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Analysing the Implementation Process of Open Road Tolling in Gauteng

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DECLARATION

I hereby declare that this dissertation is my own work, unaided effort. Any use made of prior research by other individuals has been duly referenced. This dissertation is being submitted in partial fulfillment for the degree of Masters in Philosophy in the Engineering Management faculty at the University of Johannesburg. This dissertation has not been submitted anywhere for any award.

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Date: 21/11/14.....

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ABSTRACT

The daunting peak-hour traffic periods have affected Gauteng road users and the economy due to traffic congestion in the recent years. A total of 157 000 vehicles used the Gauteng freeway network each day in 2006, which went up to approximately 200 000 in 2011. This means that the average growth in traffic volumes had grown on average by 7% between 2006 and 2011. As a management strategy, The South African National Road Agency (SANRAL) launched the Gauteng Freeway Improvement Project (GFIP) in 2007 to improve the infrastructural network. The introduction of the GFIP road-user charging scheme in Gauteng has been followed by a renewed interest in the subject of urban road tolling both by practitioners and academics. The primary aim of this study was to analyse the implementation process of successful cases. The intention was to postulate the fundamental factors for such outcomes. This will be useful for the decision makers in the road pricing for future developments in South Africa.

In an effort to achieve the aim alluded to above, this study was carried out through a qualitative method. The sample for the qualitative interview consisted of SANRAL informants. The interviews were transcribed and coded into themes. These themes were then developed and translated into statements for the survey questionnaire that was located using a snowball sampling strategy to enrol a total of 48 general public road users in Gauteng. In support of this data, archive documents regarding the Gauteng Open Road Tolling (ORT) project from private stakeholders and political parties were retrieved and analysed. The data collected was collated on the Microsoft Excel program and coded to assist in the analysis process using inductive reasoning.

The findings of the study revealed that, in order to increase the acceptance of urban road pricing, it is essential to involve all affected stakeholders from the initial stages of the project. The results also revealed that the provision of adequate public transport should have been a requirement policy before the implementation of the e-tolls so that road users had an option of whether to use the roads or not. The paper also addressed the experiences of London, Singapore, Stockholm, Seoul, Hong Kong, Netherlands and New York in attempt to compare and contrast the factors resulting in these road pricing schemes implemented successfully and not implemented.

It is concluded that there is no dispute that infrastructure, such as roads, are essential to the contribution of economic growth. It is established that road improvement to alleviate traffic congestion is necessary for Gauteng road infrastructure, thus accelerating economic growth. However, the majority as high as 86% of stakeholders in general do not agree with the funding model proposed, namely the user-pay principle. It is evident that SANRAL, as an agency of government, only implements policies, which have passed into the law of Parliament. However,

SANRAL and the government did not provide alternative reliable modes of transport, catering for those who have been priced off the road and enabling modal shift.

Based on these findings and the current state of the project, this scheme faces the potential of being scrapped as can be seen from the case studies, particularly in the case of Netherlands and Hong Kong due to public concerns about technical feasibility, invasion of privacy, political and economic problems.

By way of recommendations, possible factors, such as an effective marketing strategy that is more transparent must be in place between Government and all affected stakeholders before the implementation stage is instigated. This also includes consultations with the public and politicians in order to promote acceptance of the scheme.

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II. DEFINITIONS

The following key concepts feature as an important part of the terminology of this study and are defined as follows:

- Externalities refer to any costs or benefits unknowingly generated by road users as a result of their use of a road, affecting the costs and benefits of third-party road users.
- Road pricing refers to road user charging, congestion charging, congestion pricing, road tolling, open road tolling, electronic road pricing, automatic debiting systems, value pricing, variable pricing and peak period pricing.
- Electronic Toll Collection (ETC) refers to a transaction in which a vehicle is identified by means of a toll tag, the vehicle license number or by other electronic means in order to effect the payment of a toll. The system determines whether passing vehicles are enrolled on the database, alerts the appropriate authorities for those that are not, and electronically debits the accounts of registered vehicle owners. ETC toll collection systems rely on four major components, namely Automated Vehicle Identification (AVI), automatic vehicle classification, transaction processing and violation enforcement.
- Intelligent Transport System (ITS) refers to interventions put in place by road authorities by adding real time information and communications technology in order to manage congestion, incident response, improve safety, journey time and to inform the driver.
- Open Road Tolling (ORT) refers to another form of Electronic Toll Collection (ETC), whereby the motorist is not required to stop at a toll booth or plaza to pay toll fees. Overhead gantries are positioned along the toll route and technology mounted on these gantries will take photos of the front and rear of the vehicle and read the transponder (e-tag) in the vehicle. If there is no e-tag in the vehicle, it is identified using the photos that are taken of the front and rear of the vehicle.
- Transponder/e-tag refers to any Dedicated Short Range Communication (DSRC) based electronic equipment installed within or on a motor vehicle, and is also known as an On Board Unit (OBU) or interchangeably On Board Equipment (OBE).
- "HOT" is the acronym for "High Occupancy Toll." On HOT lanes, low occupancy vehicles are charged a toll, while High Occupancy Vehicles (HOVs), public transit buses and emergency vehicles are allowed to use the lanes free of charge or at reduced rates. HOT lanes create an additional category of eligibility to use HOV lanes.

III. LIST OF ACRONYMS AND ABBREVIATIONS

AA – Automobile Association
ACM – Automatic Coin Machine
ALS – Areas Licensing Scheme
AVI – Automatic Vehicle Identification
BOT – Build-Operate-Transfer
BRIC – Brazil, Russia, India, China
BRT – Bus Rapid Transit
BUSA – Business Unity South Africa
CBD - Central Business District
COSATU – Congress of South African Trade Unions
DA – Democratic Alliance
DoT – Department of Transport
DSRC - Dedicated Short Range Communication
ETC – Electronic Toll Collection
ERP – Electronic Road Pricing
GDP – Gross Domestic Product
GFIP – Gauteng Freeway Improvement Project
GPS– Global Positioning System
HOT – High Occupancy Toll
HOV – High Occupancy Vehicle
ITS – Intelligent Transport System
OBE – On-Board Equipment
OBU – On-Board Unit
ORT – Open Road Tolling
OUTA – Opposition to Urban Tolling Alliance
PPP – Public Private Partnership
RFA – Road Federation Association
RFID – Radio Frequency Identification
SACP – South African Communist Party
SANRAL – The South African National Road Agency
SARF – South African Road Federation
SAVRALA – South African Vehicle Rental and Leasing Association
VPS – Vehicle Positioning System

CHAPTER 1: ORIENTATION AND INTRODUCTION

1.1 Introduction

Roads and their vital contribution to security, safety, economic growth and social development are often taken for granted. There is no dispute among road users and other citizens of the value of a good, well-functioning road network. Moreover, how effectively a nation's road infrastructure is managed is key to the quality of the environment in which it lives (Alli et al., 2012).

According to Eberts (2000), the interface between transportation investment and economic development has broad ramifications that go beyond transportation's basic purpose of moving goods and people from one place to another. Whereas there is no doubt that transportation is essential in the operation of a market economy, much still needs to be understood about ways in which an efficient transportation system can improve the productivity of the economy. Eberts (2000) further noted the broader role of transportation in shaping development and the environment.

Rodrigue et al., (2009) noted that when transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects, such as better accessibility to markets, employment and additional investments. They also noted that when transport systems are deficient in terms of capacity or reliability, they can have an economic cost, such as reduced or missed opportunities and a lower quality of life. In their study, Banister and Berechman (2001) identified three sets of necessary conditions, viz. positive economic, investment and political factors, which must be met simultaneously for transport-induced economic development to take place, as shown in Figure 1.1.

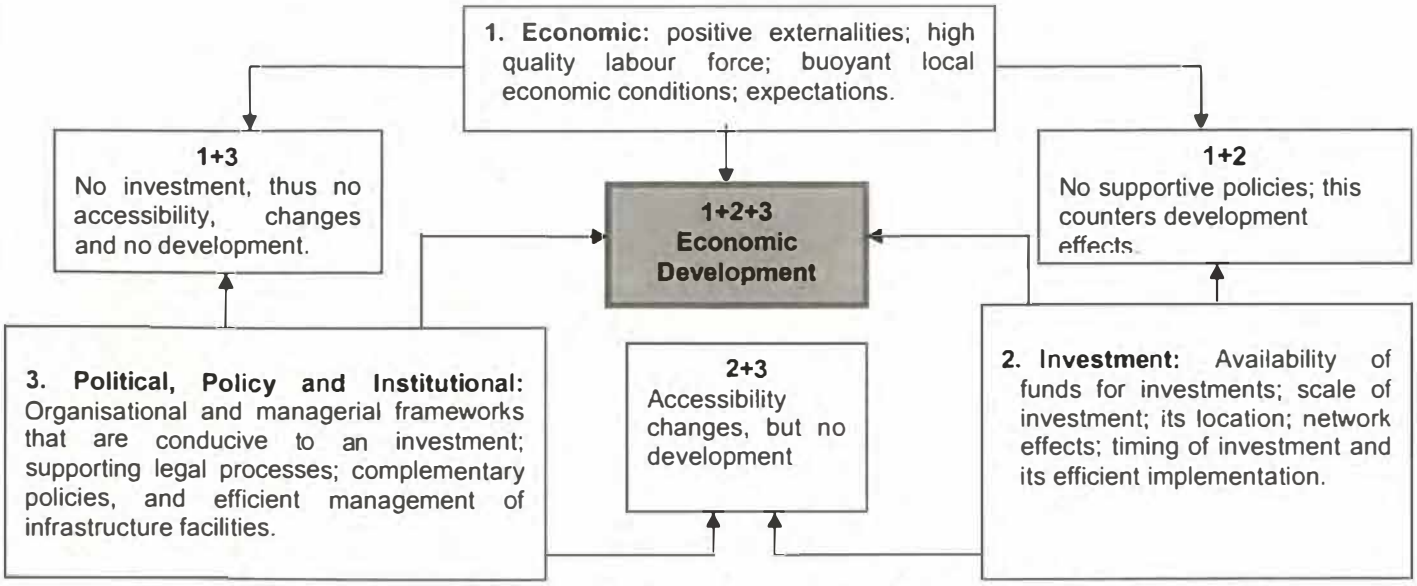

Figure 1.1: Illustration of the necessary sets of conditions (Banister and Berechman, 2001).

In his study, Downs (2004) asserted that rush hour traffic congestion is inevitable because of the benefits of having a relatively standard workday. In a capitalist economy, goods can be allocated either by pricing (ability to pay) or by queuing (first-come, first-serve); congestion is an example of the latter.

Sumalee (2005) noted that economists claim that road users do not pay the true price of their road use, which leads to inefficiency and congestion in the transport system. Particularly, there exist externalities, in the form of congestion, pollution, and accidents that the car users do not perceive and are not charged for. A fiscal tool to rectify the failure in the transport market and to resolve the congestion problem has been proposed, which is the idea of congestion charging or road pricing. Congestion charging raises the social welfare of the system, in theory, by imposing appropriate charges for the usage of roads (Sumalee, 2005). Ieromonachou et al., (2006) revealed that as early as the 1920's, economists' recognised road pricing as a simple way for taxing the external costs of transportation, namely congestion, accident risks, noise and emissions of pollutants.

Doan (2010), Jaensirisak and Ratchathani (2003) believe that road pricing as a management strategy can play a vital role in creating new funding for transportation, encouraging an improved quality of life in the urban environment, advancing economic productivity for goods movement and business, increasing the use of public transit, and reducing congestion and emissions. They further categorised the definition of the main concept of road pricing in two ways. Firstly, by traffic engineers and transport planners, it refers to the imposition of direct charges on road use, with a variety of objectives. These are for managing travel demand in order to alleviate traffic congestion and to reduce the environmental impacts from traffic, and for generating revenue to finance transport services and infrastructure. Secondly, by economists, it is the setting of pricing equal to the difference between the social marginal cost and the average private cost of a journey. Figure 1.2 illustrates the fact that some programmes emphasise one objective, and others seek to blend the two objectives in one harmonious programme.

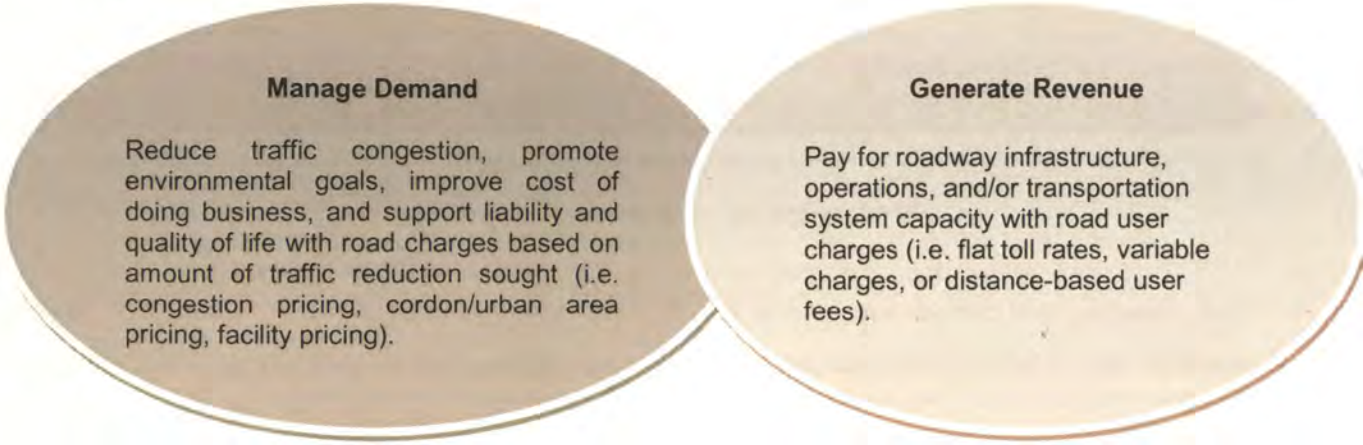

Figure 1.2: Purpose of road pricing (Doan, 2010).

Klodzinski, Gordin et al., (2007) indicated that improvements have been sought to decrease toll transaction times so that drivers experience reduced delays or none at all. Although intelligent transportation systems technology, such as automatic vehicle identification in the form of Electronic Toll Collection (ETC) is a concept that has revolutionised toll collection, with the ever-increasing traffic volumes on toll facilities, more innovative methods, such as Open Road Tolling (ORT) are being deployed.

Copeland (2008) reported that highway agencies are increasingly embracing high-speed ORT in which drivers do not have to slow down or stop at a tollbooth or gates, and often no cash is involved. Instead, overhead antennae "read" windshield-mounted transponders in the cars beneath and charge drivers' pre-paid accounts. Overhead cameras capture license plates, and drivers without transponders get a bill in the mail.

Figure 1.3 below demonstrates the migration path of toll collection operations from fully attended cash lanes to express and ORT collections. Each technology milestone, from implementing the Automatic Coin Machines (ACMs) through today's ORT operations, has resulted in higher throughput, while delivering lower overall per-transaction costs (Gallagher, 2005).

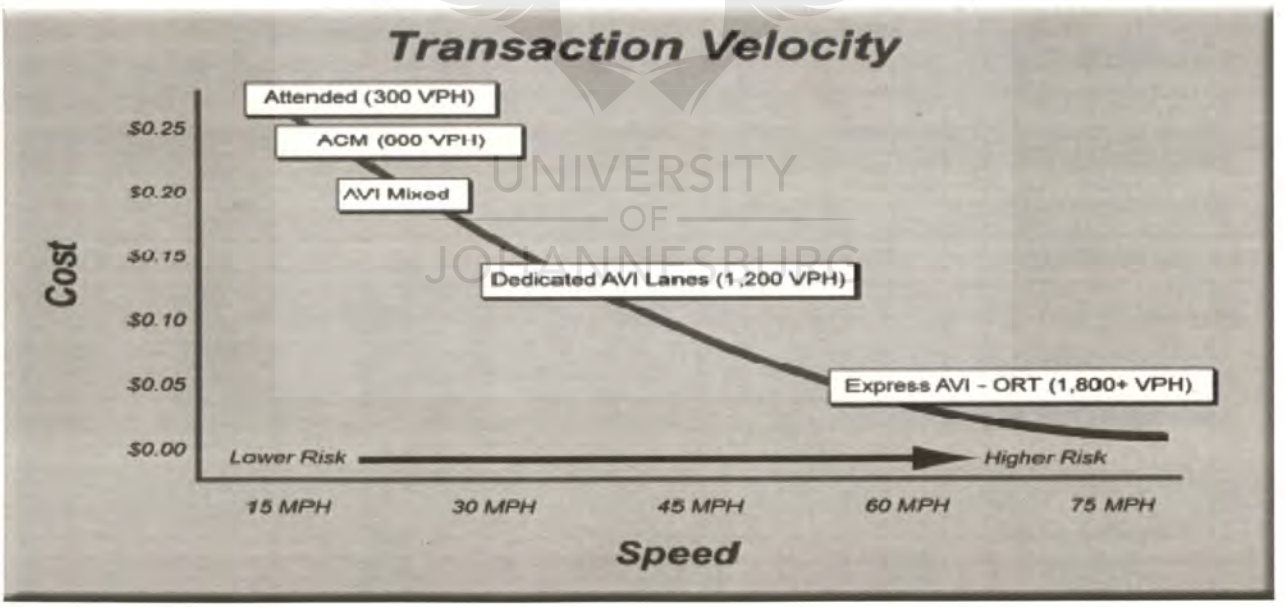

Figure 1.3: Speed-Cost analysis (Gallagher, 2005).

However, Gallagher (2005) also noted that the ORT is a complex matter that presents both challenges and opportunities in technology, customer service operations, and in the business policies and legislation that support toll collection.

1.2 Background

The Gauteng province is one of the nine provinces of South Africa. Mokonyama (2012) pointed out that this province serves as the economic epicentre of the country, contributing to 38% of the country's Gross Domestic Product (GDP). Van Niekerk (2011) revealed that a total of 157 000 vehicles used the Gauteng freeway network each day in 2006, which went up to approximately 200 000 in 2011. This means that the average growth in traffic volumes on the Gauteng freeway network had grown on average by 7% between 2006 and 2011. Van Niekerk (2011) also revealed that there has been an 80% growth in the number of people who own cars since 1994. Cox's study (2013) warned that the number of vehicles was set to double from 3.65 million to 6.5 million in the next 25 years. He further warned that by continuing with the existing trends and not intervening in the present urban structure and the manner in which land is developed, not changing people's travel patterns and choices, and not investing in more friendly technologies, Gauteng will increasingly become a far less pleasant and unhealthy urban area to live in. The overall demographics of the province is summarised in Table 1 below, where indicators, such as population, households, and labour force are given and also compared with national figures.

Table 1: Selected illustrative statistics for the Gauteng Province (Mokonyama, 2012).

Parameter	Value	Relative to the rest of the country
Population (2011)	11, 328,203	22% of country total
Households (2011)	2, 712,000	19% of country total
Labour force (2011)	3, 965,000	30% of country total
Area (2011)	16 548 km2	1% of country total
Registered number of all types of motorised vehicles (business and private) (2012)	3, 661,881	39% of country total
Contribution to South Africa's GDP (2010)	R811 Billion (€1≈R10)	34% of country total
% of households with cars (2003)	33%	The figure is 26% for the whole country

The above table shows that only a third of households have access to a car and that areas are relatively dense, with a fifth of the country's population, but occupying 1% of the country's space. South Africa's pressing development challenges include an ageing road network and a sharp growth in road traffic. The construction of an adequate transport infrastructure, and the capital investment required to fund it sustainably are prerequisites for social and economic development (Alli et al., 2012). Given the financial constraints to expand and maintain increasingly congested urban-based national road network (Mokonyama, 2012), the Gauteng Provincial Government

investigated tolling as an option to upgrade and expand freeways in Gauteng during the mid-1990. The impact of traffic congestion on the Province's ability to sustain economic growth was already identified as a major constraint at that stage. To address the situation, over a period of about three years, the Gauteng Province, together with The South African National Road Agency Limited (SANRAL), explored the implementation of the project as a concession project. An unsolicited proposal received in accordance with SANRAL's policy on Unsolicited Bids was entertained as a public, private partnership (PPP's). This proposal was found unacceptable for, inter alia, the tariffs to be charged to the motorist (DoT, 2012).

In 2007, the cabinet approved the Gauteng Freeway Improvement Project (GFIP) after which SANRAL followed the Intent to Toll process. Amongst other requirements, SANRAL widely advertised the details of the project, the intent to toll, the proposed toll points, expected toll tariffs, upon which the public were given the opportunity to comment. The comments were considered by the Minister of Transport after the related road sections were declared as toll roads (SANRAL, 2013a).

In 2008, SANRAL launched the GFIP (See Map 1) in the form of an automatic open road tolling, covering 560 kilometres (km) of road as a project that will help ease traffic congestion in Gauteng's freeways (Mokonyama, 2012). The first 185 km of road included the construction of additional lanes, reconfiguring interchanges and the introduction of a multi-lane free-flow electronic toll collection system, all to be financed through capital borrowings and toll income (Alli et al., 2012).

According to SANRAL (2013a), the project is being implemented in phases to meet the demand, to match the financial viability of the project and the construction industry's capacity. This project is the single largest national road project undertaken by SANRAL and the government in over 25 years and is expected to reduce traffic jams, and widen economic and social development opportunities (Alli et al., 2012).

Alli et al., (2012) revealed that SANRAL raised R10 billion (£778 million) between July 2008 and April 2009 on the capital markets towards the financing of the project, which is a multi-lane free-flow electronic toll collection system, also known as ORT and it allows for toll to be charged without vehicles having to stop or slow down.

Brits (2010) reported that funding for SANRAL's national non-toll roads is allocated by the National Treasury, which levies a general fuel tax in terms of the Customs and Excise Act 91 of 1964. He also said that the fuel levy varies monthly according to international fuel prices. As Roth (1996) indicated, in Latin America, the income from the fuel levy tax is combined with other state revenues

and allocated according to priorities. However, since other priorities, such as poverty alleviation, education and health may be ranked higher than expanding road infrastructure, approximately only 33% of the South African fuel levy is allocated to roads and as such, SANRAL's cumulative budget deficit of R10.8 billion has developed between the financial years 2001/02 and 2007/08 (Brits, 2010).

Table 2: Fuel levy collected and fuel levy allocations (DoT, 2012).

	2009/10	2010/11	2011/12	2012/13	2013/14
		Revised estimate	Medium-term estimates		
Provincial	13,527,087,000	14,841,633,000	15,905,302,000	17,199,542,000	18,402,116,000
National	5,608,086,000	6,844,501,000	8,651,596,000	9,728,055,000	10,340,966,000
Local	10,050,262,238	6,955,989,601	8,380,816,634	1,713,432,045	
Total	29,185,435,238	28,642,123,601	32,937,714,634	28,641,029,045	28,743,082,000
Fuel levy	28,832,536,000	34,300,000,000	35,000,000,000	38,110,000,000	39,190,000,000
General fuel levy sharing	6,800,000,000	7,542,000,000	8,573,000,000	9,040,000,000	9,613,000,000
Fuel pipeline		1,500,000,000	1,500,000,000	1,500,000,000	
Net Fuel levy	22,032,536,000	25,258,000,000	24,927,000,000	27,570,000,000	29,577,000,000

The table above demonstrates the total amounts collected from the fuel levy for the 2009/10 financial year, the revised estimate for the 2010/11 financial year and the medium-term estimates up to the 2013/14 financial year. This is also illustrated Figure 1.4 below, where it is evident that the current fuel levy or tax is insufficient to cover existing road construction and maintenance budget allocations. In essence, the transport sector is benefitting from the principle that all tax revenue collected is surrendered to the national revenue fund, since the allocations made through the single budget process towards transport far exceeds budget allocations towards roads alone (DoT, 2012).

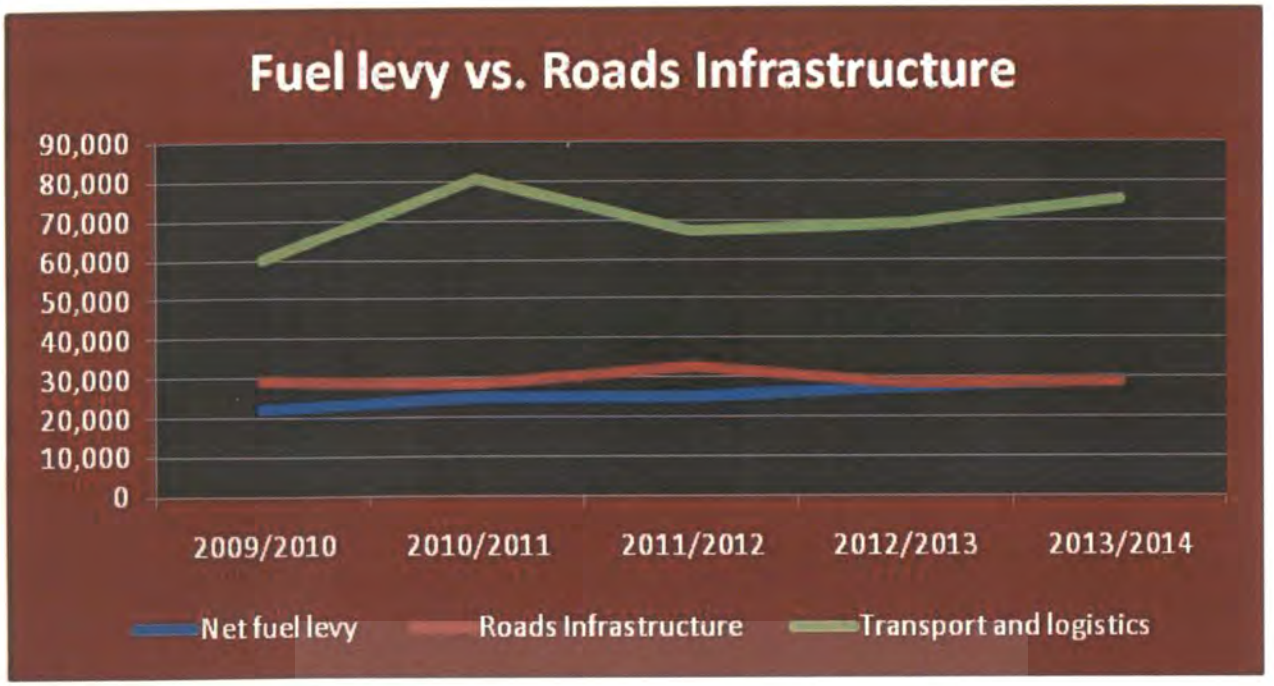

Figure 1.4: Total transport and road infrastructure requirements versus net fuel levy (DoT, 2012).

Rasool (2012) argued that toll financing has a distinct advantage of providing infrastructure earlier than what would have been possible with financing through general taxation. Consequently, the benefit of increased roadway capacity is available to the public sooner, hence tolling is regarded a justifiable way of funding large infrastructure projects, such as high volume primary roads, which does not compromise fiscal integrity. In this regard, Pienaar (2012) believed that tolling is an economically viable option for Gauteng's circumstances and the GFIP has proven feasible in various studies and analyses.

Malahleha (2011) asserted that road user charging is regarded as a politically sensitive area, particularly after 1.8 million people voiced their disapproval of the concept through an on-line petition. It is in light of these challenges with the various options that average speed enforcement cameras can be regarded as a simple and cost effective solution, which does not require road widening or infrastructure upgrade, and will not cost law-abiding drivers anything extra. The use of average speed enforcement has been shown to reduce congestion, improve journey reliability, and make the carriageway safer for all road users. All of this, at a typical cost of GBP0.1 million per mile, which is 400 times less expensive than carriageway widening. However, one cannot solve a problem, such as traffic congestion, with just one project or solution in isolation (Malahleha, 2011).

SANRAL (2013b) revealed that the GFIP will use the electronic toll collection methodology, but with an ORT configuration. ORT employs specialised gantries over the road and roadside equipment, enabling toll collection at designated points at freeway speeds.

In this scheme system, the toll operator collects tolls on toll roads without using booths. However, drivers equip their cars with transponders, as depicted in Figure 1.5 below, which is keyed to their credit card. Users simply drive through a gantry at high speeds and are charged electronically without having to slow down. Open-road systems can also use license-plate recognition technology to bill those who do not have transponders. Road users have the option to either register online, through the SANRAL Call Centre, at a point of presence, which is usually situated along the freeway route, at mall kiosks or at most major retail outlets. The users' accounts will then be linked to the relevant vehicle and can either be nominated as a pre-paid payment method or alternatively, linked to a credit card account or other form of bank instrument (SANRAL, 2013b). According to Munroe (2006), transaction costs associated with toll collections have been traditionally high because of delays imposed on motorists. Hence, this technology will play a part in reducing transaction costs and allowing market solutions to emerge.

Figure 1.5: ORT e-tag and gantry.

The GFIP tolling scheme is one of the Gauteng Province's most controversial projects and concerns over planned toll roads are spreading to other parts of the country, with the latest being the Western Cape. The allegation labelled against SANRAL and the government is the lack of open communication and transparency on the decision to implement the GFIP (OUTA, 2012).

Mokonyama (2012) noted that the announcement of the toll network was the first major decision in the history of the country to implement the policy of the user-pays principle at a large scale on urban road networks. He further noted that after the physical implementation of the tolling proposals on the 185-kilometre network in 2011, a large wave of public protests impeded the operational implementation of the tolls on grounds of poor public consultation, inappropriate solution concept, affordability, and double-taxation claims.

Gabriel (2012) also noted that criticisms were also being levelled at the excessive construction costs of the roads development compared to World Bank statistics from other countries. He further noted the unnecessary cost of an expensive, electronic open road tolling system, the policing system, and the pricing structure of the toll tariffs as excessive and abusing SANRAL's market power.

The planned tolling cost structure was first publicised in February 2011 and caused turmoil from both road users and politicians. Most of the criticism against e-tolling has been based on how it will affect ordinary South Africans, who will suffer the cost of using roads necessary to get to their places of employment (OUTA, 2012).

Pienaar (2011) supports this project scheme by pointing out that the GDP has the capacity to add wealth to a country's economy and its population. The GFIP could increase the cumulative GDP by over R207 billion by the end of 2030. The graph in Figure 1.6 shows the contributions that the GFIP could make to the national GDP.

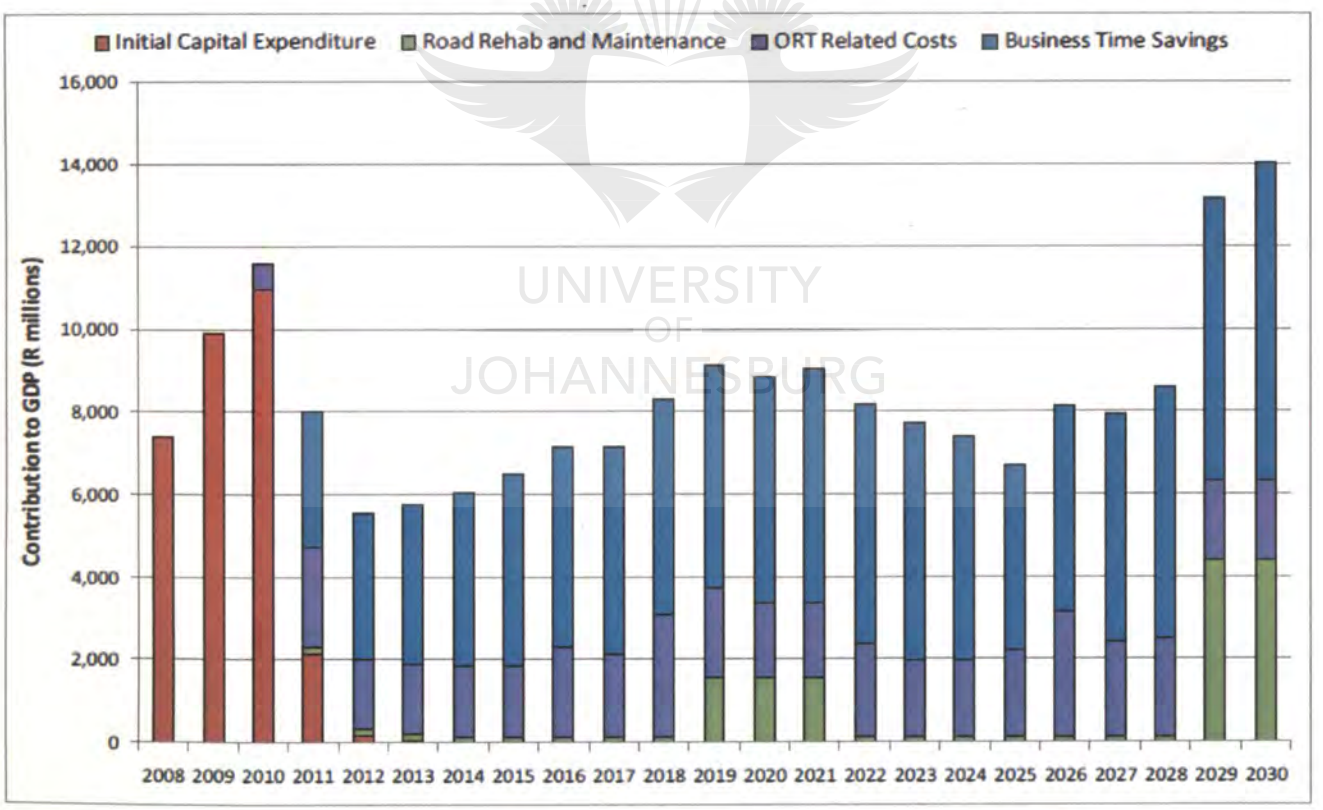

Figure 1.6: Detailed contribution of the GFIP to GDP (Pienaar, 2012).

Map 1: Gauteng Freeway Improvement Project (DoT, 2012)

1.3 Problem Statement

Due to the rapid growth of urbanisation in Gauteng in recent years, traffic congestion has affected the road users' and the economy. In turn, this has degraded the quality of life by making travel unreliable and frustrating.

Ieromonachou et al., (2007) noted that in the context of rising car ownership, pricing instruments as part of an integrated package of measures, are increasingly seen as an effective strategy to reduce traffic and raise revenue. He further noted that in Europe, a number of trials of urban road user charging are underway. However, despite gaining attention and enjoying the support of economists and transport professionals, there remain only a few implemented road-pricing schemes. Ieromonachou further stated that it appears that it is not the technical design or the economic justification that is problematic with road-pricing projects, but rather the implementation processes and the difficulty in gaining acceptance and support thereof.

Similarly, the proposed GFIP tolling scheme has led to an outcry from the public, led by the Opposition to Urban Tolling Alliance (OUTA), as well as opposition political parties and trade unions. The strategic planning process of the project is currently being cross-examined in high court, to the extent that the implementation of the project scheme has been delayed, pending a series of court cases. Tolling was supposed to begin in April 2011, but the proposed start dates have failed to materialise, despite the proposed tariffs having been cut twice since legal battles about the issue started.

This study intended to analyse the implementation process of ORT in Gauteng. Westin (2012) stated that many fear that poor people will merely be priced off roads and left with inadequate alternatives, leaving free-flowing systems for the wealthy. He also stated that, in the road pricing literature, several factors for the low acceptability have been identified, ranging from aversion of pricing, perceived loss of freedom, equity and fairness considerations, to uncertainty about revenue use and awareness of problems caused by car traffic.

1.4 Significance of the Study

A study by Kalmanje and Kockelman (2005) concluded that toll roads are not without controversy and can be mired in political debate, as in Austin, where public resistance to various elements of toll road plans have surfaced. While some toll road projects have been enormously successful, others have been perceived as notable failures, such as Germany's toll roads, the Dulles Greenway, Greenville Southern Connector, northern Tampa's toll roads, and Texas's Camino-

Columbia toll way. They concluded that all these aspects underscore the need to carefully model, study and analyse the impact of adding toll roads to a region's network.

The study assumes that an understanding of human behaviour will lead to more efficient urban tolling policies. There is a misunderstanding about behavioural responses and their consequences to road pricing policies. The reason is that the transport market has a very complex nature where the behaviour of users includes different dimensions, such as mode, route, and time of a day, even destination (Joksimovic, 2007). This means that a process of developing and reviewing tolling policies should be a consultative one, taking into consideration the collective and individual needs of urban communities. This needs to happen within the extensive outline of sustainable urban development. Figure 1.7 below illustrates road pricing, as seen from different perspectives.

Du Plessis (2008) purported that public participation has the potential to improve accountability for the effective management of resources and the development of appropriate means to protect the environment of communities of people, which is ultimately what we have environmental rights for today. Therefore, this study hoped to stimulate further research on issues relating to the role of public participation in service delivery.

It is hoped that this study and its case study will seek to demonstrate that although road tolling schemes have theoretical benefits, there are challenges when it comes to practical implementation. Finally, it is hoped that policy makers will recognise that roads need to be viewed within the extensive transport system and that all the different transport modes impact on each other.

Figure 1.7: Road tolling as seen from different perspectives (Joksimovic, 2007).

1.5 Rationale of the Study

Replogie (1991) noted that there is a growing transportation crisis in many lesser developed countries, the product rapid urbanisation and a mismatch between the supply of transportation infrastructure, services, and technologies and the mobility needs of the majority of people, whose incomes are very low. He further stated that unsustainable growth in motorisation puts increasing strains on environmental quality and many local and national economies, and is increasing social conflict and poverty.

Purvis and Grainger (2004) advocated that the development of sustainable transport systems requires an understanding of a range of environmental, economic and social systems and the input of many academic disciplines, as well as politicians, planners, developers and transport users. It is therefore vital to consider the issue of the GFIP toll scheme very seriously, as it ultimately borders on all these stated issues. In essence, the current study tried to examine the problems stated in the previous paragraphs. Most literature on transportation discloses an extensive belief in the importance of transport, and its efficiency in accelerating the developmental process of a nation. Consequently, the rationale of the study has been to reveal the potential challenges and prospects likely to be encountered when the implementation of the GFIP scheme in Gauteng as a strategy to help reduce traffic congestion takes place.

Pugh and Fairburn (2008) indicated that the adverse effects of congestion imply that decongestion, through increasing reliability with respect to journey times and costs, may have a positive effect on commercial road use and associated development. In this case, tolls reduce road use, increase reliability and so favour development.

For development to be fully realised, one can therefore conclude that accessibility to work at home must be significantly improved to propel us to develop more rapidly. The question therefore is what are the potential challenges when undertaking the implementation of this type of scheme?

1.6 Assumptions of the Study

The assumptions formulated for the study are the following:

- Despite its repudiation by public and opposition political parties, the GFIP scheme will not be cancelled, as the infrastructure has been built;
- The efficiency in the operations of the public transport system will be enhanced; and
- The implementation of the scheme will discourage people from using low-capacity vehicles, thus opting for public transport and reducing congestion.

1.7 Scope of the Study

1.7.1 Research Objectives

The primary aim of the study is to evaluate the implementation process of successful cases to postulate the fundamental factors for such outcomes, which will be useful for the decision makers in the road pricing of future developments. On a more specific note, however, the study would work towards achieving the following objectives:

- To determine the reasons for the implementation of the scheme;
- To evaluate the social and economic impact of the scheme;
- To assess the Actors-Partners Network in the establishment of the e-toll scheme and challenges during the implementation;
- To determine the policies and laws that govern SANRAL to implement the tolling; and
- To compare the GFIP scheme with other schemes implemented internationally.

1.7.2 Research Questions

The research questions listed below were derived to determine if general international implementation processes were followed in the implementation of the ORT scheme in Gauteng:

- What was the rationale for the implementation of the scheme?
- How will the social and economic impact be affected by the scheme?
- Who was involved in establishing the scheme and what were the challenges in implementing the tolling scheme?
- What are the policies and laws that governed SANRAL to implement the tolling in South Africa?
- How has SANRAL optimised the use of international practice of road pricing schemes?

1.8 Structure of the study

Chapter 1 provides a general background to the research. Chapter 2 introduces the literature review on the concepts of road pricing. In addition, major policy and legislative literature are highlighted in order to elucidate the objectives of the study. This includes the comparison to international studies. Chapter 3 introduces the case studies. Chapter 4 describes the research approach and methodology. Chapter 5 focuses on the research results and the discussion of the study and its findings. Chapter 6 provides a conclusions and recommendations.

1.9 Conclusion

Traffic congestion in most cities around the world is sincere and worsening annually. As a result, the quality of life has decreased significantly because of increased and frustrating travel time. The interface between transportation investment and economic development has broad ramifications that go beyond transportation's basic purpose of moving goods and people from one place to another. Economists recognised road pricing as a simple way for taxing the external costs of transportation, those being congestion, accident risks, noise and emissions of pollutants. Road pricing is gaining attention and enjoying the support of economists and transport professionals. However, there are only a few schemes in existence worldwide, which could possibly be that road user charging is seen as politically unacceptable. It can also be noted that it is not the technical design or the economic justification that is problematic with road pricing projects, but the implementation processes and the difficulty in winning acceptance and support of taxpayers.

The following chapter will expand these concepts and eventually draw a conclusion on the study's objectives.

CHAPTER 2: LITERATURE REVIEW

The purpose of the literature review was to study the theoretical background on road pricing through the use of journals, books, references, the internet and articles. The study was related to the aim and objectives of this study. Among other issues to be discussed, this chapter outlines the road pricing concepts, development history in transport planning, as well as the comparison with other international studies. Other critical factors discussed include common revenue use, barriers to implementation of the road pricing scheme and economic concepts.

2.1 Road Pricing

Road pricing is considered to be an effective means of both managing road traffic demand and raising additional revenue for road construction by both transportation researchers and economists (Chan and Lam, 2005). Mahendra (2008) noted that the subject of road pricing is often considered controversial with strong arguments in favour of it and against it. He noted that supporters consider the policy necessary for optimal allocation of resources and sustainable demand management, while opponents consider it as simply another form of taxation. According to Walker (2011), the terminology "road pricing," is not well-defined, and to some extent, terms are used interchangeably, depending on who or where you are, rather than any objective distinction. The term road pricing has been used to cover any fiscal form of traffic restraint, including both direct and indirect charges of road users. However, various terms have been used in parallel with the term road pricing, such as road user charging and congestion pricing, which is used in the United States of America, London and elsewhere, road tolling, open road tolling, electronic road pricing, automatic debiting systems, value pricing, variable pricing and peak period pricing.

The management of road pricing for both urban and interurban roads is in the hands of separate public agencies or government bodies with possibly different objectives and responsibilities, and at different levels of decision-making. The management of urban roads is typically in the hands of local agencies and of interurban roads in the hands of national level public agencies. The longest-standing example of a successful urban road pricing system is in Singapore, a single city-state with, in effect, a single administrative level for deciding and implementing transport policy (Niskanen et al., 2003).

A study by Kalauskas et al., (2009) found that once a road pricing project reaches implementation and planning stages, the three major organisational questions come to the fore:

(1) Who administers the programme?
(2) Who manages and operates the programme?

(3) Who oversees the programme?

The administration of a road pricing programmes includes tasks, such as determining toll rates, issuing bills, and collecting and distributing revenue. Management and operation responsibilities include managing the everyday operations of the initiative and the implementation of appropriate technologies. Finally, the overseeing organisation makes many of the important policy decisions and manages relations between administrative and operating agencies.

According to Persad et al., (2007), there are three main reasons why tolling, or road pricing, is implemented:

- *Finance/Revenue Generation:* To recoup the costs of building, operating and maintaining the facility. Road pricing is becoming a more appealing means of funding transportation, since revenues from federal and state gas taxes have not kept up with growth in demand for infrastructure. Moreover, toll financing allows projects to be built sooner instead of waiting for tax revenues to accumulate.
- *Demand Management:* To moderate the growth in demand on the transportation system, and to encourage more use of public transportation and carpooling. For example, vehicles are charged to enter inner London, England, as a way of regulating the demand in the region.
- *Congestion Management:* To place a price on limited roadway space in proportion to demand. In this application, the toll increases with the level of congestion. In the absence of such pricing, drivers do not appreciate the costs they impose on others because of the congestion they cause.

2.2 Development History in Transport Planning

The concept of road pricing was initially mentioned in the middle of the 18th century. In the United Kingdom, the government commissioned a study into alternative methods of charging for road use between 1962 and 1964. The Smeed Report was the first full contribution of the theory of road pricing to policy implementation, which seemed to be a catalyst of interest in road pricing studies (Smeed, 1964). Subsequently, the first practical road pricing scheme was applied in 1975 through the Area Licensing Scheme (ALS) in Singapore to reduce traffic congestion. Norway is another country that has successfully implemented road pricing. Toll rings were installed to raise revenue for transport projects around Bergen in 1986, Oslo in 1990, and Trondheim in 1991. In 1985, an electronic road pricing scheme was on trial in Hong Kong. In 1988, the Netherlands' government developed a proposal for a road pricing implementation in the region called Randstad. The Swedish government created a proposal for introducing tolls around Stockholm in 1991. In the

United Kingdom, several local authorities, such as Bristol, Cambridge, Derby, Durham, Edinburgh, Leeds, and London, were interested in road pricing, since the central government gave new powers to decide whether they want to implement road user charging and to provide them to use the revenue for investment (Jaensirisak and Ratchathani, 2003).

Toll collection has been documented from the times of the ancient Roman Empire in the 4th century B.C. For nearly 25 centuries since then, until the introduction of Radio Frequency Identification (RFID) and Electronic Toll Collection in the late 1980s, it has been an inherent part of the process for customers to stop in order to pay the toll. ETC dramatically changed that paradigm, as well as much of the very foundation of modern toll collection operations (Gallagher and Worrall, 2005).

While RFID, now known as Automatic Vehicle Identification (AVI), was originally implemented as part of the overall payment mix in existing toll lanes, today's toll authorities are aggressively pursuing the ultimate ETC configuration, namely ORT. Authorities view ORT as a means to achieve maximum throughput, while effectively managing or lowering per-transaction cost. Throughout the industry, significant plans are underway to convert existing facilities or build new facilities that are both free of barriers and toll collectors by exclusively accepting electronic forms of payment. However, ORT is more than just a "super-sized" version of in-lane AVI systems. Much like the transformation to ETC, authorities must understand the business, technical and customer service aspects of ORT in order to achieve a successful balance of increased mobility and customer satisfaction, while successfully managing violations and enforcement (Gallagher and Worrall, 2005).

Klodzinski et al., (2007) established that transportation engineers and planners, through the use of innovative technologies, are seeking alternatives to improve performance at toll plazas and relieve traffic congestion on toll facilities in the United States and worldwide. Improvements have been sought to decrease the time of each toll transaction, so that users experience either reduced delays or no delays at all. This has been done through the introduction of automated payment systems, such as Automatic Coin Machines (ACM) and later, implementing the ITS technology of AVI. Although many toll authorities have already applied AVI by using it in the application of ETC, increasing traffic volumes are prompting toll authorities to seek even better ways of using technology to benefit their customers. The next step in the evolution of integrating ITS technology and toll road operations is the concept of ORT. This toll collection concept combines ETC technology with typical highway travel without the inhibition of passing through a physical plaza structure that separates individual lanes. The use of ETC at highway speeds in toll collection lanes has been referred to as express ETC and can allow drivers to travel at speeds of 55 mph, which is approximately 88.5 km/h or more. Before the concept of ORT, the method for improving operations

at a toll collection facility was adding more service lanes, modifying a conventional, meaning a cash, token, or ticket payment lane to accept ETC, or converting a conventional lane to a dedicated ETC lane, which typically had a speed limit imposed on it.. Now that the general driving population using toll facilities has embraced ETC technology, and the technology has evolved, it can be effectively applied more efficiently and economically. Thus, the advancement of ETC application to develop ORT continues. Although mixed-use lanes, which are conventional toll lanes equipped with ETC technology, and dedicated lanes have been widely used on toll facilities, as the percentage of vehicles equipped with ETC increases, the benefit of ETC decreases in these lanes, owing to increased congestion from recurring bottlenecks at the plaza. ORT eliminates existing plaza barriers and creates a new toll road design that mitigates this congestion. ORT is a fully automated electronic toll collection system in an open road environment, allowing vehicles to travel through toll collection points without deceleration. There are a number of agencies around the world implementing ORT, including Israel, Canada and United States (Klodzinski et.al, 2007).

2.3 The Economics of Road User Charging

Samuel and Poole (2007) argued that traffic congestion is choking our cities, hurting our economy, and reducing our quality of life. They further argued that the successes of tolls are so striking that they should rapidly become an important part of our transportation system. According to Houghton and Atkins (2013), not only can road pricing help manage problems associated with the transport system, but it can also provide a remedy for another key challenge, being how to generate revenue that can be reinvested in road infrastructure and public transport programmes, or allocated to other parts of the economy.

Substantial studies of the economics of road user charging, based on the marginal pricing concept, introduced the simple two-road example and argued that by imposing a toll-tax on a congested road, total travel time would be reduced and encourage the more efficient use of road space, so that society's welfare would be enhanced. Since the cost rises as traffic speed falls, an extra cost is imposed on the average cost of all users when an individual driver is added to a road network. The average cost is slightly higher than before the individual joined, because of the increase of travel time and pressure from other vehicles. A basic representation of the concept is presented in Figure 2.1 below. The marginal cost function can be related to the objectives of the charge. Firstly, if the objective is concerned with only congestion, the marginal cost curve will include the extra cost of delay, which vehicles impose on each other. Secondly, the curve will be different if the objective is also concerned with other external costs, like air pollution, noise and accidents (Jaensirisak and Ratchathani, 2003).

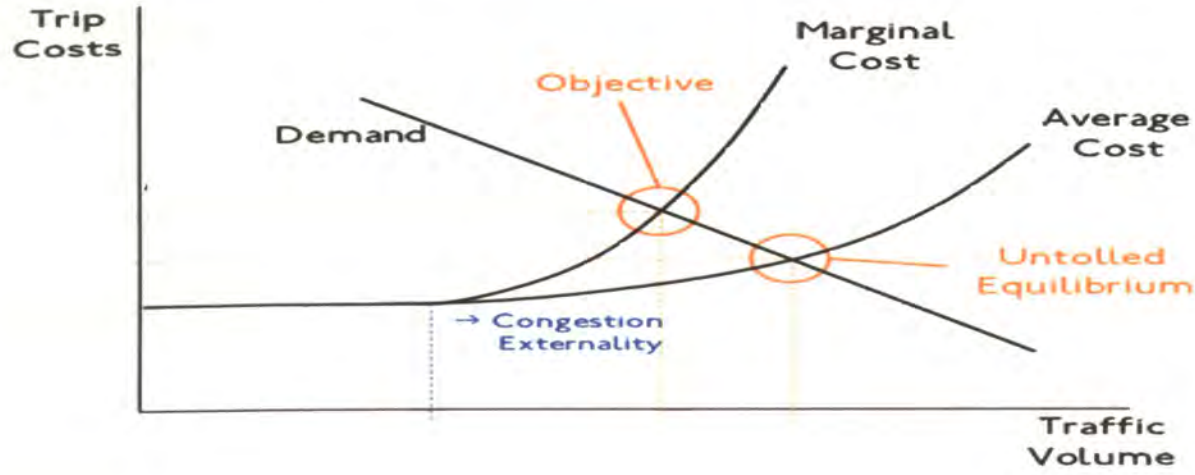

Figure 2.1: The simple economics of road pricing (Jaensirisak, 2003).

The construction of roads has usually been viewed as a socially beneficial activity, thereby justifying the collection of public funds to pay for construction and maintenance. Roads provided the necessary means for trade to occur, and those towns that aggressively built them were more likely to flourish (Klein and Fielding, 1992). According to Kalmanje and Kockelman (2012), roads are arguably the lifeline of most economies. Fast, reliable roads that efficiently move people and goods are vital for sustaining populations and their economic development. Road pricing is the best method of dealing with congestion, and would have far-reaching implications for the viability and quality of public transport, for the finance of urban infrastructure, and ultimately, for the quality of life (Leach, 2001).

Recently, interest has grown in toll roads for a two-fold purpose. According to Klein and Fielding (1992), first, toll collection provides a mechanism for financing construction and maintenance for new roads. In Africa, where budget is a problem, toll roads can offer access to outside financing. Second, recent research has found that technological innovations are increasingly making possible an effective use of time-of-day pricing on toll roads to control and alleviate problems of congestion.

In their studies, Munroe et al., (2006) revealed the following benefits:

- Ensure a high quality road network. In addition to contributing to improved road safety, these toll roads would reduce travelling distances and result in substantial savings to the running costs of the vehicle.
- They represent a fair and precise way of paying for transportation facilities.
- Link user benefits with user fees by charging only users in direct relationship to how much they use the facilities.

- Represent a fair and precise way of paying for facilities. Those who use the toll facilities benefit directly from their payments by enjoying an improved travel option; non-users are not required to contribute for facilities they do not use.
- New electronic toll collection technology will eliminate the inconvenience, delays and concerns associated with drivers having to stop and pay tolls manually.

2.4 The Importance of Revenue Use

Ubbels (2006) noted that pricing instruments may provide governments with stable and significant revenue sources. The distribution of this money is an important consideration in road pricing programme development. He suggested that revenues may broadly be used in three ways, namely:

- They can remain within the road transport sector and therefore benefit those who pay them as directly as possible, such as new road infrastructure investments, as well as the reduction in vehicle taxes;
- Revenues can be used to finance other parts of the transport sector in a comprehensive strategy to deal with particular transport problems. Congestion charging revenues may, for instance, be used to finance a substitute for road transport, such as public transport;
- Revenues can be used to fund general public expenses, in which case there is no hypothecation to the transport sector. This would allow for the reduction of other taxes that are currently used for the public financing of infrastructure, but are largely unrelated to the costs of infrastructure use.

The destination and distribution of the revenues from pricing instruments may affect acceptance levels, but the use of revenues may also be important to the overall efficiency of a scheme (Ubbels, 2006).

2.5 Traffic Congestion: An Economic Market Failure

According to Jimoto (2011), market failure is the situation where the free market fails to deliver on the efficient allocation of resources and results in a loss of economic and social welfare. Traffic congestion is often seen as an example of markets not functioning properly, because personal costs do not take into account wider costs, and externalities occur. An important branch of economic theory attempts to explain potential market failures that arise because of "externalities." The term "externality," is used by economists to denote situations in which the production or consumption of a good has an impact on others that are not taken into consideration in the production or consumption decision (Munroe et. al., 2006). For example, in the case of roads, a

decision by a driver to use the road can impose externalities on other drivers if his or her presence creates congestion and slows the speed at which those others can travel. Given the problems of identifying users and making determinations about who uses the road when and at what price, the costs of these negotiations make a market solution infeasible (Munroe et. al., 2006).

Roosendaal and Verhoef (2006), in their study of basic economic principles of road pricing, concluded that economic distortions in related markets and/or inherent constraints on the pricing instrument itself, call for the use of second-best taxes, namely marginal cost-based pricing in transport.

Coase (1988) argued that externalities are assumed to arise as a result of factors that cause this market failure. A primary cause of market failure is the existence of poorly defined property rights and high transactions costs. As long as no congestion occurs, the addition of another vehicle does not impose costs on those using the road. The second challenge in the case of roads involves transactions costs. The problem of congestion can be eliminated through contracts among parties only if (a) someone is granted the ownership right to the road, and (b) those wishing to use the road can negotiate a price for access.

2.6 Barriers to Implementation

It is difficult to avoid problems when implementing measures that are often considered unpopular, because they dictate a reduction in the use of private vehicles. Pro-motorist groups, political opposition, as well as a great part of the public, oppose road tolling, either because of lack of knowledge, or the existence of vested interests. Even at both national and local governmental levels in the United Kingdom, there is still pressure for capacity expansion over demand management, such as the recent proposals for expansion of some motorways around London, and/or the lack of support for such schemes. By taking on influential stakeholders and creating networks of several diverse groups, it then becomes easier to overcome opposition to implementation. The transport problem is one that affects everybody in some way; whether as individuals or members of a group, each one is affected at a different level. The more people involved in the process of change, the less difficult it becomes. Every successful measure implemented helps solve some of the problems and can help steer it in the right way in a similar situation. Whether it is policy or technology, early choices and decisions affect the way in which future solutions are shaped (Ieromonachou, 2005).

Cleland (1999), as cited in Walker et al., (2008) argued that successful completion of project deliverables is critically dependent upon relationship management skills, among these the need to achieve project objectives that fully address stakeholder expectations throughout the project life-

cycle. However, one major task that needs to be undertaken in developing a project's strategic aims is to identify stakeholders in order to develop a project brief that best addresses their often-conflicting range of needs and wishes.

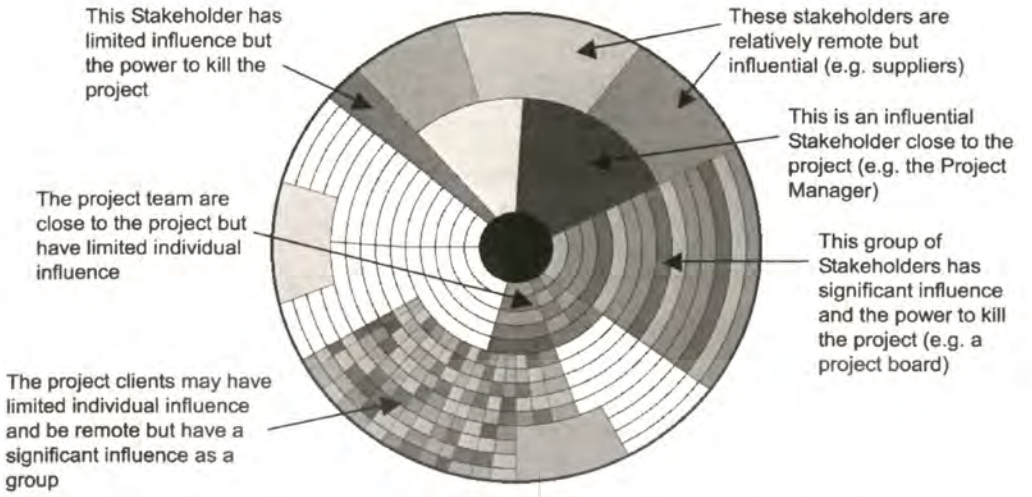

Figure 2.2: The stakeholder cycle (Walker et al., 2008).

The stakeholder circle, as depicted above, is based on the premise that a project can only exist with the informed consent of its stakeholder community, and that managing the relationships increases the changes of project success (Walker et al., 2008).

Even though government legislation suggests the use of preferred measures, each local authority or transport operator, can independently decide on local transport and traffic management issues. The legislation aims at creating environmentally friendly cities, but defines the outcome and not the method. Politicians from many local authorities do not want to risk their position by introducing restrictive measures that lack public acceptance. Local authorities have numerous economic constraints and need to plan their actions carefully. Pioneering new and untested schemes hold many risks. The process towards the implementation of a scheme can also appear as a barrier, because the initial impact of people's acceptance can determine the process from there on. Information diffusion, which is the process of informing the public about the details of schemes, should not be viewed as a barrier, however bad publicity can turn it into one (Ieromonachou, 2005).

This section will outline the barriers that can be categorised into three groups:

(1) Acceptability barriers;
(2) Technological and practical barriers; and
(3) Legal and institutional barriers.

2.6.1 *Acceptability Barriers*

Schuitema and Steg (2008) suggested that the acceptability of transport pricing is assumed to depend on an evaluation of the expected outcomes of these policies, and is therefore defined as an attitude towards transport pricing. On the other hand, May et al., (2010) defined acceptability as the prospective judgment by individuals, interest groups or politicians of a measure to be implemented in the future.

Strong public and political acceptance are perhaps the most important factors in determining whether a road pricing project moves forward or not. While technological, practical, legal, and institutional challenges can be overcome, provided enough popular and political support exists, achieving such acceptance can be a daunting hurdle. The political and financial relationships among agencies at various levels of government, local and between the various political parties can have a significant effect on the policy-decision making process. Rather than being grounded in economic principles, the decision often reflects parochial political interests. Certain justifications for introducing road pricing, such as expanded road capacity, environmental, and safety improvements, are more accepted than others. Another major hurdle in achieving public support is whether the road pricing programme is perceived as equitable and fair. The means in which toll revenues are used plays a large role in justifying the equity of road pricing initiatives (Kalauskas et al., 2009).

Achieving acceptance would require a change in people's knowledge, attitudes and use of different transport opportunities. To enhance the acceptability of the tolling scheme, the objectives must be simple and known to the affected groups, to predict possible barriers and prepare possible solutions and to take into account the views of all the affected groups, such as the community and key political leaders in the planning stages before finalising the scheme design (Kalauskas et al., 2009 and Ieromonachou, 2005).

There is a clear correspondence between public and political acceptability in a democracy where the chances of being re-elected depend on the extent to which voters appreciate the policies implemented. Politicians' perceptions of the public acceptability of transport pricing schemes in particular for their specific voter population may, of course, affect the position they take in transport pricing issues (Ubbels, 2006).

Pridmore and Miola (2011) identified a number of key themes in terms of achieving public acceptability of the different measures. These were drawn, where appropriate, from all of the measures identified, namely pricing measures, alternatives to car-based transport, and the

introduction of new technologies and fuels. This broad approach enables the key barriers and opportunities for change to be identified. The themes are:

- Is there a problem? Will the solution(s) work?
- At which stage in the process is the public being asked?
- Where does the money go?
- Are there wider benefits and impacts?
- Is there trust in those implementing the scheme?
- Is there trust that others will also act?
- How does it align with individual and group norms and values?
- Is it fair?
- Do the media influence opinion?
- Does the public influence the media?

Policies are more acceptable if the public is aware of the negative impacts associated with car use and they understand the need for measures to address these impacts. For example, Pridmore and Miola (2011) argued that acceptability of transport pricing is dependent on problem awareness and the recognition of the need for a far-reaching solution. Acceptability can also be increased by the provision of alternatives and by the use of discounts and exemptions. There is potentially a conflict between pursuit of acceptability, through lower charges and increased use of discounts, and pursuit of effectiveness, which may require higher charges and fewer exemptions. The introduction of complementary policy instruments and the use of road user charging revenue to support such policies are critical to increasing acceptability (May et al., 2010). Referring to Norway's road pricing scheme, Schade and Schlag (2000) noted that the scheme was successful since the scheme was part of an integrated package of policy instruments for urban areas.

Goodwin (2006), as cited in Pridmore and Miola (2011), through an evaluation of a number of road pricing schemes, uses a diagram to encapsulate how public acceptability of road pricing alters over time. See Figure 2.3 below.

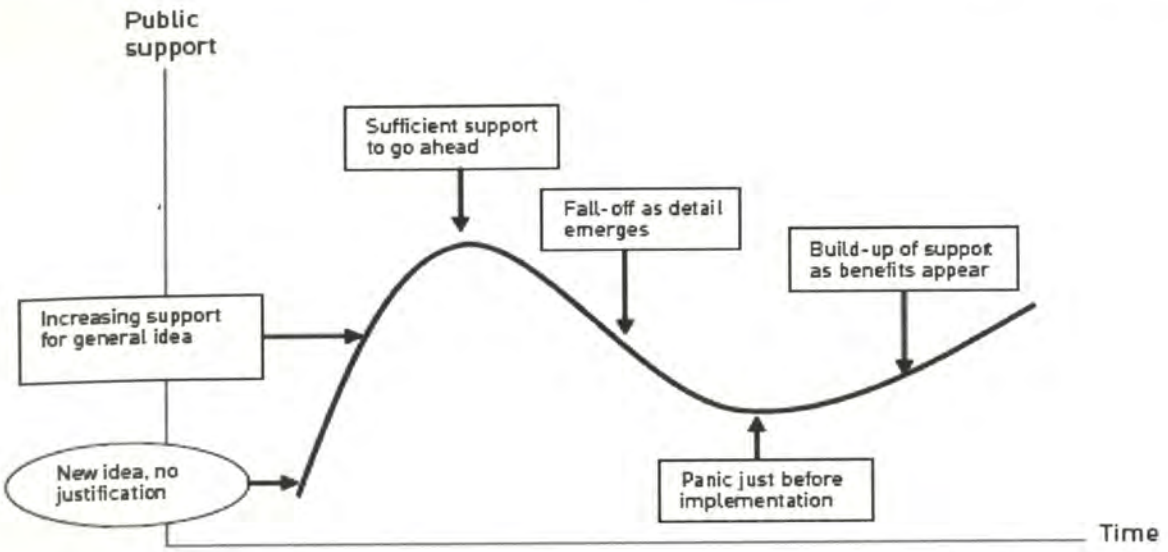

Figure 2.3: Goodwin's cycle of public acceptability (Pridmore and Miola, 2011).

There are three stages to Goodwin's model of acceptability. First is the recognition of a problem and increasing public support for the proposed mitigation measure. Second is the reduction in this support as detailed information about the scheme is forthcoming. Finally, once people have experience of a scheme, thus after a successful introduction, acceptability increases again (Pridmore and Miola, 2011).

For the political process to result in an efficient pricing policy, the decision making process must balance different interests against each other. If unable to do this, conflicting interests and acceptability constraints protecting certain interest groups can therefore lead to inefficient tolling (Westin, 2012).

Schade and Schlag (2003), as cited in Ieromonachou (2005) noted that public acceptability research has produced plenty of valuable information about how to overcome the identified barriers to road pricing. It is interesting to note that raising awareness is highly prioritised by most cities that are considering road-pricing schemes. Ieromonachou (2005) referred to the example in Edinburgh, carried out in 2002, a scheme development and public consultation exercise to establish the type of road pricing measure it would introduce. This was also done to strengthen support from potential stakeholders that would be involved in delivering the scheme to the public.

2.6.2 Legal and Institutional Barriers

Legal restrictions from higher governing bodies, such as federal or state governments, can often impede the progress of road pricing proposals, even if the support is present at the local level. In addition to legislative barriers from higher authorities, contradictory legislation can often hinder

implementation. Additionally, disconnected decision-making structures, multi-level structures of government decision-making processes or the number of administrative levels, and the role of the private sector can determine the efficiency with which a proposal moves towards implementation. The distribution of responsibilities and powers across different governmental administrative levels is often not ideal to manage and move road pricing forward (Kalauskas et al., 2009).

Legal and institutional barriers rarely serve as a long-term impediment to implementation. However, in the near-term, inadequate legislative framework can delay a programme. However, new legislation is frequently developed and passed to support popular projects. Likewise, institutional and organisational structures can be altered to reflect the changing demands of road pricing projects (Kalauskas et al., 2009).

According to Ubbels (2006), institutional barriers may prevent optimal pricing from being attainable. However, institutional barriers may also arise on the regulatees' side, such as automobile associations, labour unions, chambers of commerce. Moreover, these organisations may join forces in their opposition against transport pricing implementation.

Legal barriers may be distinguished as a specific type of institutional barriers, as it may not always be possible to charge the ideal prices based on legal arguments. If congestion is to some extent unpredictable, which it is in reality, for example due to weather conditions or road works, the optimal congestion charge would vary too, not only over the day, but also between days. A legal barrier could then exist that prevents the latter type of variation from being implementable (Ubbels, 2006).

2.6.3 Technological and Practical Barriers

Frequently encountered technological challenges include interoperability issues and reliability of technology on large-scales. Some common practical barriers jurisdictions face includes the complex structure of urban road networks and a lack of space for added capacity in urban areas. While these technological and practical barriers can certainly hinder the implementation of road pricing projects, it is unlikely that with currently available technologies, these would be the sole, or even principal, reason a project failed to move forward (Kalauskas et al., 2009).

Ubbels (2006) suggested that, for realistic road pricing schemes, one would expect differentiation over user classes to be possible only for a crude distinction into passenger cars, vans and trucks, as well as over time up to the level of a few time-intervals during peak times and one level outside it and tolls to be charged on only a few main roads in the network.

Other practical barriers that can be distinguished would be insufficient: knowledge on marginal external cost figures, inadequate transport models and procedures for predicting equilibrium levels of second-best optimal road taxes, and so forth. For these reasons, provided tax levels do not have to be fixed for a long time, it is to be expected that deviations between predicted and actual behavioural responses may lead to the adaptation of initial tax levels (Ubbels, 2006).

2.7 Legal and Regulatory Framework

In reality, political factors influence most economic policies. This problem is not in any way restricted to the transport sector. Other sectors that may suffer from similar constraints in economic policy include, for example, network utilities and polluting industries (Santos and Fraser, 2005).

Yescombe (2007) defined a legal framework as a specific law relating to the project or to concessions in general and would allow a private sector company to charge and collect revenues from users for providing a public-sector service.

Nagawoo (2011), citing Kuramani et al., (1999), noted that legal and regulatory frameworks are one of the least visible aspects of toll road development, but are nevertheless vitally important elements. As in the case of Cambridge, the Council was keen to pursue the development of road charging, but did not have the necessary legal powers to introduce congestion charging at the time. Until recently, local authorities in England and Wales are empowered by Part III of the Transport Act 2000 to introduce Local Congestion Charging Schemes, which includes workplace-parking levies, where this can help to achieve the local transport objectives.

Nagawoo (2011), citing Kuramani et al., (1999), noted the following issues, which are generally included under legal and regulatory:

2.7.1 General need for well-drafted Laws and Regulations

Irrespective of institutional option, well-drafted laws and regulations have proven necessary for successful toll road development. When the private sector is involved in toll road development, concession laws need to be well drafted. The host government must provide the basic legislative and regulatory authority for a given infrastructure project to be built and operated by the private sector. This includes the designation of the individual ministries, government agencies, or local governments authorised to grant concessions. The enabling legislation may be general and enable different types of concessions to be granted, or alternatively, it may be specific and provide for a particular concession. Either approach should be acceptable, provided that, among other things, the right agency is designated as concession grantor and the permitted term of the concession is

sufficiently long so that the concessionaire will be able to build and operate the toll road in accordance with its business requirements.

2.7.2 Bidding and selection procedures

Formalised and transparent procedures for dealing with investors prior to and during the bidding process are required. Bidding should be competitive to minimise the level of government support and reduce residual risk bearing by the government. A clear bidding and negotiation process requires that:

- The need for project requirements to be specified closely, to ensure evaluation is of like-for-like;
- Clearly defined government support measures in the bidding documents, where necessary as a maximum, rather than held back for negotiation; and
- Simple evaluation criteria be in place, for example, bidding at defined tariffs, to meet government policy objectives and to minimise the level of government investment required.

2.7.3 Regulations of Foreign Direct Investment

General laws and regulations concerning foreign investment may provide incentives or disincentives to foreign investment in toll road concessions. Some countries, in pursuit of equity objectives, have adopted a National Development Policy with the aim of securing a significant portion of the ownership of local companies. This policy effectively precludes foreign direct investment, but on the other hand, has helped to develop the domestic private sector.

2.7.4 Currency Issues

The currency used for the pricing of tolls and the ease of its convertibility to foreign currency affects the interest of international investors in toll road projects. To minimise the risk of hard currency investments, some of the toll rate formulas include variables that reflect exchange rate movements. The ability of a foreign-invested highway project to secure adequate foreign exchange payments is therefore subject to risks relating to exchange rates and access and availability of foreign currency.

2.7.5 Dispute Resolution

Although no one hopes for disputes on a Build-Operate-Transfer (BOT) project, the regulatory framework must provide for adequate dispute resolution procedures in event that such disputes occur. Where there is a contract to which a foreign party is a signatory, such as in the case of a

foreign economic contract, it should clearly be stated whether the parties to such a contract can stipulate arbitration either inside or outside the country. While there have been difficulties in enforcing foreign arbitral awards rendered in the country in practice, foreign investors require the country be bound under international treaty to enforce foreign arbitral awards rendered in other jurisdictions. In general, the dispute resolution clauses should clearly spell out procedures for arbitration and dispute resolution in accordance with international law.

2.8 Conclusion

The main theme coming from the literature review is that road pricing is complex and frequently implicates not only economics aspects, but also political aspects. Public views are that road building is a government responsibility, thus, the government should provide the funds for it. Strong public and political acceptances are the most important factors in determining the success of a road pricing project and therefore need to be considered seriously by implementers. To achieve acceptance, a change in people's knowledge, attitudes and use of different transport opportunities, is required. Therefore, it is vital to identify the stakeholder network and involve them in both developing and implementing a policy initiative and also in the decision making process. This also assists in public education on the objectives and benefits of the scheme to be implemented. It is also vital to have a project champion to motivate the learning and acceptance process of getting the scheme into place.

The next chapter undertakes an analysis of the Road pricing case studies

CHAPTER 3: ROAD PRICING CASE STUDIES

3.1 Introduction

This section comprises international studies from the leading European cities and other developed countries in the field of urban road user charging. The objective of this chapter is to provide an overview of how these countries have implemented road pricing schemes. These cities represent different fundamental aspects during the planning and implementation processes of their scheme's policies. In addition, the conditions of these cities to a certain extent are similar to South Africa, more particularly the Gauteng Province. The international case studies in this research study include the United Kingdom, London; Singapore; Sweden, Stockholm; South Korea, Seoul; Hong Kong; Netherlands and United States of America, New York.

3.2 United Kingdom - London

The first proposal for London road pricing was during the 1970s by the Greater London Council (GLC). The charging system was 'supplementary licensing', in which every vehicle was required to purchase a daily licence to drive in the Inner London area (Jaensirisak et al., 2009).

In the 1980s the London Planning Advisor Committee (LPAC) commissioned research into a number of transport strategies. This work concluded that improvement of public transport by itself was not seen as sufficient; there was a need for direct measures to restraint road traffic and to obtain a better balance between the demand and supply of road space. Various possibilities were suggested. Congestion charging was seen as the most favourable (Jaensirisak et al., 2009).

Ieromonachou, Potter et al., (2007) assert that over the years, a number of measures have been implemented to address the traffic problems in London, but none have alleviated it. Litman (2011) noted that before the implementation of the road pricing scheme, the plan was widely criticised by various interest groups, including politicians, motorist groups and some labour organisations. The conservative mayor candidate promised to end the programme, if elected in year 2000. Many newspapers were sceptical or opposed to the scheme, and opponents produced a website, entitled *Sod-U-Ken* to promote their objections.

Leape (2006) noted that congestion charging contributed to achieving four transport policies, namely the reduction of congestion, the improvement of bus services, the improvement in journey time reliability and a better distribution of goods and services. In 2003, Mayor Ken Livingstone introduced a congestion pricing scheme that was applied to central London. After an 18-month

period of extensive public consultation, some observers have argued that it was critical factor in making the scheme publicly acceptable (Leape, 2003).

Jaensirisak, Sumalee et al., (2009) revealed that prior to the implementation of the scheme in London, the government had to modify and approve several legislations to allow for the introduction of a road pricing scheme and enable the local authority to utilise the revenues collected from the scheme in several ways. In addition, on the non-legislative part, several policies at the national level were put forward by the government to encourage and support different cities in applying the pricing policy. For instance, the government offered an advance budget for developing major public transport infrastructures for the cities' planning to implement the policy. They also noted that on the technical side, a congestion charging partnership was set up to regularly promote the idea and provide information on the development and design process of the scheme.

Ieromonachou (2005) noted that a Transport Bill was published in December 1999 and became law in autumn 2000. The bill contained the power for local authorities to introduce road user charging schemes, provided they formed part of an integrated transport plan. He also noted that the government legislation, as evidenced in Transport Act 2004, allows for the introduction of road user charging.

Litman (2011) noted that Mayor Livingstone was re-elected in 2004, largely on the success of the road pricing programme and his plans to expand the pricing zone. He also noted that the scheme had reduced traffic congestion, improved bus and taxi services, and generated substantial revenues. This clearly shows that the objective of the scheme, which is to reduce traffic, had been reached.

3.3 Singapore

Jaensirisak, Sumalee et al., (2009) noted that Singapore has been at the forefront of the development of the road pricing policy, which was started by a low-tech scheme since the 1970's. In 1975, according to Arnold, Smith et al., (2010), Singapore undertook a bold new approach to manage traffic and improve air quality by introducing a fee for vehicles entering the Central Business District (CBD) during the morning peak-hour period. They also noted that since its inception as a prepaid, non-electronic windshield permit, Singapore's road pricing system had expanded and modernised to become the most extensive congestion pricing system in the world. The new technology, Electronic Road Pricing (ERP), was introduced in 1998 and it allows the system to operate with vehicles travelling at full freeway speeds, up to 120 km/h.

Given the governmental structure, authorities could have implemented congestion pricing with little or no public involvement. Instead, authorities carried out a yearlong intense assessment and education programme. They responded to public reaction by adjusting the pricing programme before implementation (Arnold et al., 2010 and Jaensirisak et al., 2009).

Richmond (2008) noted that policies on road pricing gives Singapore almost free-flow roads and clean air, making the city-state the antithesis of the polluted, traffic-choked cities common elsewhere in Asia.

It should be noted from the experiences of Singapore that the road pricing scheme is successful, because the system is a part of a policy package, including factors, such as the substantial improvement of public transport, high parking charges and additional registration fees, and vehicle quota systems. Singapore can easily implement the 'stick' policies, because there is no political problem; the government is strong and its people believe in the government's policies. Moreover, surprisingly, the restraint policies have no major negative side effect on economic growth; on the contrary, they have generated substantial funds for the improvement of social welfare (Jaensirisak et al., 2009).

In addition to the ERP system, congestion management also addressed through multimodal transportation investments as alternatives to driving, parking management systems to facilitate identification of available parking, and national quotas that cap increases in vehicle ownership. Highly integrated land use and transportation planning also support congestion management objectives (Arnold et al., 2010).

3.4 Sweden - Stockholm

Arnold et al., (2010) noted that congestion pricing has been on the political and planning agenda in Stockholm for over twenty years. During this time, numerous feasibility studies were carried out and pricing proposals were modified and abandoned. He also noted that the road pricing system for Stockholm was proposed in 1991 and the objective was to manage congestion and also promote transit and protect environment. However, in 1997 the proposal was suspended by the government because of political problems and opposition by the business community (Jaensirisak, S., et al., 2009).

In 1999, a new study of road pricing for Stockholm was carried out by the Swedish Institute for Transport and Communications Analysis (SIKA), a governmental agency. It was claimed that road pricing would be able to reduce the number of private cars struck in the morning peak period by

90-95%, compared to the current situations, and to decrease car traffic in the Stockholm region between 1998 and 2010 by 9% in the morning peak time (Jaensirisak, S., et al., 2009).

Jaensirisak, S., et al., 2009 also noted that on 2 June 2003 the Stockholm City Council passed a decision to conduct a trial implementation of environmental charges in the Stockholm inner city zone, about 47 square kilometres.

Before the demonstration, public support for the pricing scheme was at 25%. After the demonstration, public support from Stockholm's residents voting in the referendum was more than 50% in favour of reinstating the congestion pricing. The referendum counted only Stockholm residents who realised the most tangible benefits of congestion pricing coupled with significant investments in transit (Arnold et al., 2010 and Jaensirisak et al., 2009).

Finally, the government succeeded in implementing the current scheme on a trial basis in 2006 and then on a permanent basis in 2007. Sequencing a referendum vote after the trial concluded was instrumental in garnering public support. The intervening period saw much public consultation, education and outreach effort (Arnold et al., 2010).

At the national level, the Ministry of Finance proposed a congestion tax bill on April 28, 2004, transferring responsibility for procurement, technical solutions, and other implementation to the Swedish Road Administration. This bill was adopted by the parliament on June 16, 2004 (Jaensirisak and Ratchathani, 2003).

Åkerman et al., (2011) noted that the revenue from congestion charging was initially intended to be used for the improvement of public transport. However, the new government in Stockholm, which was opposed to congestion charging, changed this and decided that the revenue should instead be used for building roads. According to Eliasson et al., (2009), the congestion charge is made deductible from the income tax, which may reduce the effective tax rate by up to 57%, but on average, probably much less. The tax exemption for taxis has been abolished, while it is to be kept for eco-cars for a period of five years.

3.5 South Korea - Seoul

Jaensirisak et al., (2009) stated that Seoul has experienced a rapid growth in car ownership since the 1980s, leading to serious congestion problems. Several self-financed expressways were commissioned to relieve the pressure on the existing road network. These authors also noted that the objectives of this implementation are three fold, namely reducing low occupancy vehicles,

raising revenues for transport-related projects, and assessing the effectiveness of the pricing technique.

Before the implementation, the Seoul Metropolitan Government started a campaign to spread information in Seoul to raise the awareness of the congestion problem, particularly through the Namsan tunnels. The campaign also promoted participation and communication between the public and the authority to ensure the acceptance of the new policies (Jaensirisak et al., 2009).

In order to implement congestion pricing, proper legislation had to be in place. The relevant congestion pricing collection ordinance in Seoul was enacted in 1996. The ministry of construction and transportation amended the Urban Traffic Re-adjustment Promotion Act to enact the congestion pricing collection ordinance, and this ordinance can be amended again as the occasion demands (Strategies-APEIS, 2009).

According to Strategies-APEIS (2009), on July 1, 2004, the Seoul Metropolitan Government introduced a wide range of reforms to its public transport system. Among others, it completely re-organised bus services, installed the Bus Rapid Transit (BRT) corridors, improved co-ordination of bus and metro services, and fully integrated the fare structure and ticketing system between routes, as well as modes.

3.6 Hong Kong

Jaensirisak, S., et al., (2009) asserted that Hong Kong has been trying to discuss and plan a road pricing scheme for several decades but without any success yet.

In 1982, a number of measures have been implemented to address the traffic problems in Hong Kong, but none yielded desired outcome. In response to this failure, in 1983 the Hong Kong government decided to commission a 2-year investigation of the viability of introducing a road user charging scheme using an ERP (May and Sumalee, 2005).

May and Sumalee (2005) also noted that in March 1985, after the success of the technological trial and the potential positive outcome of the ERP, the Hong Kong government decided to consult the district boards, which represented the public.

The government faced two main arguments: the need for road pricing given the scale of the congestion problem and the potential for invasion of privacy. In early June 1985, the proposal of the ERP was unanimously turned down by the district boards (May and Sumalee, 2005).

Hau (1990) listed some the following as reasons for the failure to implement the scheme:

- A poor time for the scheme to be considered due to other infrastructure developments such as Island Line, which were also designed to ease congestion;
- There was an economic downturn at the time of the Study that raised concerns over the addition of another perceived tax on the road user;
- There was strong objection against the possible invasion of privacy resulting in a low level of public acceptability;
- Some thought ERP was unnecessarily expensive;
- The scheme was introduced at the most sensitive time, shortly after the initialling in December 1984 of the Sino-British declaration, under which Hong Kong was to be handed over to China in 1997;
- The government did not succeed in effectively selling the scheme to the public;
- The government could have made information regarding the scheme more publicly accessible for comments and discussion;
- Some transport specialists noted that the use of the patented ERP technology would be tantamount to exporting employment to the United Kingdom.

The White Paper on Transport Policy was released in January 1990 after the end of the public consultation period. The government decided against introduction of the ERP and citing it as a long term option to reduce congestion while monitoring the latest developments in area pricing technology (Hau, 1990).

In 1994 the government revived the idea of tackling traffic congestion by road pricing. The government commissioned a major feasibility study, which began in March 1997, with the objective of examining the practicality of implementing ERP in Hong Kong. To rectify the failure of the first proposal, there was a well-planned public consultation program to allow public input into the development of the scheme. Technology trials were conducted in late 1998 with both the dedicated short-range communications (DSRC) and the vehicle positioning system (VPS) based on the Global Positioning System (GPS). The results showed that both DSRC and VPS could be adopted in Hong Kong and that the privacy issue could be overcome. However, in 2001 the government concluded that on the basis of the feasibility study report in 1999 there were no transport and environmental grounds to justify ERP. Therefore, the government decided not to pursue the implementation of the ERP, despite the promising results of the technological trials. Although the technological barrier in relation to the privacy issue has been overcome, the question of the political and public acceptability of ERP remains (May and Sumalee, 2005).

3.7 Netherlands

Solehmainen (2011) assert that the rapid increase in car ownership and in traffic demand has escalated to road congestion, especially during peak hours in Netherlands, especially in the Randstad area (cities of Amsterdam, The Hague, Rotterdam, and Utrecht).

During the late 1980s, the Dutch government developed a road pricing proposal as a policy measure, to manage travel demand and raise revenue to finance transport project (Jaensirisak and Ratchathani, 2003).

Jaensirisak and Ratchathani (2003) noted that the proposal was rejected in 1990 because of public concerns about technical feasibility, invasion of privacy and prevention of traffic spilling over to local streets.

In 2001, new charging scheme was proposed by the Dutch Ministry of Transport, Public Work and Work Management, in 'The National Traffic and Transport Plan' proving a vision for traffic and transport in 2020. It included the mileage charge scheme, in which private cars would be charged a per-kilometre fee for using their cars in the Randstad area. This was based on the principle "the more you drive the more you pay". The charges will include environmental tax and vary with peak and off-peak periods. The scheme was expected to be introduced around 2010 (Jaensirisak et al., 2009). However, the current government has cancelled these plans (Overdevest, 2011).

3.8 New York-USA

In 2007, New York's Mayor proposed a congestion pricing scheme for his city to alleviate congestion problems. Furthermore, the mayor devoted himself to a "greener, greater New York". These developments resulted in his 2007 proposal and the proposal showed similarities with the successful London's pricing scheme (Schaller, 2010).

Bloomberg's proposal was introduced in the State Legislature in June 2007 without taking action. In mid-July, under pressure from politicians and other stakeholders, the Legislature reconvened and created a 17-member Traffic Congestion Mitigation Commission to evaluating different approaches to traffic congestion in the central part of Manhattan. This included both pricing and non-pricing approaches, and making a recommendation to the Legislature by January 31, 2008 (Schaller, 2010).

Schaller (2010) noted that during the fall of 2007 and January 2008, the Traffic Congestion Mitigation Commission held 14 public hearings on the Mayor's plan and alternatives. This committee recommended several modifications, mainly to simplify the operations and reduce the implementation costs. The strongest oppositions came from areas outside Manhattan, as these commuters would have to pay the full fee. Despite extensive support, the proposal was rejected in the State Legislature. As the required legislation had not yet been reached when the deadline for federal funding passed, the congestion proposal for New York could not be implemented (Overdevest, 2011).

Schaller (2010) noted that payments could be made through an electronic tolling system, or through cash and credit card payments. He further noted that the entire revenue was aimed to be invested in transportation improvements.

3.9 Conclusion

It is clear from the above experiences of the international countries that policies, clear objectives, effective public outreach, and enhancement of public transport before implementation are key factors in the scheme's success. Stockholm, however, had a different approach compared to the other schemes in that they started with a trial prior to the public referendum. Thereafter, the majority voted in favour of the permanent status of the scheme. The lessons learnt from the international studies aided in identifying the lifecycle, as illustrated in Figure 2.4 below, and the critical factors involved during the planning and implementation phases of a road pricing scheme.

Jaensirisak et al., (2009) revealed that once the government suggests or raises road pricing as a possible solution for the city, the lifecycle of the policy moves from the initial phase to the design phase, which also gradually increases the perception of the likelihood and inevitability of the scheme. They indicated that during the initial phase, the public may not really pay a close attention to the continuous discussion, since they may perceive this as an idea far removed from reality. Thus, the opposition level and acceptability problem may not be so high, but may also have no strong support. When the process moves to the design phase, if the outcome or impact of the scheme is still uncertain, many oppositions, or stakeholders will eventually come out to strongly criticise and oppose the policy. Consequently, the acceptability level will decrease rapidly. Jaensirisak et al., (2009) have also noted that many cities have abandoned the scheme at the initial or design phases to avoid the public confrontation and political damage. London and Stockholm had been back and forth between these two phases before successful implementation.

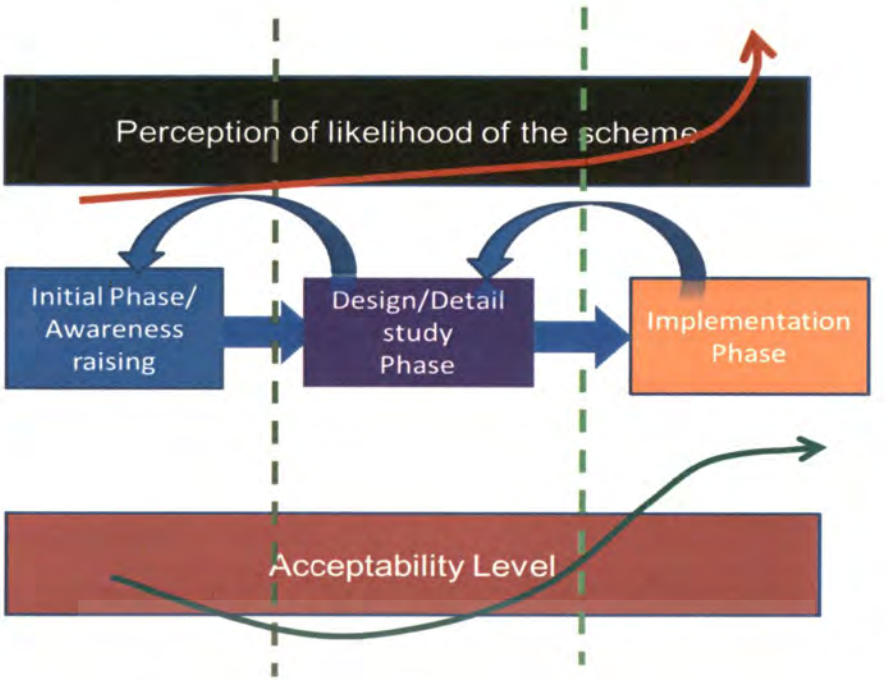

Figure 2.4: Lifecycle of road pricing policy development (Jaensirisak et al., 2009).

Prior to the implementation phase, there are two prior phases, namely the initial phase and the design phase. The initial phase is to raise the awareness of the public on road pricing. The design phase is mainly to study the detail of the system design (Jaensirisak et al., 2009).

The next chapter undertakes a discussion on the research methodology of this study.

CHAPTER 4: RESEARCH APPROACH AND METHODOLOGY

4.1 Introduction

The purpose of research methodology is to provide a sound platform for the author to achieve the aims and objectives of the study. This study follows a qualitative research approach. This chapter highlights the chronological order of the research methodology, as well as the discussion on how the research methodology will be conducted in order to achieve the objectives of this research. It is also important in obtaining relevant primary data from the selected group. Subsequently, an analysis is conducted to study the data obtained from the respondents and finally, based on the obtained results, a conclusion is derived.

4.2 Research Methodology

Kaplan and Maxwell (2005) noted that the goal of qualitative research is to understand issues or particular situations by investigating the perspectives and behaviour of the people in these situations and the context within which they act. To accomplish this, qualitative research is conducted in natural settings and uses data in the form of words, rather than numbers. Sandelowski (2000) noted that researchers conducting qualitative studies want to collect as much data as they can that will allow them to capture all of the elements of an event that come together to make it the event that it is. When undertaking their studies regarding the feasibility of the GFIP tolling scheme, both Gabriel (2011) and Malahleha (2011) employed the qualitative approach.

The fact that a qualitative approach allows for the studying of people in terms of their own definition of the world, makes this a relevant approach to this study, since the participants in this study discuss their own understanding around the factors that hamper the implementation of road pricing in Gauteng (Mouton, 2001).

Mouton (2001) stated that the weakness of the qualitative approach is that the participants can be biased in their responses. However, following this approach, bias in the study is not a weakness, as the study focuses on the implementation of road pricing and the perceptions of the participants regarding the barriers to implementing road pricing, and not what they think the barriers are in South Africa in general. In other words, the intention of this study is not to generalise the findings to be representative of every other group or even any other department within the Gauteng Province. This study employed semi-structured interviews, archival, and structured questions to collect primary data from officials and stakeholders of both SANRAL and Gauteng residents in an attempt to answer the research questions.

The next section provides a discussion of the research design followed in this study.

4.3 Research Design

It is vital to provide a definition of research design. Leedy and Ormrod (2005), as cited in Gabriel (2011), defined research design as 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.

The differences between quantitative and qualitative research approaches had to be fully understood before finalising the best approach method. 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.

	QUALITATIVE	QUANTITATIVE	APPLICATION TO THIS STUDY
1. Purpose of the research	• Describes and explain. • Explores and interprets. • Build theory from the bottom up.	• Seeks explanations and predictions. • Establishes, confirms and validates relationships. • Develops generalisation, which tests and contributes to theory.	• To define and explain the GFIP tolling scheme. • To interpret and analyse information about the implementation of the scheme. • To explore and understand theories, approaches and international literature best.
2. Nature of the research process	• Holistic process. • Focuses, designs, measurement methods and interpretations develop change during the study. • Researcher interacts with participants. • Information, patterns and theories are context bound. • Variables emerge from the data.	• Concepts, variables, hypothesis and measurement methods are defined and do not change. • Objective measurement of variables. • Remain detached and reach unbiased conclusions.	• Holistic research approach to the problem. • Subjective measurement of variables. • Researcher interacts with participants. • Data collected is context bound. • Variables and themes emerge from the data.
3. Type of data	• Textual and image based, verbal and non-verbal. • Informative, small sample selected.	• Numeric data. • Representative and large sample.	• The data collected in this study will be textual and non-verbal, including photos, documents and interview comments. • Small sample of informative people will be subjectively selected, based on their knowledge of the GFIP scheme. ***The type of data to be collected in this research study best suits data in qualitative.***
4. Data collection methods	• Loosely structured, non-standardised observations and interviews.	• Standardised instruments.	• This research study will involve collecting information regarding the GFIP scheme and other similar schemes worldwide and analysing this information. • Interviews will be conducted. ***The qualitative data collection methods are best suited to this research study.***

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

Table 3: Research design analysis (Gabriel, 2012).

The research problem in this study is best suited to the qualitative research approach, as clearly seen in the analysis of the best research design in Table 3, demonstrated above. Golafashani (2003), as cited in Bashir, Afzal et al., (2008), described qualitative research as using a naturalistic approach that seeks to understand phenomena in context-specific settings, such as real-world settings in which the researcher does not attempt to manipulate the phenomenon of interest and only tries to unveil the ultimate truth. Kaplan and Maxwell (2005) noted the strengths of qualitative methods, which primarily relate to the understanding of a system's specific context of development

and use, the ways developers and users perceive the system, and the processes by which the system is accepted, rejected, or adapted to a particular setting.

3.3.1 Case Study

There are many different conceptions of what the term 'case study' refers to. The meaning of the term has also been used inter-changeably with that of others – notably with ethnography, participant observation, and fieldwork. Furthermore, the use of case study is not restricted to the research context (Ieromonachou (2005).

Yin (1984) cited by Noor (2008) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. He also noted that case studies have been criticized by some as lack of scientific rigour and reliability and that they do not address the issues of generalize ability. However, there are some strengths of case study. For example, it enables the researcher to gain a holistic view of a certain phenomenon or series of events and can provide a round picture since many sources of evidence were used. The other advantage is that it enables a researcher to closely examine the data within a specific context study (Zainal, 2007).

Zainal (2007) noted that although case study methods remain controversial approach to data collection, they have been an essential form of research in the social sciences and management. He also noted that in addition, there are also other areas that have used case study methods extensively, particularly in government, management and in education. He referred to studies conducted to ascertain whether particular government programmes were efficient or whether the goals of a particular programme were reached.

Case study method has always been criticized for its lack of rigour and the tendency for a researcher to have a biased interpretation of the data (Zainal, 2007). However, one way to establish the construct of validity and reliability of a case study is by the use of multiple sources of evidence (Ieromonachou (2005). This was also confirmed by Baxter and Jack (2008) citing Patton (1990) and Yin (2003) who described case study research as the use of multiple data sources, a strategy which also enhances data credibility.

Unlike strictly quantitative research and specifically directed experiments, case studies aim to provide as complete an understanding as possible of a problem or situation that requires a holistic understanding. Case study is the investigation of the particularity and complexity of a single case,

coming to understand its activity within important circumstances. By their nature, case studies or qualitative methods in general produce a wealth of detailed information; this is partly due to the number of sources of information utilized. In designing qualitative evaluations, of which case studies are just one example, several methodologies exist, both for carrying out the investigations, undertaking analysis and critically in choosing the sample (Ieromonachou (2005).

According to Baxter and Jack (2008), this approach has the potential to deal with simple through complex situations. It also enables the researcher to answer "how" and "why" type questions, while taking into consideration how a phenomenon is influenced by the context within which it is situated.

A descriptive case study was used to enable the researcher to gain a holistic view of the process followed to implement the scheme.

4.4 Method of Data Collection

The most important principle of qualitative data collection is that everything is potential data. The evaluator does not rigidly restrict the scope of data collection in advance, nor use formal rules to decide that some data are inadmissible or irrelevant (Kaplan and Maxwell, 2005).

This research paper has been compiled with information from archive documents, questionnaires and more importantly from structured interviews with SANRAL informants. Interviews were done in a rigorous and consistent manner and were characterised by using a set of structured questionnaires to act as a framework for discussion. Further communications via a follow-up e-mail were also performed to clarify and update specific issues. The three data gathering techniques used in this study, namely structured interviews, archive documents and survey questionnaires, served as a basis for data triangulation (Zainal, 2007). For the survey questionnaires, a snowball sampling procedure was employed. The snowball strategy is a form of purposeful sampling in qualitative research that typically proceeds after a study begins and occurs when the researcher asks participants to recommend other individuals to be sampled (Creswell, 2012).

4.4.1 Triangulation

Kaplan and Maxwell (2005) define triangulation as the process where researchers employ more than one source of data and more than one method of data collection, which allows findings to be strengthened by cross validating them. Roe (1998), as cited in Ieromonachou (2005), stated that triangulation is most appropriate when issue complexity and uncertainty is high. The research complexity and uncertainty in this research emerges from the factors of implementing the principles of sustainable transport policies.

Clark et al., (2008) stated that researchers using this approach directly compare quantitative and qualitative forms of evidence to corroborate results or identify discrepancies between data sources or to use one form of evidence to expand on the results of the other. Together, the data gathering methods used in this study evaluated the validity of results.

The interview questions and survey questionnaire, as well as the subject areas used for data collection are listed in Appendix A and B.

4.5 Data Analysis Method

Interpretive researchers attempt to derive their data through direct interaction with the phenomenon being studied. An important aspect of data analysis in a qualitative case study is the search for meaning through direct interpretation of what is observed by themselves, as well as what is experienced and reported by the subjects (Thomas, 2010).

Data obtained from survey questionnaires, archive documents and structured questionnaires is analysed to understand the implementation of the project. Responses will be collated on Microsoft Excel program and coded to assist in the analysis using inductive reasoning. The spreadsheet will be tested for validity and the results will be tabulated and graphically presented using the frequency distribution. All relevant questions on the questionnaire will be related to the objectives of the study.

4.6 Validity, Reliability and Ethical Consideration

Research methodology needs to consider issues of validity, reliability and ethical consideration. Collis and Hussey (2009) defined validity as the extent to which the research findings accurately represent what is really happening in the situation. In his explanation, Joppe (2000), as cited in Bashir et al., (2008), indicated that validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. To increase the validity, the research compared participants' findings with what the literature has said on barriers that could hamper the implementation of a road pricing project.

Bashir et al., (2008) define reliability as a concept used for testing or evaluating quantitative research. To ensure reliability in qualitative research, the examination of trustworthiness is crucial. Joppe (2000), as cited in Bashir et al., (2008), defines reliability as the extent to which results are consistent over time from an accurate representation of the total population under study, and if the results of the study can be reproduced under a similar methodology then the research instrument is considered reliable. In other words, it is the extent to which an experiment, or any measuring

procedure, yields the same result on repeated trials. In this study, the research process was well documented and all the interview recordings are available for any future research. Therefore, to ensure reliability, the research findings on barriers were analysed in relation to the literature review.

O'Brien (2001) noted that since action research is carried out in real-world circumstances, and involves close and open communication among the people involved, the researchers must pay close attention to ethical considerations in the conduct of their work. Winter (1996), as cited in O'Brien (2001), lists a number of principles to be followed:

- Ensure that the relevant persons, committees and authorities have been consulted, and that the principles guiding the work are accepted in advance by all;
- All participants must be allowed to influence the work, and the wishes of those who do not wish to participate must be respected;
- The development of the work must remain visible and open to suggestions from others;
- Permission must be obtained before making observations or examining documents produced for other purposes;
- Descriptions of others people's work and points of view must be negotiated with those concerned before being published; and
- The researcher must accept responsibility for maintaining confidentiality.

Orb et al., (2001) concluded that ethical principles can be used to guide the research in addressing the initial and on-going issues arising from qualitative research in order to meet the goals of the research, as well as to maintain the rights of the research participants.

4.7 Conclusion

This chapter has explained the structure and use of the case study method, which is a qualitative approach. The research methodology employed in this study was discussed in this chapter. The strategy followed and the different data collection methods employed was also discussed. The four methods employed namely interviews, archive documents and questionnaires and the case study, for the purposes of this study assisted in collecting the required data. Lastly, data analysis and measures for ensuring validity, reliability and the ethical considerations of this study were also discussed.

A total of 48 Gauteng road users participated in this study. The next chapter presents the findings structured around the research objectives addressed in this study.

CHAPTER 5: RESEARCH RESULTS AND DISCUSSION

5.1 Introduction

The results from the SANRAL informants' interviews, followed by the survey questionnaire are presented and followed by those from transport organisations. The survey developed for this research study is aimed at road users in the Gauteng Province, South Africa. A total of 70 road users were requested to participate in this research study. However, 48 road users responded to participate in the current study. The participants' views were collated on an Excel spreadsheet and coded to assist in the analysis process. The questions on the questionnaire were categorised with respect to applicability to the objectives, and this can be accessed in Appendix C. The frequency distribution was computed for each question. An analysis of the respective questions is discussed below. This analysis was done to either verify or dispute the objectives supporting the research question.

The survey is conducted via multiple-choice questions using the Likert Scale to solicit input from the road users in Gauteng as suggested by Cooper and Schindler (2001). Likert scales are commonly used to measure attitude, providing a range of responses to a given question or statement (Jamieson, 2004). Archive documents from transport organisations, including the private sector's stakeholders, as well as political and trade unions were retrieved.

The coding on the frequency distributions is related to the questionnaire analysis, as follows:

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

The formal survey questions and details are attached as Appendices A and B. The following describes the questions asked in the interviews and survey, and comprises an analysis of the data.

This chapter concludes with the comparison of the international case studies as discussed in Chapter 3.

5.2 Interview Questions and Response (SANRAL)

SANRAL, as the primary respondent, was requested to evaluate the scheme against the best practice of an ideal pricing scheme. The responses were captured telephonically and a confirmation e-mail was forwarded to the respondent for editing. Below is a list of the questions that were posed to the respondent and the responses received:

5.2.1 *In general, explain SANRAL's rationale concerning the introduction of e-tolling.*

The initial Gauteng freeways were under severe congestion, mainly attributed to traffic growth that emulated from the growing economy. Congestion on the freeways was a function of insufficient peak capacity, which means the full volume of traffic could not be adequately handled by the current system. Ultimately, the level of service to the motorists dropped significantly. In order to improve this level of travel demand and influence travel patterns, a better road network was necessary to stimulate the development potential in Gauteng.

The Open Road Tolling Project, known as the GFIP, was then given the go ahead by South African Parliament in 2007, with the understanding that the cost of the system would be recovered from the road users. This followed years of debates within government circles in the Gauteng Province on how to implement user-based road charges. Following preliminary system planning, the state produced a report for use in public consultation forums in September 2006.

5.2.2 *Given SANRAL's rationale, explain the main objectives supporting this rationale.*

SANRAL's rationale is to provide an interconnected network of inner and outer ring roads as a viable solution with the expectation to alleviate traffic congestion. Facilitation of the free-flow nature of the proposed solution in the form of e-toll is to alleviate the traditional toll booths that work on the basis of stopping traffic flow for the payment of travelled road sections.

5.2.3 *Based on SANRAL's rationale, what are the benefits of the e-toll?*

- Improves economy;
- Reduces the amount of time spent on the road;
- Provides free-flowing traffic along the route and assists in eliminating congestion;
- Improves the environment and reduces the amount of carbon emission, as there is less time spent on the roads;
- Improves motorist safety and security along the route, as the facility is a free-flowing collection system along an open road; and
- Roads are monitored and road-user assistance along the tolled road network is improved in emergency situations.

5.2.4 How will the raised revenue be utilised? In answering the above, please clarify the costs of, "collections" versus consumer income?

The revenue would be used for paying the debt, operations, maintenance, as well as assisting in further upgrades and expansions.

5.2.5 There is a criticism that huge amounts of toll revenue will leave South Africa through Kapsch. What is your comment on this?

Even though Kapsch is an Austrian company and owns 85%, they pay tax in South Africa. Further, 99% of their staff is South Africans. Kapsch will only get dividends if ETC, the South African company, makes a profit and therefore, the criticisms are unfounded.

5.2.6 Who were the stakeholders in the implementation of the scheme?

- Inter-governmental workgroup (National, Provincial, Metropolitan and District Municipalities) was set up and chaired by the Department of Transport to determine and agree to project objectives and principles;
- General public (AA, BUSA, Afriforum, RFA, SAVRALA, and so forth); and
- Political parties.

5.2.7 How where they engaged during the project and what was their initial reaction?

- Firstly, the re-affirmation of the user-pay principle and the process of engagement was focused on the various options available to implement this established principle.
- Secondly, a public stakeholder engagement process was put in place. While it was recognised that a physical engagement with every member of the public was not possible, everyone was given an opportunity to contribute.

The first concern was that the toll tariff was too high. The second concern was the allocation of the "raised revenue." In general, the majority did not want the user-pay to be adopted due to lack of information, citing that they were already paying the fuel levy and also paying VAT, thus seeing it as a "double taxation."

5.2.8 How was their level of commitment?

Initially, they did not seem to take the scheme seriously. During the construction stages, no one asked questions, but waited until tariffs were announced in February 2011 and when the system was about to be implemented, they then formed an organisation called the Opposition to Urban Tolling Alliance (OUTA) to spearhead a court battle against the e-tolling system. Due to the formation of this organisation, the e-toll system delayed for almost two years.

5.2.9 What was the critical feedback you obtained from them and the actions taken?

- The model used to calculate the toll tariff was questioned;
- Resistance in supporting the scheme;
- The utilisation of the fuel levy, or ring fence the fuel levy;
- Improvement of public transport to provide alternatives for travelling;
- Impact of the system on municipal road infrastructure; and
- More meaningful, transparent and regular consultations between transport stakeholders and government.

On the request of the Gauteng government acknowledging the public outcry over the tariff finalisation process, the Steering Committee was formed. The Minister agreed to put the process on hold, subject to the formation of a Steering Committee that would revisit the proposed tariff, implement a broad consultative process and also explore the possibilities of increasing the public transport offering, to provide more options and ease the burden on the commuter. Concerning transparency, SANRAL has adhered to the process stipulated by its mandate and there has been transparency during the consultation process.

5.2.10 Were there any measures put in place to encourage the support of the project?

- Public transport operators can apply for exemption;
- Those who registered for e-tags would receive a 40% discount on the tariffs; and
- Travel demand management, such as alleviating and controlling traffic, especially during peak hours.

5.2.11 What were the barriers experienced in implementing this scheme?

The barriers were public and political acceptance.

5.2.12 What are the laws and policies that governed SANRAL to implement the tolling in South Africa?

Regarding the laws:

- *The South African National Roads Agency Limited and National Roads Act, 1998*

The Act promotes the Agency to declare any specified national road or any specified portion thereof, including any bridge or tunnel on a national road, to be a toll road with the Minister's approval.

- *National Land Transport Transition Act, 2000 (No. 22 of 2000)*

The Act states that an appropriate measure aimed at managing the transport demand must be identified and analysed. It further states that measures that prove to be practical and economically and financially feasible must be further developed for implementation. Therefore, based on these conditions, tolling is covered by this Act.

- *National Land Transport Strategic Framework, 2006-2011*

This document addresses tolling-related issues. The document states that a revised and prioritised strategic countrywide road network must be identified and be managed by appropriate institutions in the national, provincial and municipal spheres of government. This paper further states that the road network will be needs-based and it must support development priorities and may include some toll roads where they are financially viable and where they can contribute substantially to the funding of sections of the network.

- *White Paper on National Transport Policy, 1996*

This document sets out a number of relevant policy principles. The transport system will aim to promote sustainable economic development and proves the catalyst for private investment, be structured to encourage public passenger transport and to discourage excessive private passenger transport in urban areas, be financed through a combination of user charges and private/public sector investments, provide adequate accessibility together with safety and security within the constraints of social affordability, incorporate technological advances that promote and enhance the role of transport in the economy and development, and be structured to ensure environmental sustainability and internationally accepted standards.

Regarding the tolling policy:

- Have other options to finance the project been explored and if so, what are those?

The implementation of a provincial fuel levy was an option. However, it was found that it is not a viable and sustainable solution as a financing mechanism for the GFIP. The other option was to fund the project through tax-based revenues. This option also not viable since our tax base is limited. The National Treasury is responsible for funding the non-toll portfolio of the road network, which forms 84% of SANRAL's business. Subsequently, only 16% of the road network is currently tolled. The tolling of roads, thereof, is limited to a cap rate of 20% of the national road network.

- Why was the user-pay principle preferred?

The national road fiscus allocation is limited and more priority is placed on addressing other social needs, such as education, health, social grants, housing, and so forth. Given this challenge and because South Africa's road infrastructure requires substantial and urgent investment, SANRAL chose the user-pay principle, so that it can provide these more promptly and also to maintain a high quality road network, while contributing to improved road safety and generally shorter travelling distances.

5.2.13 How has SANRAL optimised the use of international practice of road pricing schemes?

We undertook a study tour of e-toll systems in North America, Chile, the United States, Australia and some European countries. We looked at the implementation, teething problems during such implementation and current operation, especially with regard to the environmental, economic and social impact. We asked these countries if their current scheme was achieving its set objectives and also what improvement can be made. Taking cognisance of the challenges encountered from the deployment to operation phase and also learning from their experience, we have adopted the ORT, known as the e-toll. Based on these international experiences with their scheme in operation years, the Gauteng e-toll system can be successful. Lastly, with the issue that the tariff is too high, a comparison with those countries whose similar schemes were implemented during the last 10 years was done and proved to be comparable, as can be seen in Table 5 below.

Table 4: The GFIP toll tariffs comparison with international tariffs (SANRAL).

Country	Toll Scheme	Toll type	Toll Distance (km)	Tag Toll Rate (per km)	Tag Toll Rate/km	
					Exchange rate	Big Mac Index
Australia	East Link	ORT	39	AUD 0,180	R1,25	R0,76
Australia	West Link (M7)	ORT	40	AUD 0,346	R2,40	R1,46
Chile	Autopista Central North-South Axis	ORT	39	CLP 42,497	R0,61	R0,45
Chile	Autopista Central General Velasquez	ORT	20	CLP 42,497	R0,61	R0,45
Spain	AP-7 Toll Motorway – Extension from Cartagena to Vera	ETC/ Cash	98	€ 0,13	R1,23	R0,71
USA	Intercounty Connector (ICC)/MD 200		9	USD 0,402	R2,79	R1,99
USA	Southern Connector	ETC/ Cash	26	USD 0,201	R1,40	R0,99
USA	Route 138A	ORT	19	USD 0,215	R1,49	R1,06
USA	Sam Rayburn Tollway	ORT	42	USD 0,246	R1,71	R1,22
USA	Pocahontas 895	ORT/ Cash	14	USD 0,503	R3,49	R2,48
USA	Chesapeake Expressway	ETC/ Cash	16	USD 0,079	R0,55	R0,39
South Africa	**Gauteng E-Toll Project**	ORT	**201**	**R 0,495**	**R 0,495**	**R 0,495**

Due to the political climate, SANRAL informants reminded the researcher of the sensitivity of the case study in question. Although there was not enough time and not only the questions prepared for the interview, the researcher feels that the questions posed were able to shed some light on the major reasons for the implementation of the ORT in Gauteng.

5.3 Survey Research

The research results and the interpretation from the general public road users will follow below:

5.3.1 Results for Objective 1: To determine the reasons for the implementation of the scheme:

When road infrastructures are unable to keep up with the increasing traffic demands, road users and the economy are affected by the traffic congestion. Upgrading of these road infrastructures are needed for substantial economic growth and job creation. Respondents are asked to assess the rationale behind the upgrading of the road infrastructures in the following survey questions:

5.3.1.1 To what extent do you agree or disagree that the main problem associated with the existing road network in Gauteng before the upgrading was traffic congestion?

Respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figure 4.1 below:

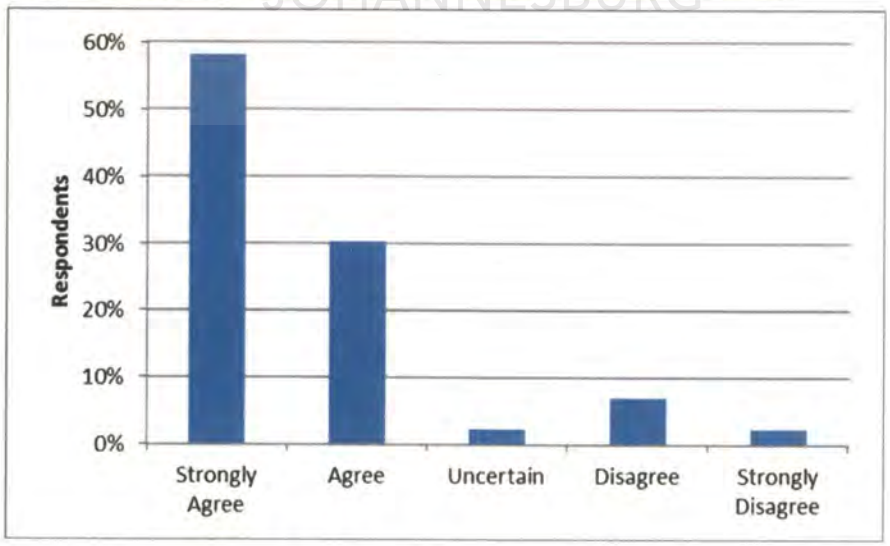

Figure 4.1: Existing road network survey

According to the survey, 89% either strongly agree or agree with the statement. This is a clear indication that respondents do view traffic congestion as the main problem associated with the existing road network before the implementation. This is consistent with Alli, et al., (2012), who

pointed out that South Africa's pressing development challenges include an ageing road network and a sharp growth in road traffic.

5.3.1.2 *In your opinion, there was a strong need to upgrade the road network in Gauteng.*

Respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figure 4.2 below.

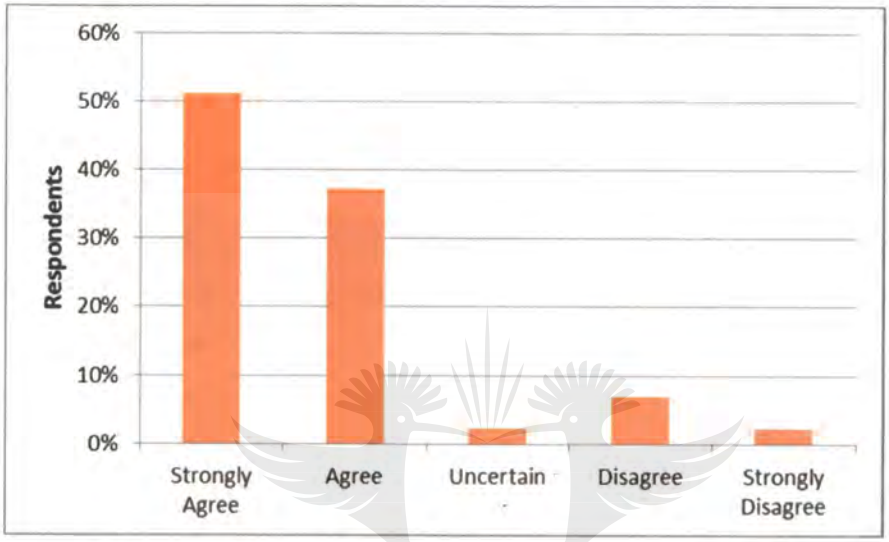

Figure 4.2: Importance of upgrading the road network

A total of 90% either strongly agree or agree that the upgrade was necessary, stating that traffic congestion has been affecting them and the economy by the daunting peak-hour traffic periods each morning and evening, limiting family and leisure time due to the negotiating of traffic. This concurs with Kalmanje and Kockelman (2012), who narrate that fast and reliable roads are vital for sustaining populations and their economies.

5.3.1.3 *Following your responses above, e-toll is necessary for implementation.*

Respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figure 4.3 below.

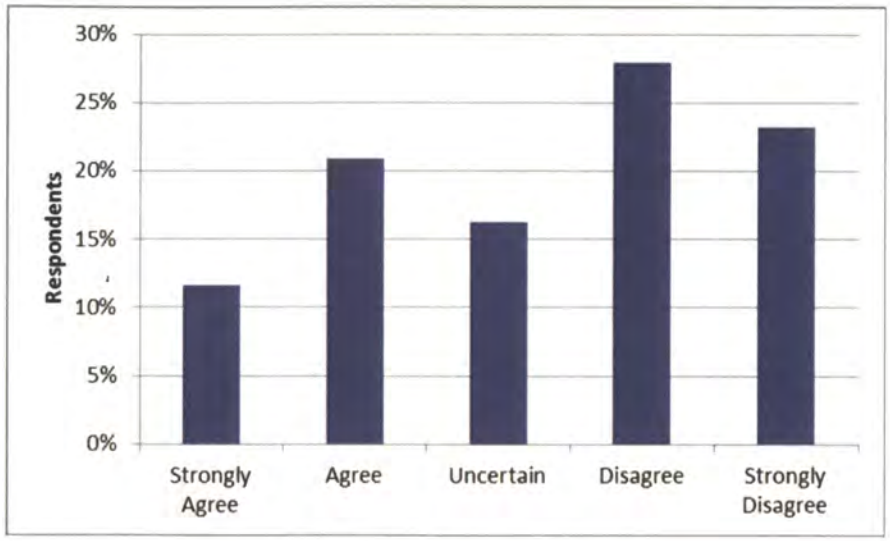

Figure 4.3: E-toll warranted survey

It is evident that the majority of 54% of the respondents in the survey are not in favour of the implementation of the e-toll, even though they do agree that the roads' infrastructure needed the upgrade. They felt that the toll charges are an additional tax that will increase the cost of living, as well as that of goods and services, which will negatively affect economic growth. In contrast, Pridmore and Miola (2011) argued that policies are more acceptable if the public is aware of the negative impacts associated with car use and they understand the need for measures to address these impacts. Only 32% of the respondents indicated that implementation of e-toll is necessary.

5.3.1.4 The upgrading of the roads and the implementation of e-toll will solve the congestion problems explained in Question1

Respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figure 4.4 below.

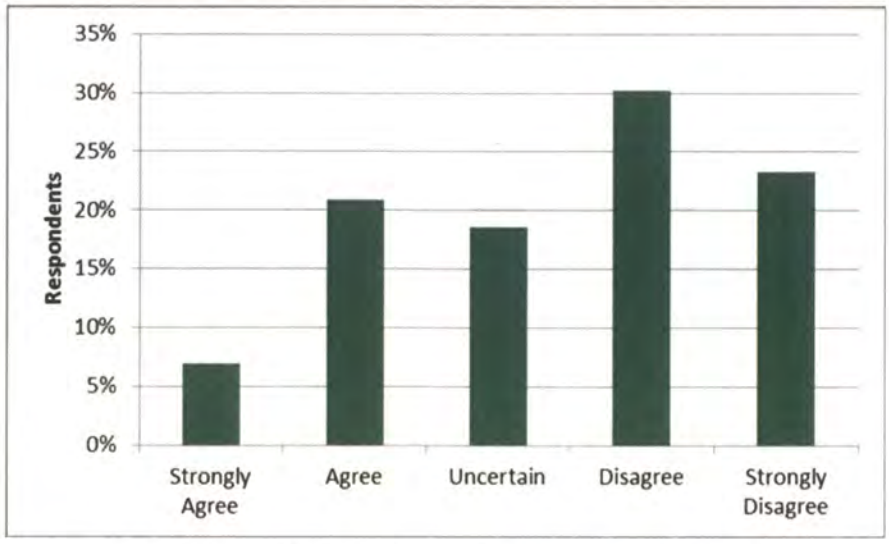

Figure 4.4: Solution for traffic congestion survey

Of the respondents, only 27% either strongly agree or agree that the upgrading of the roads and the implementation of e-toll will solve the problem of congestion. However, 56% of the respondents either strongly disagree or disagree with this question. This confirms with Mahendra (2008), who stated that the subject of road pricing is often considered controversial with strong arguments in favour of it and against it. Other findings argued that the e-tolling schemes are often an efficient way of reducing traffic congestion (Klodzinski et al., 2007; Westin, 2012 and Houghton and Atkins, 2013).

5.3.1.5 Considering the following options: Congestion relief; revenue generation, financing the facility or other, what is your understanding regarding the main objective of implementing e-toll?

The respondents are asked the main objectives of the implementation of the e-toll. The results are shown in Figure 4.5 below:

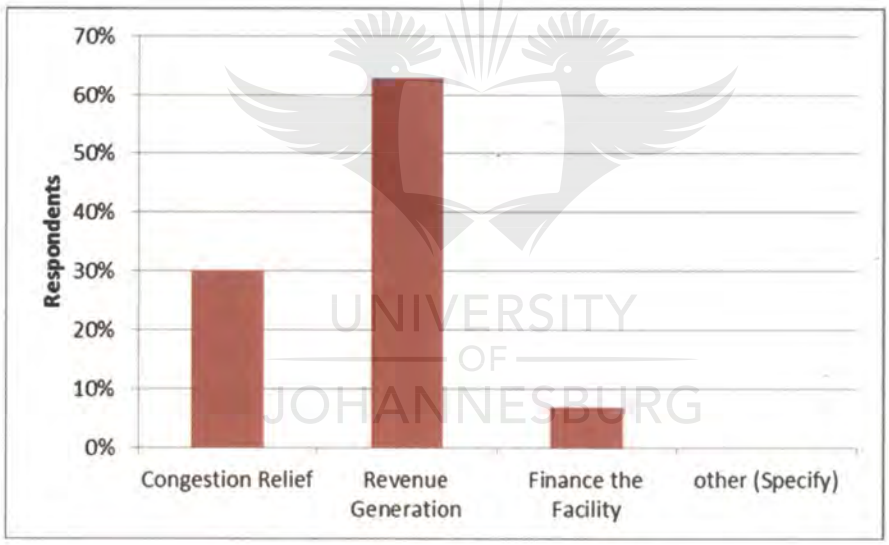

Figure 4.5: E-toll's main objectives

It is evident that the majority of the respondents, namely 65%, believe that the main objective for the implementation of the e-toll scheme is for revenue generation. This is followed by 29% who believe that the main objective is to relieve congestion and 6% believe that the e-toll's main objective is to finance the facility. This confirms the different opinions in the implementation of the scheme as asserted by Mahendra (2008).

5.3.1.6 Tolling is an important component of an overall transportation strategy.

Respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figure 4.6 below:

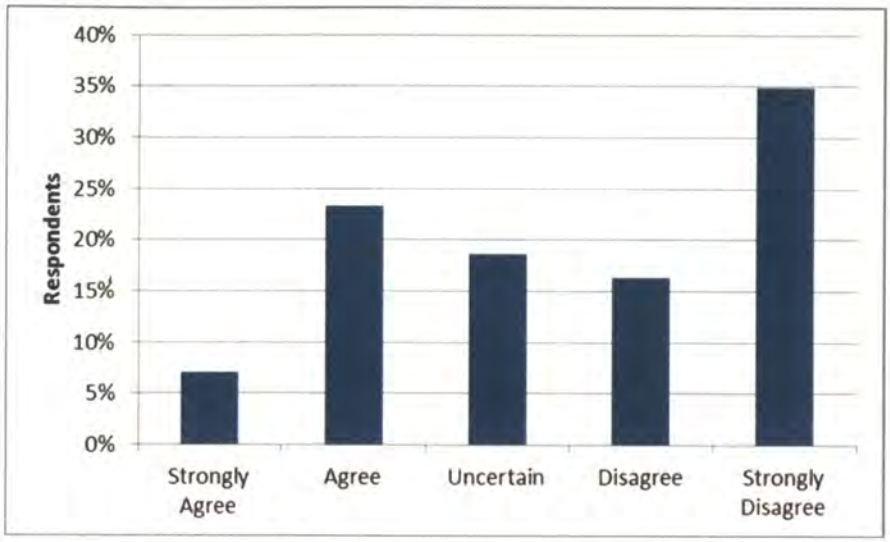

Figure 4.6: Tolling as a transportation strategy

There is a fair percentage of 55% of respondents who disagreed with the statement above. It is interesting to note that only 29% of respondents agree with the statement. This is indicative of respondents disagreeing that tolling is a transportation strategy. However, Doan (2010), as well as Jaensirisak and Ratchathani (2003) noted that the concept of tolling is a management strategy in creating new funding for transportation. This indicates insufficient communication between the general public road users and the road agency.

5.3.2 Results for objective 2

4.3.2.1 To assess the Actors-Partners Network in the establishment of the e-toll scheme and challenges during the implementation.

Zmud (2008) asserted that the public may have little daily contact with many issues on the public agenda, yet their opinions greatly influence policymakers. Therefore, they need to be involved and understand the problems, so they can accept a solution.

4.3.2.2 Which of the following stages should the affected stakeholders, namely the road users, be involved during the lifecycle of the e-toll process?

Respondents are asked the stages they should be involved in during the lifecycle of the scheme process. The results are shown in Figure 4.7 below:

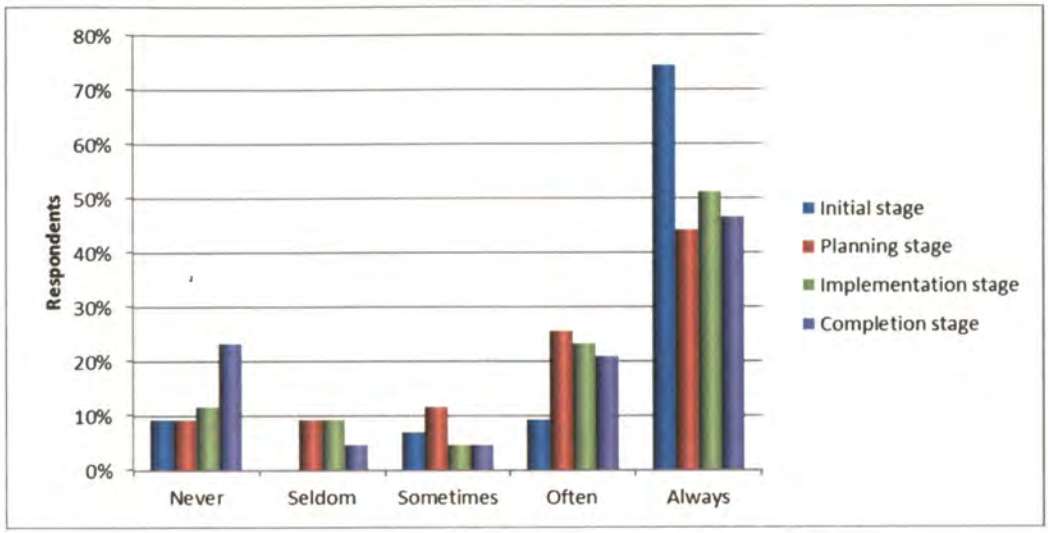

Figure 4.7: Stages of public participation in the e-toll process

Most of respondents stated the importance of public participation during all the stages. Since efficiency is vital in project implementation, not everyone should participate in the decision-making process. However, this does not mean policymakers should make all decisions alone. Instead, respondents suggested that representatives from the different stakeholders should be selected to contribute in the decision-making process prior to making the implementation decision, during the implementation process of the program. Ieromonachou (2005) noted that implementation process is the most problematic with road pricing projects.

4.3.2.3 How would you describe the consultation and transparency regarding the introduction of the e-toll?

The questions were designed to solicit the opinions of the respondents regarding the consultation and transparency, and interestingly, they yielded the same results. Respondents are asked to assess the level of consultation and transparency. The results are shown in Figure 4.8 below:

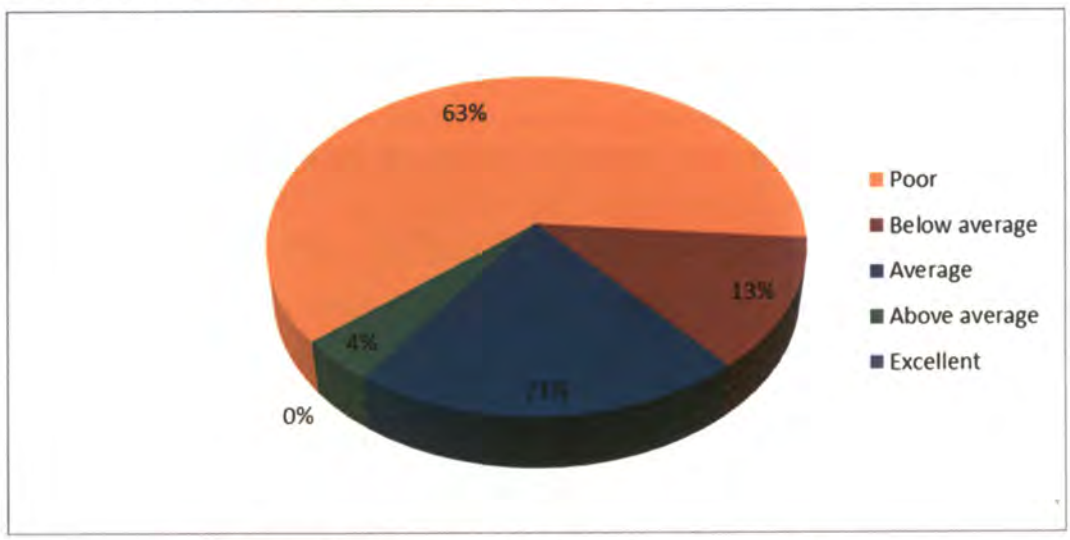

Figure 4.8: Transparency and consultation survey

A total of 63% of the respondents concurred with Leape (2003) and Ieromonachou (2005) that the promotion of public acceptability through consultation and transparency is vital to achieve the policy objectives. They indicated the level of consultation and transparency as poor, hence the resistance to the scheme. Du Plessis (2008) argued that public participation has the potential to improve accountability for the effective management of resources and the development of appropriate means to protect the environment of communities of people, which ultimately is what we have environmental rights for today. Moreover, the major barrier to successfully implement the e-toll has been that of gaining public acceptance and having it backed by politicians. SANRAL was supposed to begin tolling in April 2011, but due to public resistance, political and trade unions' resistance, three proposed dates failed to materialise.

The following questions were asked to validate the outcome of the questions in 4.3.2.2 & 4.3.2.3:

4.3.2.4 When did you hear that you will pay for using the road?

The respondents are asked to assess knowledge regarding the user-pay principle. The results are shown in Figure 4.9 below:

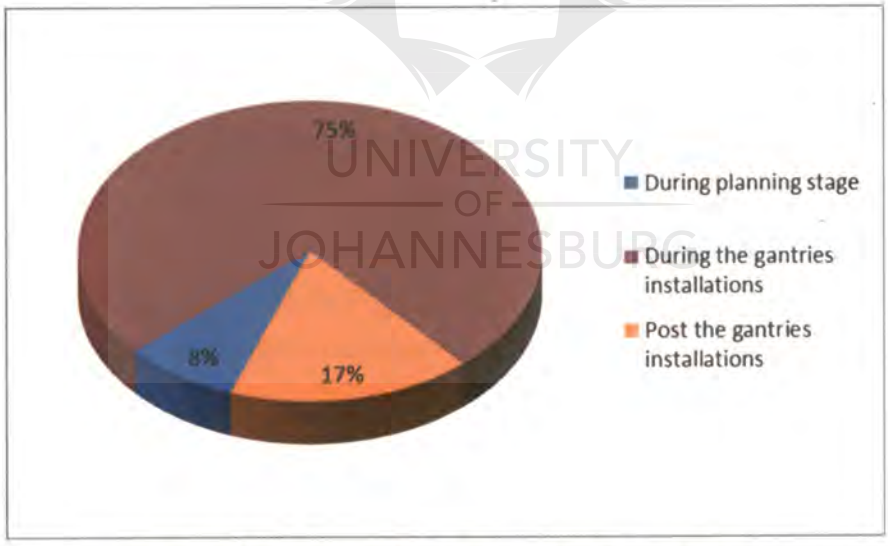

Figure 4.9: Awareness of the user-pay principle

An overwhelming majority of 75% of the respondents indicated that they only knew that they will be paying for the use of the roads infrastructure during the installation of the gantries, compared to the 8% who stated that they were aware during the planning stages. In view of the researcher, for a major infrastructure investment project like this, which has a huge impact on both social and economic spheres, it is not convincing that there was no proper consultation. The survey results support the idea that policymakers should gain opinions from affected stakeholders and consider them as key to the successful project implementation (Walker et al., 2008).

4.3.2.5 *What do you think were the barriers that made the implementation process of the e-toll difficult?*

The respondents are asked to identify the barriers that prevented SANRAL from implementing the e-toll, as scheduled. The results are shown in Figure 4.10 below:

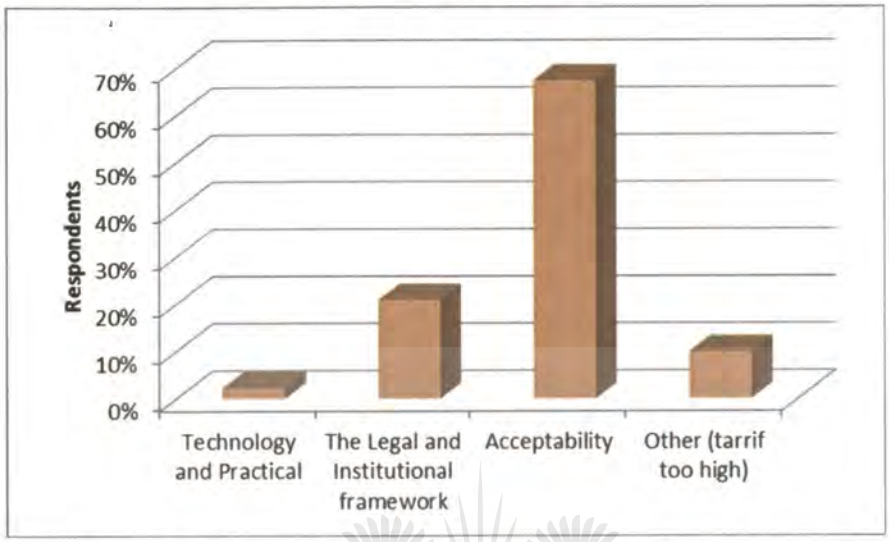

Figure 4.10: Barriers associated with e-toll implementation.

A total of 67% of the respondents concurred with Ieromonachou (2005) and Kalauskas et al., (2009) that public and political acceptances are the most important factors in determining the success of a road pricing project. The survey results also support the idea that raising awareness to the public should be prioritised before the implementation of the road pricing. This indicates that this aspect is a significant measure of concern for these respondents. This is consistent with Ieromonachou et al., (2006), who asserted that it appears that it is not the technical design or the economic justification that is problematic with road pricing projects, but the implementation processes and the difficulty in winning acceptance and support.

5.3.3 *Results for objective 3: To evaluate the social and economic impact of the scheme:*

5.3.3.1 *Please rank in order of YOUR importance, how the government and SANRAL can finance and maintain roads.*

The respondents are asked to rank the best funding mechanism in the order of importance. The results are shown in Figure 4.11 below:

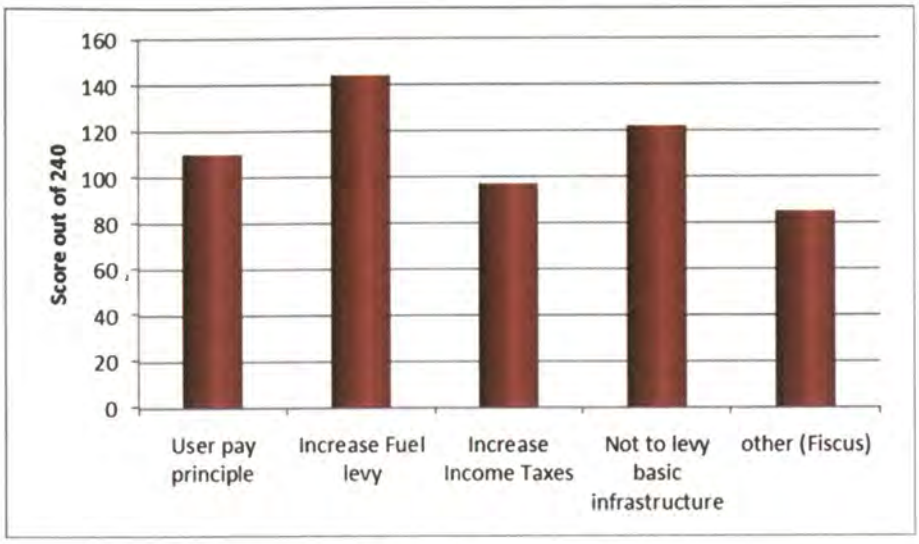

Figure 4.11: E-toll funding mechanism

The survey results showed that the fuel levy is ranked as the most effective funding mechanism, which amounts to 144 points out of a maximum of 240 points. Increases in income taxes were ranked the least favourable e-toll funding mechanism. The preferred mechanism by both the government and SANRAL was ranked third. This is indicative that the general public is of the opinion that road building is a government responsibility, thus the government should provide funding for road building. The results from the survey are in contrast with the views of Munroe, et al., (2006) and Rasool (2012), who argued that toll financing through the user-pay principle is justifiable to fund this type of project. Interestingly, the results showed that there is a relationship between the increase in income taxes and fiscus, as mechanisms to finance and maintain the road, as they almost obtained similar points. It can be deducted that the general public road users do not know the difference between the two funding mechanisms.

5.3.3.2 Please rank in order of importance where you think the revenue that will be raised through tolling should go:

The respondents are asked to rank the allocation categories of the revenue use in the order of importance. The results are shown in Figure 4.12 below:

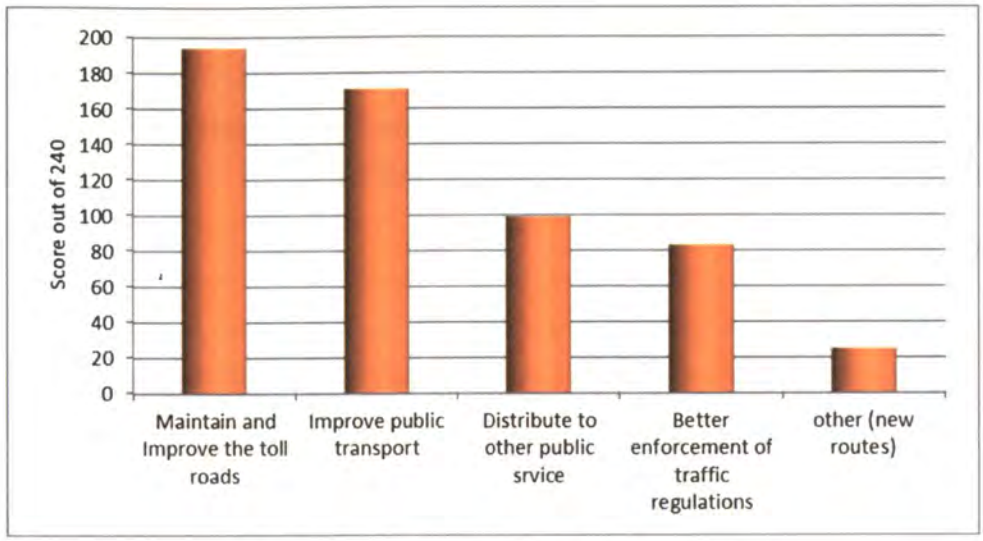

Figure 4.12: Allocation of raised revenue

According to Ubbels (2006) and Kalauskas et al., (2009), the distribution of the revenue is vital when considering road-pricing programme development. Five different possibilities were evaluated and the findings presented in Figure 4.12 show that the maintenance and improvement of the toll roads are extremely important areas where the revenue should be used; new routes were ranked as not important. This is in contrast to Houghton and Atkins (2013), who asserted that road pricing's revenue can be reinvested in road infrastructure and public transport programmes, or allocated to other parts of the economy.

5.3.3.3 I would continue to use my car to work once the public transport system in Gauteng has improved?

The respondents are asked whether they strongly agree, agree, are uncertain, disagree or strongly disagree on the above statement. The results are shown in Figures 4.13 below:

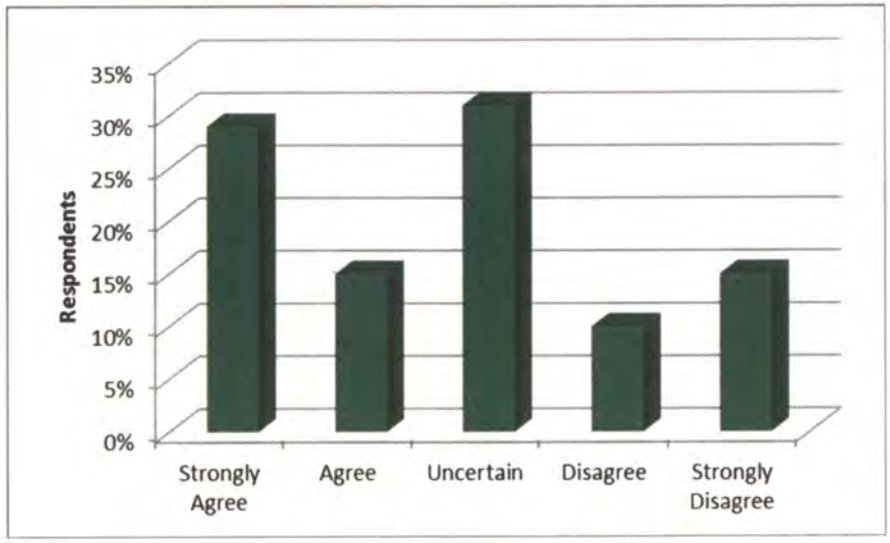

Figure 4.13: Road user behaviour

Contrary to the initial expectation that the implementation of an e-toll scheme will promote the use of public transport, it is interesting to observe that 31% of the respondents declared their uncertainty. These doubts may be related to the perceived effectiveness of the new e-toll system. A total of 44% of the respondents indicated they will continue to use their normal mode of transport. According to Joksimovic (2007), the reason for this is because the transport market has a very complex nature, where the behaviour of users includes different dimensions, such as mode, route, time of a day, and even destination. It can be deducted that those who either strongly agree or agree with the statement are aware that there are no integrated transport systems in Gauteng, which can prevent people from using public transport upon improvement.

5.3.3.4 *Indicate the degree of assurance on confidence you have in SANRAL concerning their ability to keep your personal details for toll collection purposes confidential.*

The respondents are asked to rank the level of confidence in the payment system adopted by SANRAL. The results are shown in Figure 4.14 below:

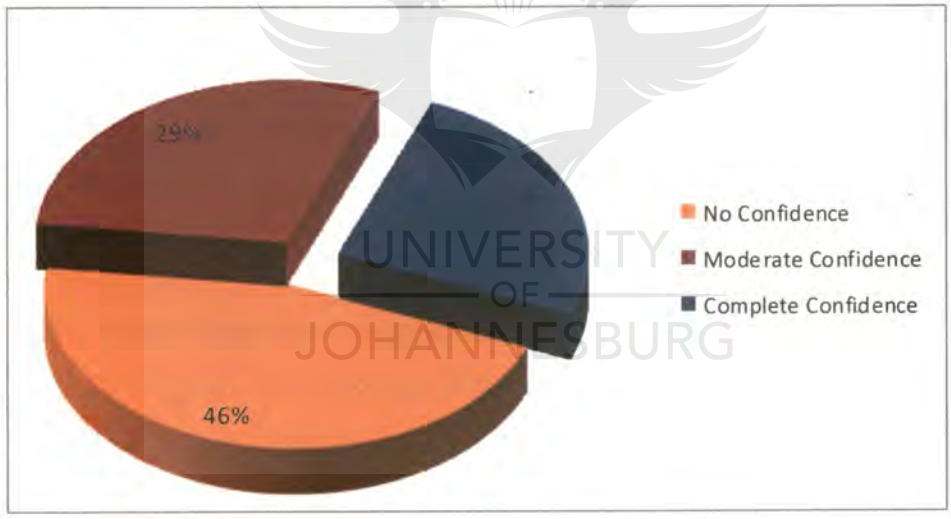

Figure 14: Confidence level

A total of 46% of the respondents stated that they do not have confidence, arguing that if they do not pay the tolls; SANRAL might track them and hand them over to the police. This is in consistence with Blumberg and Chase (2005), who pointed that history suggests that assurances by government entities that such information will be used responsibly cannot be trusted over the long-term. However, it seems preferable to develop and implement a system that does not offer such temptation by simply not facilitating vehicle tracking. Such systems will also have much greater public acceptance than the alternatives.

5.4 Private Sector Stakeholders and Political Parties' Views

The following is the input from the private sector stakeholders after the Department of Transport reopened the public participation process for the GFIP as a response to the public outcry:

5.4.1 Opposition to Urban Tolling Alliance (OUTA)

- There was lack of consultation and transparency. While SANRAL will have us believe that they did all they could to be consultative in this decision, the simple truth is they failed and fell far short of what would be expected in a matter of this magnitude. This was demonstrated by the outrage and surprise that virtually all citizens expressed when the gantries went up, and not only the individual road user, but also businesses and large fleet organisations were shocked by the extent and implications of SANRAL's e-toll plans;
- SANRAL did the bare minimum to expose and engage with society on their elaborate plan to toll the Gauteng freeway upgrade. From one advert placed in six newspapers in October 2007 to over 3, 5 million licensed vehicles/motorists in Gauteng, SANRAL received only 28 responses to their request for submissions, where one was a petition with 55 signatories. Despite this poor response, they were satisfied that sufficient engagement had taken place. Most regard this level of response as an absolute failure on their behalf, but alas, they do not see it that way;
- Tolling Gauteng's freeways is an unnecessary waste of billions of South African tax payer's money. We do realise the need to pay for the freeway improvements, but we expect to do so through efficient means to collect these "taxes";
- Raising funds for costly road upgrade projects of this nature should be done with the least negative impact on the pockets of the public, while achieving the goal of funding the infrastructure. As such, if existing or new funding mechanisms are available, these should be considered and used, unless of course a valid reason is provided and is acceptable to society, namely the people who ultimately pay;
- The installation of elaborate and complex toll gantries, electronic tags in every vehicle and the revenue collection system for this specific project means that users will pay not only the expense of the road construction, but additionally, they must suffer the heavy and unnecessary burden of this specific toll collection system. It is estimated that the electronic tolling processes planned by SANRAL will cost R1, 7 billion per annum, based on the tender awarded by SANRAL to ETC for this work, at R8,4 billion for the first five year period, excluding set up costs, just to operate and administer. The road construction capital costs of R18 billion, excluding other costs related to e-tolls, if paid over 20 years with

interest, amounts to approximately R1, 67 billion per annum, or R40, 7 billion over 20 years, including maintenance;

- E-tolling in Gauteng planned to raise over R95 billion, 236% of the required amount, and will be a burden to the road user. It is an utter and unnecessary waste of the road-users' money. One must also note here that there is no intention to halt the tolling, or reduce to cover maintenance costs only, once the capital and interest is paid up. E-toll charges will remain in place and will increase every year; and
- There is no effective and reliable public transport option. Earlier communications and plans for e-tolling by authorities indicated that, paramount to the e-Toll process, was the implementation of an efficient public transport system. This alternative is almost non-existent for most of the current freeway users and to date, very little has been done to rectify the situation. SANRAL's earlier e-toll decision included funding allocated to public transport park and ride facilities, which never transpired (OUTA, 2011).

Proposed Solution

There are less expensive and far more efficient processes used for road funding. We believe the funding of our entire road network system, including upgrades to urban freeways should be conducted through the hybrid of user-pays initiatives as follows:

- The National Treasury: There is no doubt that the entire country benefits from a good road infrastructure, even if one does not use the roads and as such, the National Treasury needs to be an important contributor to the funding of roads;
- Fuel Levy: There is no doubt that the road user should also contribute toward our roads, more so than a non-road user, therefore the fuel levy was introduced in the mid 1960's. Today, the average car's fuel tank fill contributes around R100 toward the levy, which helps maintain and build our roads. In reality, this goes into the big treasury pot, but ultimately, treasury directs this toward roads;
- Long Distance Toll Roads: There is an argument for the tolling of new rural and inter-city roads, which aim to bypass the longer and more dangerous older routes, justified because these routes offer clear benefits to the road user, who also has the option of using the alternative route for free. Today, SANRAL earns billions from these rural tolled routes and these funds reduce the burden to subsidise other rural and urban road construction from the general road funding tax pot; and
- Vehicle License Fees: Revenues generated by the sale of car licenses at the local level are supposed to be utilised to fund road maintenance and infrastructure development within the local municipal and metro areas. These fees have increased substantially in recent years. However, the benefits to the local road user are not being experienced at the levels

expected from the local authorities. Nonetheless, these fees are also part of the road funding hybrid model (OUTA, 2011).

5.4.2 Automobile Association (AA) of South Africa

AA (2011) submitted the following concerns to the Department of Transport Steering Committee on Gauteng Tolls:

- Contributing to the current road safety and road congestion crises in South Africa is the critical lack of affordable and accessible public transport. The public transport system is patently inadequate, and as a result, the public has no choice but to resort to private transport;
- E-toll will constitute an unfair manner of supporting the country's roads infrastructure network and it will discriminate against local commuters. It will also have a serious impact on the safety conditions of alternative routes where they exist;
- The implementation of a toll will push up freight distribution costs, not only in the immediate vicinity of Johannesburg and Pretoria, but throughout the region. Businesses will have no alternative but to pass these costs on to consumers, creating a further burden on South African citizens;
- A toll structure, as proposed, will have the detrimental consequence of over-taxing road users, who unavoidably would have to pay toll fees every day. This user-pay principle, used to alleviate the shortage of state funds for road construction and maintenance, will not be beneficial to more disadvantaged motorists, who will be forced to absorb the additional costs;
- The proposed toll structure will, therefore, seriously affect local commuters, as the alternative routes were not designed to cope with the anticipated high-traffic volumes, as was evidenced during the recent construction phase;
- At a macro-level, the AA is concerned with the lack of evidence to suggest that alternative methods of subsidising the roads network in South Africa have been extensively explored. It is also of critical importance that government establishes clear and supported policy on road maintenance spending on all road infrastructures, including national roads, provincial and municipal roads;
- A dedicated road fund will create a more equitable and supportive system, which will assist all those concerned to enjoy access to reasonable and safe transport in the form of a properly maintained road infrastructure. Furthermore, such a fund will also create a secure, adequate and stable flow of funds to the correct authority. Funds so derived should then be

apportioned across the entire road network, according to a predetermined formula or priority with transparency as the cornerstone;

- A further point of contention is the capital-intensive nature of the toll collection and the potential outflow of the Rand to a foreign entity. The nature and appointment of the toll collection agency is also questioned and the AA asks for full transparent disclosure in this regard. It is apparent from the Kapsch website that the partnership with Traffic Management Technologies (TMT) was established in October 2007. Media investigations suggest that the majority shareholding of the toll collection company, Electronic Toll Collection (ETC) is held by KapschTraffic Com AB. No doubt this company is a profit-making entity and the AA requests full disclosure of funding and profit distribution, which the South African motorist is expected to bear; and
- On the issue of other taxes imposed on motorists, the AA requires disclosure by government on the application of the eNaTIS transaction fees, the fuel levy, vehicle licensing fees and the "Green Tax," on new vehicles. All the above revenue is generated from the motorist and yet full disclosure on the amount and how it is utilised has not been forthcoming from government. This situation needs to be remedied urgently.

5.4.3 Road Federation Association (RFA)

The RFA supports the user-pay principle and the open road tolling. However, they do not support the high tariffs. The following were raised to the Parliamentary Monitoring Group (PMG) (2011):

- Sufficient information is not forthcoming, and they 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 the 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.
- The GFIP should be funded from the fuel levy;
- When planning, government needs to reference BRIC (Brazil, Russia, India and China) countries, not just the European and the USA counterparts; and
- Rail can be used as an alternative for freight transport, but it 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; and
- The use of the fuel levy for road infrastructure (PMG, 2011).

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

BUSA (2012) submitted the following concerns to the Department of Transport Steering Committee on Gauteng Tolls:

- The Department of Transport and SANRAL have been incapable of communicating developments around the e-toll system effectively and transparently;
- There is poor perception management and inadequate consultation between government and its social partners on the e-toll system;
- Gauteng e-tolling's current model was problematic, with inefficient and expensive ways of collecting the tax, and its external effects were significant and would extend to other areas of the country;
- BUSA argued that alternative roads were poorly maintained and unable to support the existent demands on the system;
- In addition, there were limited public transport options available to commuters and these were often unsafe, unreliable or prohibitively costly;
- The combined costs of enforcing the regulations and those outlined in the tariff schedule have the potential to greatly increase the costs of conducting business in South Africa; and
- BUSA proposed "shadow tolling," through the fuel levy as an alternative to e-tolls.

5.4.5 Southern African Vehicle Rental and Leasing Association (SAVRALA)

SAVRALA (2011) agrees with SANRAL on the need for the GFIP and that it will provide some benefit, but how much and at what cost is now a moving target. In reality, the viability and efficiency of the proposed e-tolling model is now well beyond any economic argument.
SAVRALA submitted the following concerns to the Department of Transport Steering Committee on Gauteng Tolls (PMG, 2011):

- The user needs to be put at the heart of transport policy;

- There are concerns about the lack of transparency on an alternative funding source;
- Public transport alternatives are currently very limited;
- More meaningful, transparent and regular consultations must be in place between transport stakeholders and government;
- The density and location of toll gantries are aggressive;
- There are unresolved issues for the industry on the direct and secondary administration costs related to open road tolling;
- Toll costs will be passed directly onto leasing and car rental customers; and
- SAVRALA is in dispute with SANRAL on the payment terms for outstanding fees.

Proposal Solutions

- 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, such as reduced accident costs, compulsory third party motor insurance, and so forth;
- Improved enforcement of existing laws and regulations will bring in more revenue, like unlicensed vehicles and the cost of accidents;
- The introduction of compulsory third-party insurance; and
- Introducing greater efficiencies in the system will save money. An example is the AARTO process that is costing the industry a vast amount of money due to the administrative burden (PMG, 2011).

5.4.6 The 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 costs, upgrades, and operational and maintenance costs of the roads (PMG, 2011).

5.4.7 South African Communist Party (SACP)

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

The SACP is opposed to tolling on the following grounds (PMG, 2011):

- The state has a constitutional obligation to build and maintain road infrastructure;
- Citizens are already paying taxes in the form of 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; and
- 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 solution:

- GFIP should be funded from the national fiscus;
- The government is to address infrastructure development programmes differently going forward, guided by a clear set of strategic priorities; and
- To exempt public transport from e-tolls.

5.4.8 The Congress of South African Trade Unions (COSATU)

COSATU (2012) argued that public support keeps growing and are certain that the power of the people will ultimately convince the government to abandon a policy that is extremely unpopular, unfair and unworkable, for the following reasons:

- Tolls will put an indirect burden on the poor of the whole of South Africa by adding to the cost of transporting goods and will have an immediate effect on food inflation;
- Tolls will perpetuate exclusion, as the 'user-pays' means that you cannot use the best roads if you cannot afford to pay. The logic is that those without the money to pay the tolls should be excluded from access to the best roads. They must find the potholed side roads, while those with the money glide along the highways in their fancy cars. COSATU has consistently argued that taxation must be the main source of funding for road infrastructure. If additional revenues have to be raised by government, then this must be done through a progressive tax system, rather than tolls, which take no account of the ability of the drivers' to pay;
- Public transport is totally inadequate. Government has now exempted registered public transport vehicles from the tolls, but very few buses and taxis actually use the tolled highways. Public transport largely remains woefully inadequate, both in quality and in the

numbers of people it serves. A third of our people use private cars to get to and from work. Not from choice, but because our public transport system is expensive, unsafe and unreliable;

- Tolls represent a form of privatisation. The introduction of a tolling system that brings the private sector to operate the tolled roads is a form of privatisation; the commodification of what ought to be an essential publicly funded public service. Worst is that the contracts signed with the companies operating the tolls remain secret. All evidence indicates that the revenues from the tolls are going to be enormous and that the loans will be paid off quickly, leaving the private operator to milk the public;
- Another reason for opposing the tolls is the cost of collection, which will consume a massive 17% of the money collected in tolls. This means that tolls are not only unfair, but also a grossly inefficient way of raising the money for road improvements. Even if the government makes further cuts in levels of tolls, the collection costs will become an increasingly larger percentage of the amount collected. A large portion of the revenue collected will ultimately find its way into the pockets of the toll operators. Trying to collect all this money from four million motorists will be impossible to manage and will become unworkable; and
- Income to be supplemented by fine collection. In addition to the collection of toll fees, the operator will rely on the technology in the system to administer fines for non-payment of toll fees. This back-door generation of income for profit from fines is, in COSATU's view, an abuse of the rule of law.

5.4.9 Democratic Alliance (DA)

- Government has bungled the entire process of developing the e-toll system and left the public feeling ripped off. The first lesson they should learn is not to take the public for granted. There was some public participation during the planning of the GFIP, but at one meeting, for example, only 14 people were present. This shows how little people understood the implications of this project from the start;
- We must not assume that what is affordable in so-called Western countries is affordable in South Africa. Open-road tolling is mostly used in Western, urban and First World environments. We have many toll roads in South Africa; the problem is that people have balked at the costs involved in this specific case. Except for the few super-wealthy, South Africans are not earning the same as Germans, Americans or Australians. If an individual earns R6 000 a month and drives a second-hand car to work, that individual could be required to pay an extra R550 a month for toll fees. That is a big chunk out of one's salary.

Proposed solutions:

- We have long called for ring-fenced fuel levies that should only be used for road maintenance;
- SANRAL and the Transport Department must perform both socio-economic and traffic impact studies, which will show the impact of any new toll roads on surrounding towns and cities. This would have prevented the degeneration of the roads in towns like Parys, for example;
- The Department will be required to table mitigating measures that will be put in place to prevent any negative socio-economic or traffic impacts on surrounding cities;
- These studies will have to be published in the Government Gazette and on the SANRAL website, so that they cannot be hidden from the public or the opposition;
- SANRAL will have to publish, not only the cheapest e-toll rates on billboards, but also the higher rates that people will need to pay if they do not register or purchase an e-tag; and
- When this bill goes to the NCOP, its members will be requested to obtain input from those provinces that have a Metro where e-tolls could be implemented in future, as SANRAL clearly has other metro cities in its sights (DA, 2013).

5.4.10 African National Congress (ANC) Youth League

- The ANC Youth League is 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; and
- The state has a responsibility to fund infrastructure development and maintenance.

Proposed solutions:

- SANRAL, the 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; and
- 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).

5.5 Analysis of Road Pricing Case Studies

In this section, the case studies assessed is analysed and include: United Kingdom – London; Singapore; Sweden– Stockholm; South Korea – Seoul; Hong Kong; Netherlands; United States of America – New York (See Table 5).

The success of Singapore's scheme can be credited to the scheme being part of the integrated transport policy package. Political leadership also played a key role in the success of the scheme. Similarly, the success of London's scheme can be credited to both public transport improvement and political leadership. However, the Stockholm's scheme illustrated that their success was due to the planning and development process of the trial scheme and the communication methods between the city and the public which was vital to the success of the current scheme. Moreover, the Seoul's scheme illustrated a different approach of introducing the road pricing scheme to the public through the introduction of toll onto existing tolled road but with different purposes. The success of the scheme can be credited to adequate public hearings, information campaigns, and efforts to win media support, as well as political leadership.

Although different kinds of policies such as public transport and improvement of the road system efficiency were considered, the Netherland's scheme failed because the public expressed concerns about fairness of the scheme. The public argued that it is expensive and favour the rich. Similarly, the Hong Kong's road pricing failed to be implemented because of both political and public acceptability despite overcoming the technological barrier (the system claimed to violate their privacy). It can be concluded that although the government was involved in the planning of these schemes, there was no political project champion. This concurs with Ieromonachou, et al., (2007), who noted that where projects involve complex systems of partners and actors, the management process needs a mechanism to provide focus and drive. This is particularly so for innovative projects involving the creation of new networks. This role can be filled by project champions as can be seen in London. It can be noted that in New York City, there was a political project champion. However, legislations made it impossible to implement the scheme.

The difference between these cities was that approval processes and political environments worked in favour of the successful implementation. The results from the case study supports Ieromonachou (2005) who argued that it is not the technical design or the economic justification that is problematic with road pricing projects but the implementation processes and the difficulty in winning acceptance and support.

Table 5: Summary of International experience including South Africa, Gauteng

Countries	United Kingdom – London	Singapore	Sweden– Stockholm	South Korea – Seoul	Hong Kong	Netherlands	USA – New York	South Africa- Gauteng
Project champion	Mayor Livingstone	Government	Government	Government	Government	Government	Mayor Bloomberg	SANRAL
Main Objective	Manage congestion	Manage congestion	Manage congestion	Reducing low occupancy vehicles, raising revenues for transport-related projects and assessing the effectiveness of the pricing technique.	Managing Congestion	Planned to manage congestion, replace vehicle tax revenue, and promote user-pays principle.	Generate revenue	Managing Congestion
Partner-Actor Networks	Transport for London (representing public)	Public	Business community and public	Public and government authority	The automobile Association	public and private organization	Non-governmental groups.	Government & Non-governmental groups.
Protection measures	Enhancing public transport services	System is a part of a policy package	Seven-month trial period	Public transport and improvement of the road system	Technological trial	Various kinds of policies such as public transport services	Transit system	None
Revenue use	London's transport system	Improvement of social welfare	Invest in the road network and in transit	Invest in the road network and public transport	Invest in the road network	Invest in the road network and public transport	Transportation investments and capital investment	A variety of needs linked to the road and 17% towards managing the toll operation and collecting and maintenance
Main Barriers	Public acceptability-high after extensive public consultation.	None	Public but after trial the resistance was low.	None	Public and Political acceptability	Public and Political acceptability	Public and Political acceptability	Public and Political acceptability
Legal and Regulatory Framework	Legislation did not exist in the UK for road pricing measures until the year 2000	People believe in the government's policies	Congestion tax bill	Urban Traffic Re-adjustment Promotion Act	The White Paper on Transport Policy	The Netherlands Ministry of Transport's policy on mobility	Three legislative bodies	Various laws
Current Status	Successful	Successful	Successful	Successful	Unsuccessful	Unsuccessful	Unsuccessful	Inconclusive

5.6 Conclusion

In this chapter, analysis of responses to follow-up questions to SANRAL informants was presented. In addition, the key findings of the public, private stakeholders and political parties and trade unions' viewpoints regarding the implementation process of the ORT in Gauteng has been presented and compared to that of the literature. For the purpose of clarity and to obtain additional information, analysis of road pricing case studies were also was presented.

In the last chapter, the conclusions and recommendations stemming from the results will be made.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The preceding chapter was concerned with the results, data presentation, analysis and discussion. The implications of the findings were given not only for this present study but also for the general challenges that may hamper the implementation of road pricing. The discussions below will present the findings of the research questions but will also draw conclusions and make recommendations for the research study.

6.2 Findings

The aim of this section is to summarise the empirical findings and to provide concluding remarks about the findings. The results will be summarised in a similar structure as for Chapter Five, where the results were presented for the research questions:

- What was the rationale for the implementation of the scheme?
- How will the social and economic impact be affected by the scheme?
- Who was involved in establishing the scheme and what were the challenges in implementing the tolling scheme?
- What are the policies and laws that governed SANRAL to implement the tolling scheme in South Africa?
- How has SANRAL optimised the use of international practice of road pricing schemes?

6.2.1 Results for research question 1: What was the rationale for the implementation of the ORT scheme?

SANRAL's rationale is to provide an interconnected network of inner and outer-ring roads as a viable solution, with the expectation to alleviate traffic congestion. This correlates with Persad et al., (2007) and Klodzinski et al., (2007) who stated the main reasons why tolling, or road pricing, is implemented. However, the conclusion drawn from both the survey research and the private stakeholders in Chapter Five is that the ORT scheme was implemented to generate revenue. It clearly shows that there is a lack of communication between the affected parties. This difference in opinions on the rationale of the ORT scheme correlates with Marnewick (2010) who argued that if there is no regular communication with users, the users do not know what to expect from the delivered system and they will not understand why the system affects their daily business activities. Once the system is delivered, the users will not accept it and customer satisfaction will be a major problem. He further argued that open and regular communication facilitates the change management process.

6.2.2 *Results for research question 2: Who was involved in establishing the scheme and what were the challenges in implementing the tolling scheme?*

SANRAL indicated that various stakeholders such as Inter-governmental workgroups; general public and political parties were invited during the initiation stages, but the level of their commitment was very low. This was confirmed by the Department of Transport (DoT), stating that public engagement was relatively low for the toll declaration process in 2007. In contrast, both private stakeholders and the public confirmed that consultation and transparency were insufficient. This correlates with Jaensirisak et al., (2009) who indicated that during the initial phase, the public may not really pay a close attention to the continuous discussion, since they may perceive this as an idea far removed from reality. According to international case studies, countries who have successfully implemented this type of a scheme have succeeded by adequate stakeholders' participation. Walker et al., (2008) indicated that a project can only exist with the informed consent of its stakeholder community by the client. The stakeholders' involvement seems to be lacking in the case of SANRAL, who carried on with the implementation process despite the extremely low response.

SANRAL indicated that the main barriers to the implementation were both public and political acceptance. This concurs with Ieromonachou (2005), Ubbels (2006), Kalauskas et al., (2009) and Westin (2012), who all stated that the biggest obstacle to successfully implement road pricing is gaining public acceptance and having it backed by politicians.

6.2.3 *Results for research question 3: What are the laws and policies that govern SANRAL to implement the tolling in SA?*

Similar to the case studies, SANRAL indicated the various laws and policies that govern the implementation of tolling in Chapter 5. The vision for South African transport, according to the National Transport Policy Framework, is of a system which will provide safe, reliable, effective, efficient, and fully integrated transport operations. In contrast to the vision, both the general public and the private sector stakeholders indicated that there is no effective and reliable public transport system in Gauteng. This is consistent with case studies experience which illustrated that adequate public transport was a requirement policy before the implementation of the road pricing schemes.

6.2.4 *Results for research question 4: How will the social and economic impact be affected by the scheme?*

Rodrigue et al., (2009) noted that when transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects. From the findings, SANRAL believes the system is economically and socially viable and provides very high benefits to

the Gauteng Province and South Africa. According to SANRAL's tariffs, a comparison with those countries whose similar schemes were implemented during the last 10 years was done and proved to be comparable as indicated in Chapter 5. Furthermore, they believe the scheme will reduce travelling distances, which would result in substantial savings on the running costs of vehicle and much valued travel time. This concurred with Jaensirisak, Ratchathani and Doan (2010), as well as Atkins (2013) who asserted that road pricing advances the economy. Kalmanje and Kockelman (2012) also purported that fast and reliable roads are vital for sustaining populations and their economy development. Contrary to SANRAL, both the public and various private sector stakeholders are against the ORT system, suggesting that tariffs are high and will be an additional burden on the poor and have a negative social impact. They proposed that provincial fuel levy or a provincial tax or shadow tolling should be explored. They also argue that the revenue raised will leave South Africa since Kapsch, the company collecting the toll revenue, is an Austrian-based company. However, Pienaar (2012) believed that tolling is an economically viable option for Gauteng's circumstances and the GFIP has proven feasible in various studies and analyses.

6.2.5 Results for research question 5: How has SANRAL optimised the use of international practice of road pricing schemes?

SANRAL indicated that they undertook a study tour of e-toll systems in North America, Chile, the United States of America, Australia and some European countries. They also looked at the implementation, teething problems during implementation and current operation, especially the environmental, economic and social impact. The Road Federation Association agreed with SANRAL's approach, but indicated that instead of looking at those countries, SANRAL needed to reference BRIC countries too. The DA (2013) indicated that this scheme is mostly used in the Western and First World countries, which can afford it and most South Africans will not be able to afford the payment.

6.3 Conclusion

Although road pricing has gained attention and enjoys the support of economists and transport professionals, there remain only a few successful implemented road-pricing schemes. The fundamentals when implementing a road pricing project is that it should be economically viable and also benefit the road users. A road pricing project would usually results in benefits such as, savings in vehicle operating costs, savings in time, and savings in distance covered. In South Africa, this concept is not new since the modern toll road was introduced in 1983 in the Tsitsikamma area, Eastern Cape Province. The impact of traffic congestion in Gauteng Province was identified as a major constraint to sustain economic growth and SANRAL and the government decided to implement the ORT. The announcement of the toll network was the first major decision in the

history of the country to implement the policy of the user-pays principle at a large scale on urban road networks.

It is clear from the research results that the standards and processes in the organisation are well-established, in relation to this project planning. On the contrary, Sweden-Stockholm's scheme success is credited by the illustration of both the objectives and benefits of the scheme to the public during the planning and development stages as asserted by Jaensirisak et al., (2009). It can be concluded that SANRAL failed to market the scheme efficiently to the affected stakeholders, hence the difference in opinions in this regard. Had sufficient and meaningful public participation on e-tolling been undertaken in 2007, the government and SANRAL would have learnt then of the difficulties they now face, all of which has given rise to the rejection of the e-toll scheme.

The findings provided major factors which should be concerned in design and implementation processes of road pricing schemes, in order to achieve acceptability. The factors include political, economic, and social aspects. As can be imagined, the implementation process of road pricing in Gauteng is complex, taking into consideration that toll collection has commenced despite the numerous attempts to stop e-tolling.

When measuring the extent to which alternative policy options contribute to achieving the policy objectives, public and political acceptance is a key criterion. Schade and Schlag (2000) asserted that the viewpoints of the national politicians are of great importance for the implementation of the road pricing. Therefore increasing support for the proposed scheme is essential. It can be deducted that there was a lack of political leadership in the implementation of this scheme. This is based on the turnover within the DoT, where four ministers have been appointed since the launch of the project in 2008.

From the findings, it is evident that SANRAL, as an agency of government, only implement policies that have passed into the law of Parliament. Consequently, it can be noted that SANRAL is governed by Acts to declare the Gauteng highways to be tolled and therefore collect toll fees from the roads users. It can also be noted that the financing acquired for the project is also within SANRAL's authority. On 9 October 2013, the High Court allowed the government and SANRAL to proceed because the GFIP had been lawfully instituted. This was after the President of the Republic of South Africa signed the Transport Laws and Related Matters Amendment Bill, which paved the way for the implementation of the scheme. On 2 December 2013, a last-minute attempt by the Freedom Front Plus to stop e-tolling failed and the case was struck from the roll by the High Court. Despite numerous attempts to stop e-tolling, the system went live on 3 December 2013. However, the main issue remain, is the user pay principle the best funding mechanism? While the

policies are clear from the findings, in general, stakeholders argue that alternatives are inadequate. In contrast, as per SANRAL's policies, when the planning of the GFIP Project was underway, other transport modes were taken into consideration and strived to create links with other transport modes to provide citizens with the choice of using public transportation or car-pooling that will alleviate congestion caused by single-passenger vehicles. However, no other modes of transport were considered except for the Gautrain. Even so, the Gautrain is perceived to be for the rich due to its pricing strategy, hence it is not accessible to more people. Therefore, it can be concluded that SANRAL and the government did not provide alternative, reliable modes of transport, catering for those who have been priced off the road and enabling modal shift.

Kapsch, as an Austrian company, will be paying taxation and employing 99% South Africans. However, in the long term, most dividends will be paid to Kapsch and this will create a current account deficit and could result in weakening South Africa's currency. Furthermore, when Kapsch gets the dividends, would they reinvest in South Africa? If not, the benefit to the South African economy would be minimal. The findings also show that the tariffs are comparable with the other schemes similar to the GFIP ORT schemes worldwide. Referring to United States of America, the Indiana case study, Daniel (2006) and Ryan (2011) argued that the Indiana leaders leased a 157-mile toll road to private investors, which proved to be a short-term measure that strengthens the current Indiana government balance sheet, disregarding the long-term in favourable implications. It can be concluded that there are short-term social and economic benefits with this system.

Although SANRAL applied best practice principles in structuring the ORT scheme, there are some fundamental flaws that came to light during the implementation. The researcher is of the view that since South Africa is a Third World country, it cannot be compared to First World countries. Therefore, it can be concluded that SANRAL did not fully optimise the use of international practice.

Based on these findings and the current state of the project, this scheme faces the potential of being scraped as can be seen from the case studies, particularly in the case of Netherlands and Hong Kong. These schemes were rejected because of public concerns about technical feasibility, invasion of privacy, political and economic problems. Ieromonachou et al., (2007) concluded that it appears that it is not the technical design or the economic justification that is problematic with road-pricing projects, but rather the implementation processes and the difficulty in gaining acceptance and support thereof.

6.4 Recommendations

Based on the findings and conclusions reached in this study, the following recommendations are made.

With the increase in vehicle sales and traffic volumes being experienced in Gauteng, an increase in congestion and the difficulty to provide more road space is inevitable. Therefore, the government and SANRAL should improve their marketing strategy for their second phase of this project. To promote acceptance of the scheme, more meaningful, transparent and consultative work with transport stakeholders, the public and politicians is required during the initial stages, as seen from the respondents' views. Allowing deeper debate and thorough discussion among all stakeholders is essential, as can clearly be seen from other countries that have successfully implemented the scheme. This was confirmed by Deloitte (2011) who asserted that winning support for substantial reform will require a transparent diagnosis of the problem, and a deliberate consideration of the benefits and impacts of alternative options. Failure to do this will lead to the road pricing policy being challenged constitutionally, as recently experienced in South Africa.

As noted by Nagawoo (2011), before pursuing a private toll road program, the advantages and disadvantages of private tolling relative to public funding or public toll roads should be carefully weighed. Furthermore, Ward and Sussman (2006) also suggested that given the financial impact on travellers, the government must ensure that a toll road PPP program operates in a transparent manner. This will reduce the long-term risk to toll road PPP's caused by political instability. Kwak et al., (2009) acknowledged that if properly formulated and managed, a PPP can provide a number of benefits to the public sector. It can alleviate the financial burden on the public sector due to rising infrastructure development costs. This allow risks to be transferred from the public to the private sector and increase the "value for money," spent for infrastructure services by providing more efficient, lower cost, and reliable services.

The transport sector in South Africa is benefiting from the principle that all tax revenue collected is surrendered to the national revenue fund. This is due to the fact that allocations made through the single budget process towards transport far exceed budget allocations towards roads alone. Despite National Treasury asserting that it is not their policy to ring-fence tax revenue, this funding mechanism, together with the vehicle licensing fees, should be explored.

It is evident that Gauteng, as the heart of the South African economy, needs more improved roads in order to advance economic productivity for goods movement and business. As noted by Lishman (2013), an economic regulator for the road sector must be established to develop appropriate pricing principles. This can also provide adequate oversight for SANRAL and private

sector participants, and shield investment and pricing decisions from lobby groups, such as the RFA and bid consortiums. Furthermore, a broader economic analysis from external parties needs to be done to determine the impact of the scheme on the road users, since the economy of the country is not performing well.

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APPENDICES

Appendix A

STRUCTURED INTERVIEW QUESTIONS

The purpose of this interview is to collect primary data from SANRAL Officials, for a Masters qualification with the Engineering Management field of study at the University of Johannesburg. All responses are anonymous and will be treated as strictly confidential.

CONTACT DETAILS

Kind regards
Ashley Netshidzati
Tel: (041) 372 1708 / 082 451 9668
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ashleynetshidzati@pfsa.co.za

TOPIC: Analysing the Implementation Process of Open Road Tolling (ORT) in Gauteng.

1. In general, explain SANRAL's rationale concerning the introduction of e-tolling.
2. Given SANRAL's rationale, explain the main objectives supporting this rationale.
3. Based on SANRAL's rationale, what are the benefits of the e-toll?
4. What are the policies and laws that governed SANRAL in implementing the tolling in South Africa?
5. Regarding the tolling policy:
   - Have other options to finance the project been explored and if so, what are those?
   - Why was user-pay principle preferred?
6. How will the raised revenue be utilised? In answering the above, please clarify the costs of collections versus consumer income?
7. There is a criticism that huge amounts of toll revenue will leave South Africa through Kapsch. What is your comment on this?
8. Who were the stakeholders in the implementation process?
9. How were they engaged during the project and what was their initial reaction?
10. What was their level of commitment like?
11. What critical feedback did you obtain from them and what actions were taken?
12. Were there any measures put in place to encourage the support of the project?
13. What were the barriers experienced in the implementation of this scheme?
14. What are the laws and policies that governed SANRAL in implementing the tolling in South Africa?
15. How has SANRAL optimised the use of international practice of road pricing schemes?

Appendix B

Dear Participant,

You are kindly requested to participate in the research project, which is being carried out by way of questionnaires aimed at gathering information on the Implementation Process of the **Open Road Tolling (ORT) Scheme in Gauteng, also known as the E-Toll.**

This study forms part of an MPhil research project, conducted by Ashley Netshidzati under the guidance of Dr. Wessels and Prof. Pretorius at the University of Johannesburg. Your participation is voluntary and may be withdrawn at any time without negative consequences.

You are kindly requested to complete the following questionnaire, which should not take longer than 15 minutes. Your responses and other details will be considered highly confidential and treated as such by the Researcher and the University of Johannesburg. Responses will be analysed, and only consolidated results will be made available on request.

Please return the filled questionnaire to Ashley Netshidzati before the 15th of November 2013

Kind regards
Ashley Netshidzati
Tel: (041) 372 1708 / 082 451 9668
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1 ***To what extent do you agree or disagree that the main problem associated with the existing road network in Gauteng before the upgrading was traffic congestion?***

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

2 ***In your opinion, there was a strong need to upgrade the road network in Gauteng?***

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

3 ***Following your responses above, e-toll is necessary for implementation?***

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

4 ***The upgrading of the roads and the implementation of e-toll will solve the congestion problems explained in Question 1?***

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

5 ***Considering the following options, what is your understanding regarding the main objective of the implementing e-toll?***

Objective	**Mark with X**
Congestion Relief	
Revenue Generation	
Finance the Facility	
Other (Specify)	

6 ***Tolling is an important component of an overall transportation strategy.***

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

7 ***Which of the following stages should the affected stakeholders (the road users) be involved during the lifecycle of the e-toll process?***

Stages	*Never =1*	*Seldom=2*	*Sometimes=3*	*Often=4*	*Always=5*
Initial Stage					
Planning Stage					
Implementation Stage					
Completion Stage					

8 How would you describe the consultation regarding the introduction of the e-toll?

	Mark with X
Poor	
Below average	
Average	
Above average	
Excellent	

9 How would you describe the transparency regarding the introduction of the e-toll?

	Mark with X
Poor	
Below average	
Average	
Above average	
Excellent	

10 When did you hear that you will pay for using the road?

.....

11 What do you think were the barriers that made the implementation process of the e-toll difficult?

Barriers	Mark with X
Technological and Practical	
The legal and Institutional Framework	
Acceptability	
Other (Please specify and explain)	

12 Please rank in order of YOUR importance, how the government and SANRAL can finance and maintain roads. 1 – not important, 2 – slightly important, 3 – important, 4 – mostly important, 5 – extremely important

Method Options	Ranks				
	5	4	3	2	1
User-pay Principle					
Increase Fuel levy					
Increase Income Taxes					
Not to Levy Basic Infrastructural Needs					
Other (Specify)					

13 Please rank in order of importance where you think the revenue that will be raised through tolling should go to: 1 – not important, 2 – slightly important, 3 – important, 4 – mostly important, 5 – extremely important

Policy Options	Ranks				
	5	4	3	2	1
Maintain and Improve the Tolling Roads					
Improve Public Transport					
Distribute to other Public Services					
Better Enforcement of Traffic Regulations					
Other (Specify)					

14 I would continue to use my car to work once the public transport system in Gauteng has been improved?

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
5	4	3	2	1

15 Indicate the degree of assurance on confidence you have in SANRAL concerning their ability to keep your personal details for toll collection purposes confidential (Mark with X):

Degree	Mark with X
No Confidence	
Moderate Confidence	
Complete Confidence	

Thank you for your co-operation in completing this questionnaire. Kindly return the questionnaire, as specified in the cover letter.

Appendix C

Analysis of Research Questionnaires

Question 1: To what extent do you agree or disagree that the main problem associated with the existing road network in Gauteng before the upgrading was traffic congestion?

Question 1	Frequency	Percentage
Strongly Agree	28	58%
Agree	15	31%
Uncertain	1	2%
Disagree	3	6%
Strongly Disagree	1	2%
Total	48	

Question 2: In your opinion, there was a strong need to upgrade the road network in Gauteng

Question 2	Frequency	Percentage
Strongly Agree	25	52%
Agree	18	38%
Uncertain	1	2%
Disagree	3	6%
Strongly Disagree	1	2%
Total	48	

Question 3: Following your responses above, e-toll is necessary for implementation?

Question 3	Frequency	Percentage
Strongly Agree	6	13%
Agree	9	19%
Uncertain	7	15%
Disagree	13	27%
Strongly Disagree	13	27%
Total	48	

Question 4: The upgrading of the roads and the implementation of e-toll will solve the congestion problems explained in Question1?

Question 4	Frequency	Percentage
Strongly Agree	4	8%
Agree	9	19%
Uncertain	8	17%
Disagree	14	29%
Strongly Disagree	13	27%
	48	

Question 5: Considering the following options, what is your understanding regarding the main objective of the implementing e-toll?

Question 5	Frequency	Percentage
Congestion Relief	14	29%
Revenue Generation	31	65%
Finance the Facility	3	6%
other (Specify)		
Total	48	

Question 6: Tolling is an important component of an overall transportation strategy.

	Frequency	Percentage
Strongly Agree	3	6%
Agree	11	23%
Uncertain	8	17%
Disagree	8	17%
Strongly Disagree	18	38%
Total	48	

Question 7: Which of the following stages should the affected stakeholders (the road users) be involved during the lifecycle of the e-toll process?

	Frequency					Percentage				
Stages	Never	Seldom	Sometimes	Often	Always	Never	Seldom	Sometimes	Often	Always
Initial	4	0	3	4	37	8%	0%	6%	8%	77%
Planning	4	4	5	11	24	8%	8%	10%	23%	50%
Implementation	5	4	2	10	27	10%	8%	4%	21%	56%
Completion	10	2	2	9	25	21%	4%	4%	19%	52%
Total	48									

Question 8: How would you describe the consultation regarding the introduction of the e-toll?

	Frequency	Percentage
Poor	30	63%
Below average	6	13%
Average	10	21%
Above average	2	4%
Excellent	0	0%
Total	48	

Question 9: How would you describe the transparency regarding the introduction of the e-toll?

	Frequency	Percentage
Poor	30	63%
Below average	6	13%
Average	10	21%
Above average	2	4%
Excellent	0	0%
Total	**48**	

Question 10: When did you hear that you will pay for using the road?

	Frequency	Percentage
During planning stage	4	8%
During the gantries installations	36	75%
Post the gantries installations	8	17%
Total	**48**	

Question 11: What do you think were the barriers that made the implementation process of the e-toll difficult?

Barriers	Frequency	Percentage
Technology and Practical	1	2%
The Legal and Institutional Framework	10	21%
Acceptability	32	67%
Other (tariff too high)	5	10%
Total	**48**	

Question 12: Please rank in order of YOUR importance, how the government and SANRAL can finance and maintain roads.

	Frequency					Actual Score	Possible Max Score
Ranking	**5**	**4**	**3**	**2**	**1**		
User-pay Principle	**5**	**4**	**3**	**2**	**1**	110	
Increase Fuel levy	5	6	8	8	21	144	
Increase Income Taxes	11	11	6	7	13	97	
Not to Levy Basic Infrastructure	2	4	8	13	21	122	
Other (Fiscus)	11	11	6	2	1	85	
Total	**48**						**240**

Question 13: Please rank in order of importance where you think the revenue that will be raised through tolling should go to:

	Frequency					Actual Score	Possible Max Score
Ranking	**5**	**4**	**3**	**2**	**1**		
Maintain and Improve the Toll Roads	27	10	3	2	6	194	
Improve Public Transport	11	21	6	4	6	171	
Distribute to other Public Service	2	4	16	2	21	99	
Better Enforcement of Traffic Regulations	0	0	2	33	11	83	
Other (new routes)	5	0	0	0	0	25	
Total	**48**						240

Question 14: I would continue to use my car to work once the public transport system in Gauteng has been improved?

	Frequency	Percentage
Strongly Agree	14	29%
Agree	7	15%
Uncertain	15	31%
Disagree	5	10%
Strongly Disagree	7	15%
	48	

Question 15: Indicate the degree of assurance on confidence you have in SANRAL concerning their ability to keep your personal details for toll collection purposes confidential (Mark with X):

	Frequency	Percentage
No Confidence	22	46%
Moderate Confidence	14	29%
Complete Confidence	12	25%
Total	**48**	