMG, 2011).

6.5.2 National Taxi Alliance

- Taxis will be forced to pay 66c per kilometre and that's not affordable.
- Taxis provide 65 % of transport service in Gauteng Province.
- Taxis play an important role and contribute to the economic activities of the province.
- Commuters will have difficulty spending more than 10 % of their income on public transport.
- Profit margins of the taxi industry are minimal and as such cannot be eroded any further.
- Recommendations:
    - Taxis must be exempted from the tolling or pay a minimal fee after careful consideration
    - Taxis to be afforded dedicated lanes like buses
    - The tolling process to be relooked at (PMG, 2011).

6.5.3 Mamelodi Commuter Forum

- Commuters spend more than 25% of their salaries on public transport
- The e-tolling will affect the fares and thus poor will not be able to afford to travel to work. That could lead to loss of work (PMG, 2011).

6.5.4 South African Commuters Organisation

- Public transport does not adequately cater for scholars and people with disabilities.
- Introduce integrated ticketing payment system.
- Improve rail transport.
- The provision of rail transport should be expanded to where commuters are residing (PMG, 2011).

6.6 Political Parties and Trade Union Views

6.6.1 The Democratic Alliance (DA)

- DA is not opposed to the tolling as a principle, but not in support of multi taxing (Fuel levy, Motor licensing)
- The DA supports the user pay principle but the user should only pay for what he/she uses – not for unrelated, non-transport expenditures
- The tariffs are too high and not affordable to the poor
- Propose that the fuel levy to be ring fenced and be used for road construction
- An integrated approach is essential and as such the Planning Commission must play a vital role in this process
- Limited public transport as an alternative
- Proposals:
    - In the interests of true transparency and in the interests of having an informed public, the full financial implications of the project should be made available to all, including profits for all involved parties including government.
    - The Department of Transport, both nationally and provincially, should source capital injections to redeem the SANRAL loan and thus reduce the proposed toll fees dramatically – preferably to zero or by more than 60% after VAT is removed from the toll.

- The National Department of Transport must be requested to subsidise part of the interest on the loan.
- E-toll tariffs to be exempted of VAT
- An increase in the fuel levy (a few cents), ring-fenced for a dedicated road fund
- The Department of Transport –both National and Provincial - and the relevant Metros should look at a bigger investment in public transport over and above the Gautrain and Rea Vaya (i.e. Buses and Metrorail) (Farrow, 2011).

6.6.2 Afriforum/Solidarity

- The GFIP project will have a negative impact on the Gauteng economy.
- Propose that an economic independent regulator is appointed to address the issue of pricing (e.g. Eskom 45% increase hike).
- The SANRAL income projection of R300m a month is too low and does not seem to include traffic growth or price increases over time.
- Gauteng has less than 5% of all national and numbered provincial roads. The province will contribute more than 50% of all SANRAL toll income, through the most expensive tolls in the country (cost/km).
- Administered prices tend to have above inflation increases (PMG, 2011).

6.6.3 South African Communist Party (SACP)

- Notes and welcomes all the improvements on our roads, which will reduce some of the congestion on Gauteng roads.

The SACP is opposed to tolling on the following grounds:

- The state has a constitutional obligation to build and maintain road infrastructure
- Citizens are already paying taxes e.g. fuel levies and licensing fees
- The limited availability of viable travelling options as well as the state of the secondary road network
- The tolling will impact on the poor and the working class, with increases in basic commodities and transport

- People in Gauteng are at liberty to work anywhere in the province. The introduction of the toll fees will make it more expensive for people to commute to work, consequently leading to unemployment.

Proposed solutions:

- GFIP should be funded from the national fiscus;
- Government to address infrastructure development programmes differently going forward, guided by a clear set of strategic priorities.
- To exempt public transport from e-toll.
- Government to urgently review the planned second phase of the Gauteng Freeway Improvement Project (SACP, 2011).

6.6.4 The Freedom Front Plus

- The FF Plus is not opposed to the project, but takes issue with the funding model that was used. There is currently too much erosion of the public's disposable income, largely due to poor planning.
- The high levels of government wastage and lack of coordination have resulted in SANRAL being under funded from the National fiscus.

A number of factors need to be considered:

- **Fuel Factors**
  - The cost spikes which are a reflection of both the international oil price AND increased taxes/levy
  - The fuel carry costs (Transnet Pipeline)
  - The levy going into the general fiscus
- **Electricity Factors**
  - Cost spikes over 4 years (instead of the initially approved 3 year increases)
  - Escalated costs of Eskom's capital expenditure programme
- **Tax Factors**
  - 60% of public's income goes to tax (direct, indirect and stealth)
- There is a need for greater transparency on funding for the transport sector, and specifically SANRAL, in relation to the GFIP project. The transport sector is

clearly underfunded, but more clarity should be provided on the tariff determination process.

- Synovate Research also indicates that 80% of respondents are not willing to pay the current tariff.

Suggestions:

- The ring-fencing of funds like the Fuel Levy and Vehicle Licensing Fees.
- The introduction of a Toll Tariff Regulator or utilizing the Consumer Commission.
- The involvement of the Gauteng Planning Commission for a more integrated approach to planning.
- The exemption of small business from paying any toll.
- A tariff of 5c/km, ring-fenced from the fuel levy, with capped increases of 3%/ annum (Freedom Front Plus, 2011).

6.6.5 ANC Youth League

- Not in support of the e-tolling.
- Consultation was insufficient, and the tariffs are too expensive for all commuters.
- If the tolling tariffs are implemented, they would further weaken the purchasing power of consumers.
- The e-tolling will hamper the economic growth and increase unemployment as it becomes increasingly expensive to conduct business in Gauteng.
- The state has a responsibility to fund infrastructure development and maintenance.

Proposals:

- SANRAL, National Department of Transport and the National Treasury must design a new funding mechanism for this project and pay back the loan.
- Subsidise the development of a reliable, integrated and safe public transport system.
- An impact assessment must be done on the extent to which municipal roads will be affected as motorists detour away from the toll routes (PMG, 2011).

6.6.6 COSATU

- The project and proposed tariff should be taken to NEDLAC for thorough deliberation and consultation.
- Thorough socio economic impact study of the tolling project be undertaken
- Job creation in the GFIP is not sustainable.
- Improvement on infrastructure is welcomed, but Government should provide safe and reliable public transport prior to tolling (Craven, 2011).

6.7 Summary of Research Findings

6.7.1 **No to Toll Roads:** Almost all the stakeholders believe that tolling is not the best strategy for roads development. They believe that roads development is the responsibility of the State through the general revenue fund, to pay for the roads and other transport infrastructure development.

Many stakeholders, including government stakeholders, do not believe the next phases of the GFIP and other roads developments in the country should be based on tolling but on funding from increasing the Fuel Levy.

6.7.2 **Negative Economic Impact:** While most stakeholders were pleased with the new roads development, they felt that the planned toll road will have an adverse effect on the SADC regional economy, the national economy and the provincial economy. They felt that the toll charges are an additional tax that will increase the cost of living and goods and services, which will negatively affect economic growth.

6.7.3 **Negative Social Impact:** Most stakeholders felt that the GFIP toll road will be an additional burden on the poor and have a negative social impact. The cost of living will increase, jobs will be lost and poverty will increase.

6.7.4 **Negative Impact on Secondary Roads:** The impact of the GFIP toll road on the municipal road infrastructure was raised, as motorists will start to use alternative municipal roads to avoid the freeways. Local governments do not have the budget to deal with additional road maintenance costs.

6.7.5 **Increase and Ring-fence the Fuel Levy:** Almost all the stakeholders spoke of the need to use the Fuel Levy to pay for the GFIP, by increasing and ring-fencing contributions for roads. Many proposed that SANRAL renegotiate the terms of the loans to pay back over a longer period. In addition to the Fuel Levy, the toll tariffs were seen as double taxation. VAT charges on the toll tariffs were seen as a tax on tax.

6.7.6 **User Pay Principle:** Some stakeholders felt that the freight sector was not paying the fair price for the damage they do to the roads, which is 99% of the damage. The unequal playing field between road and rail keeps rail-centric freight on the road and limits further investment in the railway system, creating a vicious cycle of high maintenance road costs and an under-developed freight and passenger railway system.

6.7.7 **Improve Public Transport:** Many stakeholders raised the need to improve public transport, to provide a real alternative for a greener and less costly means of travelling. They believed that government was not spending money on the right infrastructure priorities. The passenger rail system needs to be developed as the most cost efficient and environmentally sustainable mode of public transport. The current commuter rail system perpetuates apartheid planning and does not provide a decent and always available public transport alternative.

6.7.8 **Integrated Transport Strategy:** All the transport experts and government officials spoke of the need to have an integrated, multi-modal transport strategy that looks at where the transport development priorities should be. All identified public transport and the railway system as the first priority for investment.

6.7.9 **More Efficient Government:** Many stakeholders believe that government is wasteful and inefficient in its spending. They believe that if government was more committed to developing greater efficiency, there will be enough money in the State coffers to spend on transport infrastructure and the GFIP roads development.

6.7.10 **Fraud and Corruption**: Many stakeholders are deeply suspicious of government and its agencies and are especially suspicious of potential fraud and corruption in the GFIP development. There are allegations made that the cost of the freeway upgrades cost five times more than the global norm. Many stakeholders have requested SANRAL to be completely transparent with all information relating to this project.

6.7.11 **Greater Transparency:** All stakeholders highlighted the need for greater transparency on the GFIP toll road plans, analyses and costs by government and SANRAL, especially on:

- The cost-benefit analyses conducted for the GFIP investment;
- Tender processes followed for the construction and electronic toll collection system;
- The construction costs per kilometre of the GFIP as whole;
- The decision to implement an expensive electronic toll collection system; and
- The toll tariff charge and the factors that were considered in determining of the tariff.

6.7.12 **More Consultation:** All stakeholders wanted government to have regular and meaningful consultation with all affected parties before it embarks on major infrastructure investment projects like the GFIP that have a huge impact on the economy. The fact that government is spending public money means that they are obligated to consult the public first.

6.7.13 **Consumer Council:** Some stakeholders recommended that a Consumer Council is established to represent the interests of the road user groups. The council should be representative of all road users and government must be

forced to consult with its stakeholders through the Consumer Council before it makes any major roads investment or introduces tolling on the roads.

6.7.14 Independent Transport Regulator: Many stakeholders mentioned the need for an independent transport regulator to oversee issues like toll tariffs, to resolve future disputes related to tariffs, to regulate SANRAL and other toll road operators and to protect consumer interests.

7. Analysis of Research Findings

In this chapter, the findings from the GFIP stakeholder interviews and documented positions are analysed. Learnings from the literature review are also integrated into the discussion of these findings, where relevant.

To address the research problem and sub-problems of this research study, the analysis of research findings is discussed under the following main headings:

a) Economic Impact of the GFIP Toll Road
b) Social Impact of the GFIP Toll Road
c) Environmental Impact of the GFIP Toll Road
d) Road Infrastructure Funding Strategies
e) The User Pay Principle
f) Public Policy Issues
g) Issues of Governance

7.1 Economic Impact of the GFIP Toll Road

7.1.1 Cost Benefit Analysis of the GFIP Toll Road

Investment in transport infrastructure is a catalyst for economic growth and social development. In the past decade, the massive investments seen in airports, harbours, railways and roads in the middle and far eastern countries like China, India, the United Arab Emirates, Singapore, Korea, Malaysia and Japan have prefaced an economic boom, where all new transport capacity is taken up much faster than predicted due to the resulting economic growth (Du Plessis, 2011).

The Gauteng roads were, according to SANRAL (2011b), without a doubt congested and in need of expansion and repair. This cost of delays equates to lost business time and revenue, as well as the social cost of commuters spending up to 3 hours in traffic daily. SANRAL estimates that once the toll roads are operational, business

time savings that contribute to GDP will increase from R3.27 billion in 2010 to R7.69 billion in 2030. Based on these projections, the toll road would have made a cumulative contribution to GDP of nearly R50 billion by 2013 and R207 billion by the end of 2030. Gross Geographic Value Add (GGVA) forecasts also show a value-add to the Gauteng economy of R68 billion for the period from 2004 to 2025, which equates to R155 billion at a 4% per annum rate of inflation. Large numbers of direct and indirect jobs have also been created as a result of the GFIP investment (SANRAL, 2011b).

However, infrastructure spending can be efficient or inefficient. Government spending is notoriously inefficient and wasteful, due to a lack of skills and proper management systems and processes and political interests (Flyvbjerg, 2009). The recent comments made to Parliament by the Auditor General that wastage last year was R13 billion and R21 billion this year (SAPA, 2011) is extremely worrying, especially in the light of allegations that the cost of the GFIP roads development by SANRAL are 228% more than World Bank benchmarked projects (RFA, 2011), excessive by any standard.

The complaints from many stakeholder groups about the lack of transparency and consultation by SANRAL further compound the suspicions that the GFIP decision-makers have something to hide about how the GFIP has been planned and managed until now (Democratic Alliance, 2011). When the proposed toll road tariffs were finally released, the resulting public outcry has forced government to delay the start of the tolling and to quickly begin a process of consultation with stakeholders. Social networking has had an important role to play and two Facebook pages with links to interactive websites have gained thousands of supporters demanding transparency and a review of the planned tolling of the GFIP.

This has forced government to review the planned toll roads in other parts of the country, as well as how the second phase of the GFIP will be funded (SABC3, 2011). Unfortunately, it is too late to stop the first phase of the GFIP toll road. Over R25 billion has already been borrowed, R17 billion has been spent on the roads and over R6 billion has already been spent on installing the expensive electronic toll collection system (SANRAL, 2011b). But at least now SANRAL and government have to

consult widely and negotiate with stakeholders on the toll tariffs. They will be forced to be transparent about the internal rate of return and will definitely have to reduce this from the planned 37% over 20 years (SANRAL, 2011b) to a more realistic return over a longer period. A 37% IRR during a recession is simply unrealistic and ignores the social and economic impact of tolling.

7.1.2 Impact on SADC Regional Trade

The N3 between Durban and Johannesburg forms the North-South Corridor, the busiest road on the African Continent. This corridor is responsible for the movement of goods to and from our neighbouring countries to the Durban port. Tolling the GFIP roads will increase the transaction costs of trade in the SADC region, which are already too high and limits inter and intra-regional trade (Le Pere, 2011). Freight operators have already stated that the increased cost of transport will be passed onto their customers, thereby increasing the costs of goods in the country and in the SADC region (RFA, 2011).

Without the alternative of an efficient railway to move their cargo, freight operators will have no option but to use the freeways and pay the toll fees. There will be some increase of freight traffic on the secondary roads, which are already very congested. This will increase the cost of maintaining these roads and the local governments do not have the budgets or the capacity to deal with additional road maintenance costs (Ekurhuleni Metropolitan Municipality, 2011) and (City of Joburg, 2011).

All the transport experts interviewed, except for one, did not support the commercialisation of the roads. They felt that transport infrastructure is a “regional public good” (Le Pere, 2011) and therefore a prerequisite for economic growth and social development, not just in South Africa, but also in the SADC region. These development costs should be seen as an investment responsibility of the State and paid for from the general revenue fund.

7.1.3 Limited Alternatives

The economic cost of the toll road will depend on how high or low the tariffs are set and on whether or not there are alternative transport modes. Economists for the Road Freight Association have shown that the higher the toll tariffs, and the fewer the transport substitutes, the worse the negative economic impact (RFA, 2011).

Many of the GFIP roads do not have alternatives. The alternative roads that do exist are narrow and already very congested. Intermodal transport options are extremely limited, as South Africa has no navigable waterways and the railway system is inadequate to meet the demands of freight and public passenger transport (RFA, 2011).

Therefore it can be concluded that forcing the public to pay the GFIP toll without providing them with viable alternatives first, is simply poor governance and can probably be challenged constitutionally.

7.2 Social Impact of the GFIP Toll Road

According to SANRAL (2011b), the analysis conducted on the cost of toll revenue as a percentage of projected Gauteng GDP in 2011 is 0.34% or 34c for each R100 of GDP. The toll burden for light vehicles is the equivalent of 43c for each R100 of disposable income. They claim that households with incomes of less than R24,365 would face cost of living increases of 0.15%. This is the equivalent of 15 cents for each R100 spent on consumer goods. Households with incomes between R24,365 and R55,159 would face a cost of living increase of 0.14%. Households with incomes in excess of R55,160 would have a cost of living increase of 0.13% due to the increased cost of consumer goods. Pensioners would face a cost of living increase of 0.14%. SANRAL concludes that the toll road will have little impact on the cost of consumer goods and will not be inflationary (SANRAL, 2011b).

Increased road capacity and a decrease in traffic congestion will have a beneficial social impact on family life with parents having more time to spend at home with their children and to impart social norms and values SANRAL, 2011b).

Most stakeholders disagreed however. They felt that the GFIP toll road will be an additional burden on the poor and have a negative social impact. They claimed that the cost of living will increase, jobs will be lost and poverty will increase. With the absence of suitable alternatives to the roads, most motorists will have to reduce spending in other areas to pay for the cost of the tolls.

7.3 Environmental Impact of the GFIP Toll Road

Reducing congestion on the roads results in reduced carbon emissions, which is good for the environment, according to SANRAL (2011b). Traffic congestion leads to longer travelling time and stop-go conditions, which increase fuel consumption and vehicle wear and tear. SANRAL believes that the GFIP toll road has added more road capacity and therefore will reduce congestion.

But Proost and Van Dender (2011) show that increased road capacity does not decrease traffic congestion. It actually increases traffic volumes over the long term. Anas and Lindsey (2011) show that addressing congestion does not decrease carbon emissions – they are merely spread over time and space. Therefore policies addressing congestion cannot address carbon emissions at the same time. The claimed congestion and environmental benefits of the GFIP toll road can therefore be disputed based on the research findings.

Some researchers have argued that cars of the future will have less carbon emissions and will use greener forms of carbon-free fuel. However, completely carbon free cars can only be expected after 2040 (Proost and Van Dender, 2011).

All the transport experts have stated that rail is the most energy efficient form of transport and given the global energy crisis, governments are investing more heavily

in developing their railway systems. South Africa also has this as a stated policy objective, but does not yet have a strategy to address this.

7.4 Road Infrastructure Funding Strategies

Almost all the transport experts and stakeholders interviewed believe that tolling is not the best strategy for roads development. They believe that roads development is the responsibility of the State through the general revenue fund, to pay for the roads and other transport infrastructure development. The public outcry over the tolling of the GFIP network of roads has led to government decision makers questioning the viability of tolling for future roads funding. If it is introduced in the future, the toll road development and tariffs will be subjected to intense public scrutiny and there will be a demand for complete transparency and thorough consultation with all affected stakeholders.

South Africa's fuel levy is not on par with the rest of the world, it is much lower. The National Treasury's position against ring-fencing the fuel levy collected for roads development, to increase fiscal flexibility, does seem reasonable. However the current fuel levy is insufficient for the maintaining our country's roads, so in terms of roads spending, the country spends more than the fuel levy collects. If the fuel levy is to be ring-fenced, it will first have to be increased to adequate levels, which will mean that the price of fuel will increase.

However the reality is that many countries are commercialising their roads and encouraging private sector investment to pay roads development. This is due to insufficient public funds to invest in the roads. South Africa is already spending more public money on the roads than is collected in the fuel levy according to SANRAL's CEO, Nazir Alli (SABC3, 2011).

Public Private Partnerships are an option to attract funding by commercialising national roads and will most likely result in more efficient infrastructure spending, than by government. The global financial crisis has resulted in less private sector

investment in public infrastructure and the public sector is now the largest investor in infrastructure in many countries to keep their economies going. Attracting private investment during a recession will be more difficult and government will have to offer good incentives and assume more of the risk in the PPPs (Brown, 2005).

The Deputy Minister of Transport spoke of looking to the extractive industries to finance road and rail developments, as part of mining concession arrangements. This is an option that needs further exploration, especially for provincial roads. An example is the Sishen railway built by the Sishen Iron Ore Mine to move the iron ore mined. Other mining operations that truck their raw materials from their mines should be approached to fund the maintenance of the roads they use and cause damage to.

Value capture refers to a type of public financing in which the increases in private land values arising from new public investments are “captured” through a land related tax to pay for that investment or other public projects. Value capture is a type of PPP in which the private sector compensates the public sector for the cost of a facility or infrastructure development that generates economic value.

Transport infrastructure development projects can increase adjacent land values and thus generate increased value for private landowners. Public agencies can capture a portion of that value through a variety of methods. A significant portion of the cost of the Gautrain, for example, could have been financed using value capture (Copley, 2010). Value capture is a funding strategy that needs further investigation by South African policy makers.

With growing global concern and targets to reduce greenhouse gas emissions, the world’s largest polluters are trying to reduce their carbon footprint, or trade away their liabilities by investing in environmentally-friendly projects. The trade of carbon credits is a new and growing area and can be tapped into for infrastructure development. Further research is needed on the trends and developments in the area of carbon credit funds and the opportunities these present for infrastructure development on the Continent (Copley, 2010).

7.5 The User Pay Principle

7.4.1 Balance the Road / Rail Playing Field

The GFIP roads development has added much needed roads capacity in the Gauteng province. Congestion has already been visibly reduced, although it is the opinion of many transport experts that this is due to the Gautrain, rather than increased roads capacity (Ssamula, 2011). Many transport experts feel that this substantial investment in the roads is a case of treating the symptoms of the problem and not addressing the root cause (Petkoon, 2011).

In South Africa, we are moving rail-centric cargo on the roads from steel to coal, to copper from the DRC to wood. This type of bulk cargo should be moved by rail. But the railway cannot be competitive or offer the capacity that roads can, because Transnet Freight Rail (TFR) is not subsidised like the roads are (Petkoon, 2011). This creates an unequal playing field and freight operators therefore spend less money moving their cargo by trucks and are subsidised by public motorists, who pay a disproportional amount towards the roads (CSIR, 2008).

The longer we ignore the need to make our railway system economically viable and competitive, the longer we keep freight cargo on the roads and the more damage is done. In ten years time South Africa will have to spend another R25 billion or more to rehabilitate the GFIP roads, which would have been damaged by then (Petkoon, 2011).

Rail transport is more fuel efficient, is more environmentally sustainable (Proost and Van Dender, 2011) and is a lot safer than having thousands of overloaded trucks on the road amongst public commuters. Addressing the root cause of South Africa's transport problems must start with a proper investment in the railway system. According to Dr Bridget Ssamula (2011) the billions of rands spent on the Gautrain did not address this problem. The Gautrain is not a public transport system - it is a

sophisticated and expensive business class train. The public money spent on the Gautrain and the GFIP could easily have overhauled the railway system and transformed it into a safe and efficient freight and public transport system (Ssamula, 2011), with new coaches and carriages, new ICT platforms and new management skills (Petkoon, 2011).

This would have moved the freight trucks off the roads. It would have also given the public a viable option for public transport, besides kombi taxis and overloaded buses. This would have alleviated the need for the GFIP toll road "big bang" approach to upgrading the roads. If government decision-makers needed to make a big statement before the FIFA World Cup, upgrading the railway system should have been the highest priority.

The fact that Transnet and SANRAL fall under two separate Ministries, namely transport and public enterprises, is part of the reason why there is an inability or unwillingness for government policy makers to recognise that the road and rail systems are mutually dependent and need to be planned in an integrated way. The silo management of these two enterprises is hindering the development of South Africa's transport system.

Currently SANRAL has a perverse incentive to keep the freight trucks, overloaded buses and thousands of daily commuters on the road. Traffic volumes equate to traffic revenues and this equates to a higher ROI. SANRAL gets managed on their financial performance and not on how much traffic they reduced on the roads. These objectives are perverse agency interests and not in South Africa's economic interest.

7.4.2 Who Pays?

The user pay principle is based on the user paying for what they use. If freight vehicles are responsible for 99% of the damage to the roads (CSIR, 2008), it makes sense that they should pay 99% of the cost of maintaining the road. Public commuters do not damage the roads, nor do they derive the same commercial benefit from the roads that freight operators do (Petkoon, 2011). Most of these freight operators are large and profitable companies. They can afford to pay for the damage

they do to the roads. It is unfair to expect public commuters to subside the big freight operators. A fair application of the user pay principle could be that freight operators only should pay tolls on the GFIP roads.

7.6 Public Policy Issues

There is currently an absence of a clear transport policy framework, on which SANRAL's mandate should be based (Cronin, 2010). Public policy is a key driver for achieving economic, social and environmental benefits through transport infrastructure investments (Anas and Lindsey, 2011). The transport policy should identify what the short, medium and long term government objectives are, and how subsequent transport investments should be prioritised. All the government representatives interviewed emphasised that investment in the railway system is priority number one.

South Africa also lacks a clearly defined policy on when and how the country will implement public private partnerships (PPPs) and which functions will be government managed or outsourced. Many researchers spoke of the need to separate owner and operator functions to promote efficiency (Yang and Lee, 2008) and to reduce wasteful and inefficient spending by government (Flyvbjerg, 2009). If South Africa has no option but to commercialise the roads to pay for its development, then perhaps we should be considering better ways to develop, manage and operate these toll roads, such as through concessioning and PPPs.

7.4.3 Invest in Rail Public Transport System

Passenger rail is separate from Transnet and is managed by the Passenger Rail Association of South Africa (PRASA). PRASA receives government subsidies to run a daily commuter service to bring workers from far outlying townships into the cities and to take them back again daily. A commuter service is not a public transport service as is explained by Dr Ssamula (2011). It is a humiliating system inherited

from the apartheid past. PRASA's commuter service conjures images of people hanging onto the sides of dirty, overloaded metro trains at 5am and 6pm. Safety on these trains is a problem and the researcher contends that no commuter above LSM 3 will be comfortable using this mode of transport to get to work, especially not in a suit and carrying a laptop. People are forced to wake up very early to catch these trains and after 9am in the morning the service is not available.

Apartheid transport planning persists today in the PRASA commuter service and 19 years into our democracy, we have not addressed this problem. Most developed countries have a safe, efficient and affordable public railway system. Rail is the most energy efficient mode of transport and the recognition of its growing importance has led to major private sector investments in rail, by the likes of Richard Branson and Warren Buffet. They have realised that with the growing energy crisis and the desperate global need to reduce carbon emissions, rail is the future of transport.

South African policy makers have realised the need to invest in rail. The Deputy Minister of Transport, the Director General of Transport and the Chairperson of the Transport Portfolio Committee on Transport have stated this in the interviews held. So why does this recognition not translate into prioritising infrastructure spending on upgrading our railway system?

7.4.4 An Integrated Transport Strategy

Perhaps the answer to the question above lies in the fact that most of the stakeholders interviewed mentioned the glaring lack of an integrated multi-modal transport development strategy for South Africa. We need to find a way to bring transport planners together from the different government departments and across the national, provincial and local government spheres, to develop an integrated transport strategy and identify where the transport development priorities should be in the short, medium and long term.

The sickness of having an isolated project-driven mindset in transport planning, without a guiding integrated transport plan, must be cured. The Gautrain, the GFIP, a

new high speed train from Durban to Johannesburg… these are examples of the isolated project mindset that must be questioned. If policy makers know and understand the transport needs and priorities in South Africa, then the question is what interests are driving these un-strategic investment decisions. This is certainly an area for further investigation.

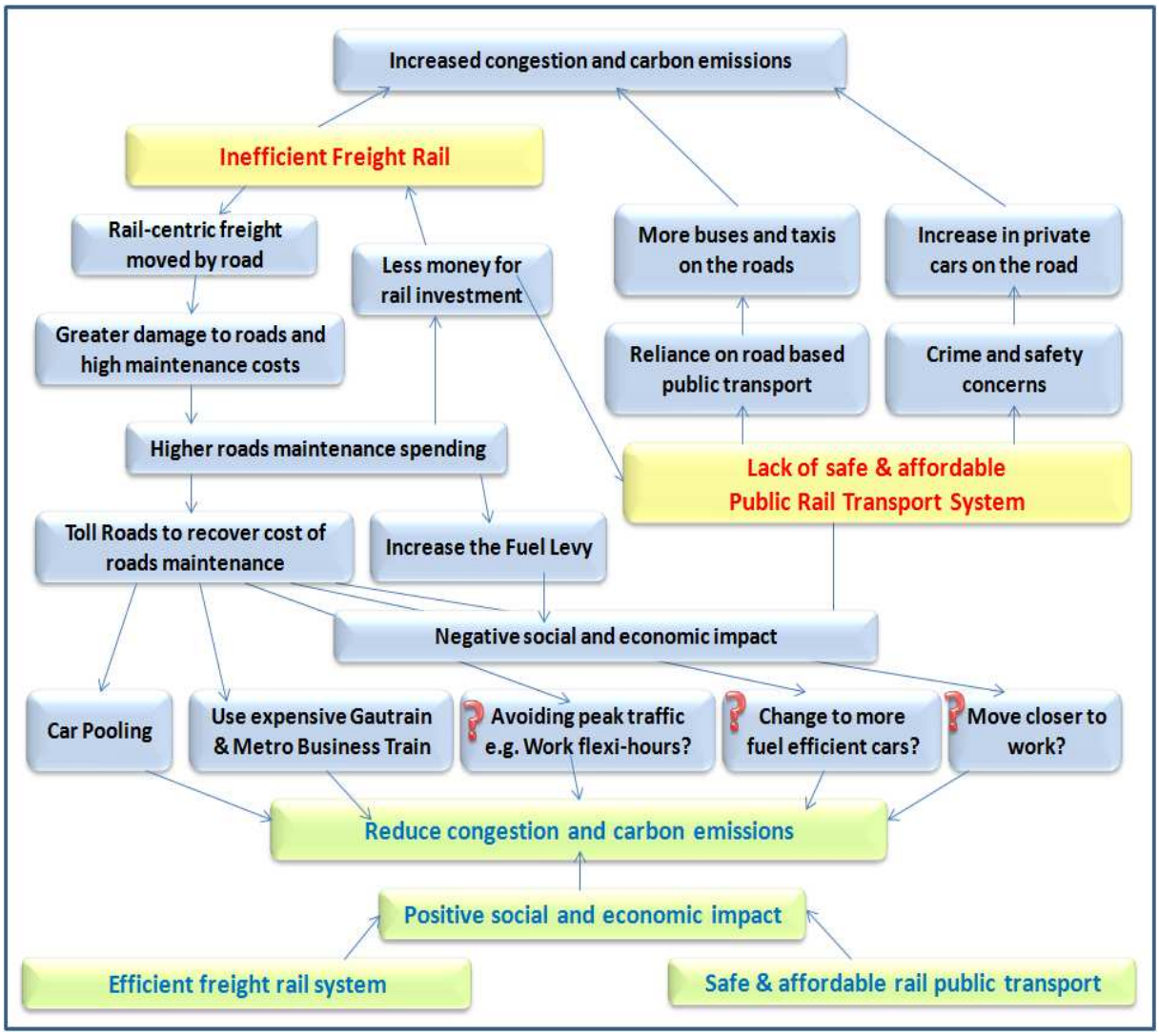


Figure 11: Integrated Transport Planning Mind Map

The mind map developed in **Figure 11** above, begins to show the strategic choices required in planning an integrated transport system, especially between road and rail. It shows how an ineffective railway system leads to the need for higher roads maintenance and results in greater congestion and carbon emissions. The GFIP investment is squarely located within this vicious cycle problem and is a symptomatic treatment of a problem that will consistently need massive investments in road. This

is not the best strategic choice for the investment of public money. Investment in a freight and public rail system is the only way to address the social, economic and environmental challenges facing South Africa in its transport system.

7.7 Issues of Governance

All the stakeholders interviewed complained about the lack of transparency and public consultation in the GFIP system. Due to the public outcry over the proposed toll tariffs, government and SANRAL were forced to embark on a wide-spread consultation process, which will result in the review and drastic reduction of the toll tariffs. It may also result in changing the financial strategy of the GFIP project completely, albeit after the fact.

This is democracy at work and government decision makers are learning a lot from this process. They are learning that in a maturing democracy, government has to consult the public before they invest public funds in large infrastructure developments, especially when the public will again be expected to pay for using the infrastructure.

The lack of transparency and public consultation is not a South African phenomenon. Many of the researchers reviewed in the literature review raised this as a problem in many countries, such as the USA, UK and China. Gwilliam and Kumar (2003) also state the roads boards reviewed in many African countries lack transparency systems and processes. Greater transparency will also be a deterrent to potential fraud and corruption.

Independent reviews of financial forecasts and cost-benefit analyses of toll road projects, such as the GFIP, are crucial, to ensure that the most effective models are used correctly, in the planning processes, with the least social impact. To this end many stakeholders feel that an independent transport regulator is needed to approve tariff pricing and mediate disputes, to ensure competitive bidding processes are

followed, to interrogate cost allocation models and to ensure consumer protection (Democratic Alliance, 2011).

The establishment of a Roads Consumer Council is also recommended by stakeholders and transport experts alike. This will ensure that government consults with all the relevant affected parties and interest groups and takes their views and recommendations on board (Glaister and Smith, 2009).

The establishment of the Independent Transport Regulator and the Consumer Council for roads are policy and regulatory mechanisms to ensure transparency and public consultation. These policy instruments are long overdue in South Africa and should be developed as soon as possible.

8. Conclusions and Recommendations

Going back to the objectives of this research study, highlighted in **Figure 1** and discussed in Chapter One, the conclusions reached and recommendation made are presented in this chapter.

Figure 1: Research Objectives

They will be presented under the following headings:

a) Economic Impact of the GFIP Toll Road
b) Social Impact of the GFIP Toll Road
c) Environmental Impact of the GFIP Toll Road
d) Road Infrastructure Funding Strategies
e) The User Pay Principle
f) Public Policy Issues
g) Issues of Governance

8.1 Economic Impact of the GFIP Toll Road

8.1.1 **Job Creation:** The GFIP project has created and will create many new direct and indirect jobs.

Recommendation: It is recommended that the numbers of jobs created are independently reviewed, so that the public can have confidence in these numbers and celebrate this as a positive outcome of the GFIP.

8.1.2 Projected GDP Growth: SANRAL's cost benefit analyses show value-add to the provincial economy and an increase in the Gauteng GDP growth. These analyses are disputed by external economists, who claim that over-pricing, limited alternatives and inefficient spending will increase inflation and secondary inflation.

Recommendations: It is recommended that:

- The economic analyses conducted by SANRAL are reviewed by external experts. More factors need to be considered in the equation, such as value for money tests, and the cost of un-strategic investments.
- Claims of inefficient spending by SANRAL are further investigated. If fraud and corruption is found to have inflated the costs of construction, then legal action needs to be taken against the relevant decision-makers.

8.1.3 SADC Impact: It is concluded the GFIP toll road will have a negative impact on SADC regional trade and the North-South Corridor. It will result in increasing the transaction costs of trade in SADC countries, which are already too high and uncompetitive.

Recommendation: It is recommended that the cross-border tariff structure is reviewed to find ways to mitigate the negative impact of the GFIP toll road on SADC freight operators.

8.1.4 Negative Impact on Secondary Roads: It is concluded that the GFIP toll road will have a negative impact on secondary municipal roads. The cost of maintenance and the congestion will increase. The municipalities do not have the budgetary means to pay for the increased roads costs that will arise.

Recommendation: It is recommended that the potential impact on the secondary roads is studied and budgetary provision is made for covering

these additional costs from the national treasury and from SANRAL's toll revenues.

8.2 Social Impact of the GFIP Toll Road

8.2.1 **Negative Social Impact:** It is concluded that the GFIP will have a negative social impact. There is no safe and affordable public transport mode. The Gautrain is an expensive alternative but does not cover the entire province. The public therefore has the choice of using unsafe kombi taxi transport or paying the tolls for using their cars. The toll road will therefore be an additional burden on the Gauteng public. The argument that the GFIP will reduce congestion is not valid. On the contrary, it could increase congestion in the long term.

Recommendation: It is recommended that private cars and public transport are exempted from toll tariffs. Tariffs should only apply to freight operators.

8.3 Environmental Impact of the GFIP Toll Road

8.3.1 **Traffic congestion:** It is concluded that the increased road capacity created by the GFIP will not result in a decrease in traffic congestion, but could increase it in the long term.

8.3.2 **Carbon Emissions:** It is concluded that roads pricing also do not reduce carbon emissions overall, but spreads these emissions over time and space.

8.3.3 **Environmentally Sustainable Transport Mode:** It is concluded that conventional railway systems are the most energy efficient and environmentally sustainable form of transport.

Recommendations:

- It is recommended that investments in the railway system are prioritised over investments in roads in the future.
- It is recommended that a time-based study is conducted to analyse the exact environmental impact of the GFIP project over the next 3 to 5 years. The carbon footprint of the GFIP construction must also be analysed.

8.4 Road Infrastructure Funding Strategies

8.4.1 **Strategic Investments:** Transport investments are currently not guided by an integrated and inter-modal transport strategy. This strategy is needed to ensure the right infrastructure investments are made in the right modes to achieve the greatest benefit for the country. It is concluded that the GFIP project is not a wise strategic investment of public funds.

Recommendations:

- A new transport policy and strategy framework is developed to ensure that South Africa has a clear vision for the development of transport, and the right infrastructure is invested in.
- Invest in the railway system to reduce the investment and maintenance budgets needed for roads.
- Public rail transport must be subsidised to derive the most social benefit. The PRASA commuter rail service is ineffective and needs to be completely overhauled.

8.4.2 **Funding Scenarios:** It is concluded that the various funding scenarios, whether by increasing the fuel levy or through direct user charging, makes no difference to the country's economy in the long run, as the taxpayer still pays. The collection mechanisms are just different. What is important is how strategic are the infrastructure investments using public funds and what the expected benefits are.

Recommendation: Other funding mechanisms for transport infrastructure must be explored, such as:

- Investments into road and rail infrastructure by extractive industries as part of mining concession arrangements;
- Value capture opportunities to raise funding;
- Trade of carbon credits for greener transport systems.

8.4.3 Efficient Government Spending: Improved efficiency of government spending will ensure that the transport infrastructure budget goes further and more beneficial outcomes are achieved. It is concluded that the spending on the GFIP was not efficient.

Recommendations: As in 8.1.2 above, it is recommended that claims of inefficient spending by SANRAL are further investigated. If fraud and corruption is found to have inflated the costs of construction, then legal action needs to be taken against the relevant decision-makers.

8.4.3 Responsibility of the State: It is concluded that roads development is the responsibility of the State and every effort must be made to pay for the roads and other transport infrastructure from the general revenue fund. Better strategic planning of transport investments will ensure that the right investments are being made for the best economic, social and environmental outcomes.

Recommendation: The fuel levy collected is currently insufficient for the current roads budgetary demands. The fuel levy must be increased to bring it up to par with the global norm.

8.4.4 Commercialisation: It is concluded that the commercialisation of the roads to fund the roads development and maintenance is not the best funding strategy. Strategically planned investments must address the transport infrastructure requirements. Commercialising the roads should be the last resort for roads funding.

Recommendations:

- Road user charging should only apply to freight vehicles and not to private motor vehicles and public transport vehicles.
- While commercialisation of the roads is not supported, where toll roads are implemented, it is recommended that PPPs are used, rather than the roads being developed, managed and maintained by SANRAL. The owner and operator roles must be separated for greater efficiency. Private sector operators are more efficient than government agencies.
- It is recommended that a policy is developed on the commercialisation of roads. This policy must state under which conditions the roads can be commercialised and clearly define how these toll roads will be managed, to ensure the least negative impact and the greatest gain.

8.5 The User Pay Principle

8.5.1 Who Pays? It is concluded that the user pay principle is unfairly applied in the GFIP toll road. The freight vehicles are responsible for 99% of the damage to the road and derive the most economic benefit from the roads. The large freight operators are highly profitable companies, but do not have to pay 99% of the toll charges.

Recommendations:

- Only freight operators should pay toll fees on the GFIP roads.
- Review road freight charges to correct the imbalance between road and rail freight, based on fairly applying the user pay principle.
- Review load weights of freight vehicle and bring them in line with global best practice standards. Overload control management is one of the most significant measures for levelling the playing field between road and rail.
- Road user charging has not been implemented in SA as per the SADC model and needs to be reviewed. The DoT needs to prioritise this in cooperation with the National Treasury.
- Redress the non-level road-rail playing field by investing in the freight and public transport railway system.

- Introduce regulatory incentives and disincentives to move freight cargo onto rail and off the roads.

8.6 Public Policy Issues

8.6.1 Absence of Clear Transport Policy Framework: It is concluded that there is currently an absence of a clear transport policy framework, on which SANRAL's mandate should be based. Although the mandate and powers of SANRAL are clearly defined in legislation, they operate within a policy vacuum. Public policy is a key driver for achieving economic, social and environmental benefits through transport infrastructure investments (Anas and Lindsey, 2011).

8.6.2 Commercialisation and PPPs: South Africa also lacks a clearly defined policy on when and how the country will commercialise transport systems like the roads, and how public private partnerships (PPPs) will be implemented.

Recommendations:

- As in 8.4.1 above, it is recommended that a clearly defined transport policy and strategy framework is developed to ensure that South Africa has a clear vision for the integrated development of transport, and to ensure that the right infrastructure is invested in.
- The policy must prioritise the investment in the railway system to reduce the investment and maintenance budgets needed for roads.
- The policy must ensure that public rail transport is subsidised to derive the most social benefit. The PRASA commuter rail service is ineffective and needs to be completely overhauled.

8.7 Issues of Governance

8.7.1 Greater Transparency and Public Control: It is concluded that the GFIP project was not transparent and consultative enough, and the resulting public

outcry is evidence of this. The government and SANRAL must be commended for putting the GFIP toll road on hold while extensive stakeholder consultation is undertaken.

Recommendations:

- It is recommended that independent reviews of financial forecasts and cost-benefit analyses of the GFIP project are conducted. Greater transparency will also avoid and root out fraud and corruption, if it exists.
- It is recommended that an Independent Transport Regulator is established to oversee all toll roads, charges and to protect the interests of the road users.
- It is recommended that a Roads Consumer Council is established to ensure that all stakeholder groups are consulted on roads projects and to protect the interests of the roads user groups.
- It is recommended that the owner and operator functions of toll roads are separated to promote efficiency.

8.8 Areas for Future Research

Some of the important areas for future research identified in this research study include the following:

8.8.1 Impact of the GFIP: The actual impact of the GFIP over a period of time, from economic, social, behavioural and environmental perspectives. This will help to inform future roads planning, especially planned toll roads. Data on whether people move closer to work, car-pool or switch to public transport modes will be useful to inform environmental planning to reduce carbon emissions.

8.8.2 Carbon Footprints: The carbon footprint of different transport projects need to be investigated. What is the carbon footprint of the construction of the GFIP and the Gautrain? This needs to be taken into account when the environmental impact of transport modes are analysed.

8.8.3 Cost of Goods: The impact of the GFIP on the cost of goods in South Africa and the SADC region over a period of time needs to be studied, to determine the exact impact on trade and transaction costs.

8.8.4 Economic Benefit of African Roads: A study needs to be conducted on who derives the greatest economic benefit from roads in Africa, at a macro-economic level. Developed countries need roads and rail infrastructure in Africa to move raw materials out, such as copper, coal, gas, wood and iron ore, causing the freight damage to the roads. Perhaps it is the end-user of the freight cargo or the supplier of containerised imported goods that ultimately need to pay for the damage caused to the roads. This will make an interesting macro-economic study.

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