Assumed models of human behaviour in the promotion campaigns of public and non-motorised transport in the Gauteng City Region

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Declaration

By submitting this research report, I declare that the entirety of the work contained therein is my own work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by the Witwatersrand University will not infringe on any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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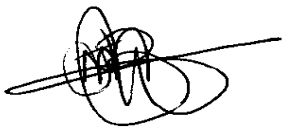

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On the **21ST** day of **May 2018**

Abstract

This study applied a case study approach to analyse assumed human behaviour models applied in the conceptualisation and implementation of the promotion campaigns for public and non-motorised transport in the Gauteng City Region and how this might have influenced the transition towards public transport and non-motorised transport. Besides the primary data collected through interviews with diverse participants, secondary data from reports and media articles were captured and analysed. The study found a diverse range of promotion campaigns for public and non- motorized transport such as *You make Joburg great* and the *Ecomobility Festival*. The related promotion campaign activities included educational campaigns and billboard messaging. Using behavioural insights such as prospect theory and rational choice theory, the study analysed the activities and tools of the promotion campaigns in order to understand the predominant assumed model. The study finds that the rational agent model of human behaviour was the most assumed model for the promotion campaigns.

Due to the fact that the outcomes of the campaigns were not systematically evaluated, specific transition-impacts of the assumed model could not be analysed and therefore no relevant finding could be made on the related sub-question. However, secondary data sources clearly indicate that IMT use continues to grow in Gauteng City Region in spite of the ongoing campaigns. The study therefore went on to identify gaps within the delivered campaign activities and considered better ways to improve such campaigns in the context of the non-rational model. The study finds that in spite of close to over three decades of scientific questioning of the rational model, the model remains as the predominant framework in the promotion campaigns for PT and NMT. Although there might be other contributing factors, this predominance of the framework possibly undermines the anticipated impacts, and in particular, inhibits the responses to such campaigns and overall transitioning towards public and non-motorised transport.

Key words: *econs*, framing, non-motorised transport, non-rational model, nudging, promotion campaign, public transport, rational model.

Dedication

I would like to dedicate this work to my son, Eldrick Mlambo for enduring my absence, my late father, Simon Muzhizhizhi, my mother, Marble Muzhizhizhi and my sister, Edith Muzhizhizhi for their love and support during my study.

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Table of contents

Contents

List of Figures

List of tables

List of abbreviations and acronyms

BRT	Bus rapid transit
COJ	City Of Johannesburg
GCR	Gauteng City Region
GCRO	Gauteng City Region Observatory
GDRT	Gauteng Department of Roads and Transport
GHG	Green House Gas emission
GMA	Gauteng Management Agency
IMT	Individual Motorised Transport
JRA	Johannesburg Road Agency
JUCA	Johannesburg Urban Cyclists Association
NMT	Non-motorised transport
OTM	October Transport Month
PT	Public transport
TOD	Transit Oriented Development
UJ	University of Johannesburg
UK	United Kingdom
UNEP	United Nations Environmental Programme

Chapter 1: Introduction and background to the study

1.1 Introduction

It is clear that the prevailing passenger transport systems in the Gauteng City Region (GCR) are unsustainable as a result of the predominant and ever expanding role of individual motorised transport (IMT). According to the United Nations Environment Programme, UNEP, (2009), the existing IMT systems are heavily reliant on the consumption of non-renewable fuel sources (especially oil), produce high levels of pollutants which degrade air quality, human health and make substantial contribution to the problem of global warming.

One more point of importance is that IMT supports energy intensive lifestyles amongst the middle and upper classes who fail to recognise the inevitable nature of ecological limits. In addition, IMT provides a high level of personal mobility at great expense to social and ecological systems, exacerbates and maintains high levels of inequality and undermines the quality of urban life, especially, with regards to public space. IMT creates "inhumane and inflexible urban space" (UNEP, 2009:19). In addition, the inefficient and unsustainable use of land through urban sprawl also leads to high dependency on IMT. This is because IMT incentivises homes which are located in the city periphery and people need to regularly commute to the city for basic amenities including work (Moody, 2012), with IMT as the most preferred mode of transport. IMT still remains the most popular mode of transport due to the associated personal benefits such as convenience, comfort and maintenance of individuals' socio-economic status that is associated with car ownership.

IMT dependency also encourages sedentary lifestyles (characterised by little physical activity) thereby undermining health and social integration (Moody, 2012). The need to reduce IMT-dependent lifestyles is also supported by the former executive director of the UNEP, Klaus Toerpfer, who stated that "We are coming to the conclusion that there is no space

for cars in cities" (UNEP, 2009:19). The problematic nature of urban transport systems therefore, needs a transition towards systems which are sustainable and urban forms which incentivise sustainable modes of transport. The promotion of non-motorised transport and public transport would in turn reduce high dependence on IMT and its negative socio-economic and resource/ environmental impacts.

1.2 Background and context

1.2.1 Reasons for promoting non motorised and public transport

Attaining a modal shift from IMT to public transport and cycling are the primary goals of most transport planning city authorities. As a result of constant increase in travel demand and insufficient private transport infrastructure, public transport in cities presents many advantages, not only in terms of sustainability, but also in terms of efficiency, safety and many other benefits which shall be discussed.

Benefits of non motorised transport

Non motorised transport (NMT) provides essential mobility, affordable transport, access to motorised modes, physical fitness as well as enjoyment (Litman, 2012). Other identified benefits include personal gains, infrastructure enhancements and the alleviation of negative environmental impacts. Heierli (1993) highlights that in medium-sized cities in countries such as Japan, Germany and the Netherlands, about 40% to 60% of all trips are done through walking and cycling while in Indian cities, this share is as high as 80%. In Africa, NMT is not driven by the type of benefits identified above because it happens as a matter of necessity. The majority of urban inhabitants in Sub-Saharan Africa (SSA) who are dependent on NMT are from low-income households whose transport expenditure accounts for 10% to 20% of family income (SSATP, 2005). Moreover, NMT generates non-skilled employment and is crucial in maintaining the incomes of some of the most vulnerable urban inhabitants since it can be used for hire, with pedicabs as one example.

According to Whitelegg and Williams (2000), NMT makes a major contribution to decreasing air pollution by providing an extensive and attractive alternative to heavily polluting motorised transport. There is also a general acceptance that there are essential links between transport systems and poverty. Further, NMT offers significant benefits for vulnerable groups such as the sick, the elderly, women and children especially in the developing world where the majority live in poverty. Continued dependence on IMT impacts most heavily on the poor and the sick. It also negatively affects NMT by making it unsafe even for the poor. The construction of infrastructure to cater for increased IMT disrupts the built environment and communities.

NMT therefore, emerges as a key solution to the highlighted challenges of IMT. Regardless of the significant and obvious advantages that NMT has for sustainability objectives, it is under threat in the developing world and in some cities even though intensive efforts have been made to promote it. This is usually justified by opinions that slow-moving NMT obstructs faster modes of transport resulting in congestion. The other opinion is that NMT projects the wrong image for cities wishing to attract foreign investment and achieving a world class status (Whitelegg and Williams, 2000). This is possibly because of the perception and association of NMT with high poverty levels.

Benefits of public transport (PT)

According to Carrigan *et al*. (2013), PT gives citizens the choice to move freely, safely and sustainably through the city, thereby creating inclusive, healthy and accessible cities. PT also reduces local air pollutants such as carbon monoxide and other greenhouse gases which pose environmental and public health concerns. Further, construction, operation and maintenance of PT infrastructure such as the Bus rapid transit (BRT) systems, creates jobs which may result in a net increase in the number of employed people, or merely a shift of workers from one job or sector to another. In some cases, these systems create new jobs in the formal economy that replaces informal jobs from the existing traditional transport

system. For example, the employment impact due to the implementation of TransMilenio BRT system resulted in a net gain of 1 900 to 2 900 permanent jobs in operations as well as 1 400 to 1 800 temporary jobs per month during construction. It is also worth noting that these were new jobs in the formal sector replacing informal jobs from the traditional system (*Ibid*., 2013:43). The positive impact of PT on quality of life, social inclusion and the environment cannot be underestimated. According to Pardo (2013:2), Guayaquil (Shanghai) restored its waterfront as part of a large redevelopment plan which also included a BRT System and a housing improvement project (see Figure 1). Previously an area of high crime rate, the riverfront is a place where citizens can enjoy public space and have an additional opportunity for daily leisure.

Although PT enables the economy to grow, if not well-controlled, it can also impede growth and the efficient delivery of necessary social services.

Figure 1: Public space. Source: Pardo, 2013:2.

In South Africa, low-income families spend more than 20% of their household income per head on public transport (Lehohla, 2015:33). According to Bernstein *et al*. (2005), households in car-dependent cities in

the United States (U.S) spend more on transport than on mortgages. This explains why oil price increases oriented to the subprime mortgage meltdown in late 2007. In addition, continuing non-viability of car-dependent urban sprawl threatens the desertion of suburbs, in a manner comparable to the kind of inner-city abandonment experienced in U.S cities in the 1960s.

However, transit-oriented developments (TOD) (see the concept in Figure 2) can offer cities economic advantages without this vulnerability. TOD implies that public transit corridors are planned in conjunction with land policies in order to complement each other such as in the case of Bogotá's BRT system (South African Property Owner's Association and South African Cities Network, 2016). Most of the cited benefits of TOD show that people living in TOD, for example in the US, had the same age and income attributes as those not living in TOD but had one less car per household. This led to a 20% increase in their household wealth (Bernstein *et al*., 2005).

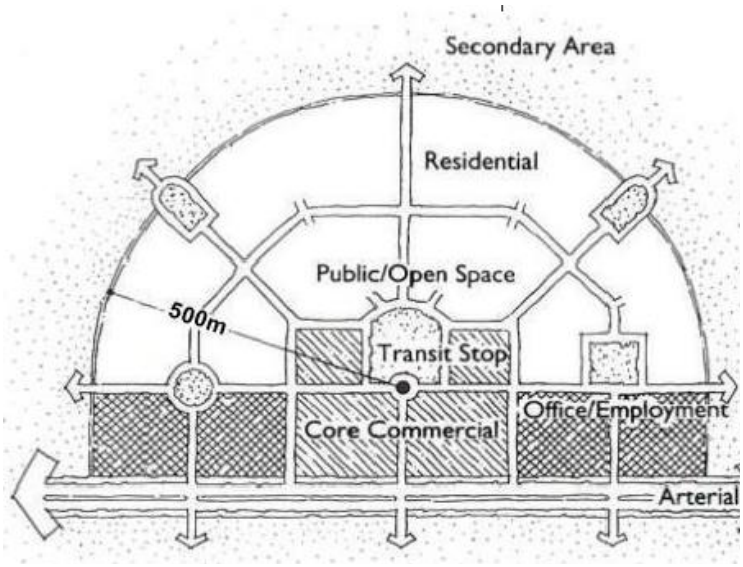

Figure 2: TOD concept. Source: South African Property Owner's Association and South African Cities Network, 2016:9.

1.2.2 Public transport and non-motorised transport promotion in the GCR

In an attempt towards mitigation of escalating reliance on IMT in the GCR, there has recently been a wide range of infrastructure and services investments in public transport (PT) and non-motorised transport (NMT) with the aim of ensuring livable and pollution free cities. The infrastructure and services include the *Gautrain*, the *A re Yeng* and the *Rea Vaya* BRT as quality forms of PT; and the promotion of cycling. The green campaign initiated in 2011 by the Gauteng Department of Roads and Transport (GDRT) led to the implementation of policies such as the non-motorised transport (NMT) policy and the green transport policy (GDRT, 2015). These were initiated in order to reduce the country's carbon footprint and improve air quality in the City of Johannesburg (COJ) which is currently at 370 parts per million mainly as a result of exhaust gases from vehicles (Johannesburg Development Agency, 2011). Further, motorists need to cut down on fuel costs and toxic gases by switching to PT and NMT.

On pursuing the goal towards livability, COJ highlighted that there is a need to promote PT and NMT as transport choices coupled with the enhancement of the relevant infrastructure. The initial purpose of the construction of the *Gautrain* was to reduce traffic congestion, especially, between Pretoria and Johannesburg. The negative side effects of the congestion include loss of productive time, higher transport costs and accident rates valued at about R300 million per year. Traffic congestion also impacts on the quality of life since it negatively affects air quality and public health (Johannesburg Development Agency, 2011).

In an effort to address the mentioned challenges, the GDRT and various stakeholders have invested in several promotion campaigns to promote the uptake of PT and NMT (as indicated in Chapter 4). Different stakeholders implemented the *Ecomobility Festival 2015* to promote PT and NMT modes of transport. For public transport promotion, *A re Yeng* and *Rea Vaya* BRTs engaged in a number of promotion campaign activities such as "*You make Joburg great*", "*Travel for less*", *October*

transport month 2016 and road safety campaigns. On the other hand, the *Gautrain* Management Agency (GMA) employed promotion campaign activities such as "*It is the season to give*", *"Discover Gauteng the sleeping giant*", "*Jump on the gift train"* and the "*Gautrain fame"*. Public and civil society entities such as Johannesburg Urban Cyclists Association (JUCA), The *Freedom Ride, Fixin' Diaries* and COJ implemented NMT promotion campaigns. These entities were all involved in the *Freedom Ride, Cycle Jozi Week* and the *Ecomobility Festival.* COJ also employed a two week cycling promotion campaign at the University of Johannesburg in 2015.

Despite intensive implementation of these promotion campaigns, the available statistics for Gauteng show that a larger number of workers still rely on IMT and other forms of unsustainable transport whereby 30.4% use minibus taxis, 44% are car/bakkie drivers or passengers, 12.5% use trains and buses, 12.2% walk and 1% use other forms of transport (Lehohla, 2013:40). In 2014, the ridership for *Rea Vaya* decreased from nearly 63 000 passengers to 55 000 passengers per day and almost 10 000 passengers at each *Rea Vaya* corridor (Venter, 2014: unpaginated). This decrease in ridership could imply that more commuters are using IMT as well as unsustainable minibus taxis as supported by the indicated statistics.

In 2012, *Rea Vaya* stated that they aimed to reach a target of 100 000 passengers per day in 2013/2014. Nevertheless, only an average of 36 081 passengers per weekday was achieved in 2013, compared to the adjusted targeted average of 50 000. In 2014 an average of 45 000 weekday passengers was recorded, compared to the anticipated 85 000 passengers. The 2015 statement, different from the 2014 statement, indicates an average of 40 000 passengers per weekday against the targeted 70 000 passengers. These figures indicate a reduction in ridership from 2014 to 2015 (South African Property Owner's Association and South African Cities Network, 2016:58).

On the other hand, the *Gautrain* has been fairly successful in changing the mode of transport for a considerable number of commuters in the GCR. There was a 33% increase in the number of passengers using the Sandton *Gautrain* station from 2011 to 2015 (from 7 588 weekday passengers to 11 349). Further, the number of weekday passengers that make use of the Midrand *Gautrain* station has more than doubled from an average of 1 906 in 2011 to 4 781 in 2015 (South African Property Owner's Association and South African Cities Network, 2016:55-57). However, the indicated figures show an increase over a period of four years. This possibly signifies a slow increase in the number of *Gautrain* commuters. Further, there is still an increase in traffic congestion in the Sandton node which signifies a continuous increase in the use of IMT. This could mean that commuters who were using *Rea Vaya* BRT, NMT and other modes of transport could have gradually switched to the *Gautrain* or IMT.

In light of the above, there is still a major gap to be addressed regarding the slow switch to public transport even after infrastructure investments and promotion of service campaigns have been implemented. In most cases, practitioners, policy makers and other professionals are shown to have focused much on the 'first mile' problems, which are efforts to develop new PT and NMT services, while minimum effort is given to the 'last mile' (Soman, 2015:7) where citizens decide to use the services. In the last mile, little things like the manner of decision presentation, colour of the promotion papers/material and the agent delivering the promotion campaign significantly influence the process of choice and decision-making by citizens to use or not to use the PT and NMT services.

1.3 Problem statement

The GDRT aims at cutting down carbon emissions and increase sustainable mobility in the region's cities by reducing car dependency lifestyles and habits. According to the GDRT (2015) there is current

improvement of transport infrastructure and services for the buses and the trains (BRT and rapid rail) as well as the cycling lanes. In order to achieve a modal shift of commuters from cars and onto PT and NMT, two categories of methods are needed. These are car dissuasion (to make car use less popular) and promotion of better PT options (to make the options more attractive). This challenge constitutes the focus of this study.

Several of the promotion campaigns (see sub-Section 1.2.2 and Chapter 4) have been implemented in order to encourage and support the switch to PT and NMT. Despite the mentioned efforts by the GDRT and the respective city authorities, the high dependency on IMT continues to escalate, coupled with an almost stalled ridership for *Rea Vaya* bus rapid transit as indicated in Section 1.2.2. The responsible officials have acknowledged that there is a need for a behaviour change (GDRT, 2015). Should the prevailing gap persist, then the transition to PT and NMT together with the goals of liveability and sustainable mobility will remain unattained. Therefore, a need arises to investigate why, despite numerous promotion campaigns, the expected transition is yet to gain satisfactory momentum.

1.4 Rationale and overall study objective

The study aims to explore the models of human behaviour commonly assumed (explicitly or implicitly) by the professionals and policy makers in the promotion campaigns of PT and NMT. An understanding of such assumed models of human behaviour would enable the development professionals to understand why and how people think, decide and behave in relation to choices and decisions for or against PT and NMT. Further, this will help us understand the decision-making process as well as evaluate and improve on promotions. The study also provides an interdisciplinary perspective on human behaviour towards improving interventions and providing new tools for promotion of PT and NMT. Moreover, the study aims at substantiating on more relevant findings

underpinning human behaviour models for use by PT and NMT promotion practitioners. The objectives of the study were:

- To understand the predominantly assumed human behaviour models in the promotion campaigns for PT and NMT in the GCR.
- To understand the transitioning impacts of the human behaviour models in promoting sustainable mobility.
- To identify the assumed human behaviour models in the promotion campaigns of sustainable mobility in the GCR.
- To determine if the current assumed model of human behaviour in the promotion campaigns for PT and NMT undermines the potential of such promotions towards the shift to PT and NMT.
- To understand how commuters make choices and decisions towards PT and NMT modes.

1.5 Research Questions

The study process was guided by the following research questions:

1.5.1 Main research question

What is the predominantly assumed human behaviour model applied in the promotion campaigns for public and non-motorised transport in the GCR and how might this have influenced responses to such campaigns and overall transition towards PT and NMT-oriented cities in the region?

1.5.2 Sub-questions

1. What are the main promotion campaigns of PT and NMT initiated in the GCR in the last ten years?

2. How can assumed models of human behaviour (implicit or explicit) be identified within the promotion campaigns of PT and NMT in the GCR?

3. What is the predominantly assumed model of human behaviour in the conceptualization and the implementation of the promotion campaigns of PT and NMT in the GCR?

4. What are the related transitioning impacts of the assumed model in the promotion campaigns of PT and NMT?

1.5.3 Working hypothesis

The study hypothesises that the rational model of human behaviour prevails as the assumed model in the promotion campaigns for PT and NMT in the GCR and that the assumed model undermines the potential of such campaigns towards influencing choice and decision-making in favour of transitioning to PT and NMT in the GCR.

1.6 Overall research approach

A case study approach was used in the study where the cases were selected on the basis that they aligned with the research questions as well as the study objectives (Ferreira, 2012). The research approach was prioritised because it allowed the researcher to capture information regarding one promotion campaign at a time. The case study approach also offered the study a chance to collect detailed primary data. More so, the approach enabled the researcher to use techniques such as interviewing the marketing teams in the promotion campaigns and observing and analysing the promotion material for each campaign of PT and NMT.

The case studies gave a richer account of the promotion campaigns and also provided directions on issues for further research. Nevertheless, this type of design had its possible flaws such as not being as comprehensive as other research methods although it gave an in-depth understanding of the overall question of this study (Salkind, 2009). Secondary data for this study were obtained from journals, reports, books and the web sources. Guided by the prospect theory, the study also used insights from the behavioural economics field in order to understand the motivation, logic and behaviour in modern decision-making at an individual level, based on how people make choices towards sustainable modes of transport (see Chapter 2 on literature appraisal).

This study is based on the observation that the prospect theoretical field of behavioural economics and neuro-economics can facilitate our understanding on why there is still high car dependence in the GCR despite numerous promotion campaigns and services of PT and NMT which also continue to undermine the transition towards sustainable transport.

1.7 Delimitations and limitations of the study

Time constraints necessitated that the scope of the study be delimited to assumed models of the promotion campaigns. Collecting impact data and differentiating between impacts due to assumed model versus other influences such as affordability would not have been viable within the timeframes of the study. Similarly, readily available secondary data are difficult to disaggregate in order to evaluate the influence of the assumed behaviour models on the stalled modal shift.

For the purpose of this study, only the relevant promotion campaigns were evaluated. Other factors that affect ridership such as affordability and quality of services were deemed to be outside the scope of this study. In addition, the study neither focused on ethical concerns with regard to assumed models, nor on the manner of their influence on the campaigns themselves. The concern which is often raised that behavioural economics brain washes and manipulates consumers was therefore, considered to be beyond the scope of the study. However, existing understanding on this field has been systematically covered under literature appraisal in Chapter 2 (see Section 2.2).

Another limitation of the study was that it could not demonstrate if the marketing teams were consciously aware of the models being investigated since the study focused on investigating presumed (explicitly unknown) human behaviour models. As a result of inadequate evaluation data, the absence of improvement in the shift to PT and NMT could not conclusively tell if the predominantly assumed rational model was the main or only cause. Given that there could be other causes contributing to the observed

inertia besides rational or non-rational models assumed in the promotion campaigns, the study recommends this as an issue for further investigation.

With regard to the time-period, the study focused on the period since 2008 given that most of the promotion campaigns were initiated around 2008. No systematic campaigns were identified prior to 2008. The *Rea Vaya* BRT was launched in 2009 while the *Gautrai*n was launched in 2010. *A re Yeng* was only launched in 2014 while NMT promotion campaigns were mainly initiated after 2010 (first promotion campaign, *Freedom Ride,* was launched in 2014). The study therefore, focused on the past 10 years. Further, the City of Ekurhuleni BRT (*Harambee*) could not be involved in the study since the spokesperson indicated that they had encountered problems which impeded the operations of the buses. Therefore, during this study, *Harambee* BRT had not run any promotion campaigns except for stakeholder relations workshops in which the transport needs of various population groups were discussed.

The study was also restricted by inadequate data especially on the related transition impacts of the promotion campaigns for PT and NMT. This is due to the fact that most of the promotion campaigns were never evaluated in terms of costs and ridership outcomes. The findings of the study were based on secondary data on the persistent unwillingness of commuters to use PT and NMT as the primary modes of transport even after the promotion campaigns. Most importantly, commuters still depend on IMT and other unsustainable modes of transport despite the growing availability and quality-of-service in PT and NMT services.

The researcher also experienced a number of limitations during the course of this study. It was difficult to schedule interview sessions with *A re Yeng* (Pretoria BRT) marketing team members. In that case, the researcher had to email the questions since the interviewee informed the researcher that they did not have time for a face to face interview but would prefer to answer the questions at their own time. However, this limitation did not

undermine the research process since the required data were eventually obtained. Further, gaining a thorough understanding of a complex system within a short space of time was quite difficult. Having approached this topic as an outsider to the marketing and advertising sub-sector that undertakes these campaigns was also a limitation in that it needed sometime for the researcher to familiarise herself with the practice ethos of related marketing professionals.

1.8 Definition of key terms used in this study

Assumed model: With reference to the study, this refers to the rational versus the non-rational models of human behaviour as described by Kahneman and Tversky (2000). These models are termed assumed because they are never explicitly stated, acknowledged or motivated for in the conceptualization of most of the studies or the campaigns themselves.

Choice architecture: This concept uses nudge theory to design better choices for people. It refers to the way in which choice options are ordered and framed for evaluation purposes by the targeted audience. The choice architecture concept argues for a responsive framing of options in a way which biases for the more desirable option as the default or generally possible choice (Thaler and Sunstein, 2008). An example of choice architecture can be in the form of framing nudges such as “Ninety of one hundred use the *Gautrain* as a mode of transport” or “Ten of one hundred do not use the *Gautrain* as a form of transport.” The commuters are likely to react more positively to the earlier than the later statement.

Decoy choice: This is also called asymmetric dominance. A decoy choice occurs when there are two options that vary on two attributes. Choice X is better than choice Y on attribute one, but not as good on attribute 2. Adding a third option, Y*, that is worse than Y on both attributes shifts choices and decisions towards Y. Y* can be called a decoy choice because it is not really preferred, but shifts choices among the other two. For example, a consumer cannot choose between two head phones. X

has a sound quality index of 100 and a comfort rate of 50. Y has a sound quality of 50 and a comfort rating of 100.The addition of a third headphone Y* with a sound quality index of 40 and a comfort rating of 90 would be expected to increase the likelihood of consumers choosing Y (Soman, 2015).

Econs: Refers to an imaginary type (a model) of people who are imagined to exist (instead of real people) by economists, politicians and academics. In conventional economic theory, *econs* are imagined to always think logically and rationally, and are not influenced by various heuristic biases such as inertia, optimism, inability to delay gratification and false assumptions which generally cause "humans" to behave in ways that are irrationally unhelpful, and neglectful (Thaler and Sunstein, 2008). *Econs* also explains a model of people's and society's behaviour from an unrealistic-expectations perspective. The existence of *econs* as the ideal consumers is a fundamental concept in conventional Economic theory. The assumption that people are *econs* can be observed when PT and NMT promoters deliver information intensive campaigns and expect commuters to select the most sustainable forms of transport.

Heuristics: In simple terms heuristics can be referred to as choice and decision-making guided by "rules of thumb," which can be applied in many situations to save time and money. Whether they yield positive or negative outcomes, most of the times heuristics constitute a key component of everyday life and thus contribute to the natural or human thinking that is often characterised as irrational, instinctive, emotional, subjective and unhelpful – but more typical of human beings (Kahneman and Tversky, 2000).

Inertia: In line with Thaler and Sunstein (2008) this refers to commuters' preference to maintain using IMT instead of PT and NMT due to fear of

loss or lack of will power to make choices and decisions towards the promoted modes of transport.

Model: In the opinion of Goodwin *et al*. (2015), a model is a worldview, framework or mindset by which human behaviour is often explained or understood in order to gain insight on choices and decisions. Models cannot explain all human activities but are adequate to present a general perspective on behavioural outcomes out of a given socio-cultural/economic scenario. In the context of this study, the identified models are the rational and the non-rational models.

Non-motorised transport (NMT): This often refers to non-fossil-fuel-powered transport (and human powered) which includes walking, cycling, and alternatives mainly such as wheelchair, scooter and handcart. For this study, NMT only refers to cycling as a mode of transport (Litman, 2012; Whitelegg and Williams, 2000 and Heierli, 1993).

Non-rational model: A few authors (Gigerenzer, 2011, 2001; Kahneman, 2011) agree that the label "non-rational" indicates a type of theory, not a type of outcome. Non-rational theories postulate human agents with emotions, limited knowledge and little time as opposed to the commonly assumed omniscient rational being (as shall be investigated in this study). In addition, non-rational denotes a heterogeneous class of theories of decision-making designed to overcome problems with rational theories. Non-rational theories have also been denoted by various terms, including models of bounded rationality, System 1, procedural rationality as well as satisficing (Simon, 1956; Kahneman, 2011; Epstein, 1994 and Stanovich and West, 2000). However, there is still no agreed-upon definition of "non-rational". According to Gigerenzer (2001), non-rational theory of decision making is not the same as irrational theory of decision making because non-rational suggests a type of theory instead of an outcome. Therefore, the idea that non-rational theory proposes agents whose decision making

is guided by emotions, limited knowledge and time does not imply that such agents lack clear reasoning or logical thinking.

Nudge: This entails “any aspect of choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives’” (Thaler and Sunstein, 2008:6). Nudges are interventions that are conceptualized with the objective of countering cognitive biases and mistakes in choice and decision-making. They are subtle manipulations which can aid commuters to switch from IMT to BRTor *Gautrain* and NMT use.

Promotion: This is a process of engaging and communicating with commuters for the purpose of marketing PT and NMT products and services. According to Ahmed *et al.* (2015), it involves sending timely and relevant messages through appropriate media in order to ensure effective communication between the sender and the target audience. Such promotions are used whenever a marketer engages with a prolonged interaction with customers in order to gain maximum effectiveness from a customer-outreach investment.

Prospect theory: This is a concept which hypothesises on choice and decision-making by individual actors under conditions of risk and uncertainty (Kahneman and Tversky, 1979). While prospect theory is mainly associated with understanding risky choices based on monetary outcomes by individuals, it can also be applied to promotion campaigns of PT and NMT without compromising its principles.

Rational choice theory: According to Verba (1961), Hodgson (2012) and Stanovich (2016), this is an economic theory based on evaluating the available options and then choosing the most favourable option based on optimisation according to some consistent criteria.

Rational model: The rational model of choice and decision-making is also referred to as the reflective thinking, System 2 or *Econ* thinking and is assumed to be logical, rational, objective and unemotional. This type of thinking is equivalent to the type of data-gathering that sensors and machines can do which leads to the selection of one out of several options after completing a "three-step process of analysing the feasibility of the alternatives, pondering the desirability of the alternatives and finally choosing the best alternative by combining both desirability and feasibility" (Oliveira, 2007:14; Kahneman, 2011).

Risk averse: Kahneman and Tversky (2000) describe this concept as the preference for a certain outcome over an uncertain outcome, even when a higher expected gain is involved. In addition, people avoid engaging in an economic opportunity when they are uncertain of the outcomes. Risk averse can also be referred to as loss aversion where commuters are more sensitive to losses than to gains.

Risk seeking: This occurs when an individual makes a choice and decision to maximize profits/utility value when they are in the domains of loss (Kahneman and Tversky, 2000).

Public transport: It is also referred to as public transit, mass transit and urban transit and includes different transport services available to the general public, ranging from vanpools, buses, trains to ferries and their variations. For the purpose of the GCR case study, public transport covers rapid rail train services and BRT buses only (Carrigan *et al*., 2013).

Satisficing: In line with Goodwin *et al*. (2015), satisficing refers to the setting of minimally satisfactory qualities/outcomes and then searching for an option that at least satisfies these criteria. This therefore entails setting a satisficing threshold and accepting the first option that meets or surpasses the threshold. This implies that commuters have a set of

qualities that they look for such as transport reliability, affordability, comfort, punctuality and safety. Before they choose a certain mode of transport, commuters ensure that the promoted form of transport meets or exceeds their expectations.

Time discount rate: An economic theory concept which describes the relative weighting of current benefits or costs weighed against future benefits or costs. An individual who does not pay attention to the future costs of his or her actions would be labeled by economists as having a very high time discount rate. This means that in the individual's mind, future events are heavily discounted or lowly weighted compared to the gains (pleasures) of today (Goodwin *et al*., 2015:149).

1.9 The significance of the study

There is significant need for transitioning from lifestyles that are heavily dependent on motorized transport, especially the one car passenger/driver commuter, to sustainable modes of urban transport as shall be discussed in detail in subsequent chapters of the study. There is also a critical need to reduce the greenhouse gas emissions which are extremely high in the GCR as a result of high dependence on fossil-fuel based transport systems. As such, research on understanding why there is a slow transition to sustainable urban transport and how the transition could be fast tracked is important. Further, from the observations such as the pending peak-oil and social deprivation, the study aims to provide an interdisciplinary approach towards expediting the transition to sustainable transport.

The study also contributes towards a better understanding of the problem especially for policy makers and practitioners/professionals with regard to the obstacles and the possible solutions towards achieving the necessary change. If cities fail to expedite their transitioning towards more sustainable urban transport systems, their social, ecological and economic production will come under increasing risk of disruption. The worst of all is

that urban economies which depend highly on the availability of affordable fossil-fuels might begin to weaken due to the related impacts hence the urgency of the case for the transition.

There has been a substantial amount of research on sustainable transport-related issues in the GCR largely in relation to NMT, the BRT systems and the *Gautrain* infrastructure as well as its services. However, choice and decision-making in the promotion campaigns of these sustainable transport systems has previously received rather limited or no attention. Further, the current promotion campaigns are predominantly premised on the rational agent model instead of the non-rational agent model which best describes how real human beings make choices and decisions towards transitioning to PT and NMT. As a result, there is a lack of academic questioning of the human behaviour models commonly assumed in the promotion campaigns of PT and NMT in the GCR. The need for a study of this sort is therefore increasingly becoming crucial.

1.10 Structure and chapter outline of the research report

Chapter 1 forms the introductory part of the study and it provides the context, background, problem statement, rationale, main research question and the working hypothesis of the study. This chapter also gives a review on why sustainable urban mobility has become one of the critical goals towards livability in the GCR. Further, the chapter also introduces key terms and models of human behaviour which constitutes the theoretical basis of the study.

Chapter 2 of the study addresses literature appraisal in relation to the main concepts and the key themes (such as the prospect theory, the nudge theory and the rational and non-rational models of human behaviour) which have been applied to guide the identification of the predominantly assumed models of human behaviour in the PT and NMT promotion campaigns. Further, a case study in the United Kingdom (UK) from Organ *et al.* (2016) is reviewed to highlight the practical application of

a balanced rational and non-rational model approach in increasing the uptake of low carbon products and services by households. Chapter 2 also includes an analysis of the key attributes of the rational and non-rational models which subsequently guided data and analysis on the identification of the predominantly assumed model in subsequent chapters.

Chapter 3 gives a brief overview of the research design, data required and data collection tools as well as an overview on the approach on data analysis towards the derivation of sub-findings and overall findings of the study. Further, the chapter describes the data used in the study, how they were collected and how the sampling was conceptualized and implemented. The chapter also highlights the ethical considerations which guided the research.

Chapter 4 presents the data from the primary and secondary sources which were used in order to address the sub-questions in Chapter 5. Chapter 4 provides data and analysis on the sub-question relating to the key promotion campaigns while Chapter 5 answers how the assumed human behaviour models can be identified within the promotion campaigns of PT and NMT. Chapter 5 is also systematically linked to the theoretical framework as appraised through literature appraisal in Chapter 2. The chapter also concludes on how human behaviour models were discerned from the content of the promotion campaigns of PT and NMT in GCR.

Chapter 5 also provides an analysis of data on the predominantly assumed model of human behaviour during the conceptualization and the implementation of the promotion campaigns of PT and NMT as well as the hypothesised gaps within the conceptualisation and implementation of the promotion campaigns. The chapter also examines the sub-findings on the sub-questions and the interpretations which are consolidated towards the derivation of the overall findings and conclusions.

Chapter 6 provides a consolidation of the findings arising from the interpretation of data in Chapter 5. This chapter is also linked to the theoretical framework in Chapter 2 and further provides a linkage with the introductory sections of the study in Chapter 1. The overall conclusions and recommendations of the study are also covered in this chapter.

The study also provides a reference list and Appendices. Appendix 1 is a list of the interview questions for NMT and PT respondents from the promotion campaigns. Appendix 2 is a list of research interviews and interactions. Appendix 3 is an ethics clearance certificate.

Chapter 2: Literature appraisal

2.1 Overview

The study focuses on exploring the underlying models of human behaviour in the promotion campaigns of PT and NMT in the GCR. There is a need to focus on how commuters think and how the influence of social context shapes choice and decision-making, especially in the process of designing the promotion campaigns. Individual decision-making is affected by context, social norms and networks; and shared mental models (internal representations of the external world) (The World Bank Report, 2015).

Under literature review, the study chose and prioritized the literature based on the need to understand the rational and non-rational models of human behaviour and the key attributes of the models in order to concretize on the theoretical framework. By so doing, the study appraised literature around the concepts of the rational choice theory. Further, the study reviewed literature around prospect theory because deviations from the rational choice theory are increasingly captured under the prospect theory. In addition, prospect theory best describes decision-making under risk. Moreso, the study pursued the objective of identifying the assumed human behaviour models based on the content of the campaigns and the interviews undertaken as part of data collection process (see Chapter 3 on methods). The review also substantiates on what constitutes a promotion campaign in order to know the data that would be required towards identifying the models in question.

2.1.1 Promotion campaign

According to Ahmed *et al*. (2015), a promotion is a significant part of the marketing mix because it generates awareness of the product and persuades customers to buy/use it. A promotion campaign is similar to a planned system of communication considered to long-lasting and changing inconsistent and unpredictable customer behaviour as well as company's goodwill.

According to the Marketing Dictionary (2016), a promotion campaign can also refer to a series of advertisements using various marketing tools that share a similar message and thoughts in order to promote a business or a product. Promotion campaigns use different media resources such as newspapers, billboards, television commercials and digital space to send the message to targeted recipients. During promotion campaigns, tools such as direct marketing and sales promotions can be used with customized messages in order to meet the objectives of the promotion campaign.

There are three primary purposes of promotions which are increasing product awareness, persuading people to use the product and reminding people that the product exists (Kotler and Keller, 2007). The choice of the most appropriate promotion tools to use such as advertising and direct marketing depends on several factors including marketing goals and objectives, consumer preferences, and resources such as budgets, expertise and staff capacity. Marketers also use internet or interactive marketing as a promotion tool and the tactics include banner advertising, sponsorships, pop-ups or under, links or paid searches (Belch and Belch, 2007).

With reference to the various definitions of a promotion campaign, the study customized the insights in order to understand the forms of the promotion campaign tools and the activities that were used in the PT and NMT promotion campaigns (see Figure 3). These tools were analyzed (as substantiated in Chapter 5) in order to derive the assumed models.

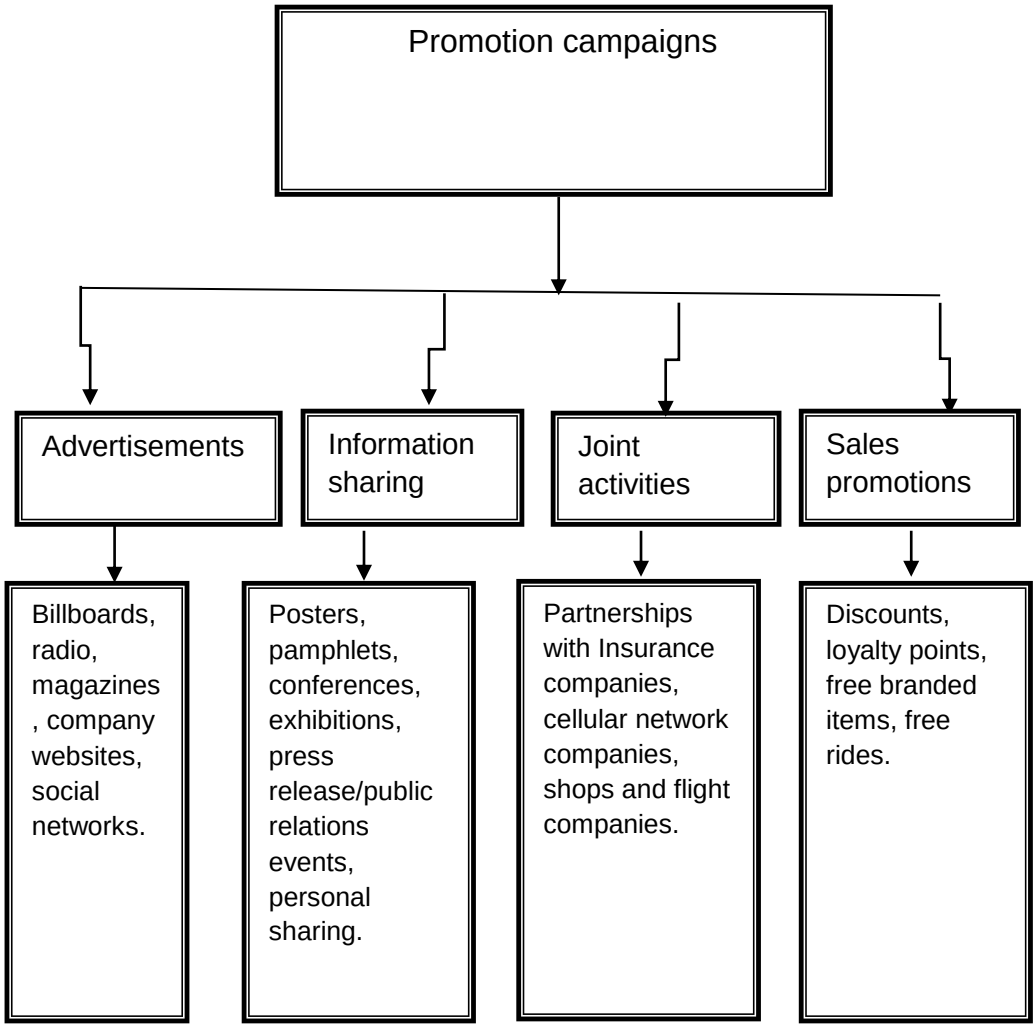

Figure 3: Diagrammatic explanation of a promotion campaign. Adapted from Belch and Belch (2007) and Kotler and Keller (2007).

2.1.2 Trends in PT and NMT within the GCR

In spite of the promotion campaigns undertaken for PT and NMT in the GCR, there is still no significant shift to such sustainable modes of transport. According to the 2011 quality of life index conducted by Culwick (2014:142), 39% of informal and formal employees in the GCR use cycling as a mode of transport while car and motorbike users amount to 60%. About 32% of unemployed commuters use cycling as a mode of transport while 11% of the same category use motorbikes or cars as modes of transport. These results indicate that a smaller percentage of the GCR population use NMT (cycling) as a primary mode of transport. Although the *Gautrain* is considerably performing better, Trangoš (2014) and Prim

(2016) conclude that a culture of IMT still predominates especially among the middle class because car use is associated with social status and wealth.

There is also an increased use of minibus taxis which have become the GCR's popular PT mode. Prim (2016) cites Vaz and Venter (2012) and indicates that in Soweto, *Rea Vaya* BRT is used by 30% only of employed commuters and is the second most used transport mode after the mini bus taxi. In addition, the development of the *Rea Vaya* BRT has failed to attract IMT users and those who rely on PT for their daily travel. Studies on the *Rea Vaya* BRT system in the past years reveal that the *Rea Vaya* is incapable of reaching the planned commuter volumes estimated prior to its development (see sub-Section 1.2.2). The *Rea Vaya* BRT system was developed with the perception that the COJ municipality would recover the development costs through the operation of the service but this has not been achieved due to low passenger ridership. Despite *Rea Vaya's* popularity, it has failed to become the first choice mode of transport for PT as per initial plan /intention.

2.2 The behavioural approach

Behavioural economics is described as a branch of economics that studies the behaviour of agents in economic situations. One of the chief objectives of behavioural economics is to describe and explain why in various circumstances, the agents manifest non-rational behaviour. Behavioural economics was founded by U.S researchers who highlighted that behaviourism is mainly based on behaviourist psychology (Stocker, 2011). It ought to be noted that a large part of the research on behavioural economics and the phenomena observed is common with those of behavioural finance, to the extent that the two fields are often closely related. The findings in particular emphasise the reality that economic decision-making is affected by psychological aspects (cognitive and emotional) which vary from the rationality ascribed to the *homo-economicus* (economic/rational man). The economic theory has therefore

been extended and transformed by the new insights, thus resulting in the new field of behavioural economics (Jarboui and Boujelbene, 2012).

2.3 Rational choice theory

Under the rational choice theory, conventional economists argue that human beings (as economic agents) have time, knowledge and computational ability to make quantitatively and cognitively deliberative choices and decisions at self-conscious level. The rational decision-making procedure is assumed to consist of a number of steps (Simon, 1977 and 1979):

- Intelligence: identifying circumstances for making a decision and choice
- Design: creating, developing and evaluating possible consequences of action
- Choice: choosing a particular result from a range of options available
- Review: weighing up past choices.

When this theoretical model of decision-making is adapted to how senior managers make decisions in reality, it is then assumed that the managers:

- are aware of all possible choices
- know the effects of executing every alternative available to them
- have a well-planned set of preferences for these effects; and
- have the computational skill to contrast the effects and to conclude regarding the most preferred option
- understand that similar options will necessarily result in the same decision choices.

According to Gigerenzer *et al.* (1999), there are many forms of rationality such as those illustrated in Figure 4. On the left side of the diagram are models that assume the human mind has unlimited reasoning capacity while on the right side are assumptions of limited reasoning power. Under unbounded rationality, people have no limitation of resources unlike what

real human beings face. Satisficing and fast and frugal heuristics are forms of bounded rationality that are applied when there is inadequate information as well as limited computation capacity for choice and decision-making.

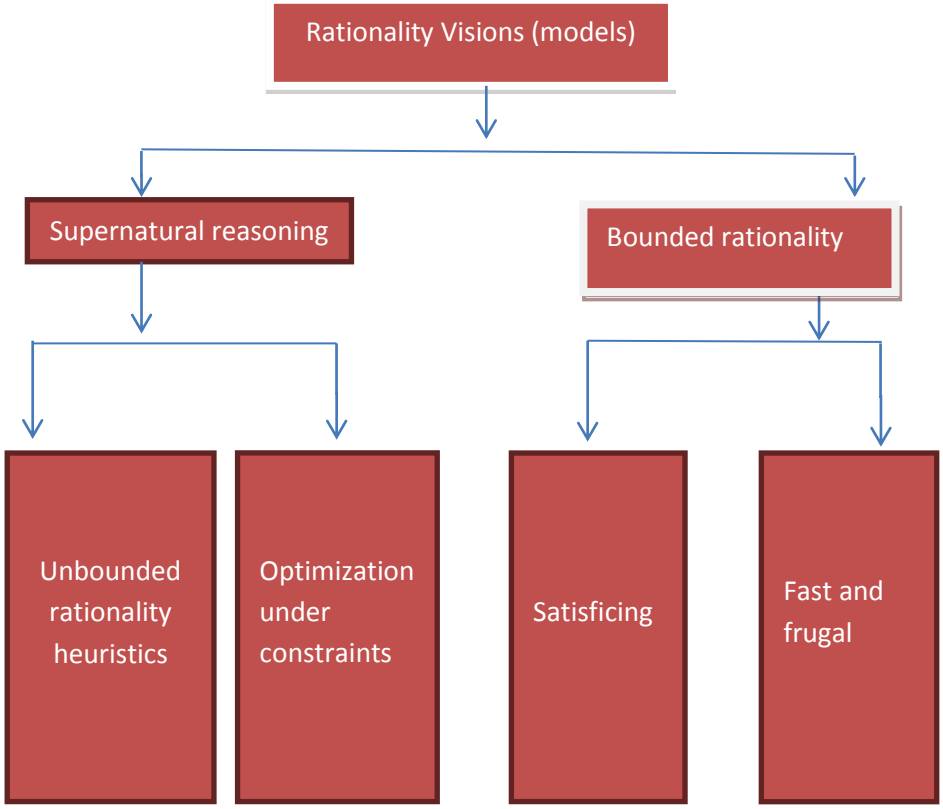

Figure 4: Forms of rationality. Source: Gigerenzer *et al*., 1999:7.

The study is based on the working hypothesis that the rational model of human behaviour is the predominantly assumed model in the promotion campaigns of PT and NMT which therefore, undermines the potential of such campaigns towards influencing choice and decision-making in favour of PT and NMT. Most of the programs aimed at the shift towards PT and NMT rely on information intensive campaigns in order to encourage the switch through a rational-choice approach. The primary assumption therefore, is that commuters need more information on the costs and benefits of PT and NMT in order to make decisions in favour of the promoted transport modes. There is also the assumption that commuters'

behaviour can be changed through the provision of economics-guided incentives.

Matthis and Steffen (2015) believe that two factors (preference and restriction) affect individual decision-making under the rational choice model. Preferences describe an individual's internal motives while restrictions account for the external incentives. Preferences are assumed to be unchangeable in the short term and therefore, cannot explain changes in short-term behaviour. It is therefore argued or assumed that it would be better to identify the kind of behaviour that is influenced by restrictions than by preferences. The behaviour of commuters can therefore be systematically influenced by changing incentives (restrictions). For example, traffic volumes can be more effectively reduced by a negative incentive of fuel price increase than by calls to refrain from car use. Similarly, a switch to PT could have been attained by giving away financial incentives such as discounted beer tours and R1 parking fee during the *Discover Gauteng the sleeping giant* promotion campaign. However, such behaviour change is only short term, for example, the 9.3% increase in the *Gautrain* ridership (Kesagee, 2016:6).

These claims align well with the rational choice theory which postulates that rational agents calculate the effects of their choice options in order to arrive at the most optimised decision. A rational agent chooses an alternative that maximizes utility by weighing the costs and benefits of the available options. The agents always do the best they can in each given circumstance regardless of the emotional effects of the decisions, for example, guilt feelings or reciprocity (Matthis and Steffen, 2015; Verba, 1961; Stanovich, 2016; Oliveira, 2007; Ogu, 2013 and Hodgson, 2012).

Concerning information intensive promotion campaigns, there is a possibility of the assumption of the rational agent model for the reason that such agents constantly require information about choices because they are born with a "fixed meta-preference function" (Hodgson, 2012:99).

According to Hodgson (2012:95), the best idea of rationality can be described as “following incentives or adaptation to circumstances”. In simple terms, the rational agent is self-calculating, self-maximizing and self-regarding. Individualism is the core attribute of the rational agent model.

Although Stanovich (2016) assumes that there are two types of rationality (instrumental and epistemic), the conclusion is that rationality concerns the maximization of expected utility. The action that the agent chooses should be the one with the highest expected value. Instrumental rationality is simplified as the optimization of a goal fulfillment by knowing and taking the best action while epistemic refers to how well a person’s beliefs align with the real structure of the world.

2.3.1 Weaknesses of the rational choice theory

Although the rational choice model is a predominant assumption in the conceptualization and implementation of the promotion campaigns of PT and NMT, it has critical weaknesses which render it inadequate for catalyzing the underlying behaviour-change for the required transitioning. The World Bank (2015:25) supports this postulation by concluding that the concept of the ‘economic man’ does not closely reflect reality. Policies based on related behaviour model often miss the opportunity for low cost and efficient interventions. In addition, Ogu (2013) and Hodgson (2012) challenge one of the rational choice model assumptions that decisions are consistent with the maximization of utility regardless of the environment, values, beliefs or situations. Although this assumption suggests that the agent can adjust to any type of environment, it is deemed too general and is inconsistent with the reality of choice and decision making. The assumption also fails to elucidate on the causes of such anomalous behaviour.

According to Hodgson (2012), the assumption that behaviour is consistent with profit maximization is misleading/flawed because some commuters might prefer a monetary reward that is lower than the expected outcome,

for example, the cost of using IMT per day amounts to R80 while the cost of using PT or NMT amounts to R40 per day. A commuter might still choose IMT even if PT or NMT is cheaper. The reason may be that there are circumstances which are not accounted for, (for example, personal comfort) or values which result in the choice of IMT. The conclusion is then that the commuter still maximises utility instead of monetary payoff, considering that utility can be intangible/can apply to any form of economic behaviour.

According to Verba (1961), the rational choice model treats each decision-point as a separate situation by ignoring other factors such as previous commitments. Consequently, the choice might be either to sustain/continue with the status quo or some limited form of such status quo. Hence, the commuters' criterion of choice will be based on better, at least or no worse than the current choice. This form of inertia in decision-making might be used to explain why commuters would still prefer to use IMT than the promoted modes of transport even in the face of promotion campaigns.

Another point of relevance is that the rational choice model assumes that human beings have unbounded willpower. The theory assumes that behaviour arises from a simple decision-making process where decision implementation is understood to run effortlessly yet people often lack the will power (inertia/do nothing) to execute decisions even when the utility-maximisation case has been made (Mathis and Steffen, 2015). Further, the complexity of the calculations and information processing required by this model in order to make a decision are beyond the ordinary prioritization ability of individuals, groups or even modern computer systems. Whereas the mind has immense capacity, ordinary decisions use very little of this capacity. For these reasons, rationality models cannot fully operate in the real world which is characterised by inadequate information especially where choice alternatives are not explicitly obvious to decision makers for selection. In fact, decision makers often have to

search for such options and this entails will and effort and thus a time consuming process (Verba, 1961).

The above weaknesses of the rational model suggest that the assumption of such a model in the conceptualization and implementation of PT and NMT promotion campaigns would limit their impact towards a successful transition from IMT. This clearly shows that the non-rational theory as an alternative model needs to be applied in such campaigns in order to address the highlighted weaknesses. The discussion on the alternative model is captured under the prospect theory of choice and decision-making.

2.4 Prospect theory

According to Kahneman and Tversky (1979), prospect theory is an alternative model to the expected utility theory, where choice and decision-making during uncertainty highlights effects that are inconsistent with the findings of utility theory. Prospect theory appears to be an expansion of Simon's (1956) theory of bounded rationality. The theory concludes that the assumption of perfect rationality is contrary to the reality of processes that human beings employ for choice and decision-making in complex circumstances. In addition, prospect theory dismisses assumptions of rationality such as theories of unbounded will power, self-interest and perfectly rational behaviour as discussed in Section 2.3.

McDermott (1998:20) cites Kahneman and Tversky (1979) and explains that under prospect theory, decision-making occurs in two phases which are the editing/framing and the evaluation phase. The editing phase/framing phase involves framing effects while the evaluation phase entails a selection of options based on a subjective value (value function) and perceived likelihood. According to Barberis (2013:175), prospect theory incorporates four main features which are reference dependence, loss aversion, probability weighting and diminishing sensitivity (as discussed from Section 2.4.1 to 2.4.4). Further, the value function incorporates loss aversion, risk aversion and diminishing sensitivity while

the probability weighting function involves overweighting of small probabilities.

2.4.1 Reference dependence

According to Kahneman and Tversky (2003) and Barberis (2013), decision makers derive utility from gains and losses which are measured in relation to a reference point instead of a final outcome. The decision maker evaluates the options and chooses his/her best option. The evaluation is done based on the value function and the weight function. Under prospect theory, value refers to a function of change in a positive or negative direction instead of wealth or welfare, unlike in the expected utility theory. In addition, change is evaluated in relation to a reference point; value is obtained as a result of the variation between the reference point and the amount of shift (negative or positive) from it. Further, the value function is deemed to be of convex form below the starting point and concave form above that point and thus forms an **S** shape as illustrated in Figure 5 (Kahneman and Tversky, 1979).

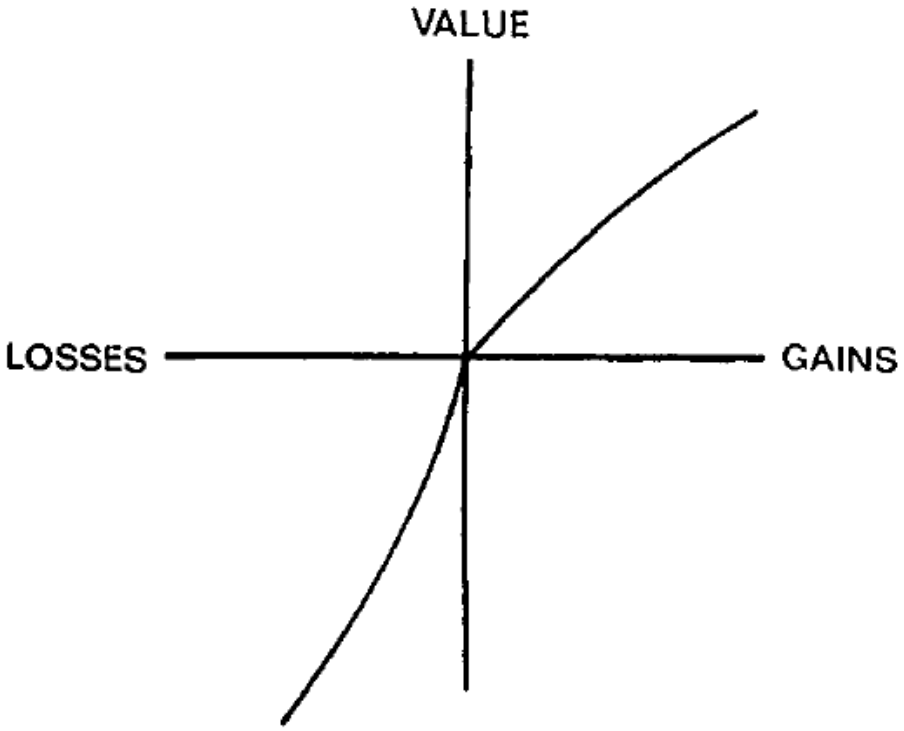

Figure 5: A hypothetical value function. Source: Kahneman and Tversky, 1979:279.

The starting point is equivalent to the status quo. The right side represents gains or stability while the left side represents losses (when a crisis occurs). The slope measures the sensitivity to change whereby sensitivity is high at the reference point and decreases as the distance from the starting point increases. Therefore, there is more effect closer to the point of reference than far from it. This can be illustrated in the impact that an individual puts more value on the $10 difference between $10 and $20 than the $10 difference between $110 and $1120 (Kahneman and Tversky, 2003).

2.4.2 Loss aversion

Derived from prospect theory (Kahneman and Tversky, 2003 and 1979), this is the tendency of individuals to assign more value to losses than gains. Loss aversion also means that the fear of possible loss tends to outweigh the pleasure of possible gain. Moreso, the pain of a loss is much

higher than the pleasure of a similarly related gain (for the same experience or the same possession). People are more sensitive to losses than gains. The value function is steeper in the domains of losses than gains. For example, there is more pain in losing R100 than the pleasure of gaining R110.

According to Liu (1998), loss aversion explains why people have a status quo bias and are highly unwilling to give up the possessions or status they already have. Moreover, the status quo bias could explain the gap between the buyer price and the seller price based on the fact that the seller views selling the possession as a loss and a violation of the status quo. In order to compensate for this disturbance of his/her status quo, the seller then asks for a higher price than they agree to if they were the ones buying the product. This is also linked with the endowment effect as reviewed in sub-Section 2.5.1.

The literature on loss aversion might explain how commuters behave in response to the PT and NMT choices in the promotion campaigns. Commuters can therefore be expected to be unwilling to give up their vehicles in exchange for the prospective PT and NMT. According to Triandis (2001), IMT users possibly have an individualism mindset where the motorists believe that they are independent from others, their life belong to themselves and can live it as they see fit. Further, the motorists believe that they can keep and use the vehicle as a product of their effort. Consequently, there is no effort needed to shift to PT or NMT as collective forms of transport. This also suggests the self-preservation element of the rational agent, where choice and decision-making is centered on the individual/ the “self” as argued by Matthis and Steffen (2015), Verba (1961), Stanovich (2016), Oliveira (2007), Ogu (2013) and Hodgson (2012).

According to Thaler and Sunstein (2008), framing of options also affects the choice and decision-making process. This is because framing of options determines how a presented choice is received. In the context of

this study, the manner of the presentation of the promotion campaigns influences how commuters determine or assess losses or gains. The manner of presentation, therefore, indirectly influences the choice and decision-making process of the commuters. Tversky and Kahneman (2003) further state that norms, habits and individual anticipations also affect the notion of framing. In relation to this study, practitioners can emphasize switching to PT and NMT saves money and time, for the IMT user which is lost due to traffic congestion. This implies that the framing is done in relation to the economic model of human behaviour or the *homo economicus* approach since it prioritises gains as the critical change-factor.

If they had framed the information with reference to loss, the same campaign could be framed around the fact that people lose half of their time and money if they do not switch to PT and NMT, or people could lose 50% of their income towards fuel if they do not use PT/NMT as their primary modes of transport. The feelings of loss accordingly trigger risk taking, which is the assumption of the non-rational model. The fear of loss and negativity creates a strong incentive towards the shift to PT and NMT because in reality, negative frames have a higher impact than positive frames. Further, the presence of a decoy choice on presented choice-architecture also affects decision-making owing to the fact that there is a need for comparison of options in order to make decisions (Soman, 2015). Understanding the above concepts helped the study to identify the assumed models of the promotion campaigns as executed through channels such as billboards and social media among others.

Another way of framing messages is achieved through the application of the sunk-cost effect (see Section 2.5.1). Thaler (1999:191) gives an example of an individual who buys a pair of shoes. The shoes hurt the first time the individual wears them. The individual tries them again after a few days but they still hurt. The individual still keeps the shoes because they were expensive. The higher the price paid for the shoes, the longer the

consumer is likely to keep them. However, the consumer eventually discards the shoes (regardless of the price) once the shoe price is cognitively considered to have been fully depreciated. In this case, the higher price paid for the shoes drives the consumer to continue wearing them despite the considerable physical pain.

Similarly, public transport users can be allowed to pay for fares on a long term or short term basis in order to maximise their use of the service, for example, they can pay a weekly fee such that failure to use the service paid for (within a week) results in the loss of the payment. This sunk cost promotes endurance until the bitter end since customers are likely to feel they have invested too much at the start and are therefore willing to tolerate/use the service for longer. However, it is important to note that sunk costs get ignored in the long run. The sunk cost effect can also possibly explain the reverse aspect better, where once a commuter has invested in a car, it will require a lot more effort to get them out into PT and NMT. This possibly poses the likelihood that it might be easier to get commuters to commit to PT and NMT before they acquire cars compared to after.

2.4.3 Diminishing sensitivity

According to Barberis (2013), the value function is convex in the domain of losses and concave in the region of gains. Further, replacing R100 gain with a R200 gain has a bigger utility impact compared to replacing a R1000 gain with a R1100 gain. The same impact is applied in the domain of losses. This concludes that people are risk averse over moderate probability gains, for example, during a promotion, commuters may prefer a certain gain of R500 to a 50 percent chance of R1000. In addition, people are risk seeking over losses as demonstrated by consistent findings where a 50% chance of losing R1000 is preferred to a definite loss of R500. The concept of diminishing sensitivity is applied in the framing of PT promotion campaigns such as discounts. The “Switch and tap” promotion could apply the diminishing sensitivity concept by indicating

that *Rea Vaya* passengers may lose 50% or R500 of every R1000 spend without a smart card. Commuters would prefer a 50% chance of losing R1000 to a definite R500 loss.

2.4.4 Probability weighting

According to Barberis (2013), low probabilities are overweighted while high probabilities are underweighted. In simple terms, individuals overweight the unlikely extreme outcomes, for example, in lotteries, people prefer 0.001 chance of gaining R2000, to a sure gain of R2. McDermott (1998) also points out that when a situation has elements of uncertainty or big prize, people prefer risky choices and decisions. In situations where an expected occurrence has never happened before, such as floods, people frequently make their own intuitive and biased assessments because it is difficult to capture such phenomenon in the imagination of most people. Further, there is no adequate experience that can be used in order for the individual to adapt and function in such environments. Therefore, they resort to the use of heuristics (see Section 2.5 on major heuristics and biases) under such uncertain circumstances. This might also explain why commuters make their own biased judgments regarding the need to switch to cleaner forms of transport. Commuters have experienced global warming due to GHG emissions but cannot relate disasters such as extreme winter, floods or drought with global warming. Therefore, educational messages based on global warming facts might be ignored by commuters which thus results in status quo preference and inertia.

2.5 Three major heuristics and biases

In conditions where people have limited time, information or experience, mental short-cuts help decision makers to understand and efficiently process information about choices. Under such circumstances, decision makers use rules-of-thumb because they are simple and quick to execute. Thaler and Sunstein (2008) cite Kahneman and Tversky (1979) and point out that there are three main heuristics. These are (i) availability, (ii) representativeness and (iii) anchoring. Further, there are biases that are

associated with each of the heuristics. Recent studies in psychology have concluded that these heuristics and biases occur as a result of the interaction between System 1 and System 2 (as discussed under the definitions of the non-rational and rational models, respectively). Other familiar heuristics from Thaler and Sunstein (2008:19, 34) and Soman (2015:52-53) include choice and information overload, inertia and the sunk cost effect as discussed in sub-Section 2.5.1.

Representativeness

According to McDermott (1998), this describes judgments where there is a probability that an event/object belongs to a particular group because of its similar traits. Thaler and Sunstein (2008) refer to this as the similarity heuristic. McDermott (1998) emphasizes that decision makers are insensitive to prior probability of outcomes and ignore pre-existing distribution of groups. They also draw strong conclusions from small number of cases in order to produce a conclusion about the bigger picture. Under this heuristic, normal events are thought to be rare while rare events are thought to be normal. This increases biases and stereotypes. McDermott (1998:6) illustrates this heuristic bias through someone who attended a seminar on arms talk. Three quarters of the attendees were academics and only one quarter were artists. One of the attendees asked a question during the seminar. This attendee was dressed in a beret, had one earring, and carried a walkman. Could this attendee be an academic or an artist? One decision maker would conclude that the attendee in question is an artist because of the stereotypical image of an artist that was observed. This conclusion is biased because there were more academics than artists.

For this study, promotion campaigns which show that most of the PT infrastructure or services resemble international brands demonstrate the assumption that the marketing team assumes that commuters have representativeness biases. Commuters' choices would be biased towards the mode of transport as they would (for example) liken the *Rea Vaya*

BRTs with international BRTs such as Metro Rapid (Los Angeles) (see Section 5.3.2 on the application of this heuristic).

Availability

This refers to inferences about the frequency of events where the frequency is judged according to the decision maker's imagination or memory. More recent and well publicized events are likely to be more vivid and therefore more likely to be given a high probability while less vivid and older events are given a low probability of occurrence. Audiences can be nudged towards the desired choice by enabling them to visualize the choices via diverse media options. In addition, this heuristic can be linked to the weighting function of the prospect theory. Its application plays a major role in finance and insurance where probability weighting has more impact than loss aversion. As an example, an individual is more likely to purchase an insurance following a recent tornado or an earthquake and such purchases decrease as the vivid memories of the events decrease (McDermott, 1998; Thaler and Sunstein, 2008 and Kahneman and Tversky, 1974). Equally, this behaviour can be used to explain the behaviour of motorists after recent petrol price increase. Commuters might switch to PT and NMT after petrol price increase and later switch back to their usual modes of transport once the cognitive pain of the petrol price has been forgotten/numbed.

Anchoring

According to Kahneman and Tversky (1974), anchoring describes how people's choices and decisions are affected by an initial anchor value. A decision maker might start with a number or prior information that is already known and uses that to guide the decision-making process. Further, anchoring suggests that decision makers can form initial impressions or opinions that persist and thus become difficult to change. For this study, good or bad anchors about PT and NMT can be formed from the commuters' initial experience. That is why promotion campaigns, especially during the launch of a service, should be conceptualized and implemented in line with the non-rational model of behaviour with the

anchoring effect as one of the biases to factor into the campaign so that choice and decision-making is not undermined by biases such as prior/ initial experience.

2.5.1 Other heuristics used in the study

Additional heuristics that have been used in this study as identified by Thaler and Sunstein (1999, 2008), Kahneman and Tversky (1979, 1974) and Soman (2015) are highlighted as follows:

Endowment effect: This is when individuals attach higher value to items that they already possess than items yet to be obtained, for example, an individual might call for a higher price when selling a particular item while at the same time calling for a lower price to purchase the same item. Under the endowment effect, commuters are likely to overvalue the current IMT benefits while undervaluing the potential PT and NMT benefits.

Confirmation bias: Refers to a predisposition towards accepting choices that confirm one's opinions, beliefs, conclusions or impulsive judgements rather than choices that are likely to contradict or require deeper mind engagement/analysis.

Mental accounting: According to Thaler (1999), individuals mentally and subconsciously allocate their money to several accounts instead of viewing all money as interchangeable (fungible) towards satisfying an obligation. For example, if individuals have allocated their money for car petrol, they are likely to face constraints in redirecting the same money towards the PT and/or NMT options being offered.

Hyperbolic discounting: This is when commuters attach more value to benefits that are reaped now instead of similar benefits reaped in the future. Mattauch *et al*. (2015:5-6) also refer to this as time-inconsistent and add that "short-term preference combined with naivety often leads to unbounded procrastination, thereby explaining a status quo bias." Stocker (2011) illustrates that small entrepreneurs are more interested in short term projects that immediately give them smaller profits than long term

projects which result in a long wait for larger profits. The costs the individual pays now are felt more deeply than costs that will be paid in the future. In this case, an IMT user might not fully value the long term advantages of switching to PT and NMT because the results are not immediately observable or valuable. The issue of climate change, whose side effects are gradual and also de-personalised possibly fall under this dilemma of not being immediately valuable. In this scenario, such an individual does not discern the urgency for change or action.

Choice overload: This is when commuters are presented with too many options for choice and specific decision. The commuters, then, find difficulties in rationally evaluating all the choices towards making a decision. Instead, they end up not making a choice or stick to their usual choice (see discussion on choice overload in Section 2.7.3).

Information overload: When potential PT and NMT users are given too much choice information, they could equally become constrained in evaluating and making a good decision.

Social proof: Commuters look to the behaviour of peers to inform one's decision-making in order to conform to similar behaviour. This is also related to social norms where the forms of persuasion are subtle, for example, when the former Mayor of Johannesburg acted as a champion of cycling through actual participation on the street, such a gesture was meant to catch the commuters' attention through the powerful (but often subconscious) force of social norming (Halpern, 2015).

Procrastination: Derived from authors such as Thaler and Sunstein (2008), Soman (2015), Thaler (1999) and Kahneman and Tversky (2003), this refers to the tendency by commuters to postpone choosing PT and NMT as the main forms of transport. This is likely to occur as a result of heuristic biases such as inertia, endowment effect, mental accounting, information or choice overload (as discussed under the prospect theory and other heuristic biases in Section 2.4 and sub-Section 2.5.1 and 2.7.3).

From the discussion on heuristics, it can be taken to indicate that there is an interconnection between various heuristics and resultant biases such as choice overload, framing, sunk cost effect, loss aversion and endowment effect. The insights on prospect theory discussed in Section 2.5 also indicate the relationship between the discussed heuristics.

2.6 Application of prospect theory insights

McDermott (1998) applies prospect theory on risk taking behaviour in international politics. The study concludes that prospect theory clearly explains political decisions that occur under uncertain and complex situations. Another study which explains why prospect theory was the most appropriate theoretical framework for this study was done by Liu (1998) where prospect theory findings were applied in a marketing study which concluded that price promotions (coded as gains) and new product positioning are set as initial reference points in the consumer's mind. Similarly, a price increase for an initially high priced product is not perceived as a loss compared to a price increase for an initially low priced product. This is also linked to the anchoring effect as examined under Section 2.5.

Further, price-linked promotions encourage consumers to try new brands or purchase a product. After the promotion period, consumers' reference price goes down as their reference point shifts with the past observed price (also linked to anchoring as discussed in sub-Section 2.5). Consequently, when a product price is set back to its regular price, consumers perceive it as a loss. This results in a decrease in the product use and can thus be related to PT price promotions as well (see discussion on *Gautrain* promotion campaigns in sub-Section 5.2.1). In addition, the idea of price-linked promotion as a reference point is also related to priming messages within promotion campaigns. Current priming messages for NMT and PT could overwrite such messages in the previous promotion campaigns or other unsustainable modes of transport in order

to subconsciously register the option being promoted as the new reference state.

Wassenhove *et al*. (2013) applies the prospect theory insights to explain cognitive biases that influence stakeholder judgments of value. The study postulates that stakeholders judge the value produced or destroyed by firms in relative terms such as losses and gains against a reference point that changes over time. Losses are assumed to weigh more than gains and the reference points change across the diverse stakeholders.

Gichia (2014) also applies prospect theory to explain why solar water heating failed to emerge as the preferred water heating technology in South Africa before the 2006-2008 energy crisis but only started to emerge as the preferred option immediately after the crisis. One of the findings of the study was that choice and decision-making in the solar water heating sector is characterized by assessed economic gains and losses where the initial costs and related payback period served as the reference points. Under uncertainty conditions, people are loss averse and prefer to maintain the status quo. The study clearly shows that long term benefits such as intra/intergenerational equity are underweighted and therefore less valued. Further, a nudge provoked by the crisis caused a shift in favour of the solar water heating technology within a context where rational agent model-based interventions had failed to make any responsive impact.

The application of prospect theory insights in this study highlight that findings on reference point, underweighting of probability and loss aversion may explain why commuters are not willing to shift to PT and NMT. There is also a possibility that commuters can shift to PT and NMT once a catastrophe such as fuel crisis occurs. This might also explain why the current PT and NMT modes experience increases in passenger ridership immediately after petrol price increase. The ridership then decreases as people get used to the adjusted prices as the new

normal/status-quo. These findings could be linked with the availability heuristic as discussed in sub-Section 2.5.

Organ *et al.* (2016) report on a pattern of behaviour which is consistent with the loss aversion element/feature of prospect theory. The study focused on how the government could encourage the take up of low carbon products or services in the United Kingdom. One of the findings was that people see the money from the cost-savings (after installation of low carbon products) as worth less than similar amounts of money paid for the initial costs of the interventions. The study therefore, concluded that policy tools should have a combination of interventions such as information, regulation and economic incentives in order to be effective. However, for incentives to be effective, they have to be delivered at the right time, for example, when a crisis strikes, when they get the right information or when incentives suit the personal motivations of the targeted actors. The study suggests that a combination of rational and non-rational interventions may be applied to counter inertia which results from loss aversion, hyperbolic discounting and preference/ bias towards the status quo.

Barberis (2013) posits that prospect theory insights such as probability weighting have been used in lottery payouts, for example, banks can offer savings accounts which enter depositors into a lottery instead of or possibly over and above, paying interest. In terms of the focus of this study, commuters can also be entered in a lottery if they use PT for 30 consecutive days. Besides lotteries, insights from the prospect theory have been used to nudge people into various choice options. For example, in line with Thaler and Sunstein (2008), frames in losses and gains from the loss aversion feature of prospect theory have been used in energy conservation nudges.

According to Thaler and Sunstein (2008), nudges are needed towards aligning behaviour/choices in a manner that acknowledges the shortcomings of the human species. The highlighted short comings

include limited memory, bounded willpower, limited cognitive capacity, biased forecasts and status-quo bias. In addition, the authors suggest that people are not always in a position to make choices that are to their best interest. Instead, people make more favourable choices in contexts or environments in which they have good information, experience, or obtain instant feedback but perform poorly in decision environments characterised by the opposite features.

Thaler and Sunstein (2008) add that nudge-approaches to choice and decision-making are designed to activate the reflective thinking system. Central to the nudge-approach in the context of this study, is that commuters can be similarly guided towards appropriate choices, in order to make better choices and decisions. Based on the insights from the studies reviewed, Table 1 highlights the differences between the rational model versus the nudge-approach to behaviour change.

Table 1: The differences between nudge and traditional approaches to behaviour change. Adapted from Thaler and Sunstein, 2008.

Rational model intervention	**Nudge intervention**
Persuasion for behaviour change to reduce IMT lifestyle	Provision of examples as models for behaviour change
Encouragement	Referencing to peer activity such as public figures/celebrities using cycling as a mode of transport
Justify and argue for behaviour change such as the need to change behaviour because there is need to reduce GHG	Referencing of social norms where the use of PT and NMT is seen as the norm/usual and most appropriate form of transport
Enforced and imposed choices such as lane closure during the *Ecomobility festival*	Free choice oriented
Talk down to people such as cycling talks indicated in Chapter 4	Discuss the need to switch to cycling with prospective commuters

Imposed action	Option of zero action or default
Sell, push towards desired behaviour change	Offer, wait, give space for behaviour change
Direct, obvious	Indirect and subtle, for example the framing of messages

The rational and non-rational agent model traits offer a better understanding of how commuters make choices and decisions. Similarly research on individualism and collectivism cultural attributes also provides an insight which assists the study to understand why commuters make decisions on PT and NMT choices. Existing literature on individualism and collectivism (Triandis, 2001 and Hofstede, 1980) indicates the following traits for individualistic and collectivist cultures/mentality:

Individualism: (most common in Western countries such as Canada, Australia and the United Kingdom)

- Concerned with self and close family members
- Prioritises individual or family interests
- Advances individual rights and not responsibilities
- Maintains personal autonomy and self enhancement
- Prioritises individual decision making and not concerned about other people's needs or interests

Collectivism: (most common in Asian countries such as China, Japan and Taiwan)

- People feel they belong to a larger group which supports them in exchange for loyalty
- Less personal privacy
- Individual decisions are more inferior to group decisions
- Concerned about needs and interests of others

- Have a sense of interdependence and prioritise group goals and norms

2.7 Predominant themes in the field of choice and decision-making

Soman (2015:52) makes reference to Kahneman and Tversky (2011) in identifying four key themes in the field of choice and decision-making as appraised in this section. These themes assisted the study towards understanding the traits of the models of human behaviour presented in the promotion campaigns.

2.7.1 Theme 1: Decision by heuristic and resulting biases

Soman (2015) notes that there are various heuristics and behavioural influences that affect choice and decision-making by individuals (see sub-Section 2.5). Gichia (2014) also states that heuristics have a deep effect on decision-making under uncertainty which involves several behavioural techniques linked to System 1 and System 2. Further, behavioural economists categorize an expanding list of heuristics such as the status-quo bias, endowment effect, loss aversion and framing effects, as reviewed in sub-Section 2.5.1. Gichia (2014) further cites Fujiwara and Campbell (2011) and states that such heuristics conflict with choice and decision theory expectations under the rational model. For example, loss aversion behaviour is contradictory to the rational choice theory in which individuals are expected to take better, profit maximising offers.

Further, loss aversion is most likely the underlying basis of inertia, status-quo bias and the persistent preference for the default option (Thaler and Sunstein, 2008 and Kahneman, 2011). These biases could be used to explain the resistance to change in general as well as the resistance to recognition and approval of emerging technologies such as sustainable modes and infrastructure of PT and NMT. Other familiar heuristics from Thaler and Sunstein (2008), Soman (2015) and Kahneman (2011) have been elaborated in sub-Section 2.5.1.

2.7.2 Theme 2: Framing: The effect of context on choice

Soman (2015) and Strauss (2008) state that context significantly influences how individuals perceive alternatives depending on the framing of options being presented. A change in framing or manner of presenting information and related evaluation can lead to a change in preference. Ariely (2008) highlights that the presence of a decoy choice during the presentation of a choice can make the main product look more attractive. For example, during PT and NMT advertisements, the promotion team can present two other choices in addition to the main choice, in which the two choices serve as decoys for comparison.

2.7.3 Theme 3: Choice overload

According to Soman (2015), economics and public policy fields are shaped by the notion of freedom of choice where it is believed that more choices result in individuals being able to find alternatives that are more closely aligned to their true preferences. In public policy and governance, it is assumed that enabling an individual the right and ability to choose what is best for them is the foundation of libertarianism. However, studies indicate that offering people too many options creates confusion, cognitive overload and analysis paralysis. Choice overload can be further compromised by information overload. As a result, people switch to options with lesser choices or not switch to any choice at all.

Soman (2015) highlights that there are strategies which can be implemented to enable people to make better choices when they are presented with large choice sets. These include encouraging attribute-based decision-making such as cost efficiency, comfort, accessibility of the PT or NMT mode. Attribute-based decision-making increases adoption of the product and more enthusiastic consumers. The other strategy to counter large choice sets is to organize and eliminate the least favourable options until the individual reaches a manageable set of favourable options. For example, for an individual to consider the choice of PT and NMT presented, they eliminate the least favourable ones based on attributes such as cost effectiveness, the efficiency, accessibility, comfort,

safety and reliability options until they are satisfied before making the switch to PT and NMT.

2.7.4 Theme 4: Choice over time

According to Soman (2015), consumers are myopic and inconsistent. The often cited example to demonstrate myopic behaviour is that of a child presented with a marshmallow. When given the choice to eat the marshmallow now and get one treat or eat later (after 15 minutes) and get two more marshmallows, a majority of the children will prefer to eat now. This metaphor illustrates the biasing of a large number of choices that people make when presented with options that give benefits now over those that give more benefits when reaped in the future (hyperbolic discounting). In addition, future outcomes are often subconsciously discounted where discounting is steepest around the time for a choice to be acted upon. Change agents can counter this through choice repair which can be done by knowing exactly what behaviour should be changed and how decision-making process occurs in human beings. Further, change agents can remove obstacles that reduce the effectiveness of a promotion campaign and possibly experiment on the intervention based on a control and treatment group model.

It is also important to note that people constantly seek pleasure as an escape to avoid pain. This pleasure-principle is understood to be the key driver of the desire for instant gratification. Once a consumer receives a reward, they will expect more rewards in the next interaction which means rewards can work to change behaviour only up to a certain extent. Therefore, the rewards need to be unpredictable and random in order to create a sense of scarcity as well as curiosity in discovering the rewarding pattern. According to Skinner (1938), variable rewards work better than fixed rewards because variable rewards mitigate the risk of consumers using the product only when there are rewards. Further, variable rewards increase consumers' anticipation of pleasure. Therefore, consumers remain psychologically engaged with the product. The principle of variable

rewards can be applied in the incentive based promotion campaigns of PT. Instead of the predictable and fixed rewards, the opposite might have more effect on changing commuters' behaviour.

2.8 Effectiveness of rational agent model based versus non-rational agent based promotion campaigns

Although a few studies (as analysed in sub-Sections 2.6) provide a good description of human behaviour and how behavioural insights can be applied in different settings as intervention methods, findings on the correlation between such insights and success rates are limited. From the analysed literature, studies that explicitly examine the link between mobility choices based on behavioural effects are still limited and have only been conducted internationally. According to Mattauch *et al*. (2015), one closely linked study was on behavioural policies for reducing carbon emissions from the transportation industry. Although the study focuses on the effect of choice architecture in shaping decisions (Thaler and Sunstein, 2008), the effectiveness of this intervention in promoting sustainable mobility remains an open question (Avneri 2009; 2011 and Mattauch *et al*., 2015).

A few exceptions may be findings of Bamberg *et al*. (2003a), where individuals moving to a new city with a good PT system were given information material and a free day ticket for PT. The modal share of PT more than doubled compared to a control group moving to the similar city. This could indicate the presence of default effects or limited attention and time inconsistent preferences (see discussion on hyperbolic discounting in sub-Section 2.5.1) when individuals make mobility decisions in a new environment.

According to Avineri and Waygood (2013), the provision of information on IMT related carbon dioxide to commuters can be seen as an intervention to increase the likelihood of the switch to PT and NMT. Nevertheless, due to the fact that transport related emissions are concluded as social costs

than individual costs, the behavioural response to information on environmental effects of IMT choices may consequently be limited. Framing can be used to enhance the assessment of choice traits and promote the shift from IMT to NMT and PT. In an experiment which examined the effects of valence framing of amounts of carbon dioxide emissions on the perceived differences between alternative commuting modes, negative framing was more effective than positive framing in indicating the difference between carbon dioxide emission amounts from alternative forms of transport. The provision of environmental benefits was indicated as a positive frame while the potential of the travel modes to reduce an environmental loss served as a negative frame. The experiment therefore, concluded that applying negative frames than positive frames was more likely to influence travel related choices because negative framing highlighted the difference between carbon dioxide amounts of the commuting modes better than positive framing.

The non-rational agent model approach also involves commuters' tendency to favour the status quo. This provides an opportunity for policymakers to influence long-term travel behaviour by motivating individuals to break undesirable habits. One example of a policy measure so far tested effectively includes the distribution of a free bus ticket to regular car users for one month. According to Fuji and Kitamura (2003), an experiment was carried out with 43 IMT users. A one month free bus ticket was given to 23 of the IMT users while the remaining 20 were not given as they were the control group. In the experiment, habits and frequency of using the IMT and the bus (PT) were evaluated before and after the experiment and an evaluation was further done a month after the intervention. The finding was that the frequency of PT use increased while IMT use decreased. The conclusion was that adjustments such as offering free bus tickets to IMT users could be a better tool for enhancing the shift to PT use.

2.9 Conclusion

The chapter has appraised literature on prospect theory which provides deviations from the rational choice theory which then leads to an understanding of the non-rational choice and decision-making model. For example, choice and decision-making based on heuristics is linked to the non-rational model of human behaviour. Further, dependence on heuristics for choice and decision-making shows that people are not necessarily rational as often assumed in economics and other social/human disciplines. This enabled the study to identify non-rational behaviour model attributes from the promotion campaigns. In addition, nudge appraisal enabled the research to identify non-rational model traits since the theory is based on the weaknesses of the rational choice theory as guided and supported by the prospect theory.

Nudge-approaches to guiding choice and decision-making are informed by a better understanding of heuristic biases. They are developed using findings on the traits of real humans instead of imaginary species (*econs*) (Thaler and Sunstein, 2008:7). *Humans* and *econs* are thus equated with the non-rational and rational model of human behaviour respectively. From the appraised studies, it is also concluded that the choice and decision to switch to PT and NMT would be affected by various biases such as loss aversion, hyperbolic discounting, sunk cost effects and status quo bias. The same heuristic biases can also be used towards a better understanding of the human behaviour model to underpin the conceptualization and implementation of responsive promotion campaigns for PT and NMT.

The study also pursued a discussion on the rational choice theory because there was a need to understand traits that would be classified under the rational model. The effectiveness of the application of the behavioural insights to enhance behaviour change was also discussed in this chapter. From the reviewed studies, the traits of the rational and non-rational model were summarized as shown in Table 2.

Table 2: Summary of the rational and non-rational model traits

Rational model attributes	**Non-rational model attributes**
Follow/respond to incentives because they assume every agent is a utility maximiser	Does not believe in utility maximising. The agent rather looks for adequate choices (satisficing).
Agents constantly acquire information about choices	Do not need much information as they are guided by intuition and past experience as well.
Agents show behavioural consistency no matter the circumstances	Agents' behaviour is inconsistent because it is affected by environmental or social cues such as values/beliefs
Choose the best utility maximizing option	Choose the adequate option.
Take time to make choices since they need time to calculate the consequences of their decisions	Analyses problems fast and effortlessly through the use of heuristics.
Behaviour is assumed to run smoothly without lack of will power	Agents experience limited will power to implement decisions; they end up seeking short term gains.
Concerned about own welfare during choice and decision-making, and are therefore, self-regarding	Not always self-centred since they often consider fairness and mutual benefit as part of choice and decision-making criteria.
Considers all possible alternatives	Not able to consider all alternatives. Instead, looks for choices that resonate with past

before choosing the best one	experience and use them as a guide.
Treats each decision as a separate entity and ignores other factors such as previous commitments.	Does not treat decision as a separate entity but considers other factors such as previous experience or policies.
Assumes information about alternatives is always available	Assumes there is no adequate information and resort to mental short cuts based on heuristics.
Considers the traits of each alternative, for example, comfort might be a factor to be considered for a motorist who is requested to shift to PT and NMT	Factors such as comfort are not consciously invoked and their effects to the situation are considered irrelevant by the commuter.
There is no emotional preferences during decision-making, such as guilt feelings after the choice and decision-making process	Preferences are affected by framing of options, emotions and context.
More regretful when they realize that the choice and decision made has turned out to be sub-optimal	Biased towards justifying the status quo rather than towards change.

The theories appraised in this chapter were chosen based on their ability to guide the study and thus assist in understanding the promotion campaigns for PT and NMT. However, under prospect theory, it is not easy to define gains and losses. For the purpose of the study, gains and losses were defined in terms of individual's overall wellbeing using outcome expectations and beliefs as the reference points. Prospect theory is also believed to be accurate in laboratory settings even though most of the evidence from the published studies such as Gichia (2014) and Organ *et al*. (2016) demonstrate that the theory provides a good description of behaviour under risk and uncertainty in real contexts.

Chapter 3: Research method

3.1 Overview

This chapter presents the research method and design as applied in the study. It also includes the data collection and data analysis methods employed in the study. Polit and Hungler (2001) define a methodology as a way of obtaining, organising and analysing data as guided by the objectives and the nature of the research question. Gichia (2014) points out the same statement and emphasizes that knowledge is created when a researcher finds a knowledge gap, successfully collects data, analyses and interprets them in order to generate findings and conclusions concerning the research problem.

In this study, method covers the motivation of overall approach as well as how the research was actually carried out. It also involves the logical sequence that the study took. The research processes (Punch, 2005 and Creswell, 2003) that were followed entailed:

1 Selection of research topic and literature review to conclude on the underpinning theories

2. Research questions and hypothesis

3. Research design

4. Data collection

5. Data presentation, analysis and interpretation

6. Findings, conclusions and recommendations

Given that the focus of this study was to explore the assumed human behaviour models in the promotion campaigns of PT and NMT in the GCR, the overall research approach taken was qualitative. According to Mouton (2001), qualitative data are often in the form of text such that during analysis, such data are deconstructed into manageable categories to facilitate the derivation of patterns and relationships which anchor the derivation of findings of the study.

3.2 Research design and approach

Mouton (1996:175) highlights that a research design helps to "plan, structure and execute" the research in order to authenticate the "validity of the findings". It also guides directions from the underlying assumptions to research design and data collection as well as analysis. Yin (2003:19) adds that

> "colloquially a research design is an action plan for getting from here to there, where 'here' may be defined as the initial set of questions to be answered and 'there' is some set of (conclusions) answers."

In order to facilitate for a systematic research process, the study evolved along in the following steps:

3.2.1 Participants

The study gained permission from the School Ethics Committee in order to ensure that it was carried out according to the university's ethical standards. The study also gained permission into the research site through writing letters and making phone calls. Subsequently, an introductory letter from the university, participants' consent forms and information sheet were sent to the marketing team respondents via email. The marketing team members were from the GMA (for the *Gautrain),* the *A re Yeng* and *Rea Vaya* BRTs, *Fixin' Diaries*, JUCA, *Freedom Ride* and the COJ cycling department. These seven entities were selected based on the exploratory findings that they have been involved in the marketing of the identified modes of transport within the GCR.

3.2.2 Process

The process followed for the study was based on the research questions of the study and mainly focused on the '*how to'* part of the study. Thus the research design process connected the research questions and hypothesis to data (Punch, 2005:63) as demonstrated in Figure 6.

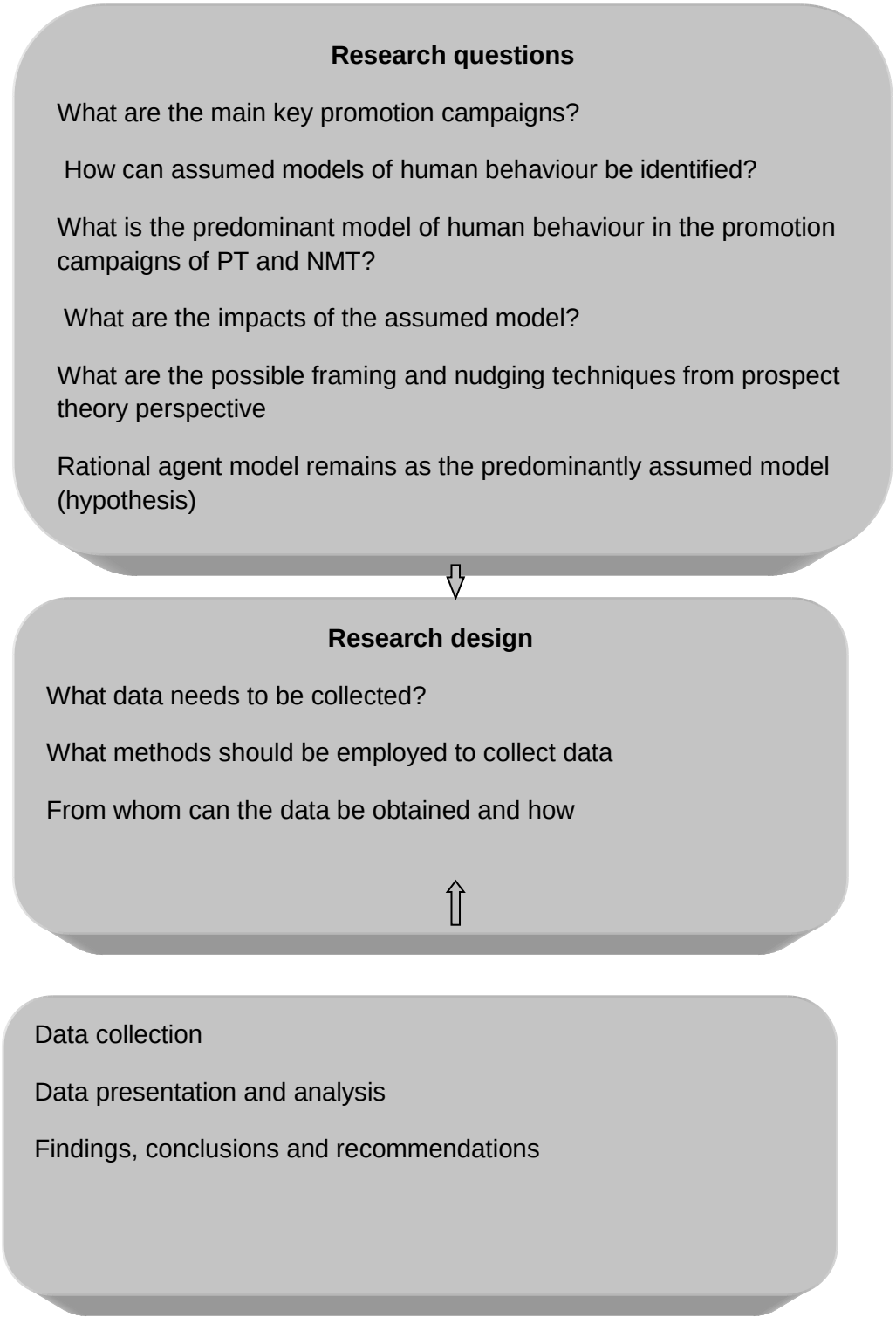

Figure 6 : Research design and approach process.

In order to identify the key promotion campaigns, the study presented the prioritised promotion campaigns implemented by the marketing teams from each entity of PT and NMT. The campaigns were identified through the attributes of promotion campaigns as appraised under sub-Section 2.1.1. Therefore, advertisements, joint activities, information sharing and sales promotions constituted the data considered in order to answer the research sub-question. This process formed Chapter 4 of the study.

The study went on to identify assumed models of human behaviour by examining the way choices of PT and NMT were presented to the citizens as described in Section 3.5 and Figure 7. The study also analysed the channels, messages or activities of the promotion campaigns in order to identify and understand the traits of the assumed human behaviour models as guided by the rational choice theory and prospect theory that were analysed in Sections 2.3 and 2.4. Messages from billboards, magazines, radio advertisements and posters as analysed under sub-Section 2.1.1 were also reviewed. This formed Chapter 5 of the study.

The study further examined the predominantly assumed model of human behaviour based on the data on the key promotion campaigns and the identification of the assumed models (Chapter 4 and 5 correspondingly). Further, the study used choice and decision-making patterns in the PT and NMT promotion campaigns to substantiate on the extent to which choice and decision-making routinely demonstrate prospect theory in general and bounded rationality heuristics in particular, rather than the predominantly assumed rational-agent model. Instead of evaluating the impacts of the promotion campaigns (due to identified limitations presented in Section 1.7), the study proposed possible framing and nudge based techniques which align with choice, behaviour and decision-making from a prospect theory perspective.

The study proceeded to investigate the main research question and tested the hypothesis as indicated in Subsection 1.5.3. This step resulted in the formation of Chapter 6. In order to evolve a resolution to the main research question, it was necessary to break it into sub-questions (see sub-Section 1.5.2 and first block/rounded rectangle in Figure 6). The main research question on the predominantly assumed model of human behaviour in the promotion campaigns for PT and NMT in the GCR remained as the key determinant of the kind of data and analyses required. This was substantiated through analyses of the patterns of decision-making in the promotion campaigns of PT and NMT based on the conventional rational agent model. The detailed data analysis and interpretation procedures are discussed in Section 3.5.

3. 3 Data Collection

Case study method

A case study as a research tool was deemed to be the most suitable for this type of study. Further, in-depth appraisal of case study approach provides an understanding of essential aspects of a new or persistently problematic research issue within its actual context (Punch, 2005). According to Berg (2007), case study research is characterized by a rich, detailed, and in-depth type of data/information. In support of the case study method, Yin (2012) highlights that other research approach/tools are unlikely to produce the rich descriptions that are facilitated through a case study approach. In addition, case studies allow for data/information to be collected in various ways thus resulting in a better understanding of the phenomenon under investigation as well as highly substantiated findings to the research questions. It also allows combinations of various data gathering and analysis techniques to be applied.

For the purpose of this study, the prioritization of the case studies selected was influenced by relevance as well as access to the marketing team members who were involved in the conceptualisation and implementation of the promotion campaigns. The entities concerned did the promotion campaigns themselves using the staff members in their employ. In some

cases external staff were sought only to supply and design promotion material such as billboards. There were also partnerships with other stakeholders such as shops and flight companies (Mall of Africa and Mango Airways respectively). The prioritised case studies are highlighted in Section 4.1.

The data obtained from these case studies were in the form of interview responses where the marketing team representatives highlighted the promotion campaigns they have implemented in the GCR. Secondary data in the form of reports and client evaluation of the delivered promotion campaigns were used as data sources as well. This study adopted the semi-structured interview method which involved a number of pre-determined but open-ended questions that were used to guide the flow of the discussion instead of the close-ended format of questionnaires. The questions for the case studies were guided by the key qualities and themes that define the association between the promotion campaigns and the values and attributes of human behaviour models of choice and decision-making.

3.4 Research data and data collection tools

3.4.1 Sampling procedure

The study applied purposive sampling technique (also termed non-probability sampling) whereby participants from the marketing teams of each stakeholder entity were intentionally identified for the interviews. The selected procedure was employed because it effectively connected the researcher with the respondents/participants in the field under study. This step answered the question on “how to collect data” (Punch, 2005 and Palys, 2008).

3.4.2 Interview as a method of data collection

The researcher began by interviewing marketing team members at the *Gautrain* Management Agency (GMA) and also sent the interview questions to the *A re Yeng* marketing team. This was followed by interviews with the representatives from the COJ, JUCA, *Fixin’ Diaries*,

Freedom Ride and *Rea Vaya* BRT. The interviews were done on a one-on-one arrangement. The process continued and the researcher gradually developed a better understanding of the dynamics of the promotion campaigns in the transport system and the people involved. Appendix 2 provides a list of the meetings and types of interviews used. The study used the same interview questions for all the interviews and used probes to follow up on areas of interest such as ridership results after the promotion campaign. The majority of the interviews were recorded on the researcher's phone and transferred to a flash drive and laptop for backup. In most cases recording the interview was complemented by extensive written notes. Later, the researcher listened to the interviews again and the main themes and important quotes were recorded as notes.

This approach allowed the interviewer and the interviewee to interact in an open-ended manner so as to elicit as much detail as possible (Simon, 2006). The study also applied direct observation of visual data whereby photos of promotion billboards were captured and then later analysed as complementary data. The complementary data were later transformed into meaningful texts. The study also collected secondary data from sources such as reports, journals and policy documents in order to understand the gaps within the promotion campaigns and better ways of addressing the gaps/deficiencies. A summary of data used and its application to the study is presented in Table 3.

Table 3: Summary of data used and its application to the study.

Source of data	Type of data	Chapter where data were analysed and applied	Aim of data application
Face-to-face interviews and electronic communication	Primary	4, 5,6	-To understand the key promotion campaigns which were delivered in the past 10 years. -To understand how the campaigns were conceptualised by the teams themselves -To understand whether the promotion campaigns were evaluated and their impacts. -To conclude on the overall finding of the study.
Literature review	Secondary	1, 2, 4, 5, 6	-To introduce concepts of choice, human behaviour and decision-making as well as provide the theoretical foundation to the study. -To answer the question on the predominant model, and the transitioning impacts of the model in the promotion campaigns of PT and NMT. To also answer the sub-question on how the models of human behaviour can be conceptualized within choice and decision-making framework of PT and NMT. -To consolidate overall conclusions and recommendations
Commissioned reports for example, the World Bank Report	Secondary	2,4, 5,6	-To demonstrate the attributes of the rational or non-rational models in human decision-making and provide an overall conclusion.
Media reports and newspaper articles	Secondary	2,4, 5,6	To highlight and demonstrate the impact of the promotion campaigns and the conceptualized models of human behaviour.

3.5 Data presentation, analysis and interpretation

The collected primary and secondary data on key promotion campaigns were first presented in Chapter 4. The data analysis process was guided by the main research question and sub-questions (see Figure 6, top block, on how the questions were broken down during data analysis). According to Miles and Huberman (1994:10), this was done following three steps. These are (i) data reduction where patterns, links and relationships were identified, (ii) data display using tables and graphs and (iii) interpreting the results in order to derive findings and conclusions. Yin (2012) highlights that during data analysis, data are presented, analysed or interpreted in a narrative form. Such a qualitative and narrative approach (rather than a quantitative appraisal) was applied in order to derive the essential patterns of choice and decision-making in the promotion campaigns of PT and NMT.

The study first presented and examined the main promotion campaigns for PT and NMT (see Chapter 4). Afterwards, the study examined the related rational/non-rational model attributes (sub-question 2). This was guided by literature on rational choice theory, nudge theory and prospect theory as discussed in Sections 2.3, 2.4 and 2.6 in Chapter 2. From the interview schedule, responses on sub-question 2 and 3 on initiatives, promotion approach and methods (see Appendix 3) were used as data sources to evaluate the rational and non-rational model attributes.

Data on promotion campaigns were analyzed for evidence of rational and non-rational models of human behaviour. This was done by identifying and grouping the specific attributes of the activities or messages in the promotion campaigns using the summary of attributes presented in Table 2 as a guide, for example, if the respondent highlighted that they used incentives such as t-shirts and loyalty points (*Rea Vaya* “Travel for less” promotion), this was categorized as rational based on the trait that rational

agents follow/respond to incentives because they assume every agent is a utility maximiser.

For the non-rational traits, the study looked for responses that did not stress financial gains or incentives because the non-rational agent does not necessarily seek to maximize utility. The agent rather chooses the option that is adequate and that aligns with beliefs and values. The non-rational traits were also identified by understanding the nudge intervention (Table 1), for example, a promotion channel/mechanism where emphasis was placed on social nudges such as the referencing of peers (social norms) was classified as the assumption of the non-rational agent approach. Figure 7 illustrates the data analysis process as narrated.

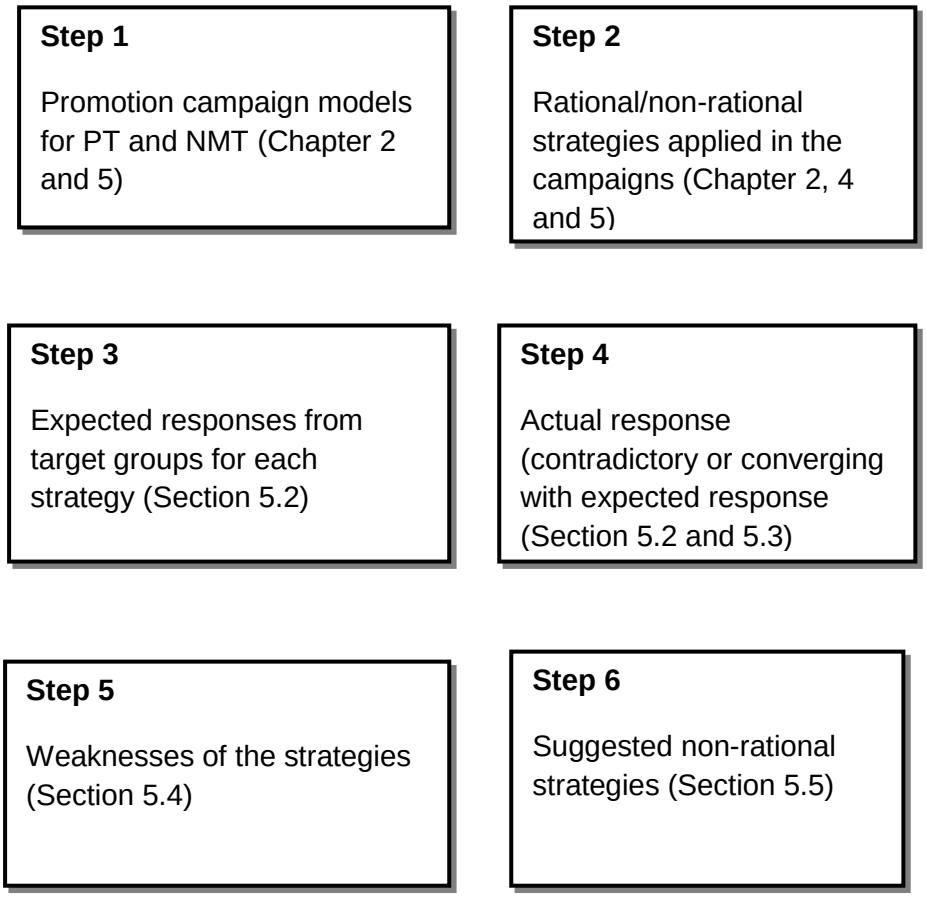

Figure 7: Method for the data presentation, analysis and interpretation process.

In addition, data were reduced by segmenting and summarizing while safe guarding against any loss of information. The data were then analysed through the use of tables (see Table 5-26). The abstraction and display of data then guided the derivation of sub-findings and a conclusion (Punch, 2005). In order to simplify the additional contents of this chapter, the matrix in Table 4 provides a summary of data collection and data analysis.

3.5.1 Reliability and Validity

The legitimacy of the interview as a data collection tool was assured by a clear conceptualisation, a purposeful design of an interview schedule and an organized plan to conduct the face-to-face interviews. Further, the consistency of the responses was checked by restating questions in different forms at various stages of the interview. In order to mitigate the loss of reliability in the study, the researcher analysed and interpreted data based on prospect theory as the main framework and the criteria were generally based on the important attributes defining the promotion campaigns of PT and NMT as well as behavioural patterns as understood within prospect theory framework. Similarly, the detailed analysis and interpretation is founded on the rational-agent model assumed and the heuristics of the non-rational agent model. The themes that resulted from these criteria were matched with the patterns of decision-making in the case studies. These themes contributed significantly to the interview questions applied in the study.

3.6 Ethical considerations

The study was guided by the code of research ethics of the University of the Witwatersrand. The researcher obtained formal permission to conduct the research from the GMA, *Fixin'* Diaries and *Rea Vaya* by means of telephone communication. In addition, permission from the COJ (cycling), *Freedom Ride* and *A re Yeng* was obtained through the use of emails while permission from JUCA was obtained through face-face contact with the participant. The study is deemed not to have caused any harm to respondents or anyone else during the research process. Further, the

researcher provided the relevant information to respondents regarding the research procedure in order to ensure that the respondents made informed consent prior to starting the interview process.

There were no benefits offered to respondents for the purpose of gaining data. Participation information sheets with adequate information concerning the study were provided to the interviewees who were also requested to sign consent forms prior to the interview process. Further, the study respected the participants' rights, protected their identity where necessary and protected the obtained data in secure storage (password protected software) as supported by De Vos, Strydom, Fouche and Deport (2005). The report maintained the anonymity of the respondents by ensuring that no individual names were mentioned except for their respective entity names. The study applied terms such as interviewee and/or respondent to refer to the research participants where necessary in order to ensure their anonymity.

Table 4: Summary of data collection and analysis.

Research Sub-questions and overall research question	**Data needed** **Data sources** **Data processes**	**Data analysis and processes**
Sub-question 1 What are the key promotion campaigns of PT and NMT initiated in the GCR in the last 10 years?	**Primary data** -Identified the marketing teams -Enquired on the types of promotion strategies and reasons for the strategies -Looked into the types of initiatives **Sources of data** Semi-structured interviews **Secondary data** -Initiatives used in other countries and their success rates -Promotions implemented in the past 10 years **Sources of data** -Internal records such as reports and customer feedback -Internet and archival documents	-Summarised the key promotion campaigns data and labelled them as promotions -Displayed the number of promotion campaigns for the given years, for PT and NMT -Verified the data using secondary sources and concluded on the promotion campaigns rendered in the past 10 years.
Sub-question 2 How can assumed models of human behaviour be identified in the promotion campaigns of PT and NMT?	**Primary data** -Models of human behaviour that positively affect choice and decision -making -Various ways of choice and decision -making -Presentation of choices in the promotion campaign activities **Secondary data** -Data on strategies of presentation of choices and decisions for rational and non-rational model -Identified attributes of rational model and non-rational model. **Sources of data** -Electronic and printed data –documents, journals, books	-Data were summarised and coded depending on the presentation of choices, for example, framing of choices, nudge-based techniques or deliberative and non-deliberative choices Data on promotion activities and mechanisms/channels were tabulated in terms of techniques and forms of assumed human behaviour model -Sub-findings were derived based on how the models could be identified within the promotion activities and mechanisms.

Sub-question 3 What is the predominantly assumed model of human behaviour in the conceptualization and implementation of the promotion campaigns of PT and NMT?	**Primary data**-Identified the assumed predominant model (rational versus non-rational).**Sources of data** -Semi-structured interviews **Secondary data** -Identified the assumed predominant model(rational versus non-rational) **Data sources** -Electronic and printed published data-books/journals	-Summarised data obtained in sub-question 2 and categorised them in terms of rational and non-rational model of human behaviour -Displayed data using tables and graphs in order to find the most assumed model -Concluded on the predominantly assumed model
Sub-question 4 What are the related transition impacts of the assumed model in the promotion campaigns of PT and NMT?	**Primary data** -Ridership before and after promotion campaigns -Evaluation types used and aims -Performance indicators used to measure -Types of studies used to examine effectiveness of initiatives -Economic evaluation of program (Cost benefit analysis) -Samples size to measure impact of program -Unexpected side effects of the program **Data sources** -Semi-structured interviews **Secondary data** -More effective methods of promotion campaign presentation based on non-rational model techniques. **Data sources** -Electronic and printed data –documents, journals and books.	-Due to lack of data on evaluation of promotion campaigns and ridership data, the study could not analyse data on the impacts of the assumed model. -Alternatively, the study used secondary data to identify the gaps within the promotion campaigns and better ways of presenting the mechanisms/tools of the promotion activities. -Concluded on more effective ways of presenting the 1promotion campaigns of PT and NMT
Overall research question: The verified sub-findings from the 4 sub-questions were consolidated in order derive the main findings.		

Chapter 4: Case studies in the promotion campaigns of PT and NMT in the GCR

4.1 Overview

The study collected and analysed primary and secondary data from the seven case studies as discussed in this chapter. The prioritized campaigns and entities are not exhaustive of the diverse PT and NMT promotion campaigns in the GCR. Instead, prioritisation was based on the ones that featured most prominently and consistently. For primary data, interview questions were designed to lead the discussion towards an understanding of how the promotion campaigns were conceptualized and implemented in relation to choice and decision-making by the target population (the PT and NMT consumers). In addition, participants who were interviewed in this study were referred to as interviewees. The questions asked in each case study (see Appendix 3) were similar in order to ensure comparable data across the promotion campaigns. The first section of the chapter (Section 4.2) presents data from the interviews (primary data) while the second section (Section 4.3) presents data from secondary sources such as reports and media articles.

4.2 Case studies (primary data sources)

- Case study 1: Train service promotion- *Gautrain* Management Agency, Midrand- an established provincial (Gauteng Province) agency that oversees the operations of the *Gautrain* (interviewed 22nd July 2016).
- Case study 2: BRT service promotion- COJ- *Rea Vaya,* Johannesburg- a municipal government agency (City of Johannesburg Council) that oversees the operations of the *Rea Vaya* BRT in the COJ (interviewed 29th August 2016).
- Case study 3: BRT service promotion- City of Tshwane- *A re Yeng* BRT, Pretoria- a municipal government agency (City of Tshwane) that oversees the operations of the *A re Yeng* BRT (responses obtained 22nd November 2016).

- Case study 4: Cycling- COJ- cycling- a municipal government agency that oversees the operations of cycling in the COJ (interviewed 8th August 2016).
- Case study 5: Cycling- JUCA - a COJ based non-governmental organization that promotes cycling as a form of NMT in Johannesburg (interviewed 06th September 2016). JUCA is also an organisation that advocates for the needs of urban cyclists.
- Case study 6: Cycling- *Freedom Ride* (interviewed 23rd August 2016). This is an organisation that promotes cycling as a form of sport and green transport in the COJ and other South African cities such as Cape Town.
- Case study 7: Cycling- Fixin' *Diaries*- a COJ private association that promotes cycling as a form of NMT. (Interviewed 01st September 2016). *Fixin' Diaries* promotes cycling around Johannesburg especially in the townships of Soweto.

4.2.1 Case study 1: Train service promotions

According to the two interviewees, the promotion campaign activities they implemented were "Competition for branding the Gautrain" and "My train for the youth". "My train for the youth" campaign entailed the provision of mentorship programs to the youth. This activity was launched during the 2007 OTM. It was implemented for the purpose of educating and mentoring learners on technology and scarce skills subjects such as Mathematics and Engineering. It also aimed to encourage teenagers to make use of PT. Further, this promotion campaign activity entailed educating learners about the benefits of the *Gautrain* such as the reduction of carbon dioxide emissions.

To brand the *Gautrain*, the G.M.A opened an opportunity for commuters to vote for their favourite logo on the *Gautrain* website. Only five of the interested commuters stood a chance to win R1 000 each if they voted. The opportunity to brand the train enabled commuters to have a sense of

ownership thereby cementing the notion of collectivism. This promotion was done before the launch of the *Gautrain* service as a mode of PT. The initiatives were based on the belief of true Africanism and innovation. The promotion tools/mechanisms they used were exhibitions, digital marketing on social media and the company website. Other promotion mechanisms included sales promotions in partnership with the Discovery insurance and Outsurance. The interviewees stated that such tools were used because they were easier to implement.

None of the interviewees were sure of which behaviour models were assumed in the campaigns despite the researcher's explanation of the models. They also stated that it was difficult to measure the effectiveness of the promotions. They noted that ridership was often influenced by toll road fees, bad weather and petrol price increases. They also mentioned that change in ridership often came unexpectedly. However, other methods to measure the effectiveness of the services were done through market segmentation, customer satisfaction surveys, brand evaluation and reputation audit. The *Gautrain* customer satisfaction surveys are done monthly. These surveys always reveal high satisfaction results. Indicators used to measure the satisfaction include value for money, service staff, information provision, ease of use, cleanliness and comfort. The interviewees also indicated that they measure any noticeable change in ridership using qualitative studies. The studies are done using online resources such as the company's website. No evaluations were specifically done for the ridership impacts of the promotion campaigns. Participants were therefore unable to respond on the question of impact of the campaign on transition to PT or NMT.

4.2.2 Case study 2: BRT service promotions- *Rea Vaya*

According to the interviewee, the promotion campaign activities were the "New route promotion" and the "Travel for less with *ReaVaya*". The interviewee could not tell whether there were promotion campaign activities implemented before the launch of *Rea Vaya* because the

participant only started working at the COJ in 2013. One of the implemented initiatives during the promotion of *Rea Vaya* BRT services was the “Travel for less”. The initiatives were conceptualised by the marketing team members. Face to face marketing at the *Rea Vaya* stations and handing out of flyers and posters were the main means of marketing. Other items handed out were t-shirts (see Figure 8), stationery and key strings. The marketing teams also used the loyalty points system during sales promotions. The interviewee was unsure of the assumed models because their marketing teams have no knowledge of such models. The interviewee also stated that efficiency in terms of costs and impacts was not examined. They often opted for cheaper means of marketing such as regular sending out of posters and flyers. No evaluations were conducted in relation to the impact of the campaigns but quarterly surveys were carried out to determine the quality of services. The results of the survey were that commuters were satisfied with the *Rea Vaya* BRT services they received.

Figure 8: Tshirt handed out during the “Travel for less” promotion campaign. Date: 08 August 2016. (Self-taken image).

4.2.3 Case study 3: BRT service promotions- *A re Yeng*

The interviewee indicated that they only implemented promotion campaigns for the City of Tshwane Municipality BRT. The BRT service in this city was launched in November 2014. This means *A re Yeng* was three years old during the period of the study. The interviewee mentioned that they had implemented promotion campaign activities such as the "Launch of the BRT system" which entailed the official opening of the bus stations. There were also traffic safety campaigns which involved teaching the commuters and the public about the specialised BRT traffic signals (robots). Further, the marketing team implemented the *Mahala* Saturdays where they offered free rides with the intent to increase ridership. The "Switch and Tap" promotion activity meant that the marketing team members trained commuters on the cashless system which uses a card to tap in and out of the bus. In addition, exhibitions (in various transport seminars and conferences) were also delivered around the City of Tshwane. The marketing team implemented the promotions after the launch of the BRT services. Their initiatives were identified from the promotion campaign themes and these include the "*Mahala* Saturdays" and the "Switch and Tap". They were conceptualised and implemented by the *A re Yeng* marketing team.

Other promotion activities/tools used were press releases where the marketing team send out information on all promotion campaigns and general BRT developments to the media. Public relations events included political heads briefing the media in order to communicate the milestones of the project. The interviewee indicated that they also held a ribbon cutting event, the launch of new BRT buses and new route or new station promotions. The purpose of the ribbon cutting event was to introduce the public to *A re Yeng,* familiarize them with the BRT services and begin a customer base. The marketing team also used social media to post any unique information about the BRT system. During the promotions, they ran competitions such as "Like our pages", "Take a selfie and tag us", "Place a video of your journey experience and stand a chance to win". The

marketing team also gave away various prizes to commuters who entered such competitions. However, the respondent could not tell which models were assumed during the conceptualisation of the promotion campaigns.

The efficiency of all the activities of the promotion campaigns was not evaluated in terms of costs or impacts. Nevertheless, the respondent highlighted that they did surveys on the services they offered and always ensured that they opted for affordable approaches such as digital marketing and sales promotions. No explicit evaluations were done before or after the promotion campaigns. Studies using surveys were only conducted to understand the quality of services provided which enabled them to identify the strengths and weaknesses of the BRT services in order to improve for better quality of services.

4.2.4 Case study 4: Cycling service promotions- COJ

One of the promotion campaign activities was the “Cycle Jozi week”. During this activity, the COJ, JUCA, *Freedom Ride* and *Fixin’ Diaries* launched the “Cycle Friday,” where Sandton cyclists meet and cycle every Friday. This campaign also entailed a workshop with other stakeholders such as *JUCA, Freedom Ride* and *Fixin' Diaries*. The workshop was held by professionals from different fields such as architects, engineers and urban planners. They discussed and advocated for the implementation of cycling infrastructure. *Qhubeka* assisted with bicycle donations to schools. The COJ cycling department also held a two week cycling campaign at the University of Johannesburg. During the two weeks, the marketing team distributed posters and leaflets on the importance of cycling. They provided training on cycling to beginners and mostly women. Talks on safety and testing of cycling lanes were also done. Following the two week campaign, a bicycle club was formed at UJ.

The last promotion campaign was the *Freedom Ride* which also involved various companies such as MTN, Vodacom, *Qhubek*a and Outsurance. Other cycling entities such as the *Freedom Ride, Fixin' Diaries, and JUCA* were also part of this promotion campaign which was open to everyone

including children and non-cyclists. Township schools such as Sacred Hearts were also involved in the campaign. The interviewee stated that they never used any initiatives although they received guidance from international experts from the city of Copenhagen, Denmark. Workshops, posters, flyers and social media were used to market cycling as a form of NMT. However, the interviewee highlighted that they need to increase their use of social media as a means of communication. The interviewee could not tell whether they base their campaigns on the rational or non-rational model. The interviewee indicated that they would have needed a human behaviour professional to assist in applying such human behaviour insights instead of engineers who then comprised the marketing team. The interviewee could also not tell the efficiency of the program because there was no such evaluation for any of the initiatives implemented.

4.2.5 Case study 5: Cycling service promotions-JUCA

The interviewee mentioned that they had not implemented many promotion campaign activities. They were involved in the *Freedom Ride* in 2014 and *Cycle Jozi* week in 2015. These campaigns entailed workshops, cycling across Johannesburg and around the UJ and the University of the Witwatersrand. Informational maps on cycling directions were provided during the testing of the cycling lanes. The interviewee also specified that JUCA and all the other cycling entities took part in the *Ecomobility Festival*. The respondent stated that they never used any initiatives. Print media was used to market cycling in low income areas. Media briefing, digital marketing and press releases were the key tools used because they reach more people including the low income groups.

The interviewee could not tell which behaviour models were assumed, but suspected that they may have assumed both models in the conceptualisation and implementation of the promotion campaigns. In addition, the interviewee indicated that no costs were incurred during the promotion campaigns. The interviewee highlighted that, "*Freedom Ride* is always sponsored by COJ, Hollard and Vodacom, among many

sponsors". The impact of the promotion campaigns were never evaluated either. Further, no formal evaluations were done before or after the promotion campaigns. However, after every ride, face-to-face surveys were done to measure the event in terms of the general arrangements such as road closures, water points, marshals on foot or bike, route branding and favourite cycling routes. Online evaluations were also done for the purpose of improving future events but there was no information on the number of cyclists before or after the campaigns.

4.2.6 Case study 6: Cycling service promotions- *Freedom Ride*

Freedom Ride campaigns were implemented in 2014, 2015 and 2016. The interviewee explained that no initiatives were specifically used. Digital marketing was mostly used as a promotion approach. The interviewee could not tell whether they assumed the rational or non-rational model during the conceptualisation and implementation of the promotion campaign activities. The interviewee stated that they could not measure the cost efficiencies because the promotion costs were incurred by companies such as *Qhubeka*, the COJ and Hollard which assisted in financing the resources used for the promotion campaigns. However, no systematic impact assessments were done. The interviewee stated that they did a bit of process evaluation where strengths and weaknesses after the promotion were identified based on social media platforms as the channel of communication. The information obtained from the surveys was used to improve on subsequent *Freedom Ride* events. However, the information was not representative of the population, for example, the *Freedom Ride* of April 2016 had 56 responses out of approximately 8000 participants. The responses were solicited through Google forms.

4.2.7 Case study 7: Cycling service promotions- Fixin' Diaries

This entity also participated in the *Freedom Ride* and the "Cycle Jozi week" as discussed in the previous sections (see sub-Section 4.2.4 - 4.2.6). The other promotion campaign activity was titled "Brunch and Ride". The "Brunch and Rides" started with information sessions on cycling rules mostly to females and then a brunch. During the "Cycle Jozi" week,

Fixin" Diaries managed to launch the "Sunday Rides". They also donated *Qhubeka* sponsored bicycles to schools in Soweto in order to encourage cycling in township schools. The interviewee indicated that they never applied any explicit models in the promotion campaigns. Digital marketing was mostly preferred because it is cheaper. Commuters were updated about cycling via Facebook. Cycling videos and details of cycling events were posted on social media. Maps of cycling paths were also part of the information packages that were handed out during the cycling events. The interviewee was not sure about the human behaviour models applied in the campaigns. Further, the impacts of the promotion campaigns were never evaluated. Nevertheless, the interviewee indicated that after the promotion campaigns, bicycle sales (from their bicycle sale project) increased in the first six months of 2016.

4.3 Case studies (secondary data sources)

4.3.1 Case study 1: Train service promotions

The promotion campaign tools used were mostly in the form of digital marketing and sales promotions. Although evaluations were done in some of the campaigns such as "Discover Gauteng the sleeping giant" (Kesagee, 2016), there were no data to indicate the ridership before the launch of the campaigns. The GMA also initiated a promotion campaign activity called "It is the season to give" between 9th December 2016 and 9th January 2017. The GMA partnered with Mango Airways and the shops located at the Mall of Africa to give away financial incentives to *Gautrain* commuters (see Figure 9). The partnership also enabled the GMA to give cash back rewards to customers who used the *Gautrain* smart card (GMA, 2016).

***Gautrain*-Mango Promotion** *"Gautrain* has partnered with Mango Airlines to offer passengers arriving at the OR Tambo International Airport in Johannesburg a complimentary *Gautrain* Card. The cards will be distributed to passengers whilst on board their Mango flight to Johannesburg. The cards are provided compliments of the *Gautrain* and some of these cards will be loaded with R174.00 – the maximum cost of a *Gautrain* journey from the OR Tambo International Airport. Mango Guests who load value onto their complimentary *Gautrain* Card by 15 January 2017 are eligible to receive a Mango flight voucher for the equivalent value (up to R250). Mango flight vouchers may be redeemed against future Mango flights. Flights must be booked on www.flymango.com by 28 February 2017".	**Vouchers worth more than R6 000 for Mall of Africa.** "Ride the Gautrain to Midrand station and collect a Mall of Africa voucher booklet from a promoter. Hop on a Gautrain bus direct to the Mall of Africa for Just R1 Activate your voucher booklet at the Mall and enjoy your shopping Because we're in the spirit of giving, we'll even throw in *R1 bus trips and R1 per day parking when you use the Gautrain this festive season. *Click here* to see participating stores. Offer valid from 09 December 2016 to 09 January 2017".	**1R Bus and Parking 'Tis the season to give!** "R1 parking per day plus R1 bus trips. Promotion is valid from 9th December 2016 to 9th January 2017. **Terms and conditions apply*."

Figure 9: *Gautrain* promotions for 2016 year end. Source: GMA, 2016: unpaginated. Date: 12 December 2016.

Another promotion activity initiated was the "Discover *Gauteng*, the sleeping giant" (Kesagee, 2016). During this activity, local commuters and tourists were allowed to use the *Gautrain*, park for R1 and take the

Gautrain bus for R1 to the tourist destination. Kesagee (2016) states that one of the main objectives of this campaign activity was to increase ridership of the *Gautrain*, which often goes lower during the festive season. They partnered with resort areas in *Gauteng* to give package deals from the tourist destinations and promoted new special routes as they marketed the service. Advertisements were stuck on the *Gautrain* buses as highlighted in Figure 10. After the "Discover Gauteng the sleeping giant" promotion campaign, ridership increased by 9.3% in comparison to 2014 (Kesagee, 2016:6). The reason for the increase could be attributed to the introduction of incentives as discussed under sub-Section 2.3.

Figure 10: Advertisements on the promotion of the *Gautrain* during the festive season. Source: Kesagee, 2016:3-4. Accessed 14 May 2016.

According to Sawubona (2015), the GMA also implemented an economic incentive based promotion activity called “Jump on the gift train.” The train commuters received dining vouchers and 10% off for movie tickets, grocery bills, health spa and at Net florist. The competition was done on a month long period from 12 December 2014 to 12 January 2015 as highlighted in Figure 11.

Jump on the gift train

Enter daily and you will win one of the following:

1. 500 fabulous weekend breaks
2. 10 000 dining vouchers
3. 10% off at the movies
4. 10% off your next grocery bill
5. 10% off at a health spa
6. 10% off at Net florist.

To enter:

1. Dial *120*48455# (Cost R1.50) on the day you travel.
2. Enter your name, email and the first 10 digits of your Gautrain gold card number.
3. We will reply with the details of your gift.

Offer valid from 12 December 2014 to 12 January 2015. Visit www.gautrain.co.za for full Terms and

Figure 11: Jump on the gift train promotion campaign. Source: Sawubona, 2015:50-51.

The GMA was also involved in the *Ecomobility Festival* in 2015. During the month of October 2015, the GMA made *Gautrain* operational adjustments such as the extension of the peak period from 14H30 to 15H30. Further, the number of trains and buses moving in one direction within an hour was increased from two to three trains/buses (20 minute interval) (Arrive Alive, 2015).

The last promotion activity was the "*Gautrain* Fame". It was run by the marketing teams of the G.M.A and the *Bombela* Concession Company. The promotion campaign involved billboard competitions in which citizens entered catchy phrases to market the *Gautrain*; won a free two-month ride with the *Gautrain* and had their names written on the *Gautrain* billboards. Channels of conveying the message were the radio, Facebook, Twitter as well as the company website. The competition ran between the 6th and the 22nd April 2016. The already existing billboards had messages to market the *Gautrain* as highlighted in Figure 12 (GMA, 2016).

Figure 12: *Gautrain* billboard messages. Source: GMA, 2016: unpaginated. Accessed 28 February 2017.

4.3.2 Case study 2: BRT service promotions- *Rea Vaya*

The *Rea Vaya* BRT held its first launch in April 2010 at several inner city *Rea Vaya* bus stations and a slogan titled "*You make Joburg great*" (*Rea Vaya*, 2010:unpaginated) was central to the launch of this BRT service. This campaign was launched by the COJ's marketing team. The campaign acknowledged the efforts of its staff and supporters in building a world class PT system. The portfolio head of transport during that period, Rehana Moosajee, stated that it is the people that make *Joburg* great. The head further emphasized that the *Rea Vaya* construction is a world class

project with world class infrastructure. The activators wore white t-shirts and held placards emblazoned "*You make Joburg great"* (Figure 13). Further, the department of transport mascot, *Pedestrian Angel*, also took part, holding a placard with the same slogan. The activators handed out brochures about the city's transport values and the *Rea Vaya* employees were given certificates of appreciation for the services they had rendered.

Figure 13: "You make Joburg great" promotion campaign. Source: *Rea Vaya*, 2010: unpaginated. Accessed 28 February 2017.

In addition to the primary data on "Travel for less" promotion campaign activity, this campaign entailed customers earning one point for every rand they spent during their use of the smart connector card and PT. During the "Travel for less" promotion campaign, there was also a provision of education at kiosks where customers gained more information about the connector card. Further, trained sales persons facilitated the process of switching to points in order to comply with the deadlines. They used personal selling at the *Rea Vaya* bus stations, sales promotions in the form of loyalty points, discounts and incentives such as R25 gain for switching to points for the first time, *Rea Vaya* branded stationery and t-

shirts as illustrated in Figure 8. In addition, posters and pamphlets (see Figure 14) were also used to provide information, especially about the smart connector card. The initiatives were conceptualized by the marketing teams.

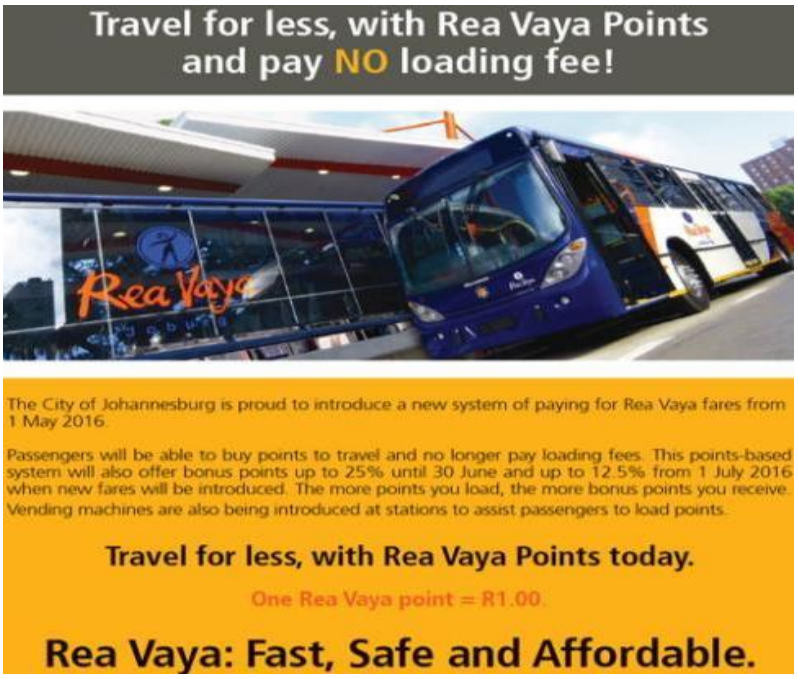

Figure 14: Points system for *Rea Vaya*. Sources: *Rea Vaya*, 2016: unpaginated. Accessed 14 May 2016.

According to *Rea Vaya (2012), Rea Vaya* BRT marketing team also held road safety campaigns which targeted motorists, school children, commuters and cyclists. They provided rules and regulations regarding the use of the road by the identified road users. They also educated the bus drivers on safety and the pedestrians on using walk ways instead of the bus lanes. Information pamphlets were handed out to the public by different *Rea Vaya* officials while the *Rea Vaya* mascot, RV, approached school children and handed out pamphlets and sweets (see Figure 15). Although the campaign aimed at improving road safety for all road users, the officials also indirectly marketed *Rea Vaya* BRT as a PT service provider.

Figure 15: Handing out of flyers by the *Rea Vaya* officials (left) and RV handing out sweets to children (right). Source: *Rea Vaya*, 2012: unpaginated. Accessed 16 November 2017.

4.3.3 Case study 3: BRT service promotions- *A re Yeng*

Facebook (2016) indicates that *A re Yeng* also used the "Travel for less" initiative where clients used the smart card and gained loyalty points (see Figure16). There were also catchy phrases such as "Did you know that pensioners between the ages of 60 and 65 qualify for a 25% discount during off-peak hours?" Further, commuters earned 25 points on their purchase of the connector card. For *A re Yeng*, after the "Switch and tap" promotion campaign, there was an increase in ridership from 60 000 passengers to 74 269 between December 2015 and January 2016, with an average daily passenger of 3 376.

Figure 16: Competition for switch and tap. Source: Facebook, 2016: unpaginated. Accessed 15 December 2016.

The primary data from the interview was similar to the secondary data on the *Are Yeng* promotion campaigns. However, secondary data also indicate that a variety of activities were done during the October Transport Month campaign (OTM) 2016. These ranged from the demonstration of new infrastructure for cleaner energy to charge vehicles, free tours for senior citizens, *Mahala* Saturdays, provision of information through expos, press release and information on why and which modes of transport should be used (such as the *Gautrain* buses, the *Gautrain* and the *Rea Vaya* BRTs). They also held exhibitions, conferences and public relations events where politicians informed consumers about *A re Yeng* as a sustainable mode of PT. The *Mahala* Saturday promotion involved City of Tshwane potential and existing customers being offered free rides every Saturday from 10th - 31st October 2016. Customers did not need a ticket to board the bus and enjoyed benefits such as free Wi-Fi and full air conditioning (Facebook, 2016). Figure 17 illustrates an advertisement of some of the activities of the OTM promotion campaign.

Figure 17: Mahala Saturday and *A Re Yeng* exhibition during the OTM. Source: Facebook, 2016: unpaginated. Accessed 16 December 2016.

4.3.4 Case study 4, 5, 6 and 7: Cycling service promotions- COJ, JUCA, *Freedom Ride* and *Fixin' Diaries*.

From the interviews conducted as well as the accessed secondary data, it was highlighted that the prominent promotion campaigns of cycling were similar across the four interviewed cycling organizations such as JUCA, *Freedom Ride*, *Fixin' Diaries* and the COJ. Promotion campaigns which were commonly rendered by the cycling organisations included rides on special days such as the Freedom day (*Freedom Ride*), "Cycle Jozi week" in the week of the 16th to the 22nd March 2015 and 17th April 2016; and education on cycling to schools and universities. JUCA, COJ and *Fixin' Diaries* managed to establish cycling support/service centres after the promotion campaigns. These include a bicycle empowerment program in Hillbrow, a cycling club at UJ and a bicycle station in Soweto. In partnership with private companies such as *Qhubeka* and Hollard, bicycles

were donated to learners in schools around the GCR as part of the promotion campaigns. In addition, the once a month cycling events such as the last Sunday of the month ride by *Freedom Ride*, once a month brunch and ride by *Fixin' Diaries* and once a month cycling by the UJ cycling club formed part of the continuous cycling promotion campaigns by the interviewed cycling organizations (Nkabinde, 2015; Freedom Ride , 2016).

In the course of the "Cycle Jozi week," there was a launch of the "Cycle Friday" campaign (Nkabinde, 2015: unpaginated) specifically for Sandton in order to curb traffic congestion and carbon emissions. In Diepsloot, the cycling entities organised a safety talk and gave away cycling helmets and reflective jackets to the cyclists. Further, local activists shared their experiences as cyclists during the cycling week. Provision of information on the importance of cycling as a mode of NMT, contribution to policies on cycling, advocacy on cycling infrastructure, workshops on the creation of cycling friendly cities and speaking to people on the importance of cycling were all central to most of the promotion campaigns which were held from 2013 to 2016. Digital marketing was the most common method of marketing because it reaches a wider population and is cheaper. Adverts in the form of posters and workshops to provide education and market cycling were other approaches applied.

Another promotion campaign was the *Ecomobility Festival* held during the OTM 2015. According to Obregon *et al*. (2015), the GDRT is the provincial custodian of the OTM campaign. It is a government-initiated campaign which expects municipalities to play leading roles in promoting the use of PT and NMT and raising public awareness on road safety. The theme for the OTM campaign was "Together moving the GCR forward". It aimed to create awareness of the GDRT's mandate to offer quality and improved mobility of people through construction and maintenance of roads, PT infrastructure and NMT facilities. The specific focus of the 2015 OTM campaign was to:

- demonstrate safe, integrated, public transport system initiatives
- encourage the use of safe and reliable transport
- promote the notion of eco-mobility
- promote NMT initiatives
- position rail systems at the centre of the PT network

According to Culwick and Trangoš (2015), the *Ecomobility Festival* was held in the month of October 2015 in Sandton with the aim of promoting both PT and NMT. During the *Ecomobility Festival*, these cycling organizations had a chance to demonstrate cycling, test the cycling lanes and educate citizens regarding cycling as a mode of NMT. Important figures such as celebrities and the former mayor of Johannesburg (Parks Tau) also took part in the cycling event. Other implemented activities involved about 50 local and international leaders parading various eco-mobility vehicles. In addition, Obregon *et al*. (2015:4) states that close to 5000 cyclists took part in the 30 km cycling journey (see Figure 18).

Another activity was a “road safety family day” (Obregon *et al*., 2015:4) where the audience learnt about street safety. During the period before the promotion campaign was held, the organizing teams launched a communication and a marketing campaign with the theme, “Change the way you move”, (*Ibid.*, 2015:5). The teams encouraged commuters to use PT and NMT. Further, the teams used banners at motorways, newspaper articles, radio, television and social media to market the festival. Persuasion of car drivers to use PT and NMT was also conducted by different activists. In addition, the responsible teams formed partnerships with corporate owners in Sandton. These corporate owners assisted them by designing adverts which marketed the festival on PT modes (see Figure 19).

There were also road lane closures in some of the streets while a few of the lanes were prioritised for cyclists and PT services to enable the program to run smoothly. Parks Tau (former Mayor of COJ) also held

meetings and interviews to market the *Ecomobility Festival*. During the one-month long festival, a participatory approach which included public debates through social media was facilitated. This helped to identify risks and measures to alleviate the challenges of transitioning to PT and NMT with the ultimate objective of increasing ridership. The approach used in the campaign had similar characteristics with the community-based social marketing model. McKenzie-Mohr and Schultz (2012) state that such a model is based on the selection of the target behaviour, which in this study was the unsustainably high dependence on IMT, identification of barriers that limited people from using PT and NMT and designing of the promotion program as a pilot project, for example, the *Ecomobility Festival* in Sandton. Details on ridership during the one month campaign are highlighted in the pie charts in Figures 20.

Figure 18: Cycling demonstrations during the *Ecomobility Festival*. Source: Obregon *et al*., 2015:4. Accessed 14 May 2016.

Figure 19: An advert of the *Ecomobility Festival* campaign. Sources: Obregon *et al*., 2015:7, 9. Accessed 14 May 2016.

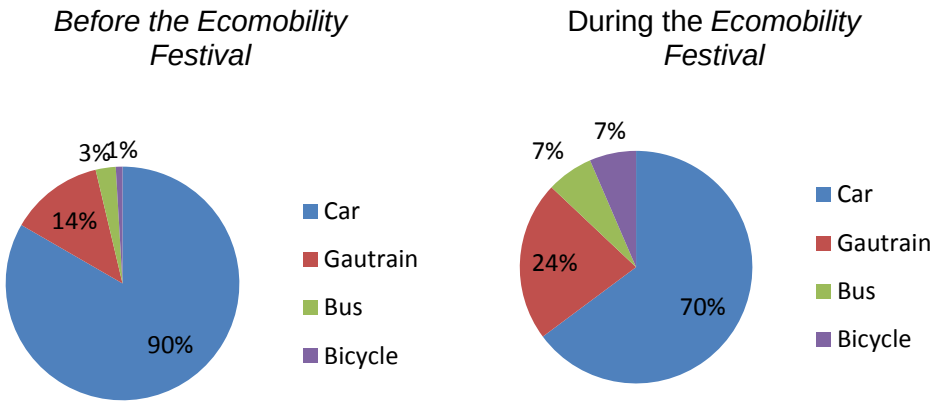

Figure 20: Ridership before the Promotion Campaign. Source: Adapted from Culwick and Trangoš (2015).

Before the *Ecomobility Festival*, the number of commuters who depended on IMT was higher than the number of commuters who used PT (Figure 20, left hand side image). There was an increase in the use of PT and a reduction in IMT use during the *Ecomobility Festival* (Figure 20, right hand side image). All the same, the use of IMT remained higher. No secondary

data showing the shift to the promoted modes of transport were available for the period after the *Ecomobility Festival*. It is therefore not evident if the increased ridership was sustained after/beyond the Ecomobility *Festival* period.

4.4 Conclusion

From the data presented, the study reached a conclusion on the PT and NMT promotion campaigns implemented in the GCR in the past 10 years. *A re Yeng* and *Rea Vaya* implemented almost similar promotions campaign activities such as loyalty points promotions, road safety campaigns and new route promotions as discussed in sub-Sections 4.3.2 and 4.3.3. The GMA implemented a few promotion activities for the *Gautrain* where most of them were executed towards the end of the year because ridership decreases between December and January (as reported in Kesagee, 2016).

The promotion campaigns for the cycling entities were common. Some of these include the *Ecomobility Festival*, “Cycle Jozi week” and the *Freedom Ride*. Further, the promotion campaign initiatives and approaches enabled the study to answer the subsequent question on identifying the assumed models of human behaviour (see Section 5.2). Five of the promotion campaign entities did not have specific taglines during the campaign activities except for *A re Yeng* and *Rea Vaya*’s “Switch and tap” and “Loyalty points” promotion. Therefore, messages and mechanisms of the promotions were analysed for those that did not use specific taglines during the campaign activities. Table 5 provides a summary of the key promotion campaigns for PT and NMT.

Table 5: Key promotion campaigns for PT and NMT. Source: Derived from Chapter 4 of this study.

PT or NMT service	**Promotion campaign activities**
Train-Gautrain	• Discover *Gauteng,* the sleeping giant • Jump on the gift train • *Ecomobility Festival* in 2015. • It is the season for giving • *Gautrain* fame • Competition for branding the *Gautrain*. • My train for the Youth.
BRT-Rea Vaya	• New route promotion. • "Travel for less" with *Rea Vaya* points • *Ecomobility festival* in 2015 • "You make *Joburg* great" • Road safety promotions.
BRT-A re Yeng	• *Mahala* Saturdays • Switch and Tap • Exhibitions • 2016 October Transport Month

	• Road safety promotions.
Cycling- COJ	• Cycle Jozi week • Cycle weeks Cycle paths • *Freedom Ride 2016* • *Ecomobility Festival, 2015*
Cycling-JUCA	• *Freedom Ride* in 2014 • Cycle Jozi week in 2015 • *Ecomobility Festival, 2015*
Cycling-Freedom Ride	• *Freedom rides* 2014, 2015, 2016
Cycling-Fixin' Diaries	• *Freedom Ride2014* • Cycle Jozi week • Brunch and Ride • *Ecomobility Festival, 2015*

Chapter 5: How to identify assumed human behaviour models and the predominant model in the promotion campaigns

5.1 Introduction

This chapter analyses and interprets data related to the sub-question on how to identify the assumed models in the promotion campaigns of PT and NMT in the GCR as well as concluding on the predominant model. Further, this chapter uses the data on the promotion campaigns that were done for PT and NMT ranging from cycling, the BRTs and the *Gautrain* as appraised in Chapters 1, Section 4.1 and Table 5.

5.2 How to identify models of human behaviour

In order to identify the models of human behaviour, the study applied guidance on how to identify the models as argued in Section 3.4. This section presents an analysis on the models of human behaviour within the promotion campaigns. In addition, data from Section 4.4 and 2.9 were used in order to derive the sub-findings for this chapter and related sub-question.

5.2.1 Case study 1: Train service promotion

Discover Gauteng the sleeping giant

The main activities of the promotion campaigns were partnerships with various Gauteng resorts/ tourist destinations for discounted vouchers. The other activity was partnership with the South African Breweries (SAB) for discounted beer tours for the passengers. There was also R1 cost for bus trips and R1 per day parking (see Figure 10). The promotion campaign had a beginning and an end date from 5 December 2015 to 17 January 2016.

By analysing these messages, the study concludes that there was an assumption of the rational model especially given the emphasis on discounts and R1 costs for parking and bus riding. The emphasis on costs and benefits means that the rational agent, given a range of options, would choose the best possible options based on costs and benefits. Further, rational agents would be assumed to respond well to incentives

when they receive full information on the options, as they are assumed to be utility maximisers. Therefore, they would respond positively to the offers and in that way, this might be the reason for ridership increases during the promotion campaign period as indicated in the discussion in Section 4.3. The time limit of the promotion from a rational agent perspective could also mean that the marketing teams could not afford to run the campaign for a longer period.

On the other hand, the time frame between December and January could be a possible indication that the campaign had the non-rational agent model in its conceptualisation. This is because of the short-term and the definite economic rewards that were offered. The non-rational agent prefers sure, immediate gains instead of possibly higher but uncertain future gains. This might explain the fact that non-rational agent also responds to incentives. However, such behaviour is not attributed to utility maximising but more so to fear of loss as supported by the loss aversion heuristic.

Understanding that the non-rational agent lacks the will-power to implement decisions, difficulties in connecting from one mode of transport to another were drastically reduced. Buses were provided to carry passengers straight to the tourist destinations. Further, the options for behaviour change were easier to implement, therefore, there was more willingness for the commuters to make the relevant choices and decisions. However, this might also mean the trip would not consume as much time as it would have if the passengers had to connect to the destinations themselves with IMT. Saving time could be concluded as a gain (possibly set to counter the cost of IMT) thereby indicating the assumption of the rational agent model. Although there are activities which show that the non-rational agent model was also targeted, the rational agent model was the most assumed during the promotion activity. Table 6 indicates a summary of the identified model in the Discover *Gauteng* the sleeping giant activity.

Table 6: Identified assumed human behaviour model in the train promotion.

Discover *Gauteng* the sleeping giant promotion activity	
Promotion channels/mechanisms	**Assumed human behaviour model**
1Rand bus and 1 Rand parking	Rational
Discounted beer tours	Rational
Time frame of promotion campaign 5 Dec 2015-17 Jan 2016	Non-rational
Tourist destination vouchers	Rational and Non-rational
Straight buses to tourist destinations	Rational

Jump on the gift train

The promotion was between 12 December 2014 and 12 January 2015. Commuters could win 10 000 dining vouchers, 500 weekend breaks and 10% at the movies, health spa, Netflorist and grocery bill (see Figure 11). This promotion campaign can be deemed to be primarily based on the rational agent model as indicated by the emphasis on financial gains which indicates one of the rational agent traits (see Table 2). The time frame with deadlines might have assumed the non-rational agent as well because such an agent experiences limited will power to implement decisions. Therefore, a deadline-framing guides the individual to take an action within the given time frame. The short time frame for the promotion might also indicate the target audience's preference for short term gains over long term gains (hyperbolic discounting). On the other hand, short term incentives could also be taken to indicate that commuters in their mental accounting did not apportion too much value to sustain the interest in PT. This would thus guide towards a finding of the non-rational model of human behaviour even though the rational agent model was the most predominantly assumed model. Table 7 indicates a summary of the assumed models.

Table 7: Assumed models on the Jump on the gift train promotion activity.

Promotion Activity-Jump on the gift train	
Promotion channel/mechanism	**Assumed human behaviour model**
Dining vouchers	Rational
10% discounts	Rational
Time span – 12 Dec 2014- 12 Jan 2015	Non-rational

The Ecomobility Festival

The theme was “Change the way you move”. There was persuasion to use PT by various activists. There were lane closures during this promotion campaign. The GM*A* made an operational adjustment for the *Gautrain* services such as the extension of the peak period from 14H30 to 15H30. In addition, there were three trains per hour per direction in place of two trains per hour/direction.

The theme was a direct and simple instruction for the commuters to shift from private car use to PT. Persuasion to use PT indicates the assumption of the traditional intervention based on the rational choice theory. The agent consciously makes the best decision based on the given facts and arguments for GHG emissions reduction. Moreover, lane closures also indicate restrictions instead of free choice. This indicates the assumption of the rational agent because no matter the context or the environment the rational agent’s behaviour remains consistent towards selecting the best and least cost option. The operational adjustments for the *Gautrain* were possibly done to accommodate the anticipated increase in numbers of commuters and thus reduce pressure on the train. The reduction of such an obstacle might mean there was an assumption of the rational and non-rational agent (see discussion on reducing level of difficulty under the “Discover *Gauteng* the sleeping giant” promotion). A summary of the assumed models is highlighted in Table 8.

Table 8: Identified assumed models in the *Ecomobility* promotion activity.

Promotion activity- The *Ecomobility Festival*	
Promotion mechanism/channels	**Assumed human behaviour model**
Theme "Change the way you move"	Rational
Lane closures	Rational
Operational adjustments	Rational and non-rational
Persuasion by activists	Rational

It is the season to give

This was done during the period between 9 December and February 28 (see Figure 9). There were partnerships with Mango Airways for flight vouchers worth R250. There was also a *Gautrain* complimentary gift card loaded with R174 upon boarding the *Gautrain* and the Mango flights. In addition, there was R6 000 worth of shopping vouchers which could be redeemed at the Mall of Africa shops. Another financial incentive was the R1 per day parking and R1 bus trip between 9th December 2016 and 9th January 2017. By concluding that the offers would be understood as gains, the rational agent who is seen as individual who maximises benefits and reduces costs of travel could have been the assumed model in the conceptualisation of this promotion campaign. Table 9 gives a summary of the discussed assumed models.

Table 9: Assumed models identified under *It is the season to give* promotion activity.

Promotion activity-It is the season to give	
Promotion channels/mechanisms	**Assumed human behaviour model**
Mango Flight vouchers	Rational
R6000 worth of shopping vouchers	Rational
1Rand bus and 1Rand parking	Rational
Jump on the gift train competition	Rational
Gautrain complimentary gift card	Rational

Time frame of the promotion- 9 Dec- Feb 28	Rational and non-rational

Branding the Gautrain competition

The promotion involved competition and prizes which were to be given to winners who voted for the most innovative name for the train. The G.M.A employees also presented information about the train using exhibitions as methods of information sharing. The involvement of the public in the branding enhanced commuters' sense of collective ownership (as indicated in sub-Section 4.2.1.) The feeling that the *Gautrain* is "ours" means that commuters could possibly invest time, effort and energy to use this mode of transport. This shows an assumption of the non-rational agent during the conceptualisation and implementation of this campaign since it focuses on the emotions of the commuters (sunk costs and endowment effects).

On the other hand, the notion of a competition with prizes to be won indicates the assumption of the rational agent. This is because of the assumption that the commuters could perform a clearheaded means versus ends calculation where the action that maximises monetary gain would be selected. The provision of information indicates the assumption that the commuters needed accurate information to make correct assessments of choices and this would translate to a rational agent model assumption (see Table 10 for a summary of the discussed assumed models of human behaviour).

Table 10: Discussed assumed models on the Branding the *Gautrain* promotion.

Promotion activity-Branding the *Gautrain*	
Promotion channels/mechanisms	**Assumed human behaviour model**
Competition for branding and R1000 prize	Rational and non-rational
Exhibitions	Rational

My train for the youth

This campaign entailed the provision of mentorship programs to the youth. One of its features is the mentorship benefit that learners received when they used the train. This represents the maximising utility aspect of the rational agent. Table 11 presents a summary of the identified model of human behaviour.

Table 11: Assumed human behaviour model in the My train for the Youth promotion activity

Promotion activity- my train for the youth	
Promotion channels/mechanisms	**Assumed human behaviour models**
Mentorship training	Rational

The Gautrain fame

The campaign features were competitions with a two month free ride to the winners. Some of the billboard messages stated that, “Unlike you, we don’t stop at Allandale” and “Fly to the airport” (see Figure 12).

Most of the information on the billboards was neither framed as gains nor losses except for a few such as “Unlike you, we don’t stop at Allandale”. This was a display across the highway over the Allandale interchange and specifically targeted at motorists at peak-hour on the highway (“the stuck” motorists) and therefore served as a comparison between motorists and the users of the *Gautrain*. The phrase was framed as a positive in that it explained that using the *Gautrain* ensured that a person would not have multiple stops during the trip as compared to the alternative of using IMT. This is possibly aimed at provoking a feeling of loss for not being a user of the service for those who are always in the traffic congestion on the highway. In addition, this catchy phrase was used as a social normative message as it compared the qualities of the *Gautrain* to that of an IMT occupant. The message highlights the presence of the non-rational traits of risk seeking in the domain of loss through the provocation of loss feelings as well as presenting the message as a social norm.

Another phrase that was framed as a positive stated “98, 4% on time. Nobody’s perfect.” This shows a manipulation of the way information relevant to a decision is valued or perceived especially through normalising possibly intended to make the IMT commuter feel a sense of belonging to the *Gautrain* service. A simple example is provided by Levin’s (1987) study on people’s choices of food which showed that people change the way they perceive food according to whether the fat content is described in positive terms (for example, 90% fat-free) or negative terms (for example, 10% fat). In this case of the *Gautrain* catchy phrase, it was framed 98.4% on time as opposed to the negative frame which would read as 1.6% late. With regard to the significance of framing, translating it as a negative would mean that there is an assumption of the non-rational man. The non-rational man is prepared to implement a decision in order to avoid loss. On the other hand, the 98, 4% on time was framed as a gain or a positive thereby targeting the *econs* geared towards utility/value maximisation.

However, some of the phrases were merely informative about the qualities of the *Gautrain* rather than framed as gains or losses. One example is “Fly to the airport” and “160kph, an absolute fasterpiece” (see Figure 12). This formed part of media literacy education in which the marketing teams recognized, honoured and used the human thought process and assumed that the *econs* would apply *econ* thinking to media messages in order to provoke wise choices and decisions. The fact that the message of the campaign was more information based also highlights the assumption that an *economic man* would reason based on the good qualities of the *Gautrain* and be able to weigh the benefits of the *Gautrain* and eventually make a choice in favour of the *Gautrain*. Table 12 highlights a summary of the identified models of human behaviour.

Table 12: Assumed human behaviour model in the *Gautrain* fame promotion activity.

Promotion activity- *Gautrain* fame	
Promotion channel/mechanism	**Assumed human behaviour model**
Billboard messages1 "Unlike you, we don't stop at Allandale"	Non rational
Billboard message 2 "Fly to the airport"	Rational
Billboard message 3 "…Absolute faster piece"	Rational
Billboard message 4 "98.4% on time"	Rational
Competitions –prize of two month free ride	Rational
Time span of promotion	Non-rational

5.2.2 Case study 2: BRT services promotion (*Rea Vaya)*

You make Joburg great

The most outstanding trait of this promotion campaign was the core message titled "You make *Joburg* great" (see Figure 13). There was also the use of the Department of Transport mascot. The employees received certificate of appreciation. Informational brochures about *Rea Vaya* were also handed out.

This feel-good campaign appealed to the PT customers' pride in being *Joburgers*. The text was neither an appeal nor a recommendation for the target audience to make choices or to reason. Instead, it served as a nudge (non-rational model assumption) which aimed at exploiting people's bias and subconscious processes possibly with the intention to associate the feelings with the BRT service. It was different from most adverts that '*rationally persuade'* citizens (Reiss, 2013:291). In addition, the use of the mascot was aimed at provoking feelings of fun and affective behaviour. Further, the mascot personified the *Rea Vaya* brand, created attention and appealed to all age groups. This resulted in the creation of strong relationship between the brand and the commuters. The presentation of

certificates of appreciation also enabled the public to build a positive image around the *Rea Vaya* brand.

Based on the personal assumption that stickers serve as a throwback product to childhood that people do not outgrow, the stickers that were handed out to commuters enhanced their feel good response/reaction. Further, the stickers possibly sustained conversations about the company similar to social media interactions on diverse platforms. The stickers served as free gifts and implied that commuters got incentives without paying for them (emphasis on gains). On the other hand, the branded t-shirts served as incentives and possibly intended to increase a feeling of pride. They therefore, possibly served the same purpose as the stickers.

The branded t-shirt, stickers, the placards and the mascot (*Pedestrian Angel)* all carried the message "You make Joburg great". They increased the ability of the BRT name to stand out (salience). This can be linked to the availability heuristic and could be taken to mean that there was also an assumption of the non-rational model of human behaviour during the conceptualisation and implementation of this promotion campaign. One more heuristic bias that stands out in the campaign is representativeness/similarity. The indicated traits of *Rea Vaya* such as world class infrastructure mean that there was an understanding that commuters would liken *Rea Vaya* with international BRTs as discussed on the representativeness heuristic in Section 2.5. Table 13 provides a summary of the identified models under the "You make *Joburg* great" promotion activity.

Table 13: Identified models under "You make *Joburg* great" promotion activity.

Promotion activity- You make *Joburg* great	
Promotion channels/mechanism	**Assumed human behaviour model**
You make *Joburg* great slogan	Non-rational
Pedestrian Angel, the mascot	Rational and Non-rational
Stickers with the slogan	Rational and Non-rational
Branded Tshirts with the slogan	Rational and non-rational
Informational brochures	Rational
Speech on BRT infrastructure	Non-rational
Public presentation of certificates	Non-rational

New route promotion

Sales promotions in the form of face-to-face marketing were employed. Flyers and pamphlets were handed out by the employees from *Rea Vaya* BRT. The flyers and pamphlets contained information on how to use the *Rea Vaya* BRT.

The application of the face-to-face marketing approach indicates that the marketing team understood that such an approach updates consumers' expectations. Informational print outs suggest that commuters needed more information about the BRT system. This information update would then enable the commuters to make decisions towards the *Rea Vaya* BRT as the alternative mode of PT (rational assumption). This could be taken to mean that there is an assumption of the rational model mainly reflected by the assumption that the decision maker needs full, perfect information to make a choice. On the other hand, the face-to-face approach creates a sense of community as the marketing team members interact with the commuters. A sense of trust and a common goal is also created between the marketing team members and the commuters once options regarding the BRT use are presented. This indicates the manipulation of the non-rational agent traits which primarily depend on emotion-driven choices and

decisions rather than on rationally driven ones. Table 14 presents a word table of the identified models.

Table 14: Identified models under the *New route promotion* activity.

Promotion activity-New route promotion	
Promotion channels/mechanism	**Assumed human behaviour models**
Face to face marketing	Rational and Non-rational
Informational brochures	Rational

Ecomobility Festival

The *Rea Vaya* BRT was part of the PT modes that were promoted during the *Ecomobility* Festival. The marketing team stressed the fact that the bus lane between Graystone and West Street was to be used as a PT expressway during the festival. This shows that the marketing team aimed to make the task to choose the use of PT easier. In order to overcome inertia that arises from a limited willpower resource, the expressway meant that traffic would move quicker and thus enable commuters to save time. On the other hand, saving time implies that there was an assumption of utility-maximising. This consideration means that the audience would save time if they chose the presented choice of PT. For these reasons, the rational and non-rational models seem to have been assumed in this case. Table 15 indicates a summary of the identified models.

Table 15: Summary of identified human behaviour models discussed under the *Ecomobility* Festival.

Promotion activity- *Ecomobility* Festival	
Promotion channel/mechanism	**Assumed human behaviour model**
Emphasis on the availability of the expressway	Non-rational

Road safety promotions

The most outstanding elements of this campaign were the simple provision of road rules and regulations as presented in sub-Section 4.3.2. Sweets and pamphlets were handed out to school children by *RV*, the mascot. Informational pamphlets indicate that there was also an assumption of the rational model as discussed under the "New route" promotion campaign. The mascot and sweets possibly indicate an assumption of both models as supported by the discussion on free gifts and the mascot on the "You make Joburg great" promotion campaign (see Table 16 for a summary of the identified models).

Table 16: Identified models as discussed under the Road safety activity for BRT promotion.

Promotion activity-Road safety	
Promotion channels/mechanisms	**Assumed human behaviour model**
Education on road rules and regulations using pamphlets	Rational
Sweets as incentives	Rational and Non-rational
RV, the mascot	Non-rational

Travel for less

The core message was "Travel for less." T-shirts with the core message and key strings with a *Rea Vaya* logo were handed out by the *Rea Vaya* employees. By using the smart connector card, commuters earned 1 point for every R1 spent. The promotion also entailed R25 rand cash back when commuters switched to the smart card for the first time. Posters and pamphlets with the title "Travel for less with *Rea Vaya* points and pay NO loading fee!" were also distributed (Figure 14). There were also bonus points of up to 25% and 12.5% until June 30 and from 1st July, respectively. Education on the points based system was presented via face to face and pamphlets.

The main message highlights the assumption that commuters prefer maximising gains. This is because of offers such as R25 cash back, bonus points, "…pay NO loading fee" and t-shirt and key rings. On the other hand, there was an intended exploitation of the sunk cost effect. Commuters had to buy smart connector cards to earn loyalty points and special offers. Once the commuter buys the card, the sunk cost effect sets off and motivates the commuter to take advantage of the special offers in order not to lose the initial fee. Unlike the rational man, the non-rational agent is affected by prior invested effort/resource. It is therefore possible that both models of human behaviour were assumed in this campaign. Table 17 highlights the identified models of human behaviour under the "Travel for less" activity.

Table 17: Human behaviour models identified under the "Travel for less" activity.

Promotion activity-Travel for less	
Promotion channels/mechanisms	**Assumed human behaviour model**
Earning 1 point for every 1 Rand spent	Rational
Deadlines on the switch process	Non-rational and rational
Demonstration on how to switch to points	Non-rational
Incentives (discounts and R25 gain)	Rational
Education through posters and pamphlets	Rational
Tshirts and key strings	Rational
Face to face marketing	Rational and Non Rational
25% and 12.5% bonus points	Rational
"…Pay NO loading fee"	Rational
"Travel for less with Re a Vaya" points slogan	Rational

5.2.3 Case study 3: BRT service promotion- *A re Yeng*

Mahala Saturdays

'Mahala Saturdays" was part of the OTM, 2016 (between 10 and 31 October 2016) which entailed free rides to all commuters every Saturday. In addition, free Wi-Fi and air-conditioning were the emphasised traits of

the bus. Senior citizens had free tours during that month. Commuters did not need any tickets to board the bus. Exhibitions about *A re Yeng* BRT were done at conferences and seminars. The marketing team also presented the green qualities of the bus (see Figure 17) and political leaders held talks to encourage the shift to other forms of PT such as *Rea Vaya* and the *Gautrain*.

According to Figure 17, the indicated traits of *A re Yeng* such as "Propelled by Compressed Natural Gas", "Reducing carbon emissions" and "Sustainable clean transport" are not easy for an average commuter to understand. Commuters may not understand the importance of these traits unless they do further research which requires time, energy and will power. Non-rational agents unlike rational agents do not have the time and will power to perform such an information demanding task. For this reason, the promotion might have been conceptualised and implemented for the rational agent.

In addition, the free rides, with free Wi-Fi and air conditioning indicate that commuters would get something for nothing. They would use the BRT without costs and commitment while creating a positive association with the brand. The emphasis of gains indicates that the rational agent model was perceived by the marketing team as the target audience. On the contrary, there was no need for tickets. This means the process did not require the commuter to queue for ticket purchase or load credits in order to ride the bus. The non-requirement for tickets indicates that a default option (nudge) was offered because no application tasks were required to ride the bus. The default effect was activated when non-ticket requirement became the norm.

The availability of the deadline (2 weeks of promotion) could have been aimed at creating a sense of urgency. Understanding that people always try to avoid losses at all costs, a given deadline within the promotion campaign meant that commuters would respond positively in order to avoid pain, in the case they miss out. The deadlines that were highlighted

in the promotion also hint to an understanding/awareness that human beings are good at procrastination (see sub-Section 2.5.1 on explanation of procrastination) which can be mitigated through an 'authoritative external voice' (Ariely, 2010:146) such as the one giving the deadline for the switching to points process. Therefore, the deadline targeted non-rational agents. One last activity was provision of information at exhibitions. This is taken to indicate that the rational agent needs more information to make better decisions towards PT. Table 18 summarises the discussed human behaviour models.

Table 18: Identified human behaviour models under the OTM activity.

Promotion activity -OTM 2016	
Promotion channels/mechanisms	**Assumed human behaviour models**
Mahala Saturdays with no tickets	Rational and Non rational
Emphasis on free WI-Fi and air conditioning	Rational
Demonstration of electric vehicles	Non-rational
Exhibitions	Rational
Free tours to seniors citizens	Rational
Time frame of the promotion	Non-rational

Switch and Tap

Commuters could win prizes by liking and sharing the BRT's Face book page, placing a video on *A Re Yeng's* social media pages, posting their own photos ("selfies") and hash tagging the BRT name (see Figure 16). There was also an indication that pensioners could receive 25% discount when they travelled during off peak hours. Commuters were provided with information on the smart connector card. 25 free points were also earned on the first purchase of the new connector card

The core feature of the "Switch and tap" was the prize that each contestant would get by liking the page or hash tagging as indicated in sub-Section 4.3.3. The rational agent assesses how the present benefits

contribute to their own welfare and makes the decision to respond to the incentives while the non-rational agent believes in mutual benefits and fairness. The idea of contests might also signify the ability of the marketing team to tap into the human drive to compete in every circumstance. This shows that the assumed target audience was the rational agent.

The discounts and 25 free points were also taken to indicate gains while information provision meant there was the assumption that the disclosure of the BRT details would satisfy the rational agent trait of constantly acquiring information about choices in order to make decisions. Requesting commuters to place a video of their experience with *A Re Yeng* demonstrates the application of the social proof effect as discussed in sub-Section 2.5.1. The video encourages other commuters to use PT because their counterparts are using it. This signifies the assumption that the commuters are also non-rational agents (see Table 19 for a summary of the discussed human behaviour models).

Table 19: Assumed human behaviour models under the "Switch and tap" activity.

Promotion activity-Switch and tap	
Promotion channels/mechanisms	**Assumed human behaviour model**
Sharing of face book page by contestants	Rational and Non rational
Hash tagging the BRT name	Non-rational and rational
'Selfies"/photo posting	Rational and Non rational
25% discounts	Rational
25 free points	Rational
Demonstration on how to use the connector card	Non-rational

Road safety promotions

The approach was similar to that of *Rea Vaya* as discussed in sub-Section 5.3.2 and 4.3.2. In addition, the marketing teams focused on educating commuters on the BRT lanes and traffic signals. Once more, this indicates the assumption of the rational agent model based on the need for adequate information (see Table 20 for a summary of the identified models).

Table 20: Identified human behaviour models as discussed under the Road safety activity.

Promotion activity-Road safety	
Promotion channels/mechanisms	**Assumed human behaviour model**
Educational talks	Rational
Education through brochures	Rational
Social network competitions on rules of the road -online	Rational

Launch of the BRT system

Information regarding the development of the BRT was provided to the public via press release. “Ribbon cutting” ceremony or grand opening events mean that the public were involved in the official launch process. The involvement of the public indicates that they aimed to build engagement with the commuters and increase sense of ownership and emotional connection. This means there was an assumption of the non-rational agent because unlike rational agents, non-rational agents’ choices and decision-making processes are influenced by resultant emotions related to their experiences and not merely on the explicit information shared. Table 21 presents a summary of the identified human behaviour models under the *A re Yeng* launch as an activity for BRT promotion.

Table 21: Identified human behaviour models under the *A re Yeng* launch.

Promotion activity- *A re Yeng* launch	
Promotion channels/mechanisms	**Assumed human behaviour model**
Ribbon cutting event	Non-rational
Press release	Non-rational

5.2.4 Case studies 4, 5, 6 and 7: Cycling service promotion (COJ, JUCA, *Freedom Ride* and *Fixin' Diaries)*.

Cycle Jozi week

Using the data presented in sub-Section 4.3.4, *Cycle Jozi*, the *Freedom Ride* and the *Ecomobility Festival* were the main promotions done by the four cycling entities. Captured under joint activities, information sharing through training and workshops were some of the activities of this campaign. Cycling helmets and reflective jackets were donated to cyclists in Diepsloot. "Cycle Friday" was launched during this week.

The distribution of freebies such as helmets and reflective jackets possibly meant that the participants would obtain the freebies as the gains. On the other hand, freebies encourage cyclists to share their experience about cycling services. This could mean an assumption of a non-rational agent who depends on the imitation of what others are doing and would therefore be encouraged to adopt cycling as their preferred mode of transport once the freebies connect them to the group. This notion is also linked to the effect of social proof (see sub-Section 2.5.1).

Information sharing could be taken to indicate the assumption of the rational agent's need for full information as supported in the previous discussions (see Section 5.2). Further, the tagline "Cycle Friday" eliminates voluminous statements and ultimately limits information overload. Such a short tagline is easily remembered by non-rational agents who would be deemed not to have a perfect memory unlike the rational agent.

The provision of information on cycling routes made it easier for the target audience to be more involved since the informational barrier on the cycling routes was removed. Bicycle donations also highlight that obstacles such as lack of equipment were removed. All these activities show the assumption of the non-rational model of human behaviour. On the other hand, provision of information could also highlight the assumption of the rational agent model in that the activists expected people to make an informed decision on cycling by availing information on the cycling routes. Further, the incentives in the form of bicycle donations also highlight the assumed model could be the rational model in which choice and decision-making of the rational agent is triggered by incentives/gains. Table 22 presents a summary of the categorised human behaviour models.

Table 22: Identified human behaviour models under the Cycle *Jozi* week activity.

Promotion activity-Cycle *Jozi* week	
Promotion mechanism/channels	**Assumed human behaviour model**
"Cycle Friday"	Non-rational
Education through workshops/seminars/presentations	Rational
Helmets and reflective jackets distribution	Rational and non-rational
Cycling club establishment by all the entities	Non-rational
Provision of cycling route map	Rational and non-rational
Information provision on benefits of cycling	Rational
Provision of bicycles to learners	Non-rational and Rational

Freedom Ride

One feature of the *Freedom Ride* was pairing the event with Nelson Mandela. Joint partnerships with other stakeholder enabled a smooth flow

of the event. Free bicycles were donated to schools and informational posters were distributed around the COJ.

The use of Nelson Mandela and the former Mayor of Johannesburg (Park Tau) as public figures in the *Freedom Rides* indicates the marketing teams' assumption of the non-rational agents. The likeability of the public figures was most likely intended to increase the credibility of cycling as a mode of transport. The public figures would also draw the commuters' attention and enable them to recall cycling as they pair it with the involved famous persons. The use of celebrities also indicates the expectation that commuters could view cycling as the norm. This indicates the application of a nudge in the form of social norms. This highlights a possible assumption of normal human beings' (non-rational agents') choice and decision-making which would thus be influenced by emotions, values, beliefs and context. Informational activities can be linked to the rational model assumption as covered in the previous sections (see Table 23 for a summary of the argued human behaviour models).

Table 23: Summary of identified models under the *Freedom Ride* promotion.

Promotion activity- *Freedom Ride*	
Promotion channels/mechanisms	**Assumed human behaviour model**
Bike donations	Rational and non-rational
Training non-cyclists and inclusion of all ages and races	Non-rational
Pairing event with Nelson Mandela	Non rational
Launch of the last day of the month cycling	Non-rational
Former Mayor of Johannesburg's participation	Non-rational
Information sharing using pamphlets and social media	Rational

Ecomobility Festival

According to the data presented in sub-Section 4.3.4, the activities of this promotion campaign involved provision of education on street safety to families and children. A 30 km cycling event, with celebrities and the former mayor of Johannesburg as part of the cyclists, was also done during the campaign. Road lanes were closed to prioritise NMT and this closure might have caused inconveniences to IMT users such that using cycling as a form of transport was the most practical option. Persuasion of commuters to use NMT was done by different activists. Traits such as lane closures (restrictions), simple information provision and persuasion have been discussed in the previous sections and are deemed to indicate the assumption of the rational model while the use of celebrities indicates the assumption of the non-rational models.

The use of demonstration as a tool in this promotion campaign indicates the assumption that the target audience need visual support to increase the value of the offered NMT modes. It is more appealing to touch and feel various NMT devices than simply listen to their description. Further, when commuters test the cycling devices, their sense of ownership could be heightened. Such heightened sense of temporary ownership means that there are better chances that the commuters would use NMT as the preferred mode of transport. This is because once the commuters form an emotional attachment with the NMT devices, the possible loss of the device could be assumed to be a threat to the commuter (as supported by the endowment effect). Demonstrations also remove the element of distrust and combats perceived doubts about NMT as a sustainable mode of transport. For these specified reasons, there was an assumption of the non-rational model in the conceptualisation and implementation of the *Ecomobility Festival.* Table 24 indicates a summary of all the identified human behaviour models under the *Ecomobility* promotion activity.

Table 24: Categorised human behaviour models under the Ecomobility Festival activity.

Promotion activity-*Ecomobility Festival* during the OTM 2015	
Promotion channels/mechanisms	**Assumed human behaviour model**
Educate citizens on cycling and street safety	Rational
30km cycle	Non-rational
Celebrities and iconic figures	Non-Rational
Demonstration of cycling equipment	Non-rational
Approach and persuasion of IMT users	Rational
Edutainment	Rational and non-rational
Holding of meetings and interviews by the former Mayor of Johannesburg	Rational and non-rational
Lane closures and restrictions	Rational
Participatory approach/public participation-online	Non-rational

Brunch and Ride

The key characteristics studied for this event were the incentives (brunches) and the information sessions on cycling rules. During the "Cycle Jozi week", *Fixin' Diaries* managed to launch the "Sunday Rides". Incentives highlight the assumption of both rational and non-rational models while information sessions indicate that the target audience are assumed to be rational agents as discussed in previous promotions. Although the meal offers can be viewed as gains, they possibly made the recipients share the experience with other people especially on social media. This then, means there is an assumption of non-rational agent who depends on experience and social context to guide/influence decision-making. The tagline "Sunday Rides" also indicates the assumption of the non-rational model as supported by the discussion on "Cycle Friday", through mitigating information overload. Further, the establishment of the club for Sunday rides indicates a need for peer-support to continue using cycling as a mode of transport. Encouragement of cycling through the

activities of the event possibly contributed towards the reduction of attachment to the status quo (see Table 25 for a summary of the assumed models discussed).

Table 25: Identified human behaviour models on the Brunch and Ride activity.

Promotion activity- Brunch and Ride	
Promotion channels/mechanisms	**Assumed human behaviour models**
Information session	Rational
Brunch offer	Rational and non-rational
Sunday rides	Non-rational

Cycle week Cycle paths (Two- week campaign at UJ)

The marketing team distributed posters and leaflets about the importance of cycling. They provided training on cycling to beginners and mostly women. Talks on safety and testing of cycling lanes were also presented. Following the two-week campaign, a bicycle club was formed at the UJ. Based on previous discussions, direct talks on safety and informational posters indicate simple provision of information (rational model assumption) while training and demonstration of cycling indicate non-rational model assumptions. The establishment of the cycling club also indicates the assumption of non-rational agent model as discussed under the "Brunch and Ride" promotion. Table 26 sums up the identified human behaviour models under the "Cycle week Cycle paths" activity.

Table 26: Identified human behaviour models on the *Cycle week Cycle paths* activity.

Promotion activity- Cycle week Cycle paths	
Promotion channels/mechanisms	**Assumed human behaviour model**
Demonstration and testing of cycling lanes	Non-rational

Cycling club establishment	Non-rational
Training to non-cyclist students	Non-rational
Availability of bikes for training	Rational and non-rational
Education on the benefits of cycling and rules of the road	Rational

5.3 Predominant model of human behaviour in the promotion campaigns of PT and NMT.

5.3.1 Introduction

This section analyses data from section 5.2 in order to derive a sub-finding on the most predominantly assumed model of human behaviour by the professionals and policy makers in guiding the conceptualisation and implementation of the promotion campaigns. This is based on sub-findings in Section 5.2 which identify the assumed models of human behaviour. The sub-findings on the assumed human behaviour models were tabulated (see Table 6-26).

The sub-findings from Table 6-Table 26 were further categorized and presented in the form of graphs as highlighted in Figures 21, 22 and 23.

BRT service promotion campaigns

BRT promotions				
Total of promotion campaigns	**Activities/messages**	**Rational model**	**Non-rational model**	**Rational and non-rational model**
9	41	18	11	12

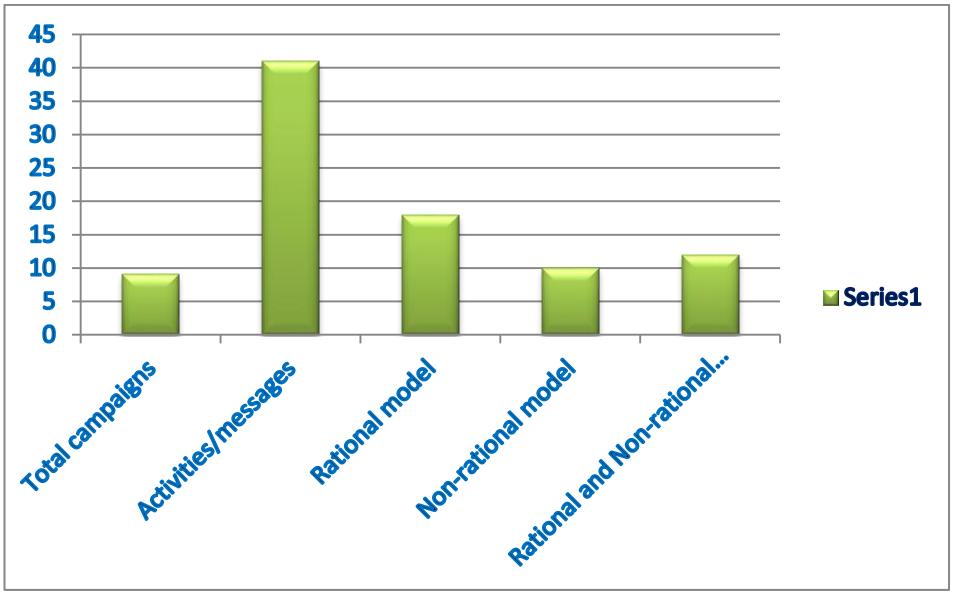

Figure 21: BRT promotions.

From the presentation above, the predominantly assumed model in the conceptualization and implementation of the BRT promotion services was the rational model of human behaviour.

Train service promotion campaigns

Gautrain service promotion				
Total of promotion activities	**Channels/mechanisms**	**Rational model**	**Non-rational model**	**Rational and non-rational model**
7	27	19	4	4

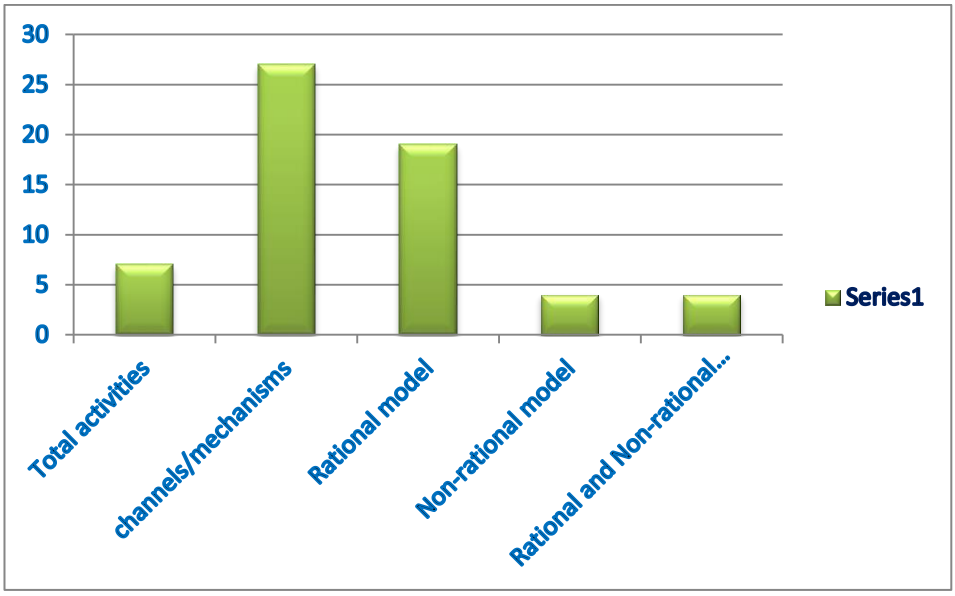

Figure 22: *Gautrain* service promotion.

The rational model of human behaviour was the predominantly assumed model in the conceptualization and implementation of the *Gautrain* promotion campaigns.

Cycling service promotion campaigns

Cycling promotion				
Total of promotion activities	**Channels/ mechanisms**	**Rational model**	**Non-rational model**	**Rational and non-rational model**
5	30	8	14	8

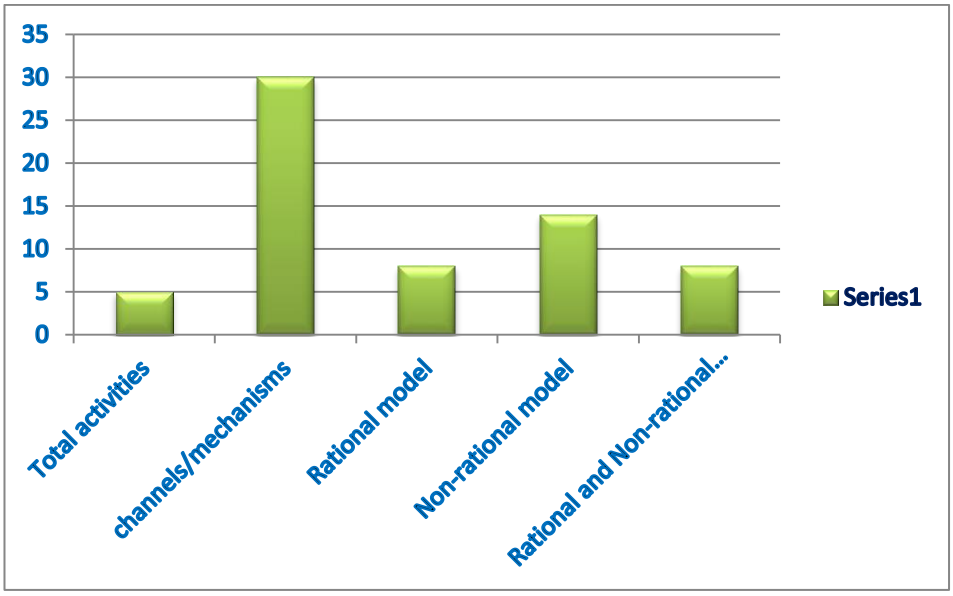

Figure 23: Cycling service promotion.

From the data given above, the non-rational model of human behaviour was the predominantly assumed model during the conceptualization and implementation of the cycling promotion campaigns.

5.3.2 Predominantly assumed model

In order to obtain findings for this section, and thus addressing the main question of the study, there was a need to analyse the predominant model of human behaviour. This was achieved by adding the totals of the promotion campaign activities and channels/mechanism and the assumed human behaviour models for the PT modes as well as the NMT modes. This was achieved by adding findings from the BRT and the train service promotions and presenting them together with the NMT findings as illustrated in Figure 24. The study then added altogether NMT and PT findings to conclude on the overall assumed model in the promotion campaigns of PT and NMT in the GCR as indicated in Figure 25.

	PT	NMT	Total
Total of promotion activities	16	5	21
Channels /mechanisms	68	30	98
Rational	37	8	45
Non-rational	15	14	29
Rational and Non-rational	16	8	24

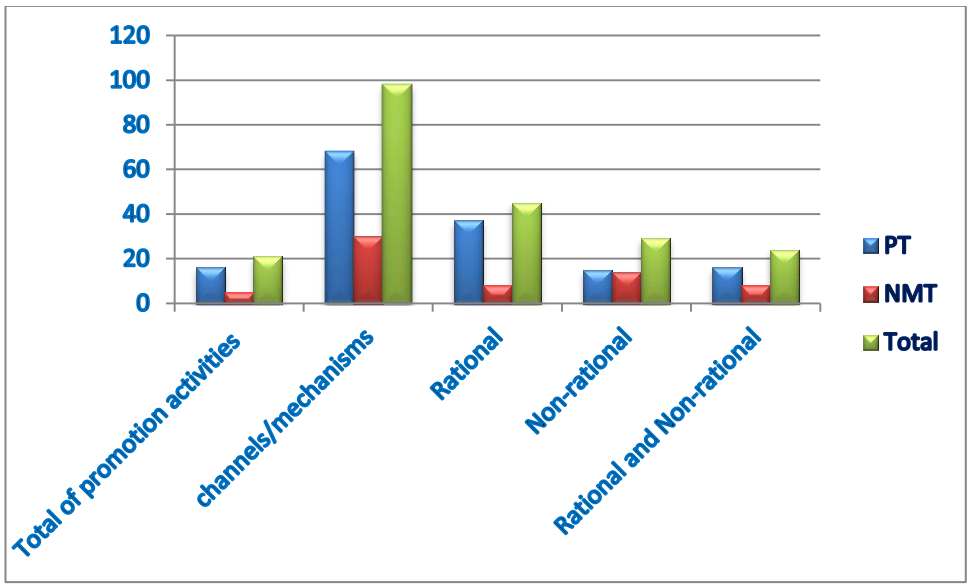

Figure 24: Sub-findings for PT and NMT.

	PT and NMT
Total of promotion campaign activities	21
Total channels/mechanisms	98
Total Rational	45
Total Non-rational	29
Total Rational and Non-rational	24

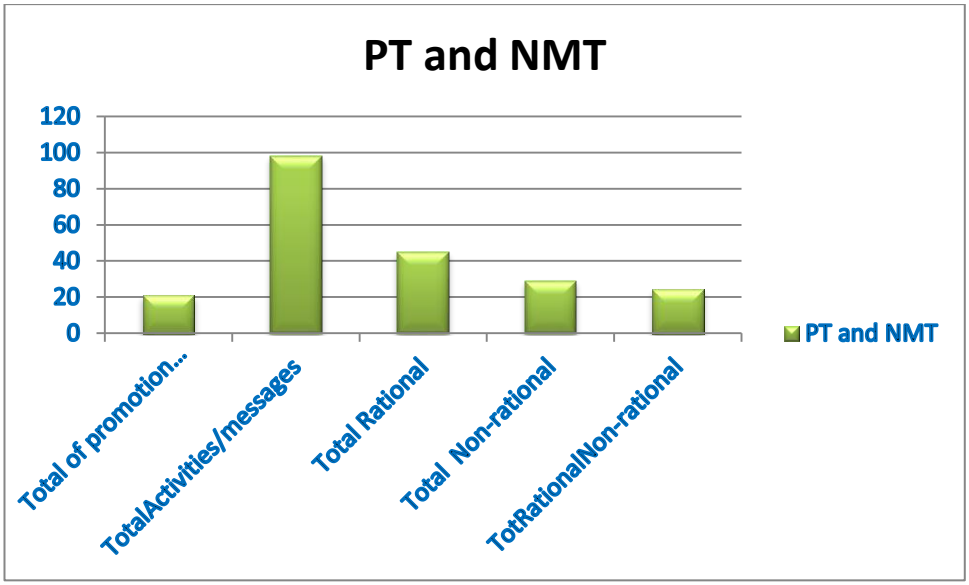

Figure 25: Overall findings for PT and NMT in the GCR.

The rational model of human behaviour is the predominant model in the conceptualization and implementation of the key promotion campaigns of PT and NMT in the GCR as highlighted in Figure 25.

5.4 Identified gaps/deficiencies in the promotion campaigns

This section is based on the assertion that there might be gaps/deficiencies within the promotion campaigns for PT and NMT. This section also analyses the ways in which more effective promotion campaign activities and messages can be done and framed especially based on insights on human behaviour models as discussed in Chapter 2. More effective ways of conceptualizing and implementing PT and NMT promotion campaigns can be classified under choice architecture (decoy and default effects), environmental influence (social proof and salience),

outcome valuations (status quo bias and sunk costs) and calculation bias (anchoring and availability heuristics) .

One deficiency of the promotion campaigns of PT and NMT is that they are information intensive. Most of the information is given in a plain and direct manner. This is possibly due to an assumption that the commuter is a rational agent, as discussed in the previous chapters. In order to address this gap, framing and nudging techniques can be implemented. More effective ways to construct PT and NMT promotion campaigns to encourage choice and decision-making can be formed using heuristic biases. Applying the loss aversion principle, there is a need to ensure that the expected gains from PT and NMT overwhelm the anticipated losses from giving up the already owned vehicles. This counters the inertia entrenched through the endowment and loss-aversion effects.

The current transport system is characterised by reactive behaviour including denial and attempts to justify status quo behaviour and unwillingness to switch to PT and NMT. Commuters favour their current IMT modes relative to PT and NMT. The promotion campaigns as measures introduced to effect/achieve the switch to PT and NMT were mainly characterised by economic-based rational-agent model techniques (as discussed in Section 5.2 and 5.3) such as social marketing to cause behaviour change in exchange for benefits. In response, consumers either ignored the interventions; or acted in favour of them only during the duration of the offer of the economic incentives or contrary to the expected behaviour. The applied nudge mechanisms such as referencing celebrity in cycling activities and PT promotion campaigns did not seem to register as a priority in the minds of the commuters. Such mechanisms might have been too complicated and confusing for System-1 thinking. They were therefore, either ignored or delayed such that they did not achieve the desired impact.

One way of improving the promotion campaigns include the use of nudges. Nudges prompt choices without heavily depending on people

evaluating their options consciously through System 2, and therefore, do not include openly persuasive interventions such as media campaigns and edutainment as was the case during the *Ecomobility Festival.* Although information provision in isolation has limited effect, evidence suggests that large-scale education campaigns coupled with other measures such as fiscal interventions and improvements on infrastructure can be effective in changing behaviour in the long-term. Such measures play a vital role towards yielding better results. On the presentation of information, for example, provision of information and personalised travel plans (such as through the *Vaya Moja* app for *Rea Vaya* BRT) may have a higher impact and are likely to be more cost-effective.

Nudges themselves may also be provided through regulatory means. For example, PT companies may provide a certain choice architecture in order to "nudge" individuals. It has been argued that public policy has placed too much emphasis on the reflective system or deliberative decision-making, leading to the assumption that behaviour change can only be achieved by appealing to knowledge and values and, as a result, underestimating the importance of the automatic or non-deliberative aspect of making choices. Behaviour is also influenced by the physical environment within which the behaviour happens. The availability of cheap and unhealthy food, for example, makes it more likely that people will consume it. Equally, if there are very busy roads and no cycling lanes, people are less likely to travel by bikes.

According to Marteau, a psychologist at the United Kingdom Department of Health and National Health Service (DH and NHS), behavioural economics have a better impact in highlighting the contextual and automatic determinants of behaviour. He concluded that choice architecture is more effective than information based campaigns (House of Lords, 2010). Therefore, instead of straight information based campaigns, nudges might be a better option towards more effective promotion campaigns. Further, Sunstein (2013) highlights that in order to measure

the effectiveness and success of nudges it is important to be experimental through having specific trials on a small scale with variations which will give a sense of what works and what does not. Afterward, it is vital to then make a projection of the impacts and outcomes if it is done at a bigger scale. Such an approach was only evident in the COJ cycling promotion campaigns at UJ but can be done by all entities in order to assess the effectiveness of their promotion campaigns.

Another gap noted was in the “Discover Gauteng, the sleeping giant” promotion campaign. The provision of incentives lacked variability and was thus highly predictable. Had the incentives and rewards been well presented towards effecting better behavioural change, they could have been in the form of variable rewards. Similar to the Skinner box (1938), as discussed in sub-Section 2.7.4, commuters could become “psychologically adapted” towards the use the *Gautrain* if the rewards were given on a more variable schedule where commuters would not be certain when they are likely to get rewards. Consequently, they would keep using the mode of transport more and more as they hoped to get more calculated incentives.

However, providing the incentives on a short term basis is also effective (but for a short time only) given that consumers prefer short term rewards (which are certain) to longer term rewards (which are uncertain) due to the fact that they are more risk averse. It is also important to note that most individuals experience difficulties projecting value into the future and are, therefore, more likely to undervalue future rewards, as these are felt/sensed in less concrete manner. This principle could be used efficiently to encourage individuals to switch to PT and NMT and save money by framing the messages on a short term focus and immediate benefits than on long term goals. One example can be presenting fuel cost savings per month instead of per year when using PT and NMT.

It is also worth noting that human behaviour patterns seem to display weakness of will such that if there is a long time interval between selecting and experiencing costs and benefits of choice, individuals are likely to select recklessly. When costs and benefits are immediate, people make faster choices and decisions primarily through sacrificing long run payoffs in favour of instant payoffs. For example, smokers may know that their routine will harm them in the long run, but cannot stand to sacrifice the current urge to smoke for the benefit of the far-off and uncertain reward of a healthy future. Similarly, motorists may know that their individual habit of car dependence emits carbon which harms the environment but cannot bear to sacrifice their cars in preference of more sustainable but collective modes of NMT and PT. This means the individual wins over the collective in choice and decision making (individual versus collective concept as discussed under the loss aversion principle in sub-Section 2.4.2).

In addition to enhancing the presentation of activities in the promotion campaigns, framing and nudging techniques can also be incorporated in the conceptualisation and implementation of the promotion campaigns. The way choices and options are presented to individuals influences the way they make decisions. Decision-making is perceived to be easier when a few options are available, as the relative or comparative decision process tends to be easier compared to the rational-agent approach which entails choices in contexts of largest possible range of options. Having too many options (choice overload) can be detrimental to the making of efficient decisions. In addition, behavioural economics studies suggests that irrelevant alternatives might play an important role in choice and decision-making process, as these could help individuals to become aware of their own preferences.

According to Ariely and Jones (2008), choosing from two versus three options leads to different decisions. Studying subscriptions choices for a magazine, they first looked at student options when choosing between

three alternatives such as all web content for $59, a subscription to the print edition for $125 as well as a combined print and web subscription, also for $125. From these three options, students were more likely to choose the second option. However, when only two options were presented (the web-only option for $59, and the combined press and web option for $125), students were more likely to choose the former. Ariely and Jones (2008) highlight that the second option (print edition for $125) helped participants with figuring out their preferences as it served as a decoy.

The consequence of this finding for policy makers and marketing professionals is that choices should always be framed in ways that help consumers to understand better what their preferences are. Whereas framing is a primarily subliminal process, it can be manipulated deliberately in promotion campaigns to maximise the attention of consumers as demonstrated in laboratory experiments (Tversky and Kahneman, 1981). In these experiments, it was shown that manipulation of the way outcomes are described, that is, either as losses or gains, or in pennies a day, results in completely different decisions being made. Framing a choice as a loss is more effective than framing it as a gain because people are more likely to take risks/chances when it comes to losses than gains. In other words, people prefer a certain result when it comes to a potential gain but are willing to take a chance if it involves avoiding a loss.

During the presentation of choice, it is important to highlight the benefits of the right choice and the costs of a bad choice using the appropriate language of nudging. For example, presenting a choice in a potential loss frame is more effective for behaviour change. One example could be based on the *A re Yeng* catchy phrase “Did you know that pensioners between the ages of 60 and 65 qualify for a 25% discount during off-peak hours?” Had the phrase been framed as a potential loss, it could have

been as follows: “Did you know that pensioners between the ages of 60 and 65 spend 25% more on travel fare when they travel during peak hours.” This would mean that the non-rational model of human behaviour is assumed in the conceptualisation and implementation of the “Travel for less with points” promotion, which would possibly ensure more effective behaviour change.

Framing of the promotion campaigns can also include both information and context about the choice and decision to be made such as time constraints and emotional aspects. Individual differences in the way information is perceived, organised and interpreted, and differences in context result in different decisions and choices made about the same decision issue by individuals across different contexts (Kahneman and Tversky, 1982). Based on the idea that non-rational agents are loss averse, there are ways in which aversion to loss has been shown to affect decision-making such as the sunk-cost effect. As discussed in sub-Section 2.5.1, the sunk cost effect means that commuters are likely to continuously use the mode of transport once they make an initial investment on it. Another way of effecting choice and decision-making using the element of loss aversion is to use the default option in cases where commuters are reluctant to implement a decision.

One more identified gap in the study is that incentive-based promotion campaigns, especially for the PT modes, have more negative outcomes than positive outcomes. This is because price promotion (as discussed in Section 2.6) is usually labeled a gain by commuters and it encourages commuters to use the mode of transport. After the promotion, commuters' reference price will go down as commuters' reference price shifts with past observed price. This means when the price goes back to its regular level, commuters will perceive it as a loss, leading to decreased PT use. In order for a promotion to be profitable there has to be a trade-off between the losses in future sales and the gains in the current sale. Irregular promotion

might result in a higher sensitivity to gains among commuters and thus increase PT use. In addition, if a commuter perceives the PT mode (*Gautrain*) as being often promoted (frequent sales promotions), the non-promotion period will result in a loss feeling for the commuter and negatively influence its use. Therefore, PT marketers offering frequent promotions should especially pay attention to the effect of promotion reference point.

The promotion campaigns also failed to capture the reality of decision-making in prospect theory perspective and especially with regard to the bounded rationality constraint and the role of System-1 heuristics. Further, in failing to identify the effect of bounded-rationality-based nudges and choice architecture in decision-making, the adopted approaches and initiatives of the promotion campaigns ended up being overwhelmed by commuter-inertia. Therefore, using the non-rational model of human behaviour in aiding the transition to PT and NMT through promotion campaigns should take cognizance of the way in which choices are presented (framing and nudging) as well as the context in which the relevant/related choices are made.

In order to offset the forces of the status-quo bias and the endowment effect that prejudice new technologies, there is a need to identify and recognise the change agents that play a catalyst role in the transition to PT and NMT; including choice architecture, where to apply it and when. If the reference point of the promotion campaigns shifts from low cost travelling using NMT and PT to the current environmental crisis which will be later reinforced by unparalleled huge oil price increases, the events and experiences could translate from heuristics such as status-quo bias, and inertia into the availability effect as discussed in Section 2.5.1. Further, by consistent demonstration of PT and NMT use by likeable and famous individuals, commuters could be nudged towards transforming their attitudes and perceptions of PT and NMT use.

5.5 Key findings

Two sets of analyses were conducted including evaluation on the key promotion campaigns and the predominantly assumed model of human behaviour. After presenting the data in Figure 25, the study established the extent to which the rational model is assumed in the promotion campaigns of PT and NMT by drawing from the preliminary results in Figure 24. In the second analysis, the study found that no evaluations were done before and after the launch of the promotion campaign. This finding was addressed under the recommendations section in Chapter 6.

The second analysis involved identifying the gaps and deficiencies within the promotion campaigns and providing better techniques of conceptualizing and implementing the campaigns as discussed in Section 5.4.

The study found a number of promotion campaigns for PT and NMT which ranged from *You make Joburg great* to *Cycle Jozi* week and the *Ecomobility Festival* as presented and discussed in detail in Chapter 4 and 5 respectively. The promotion campaign activities ranged from educational campaigns, sales promotions and face to face marketing. The main promotion campaigns for NMT such as the *Freedom Ride, Cycle Jozi* and *the Ecomobility Festival* were done jointly. For PT, the GMA delivered a few promotion campaigns for the train especially towards the end of the year when ridership decreases. Such promotions campaigns were mostly competition and prize/incentive based. They were mainly delivered through social media as an inexpensive marketing channel. The two BRT modes delivered very similar promotion campaigns such as smart connector card, route and road safety promotion campaigns. Emphasis also placed on small incentives and freebies while social media channels and sales promotions were also used to reach the target audience. Besides social media channels (such as Facebook and Twitter), information was also shared using posters, flyers and pamphlets.

On the second sub-question, secondary data were used in order to identify the assumed models of human behaviour. In order to identify the assumed models of human behaviour, the study looked at the key activities of the promotion campaigns and especially the approaches or mechanisms used to deliver the campaigns. A table for each case study was presented in order to summarise the identified human behaviour models. Analysis of the activities and mechanisms was used in order to derive sub-findings on assumed models of human behaviour. In addition, it was necessary to understand the traits of the rational and non-rational agent models themselves as well as the key heuristics that were assumed. Key heuristics that featured in the identification of the assumed models were inertia, status quo bias, sunk cost effect, loss aversion and social proof. In some cases, nudges were applied in order to counter heuristic biases such as limited willpower. One more key finding of the study is that there was a mix of the assumed models within each promotion campaign. In most cases the campaigns had a limited time frame possibly because the promoters needed to minimise campaign costs.

The second sub-question evaluation led to the third sub-question findings where the rational model emerged as the predominantly assumed model for PT promotion campaigns (see Figure 25). There were also instances where there was a mix of the two models for PT. For NMT promotion campaigns, the finding was that the non-rational model (with a mix of the two models in some cases) was the predominant model. Out of the 98 identified channels/mechanisms of the NMT and PT promotion campaigns, 45 of them were conceptualized and implemented on the basis of the rational model, 29, on the non-rational model and 24, on a mix of the two models as presented in Figure 25.

The analysed data indicate that the entities of PT and NMT prefer affordable promotion approaches and methods such as digital marketing (social media and the company web) and sales promotions (discounts, competitions and points). Further, face to face selling (personal selling)

accompanied by informational pamphlets is also preferred. This is because such approaches entail low costs as compared to organizing bigger promotion campaign events. The study also looked into the efficiency of the promotion campaigns in terms of costs and impacts on the shift to PT and NMT. The key conclusion is that there were no systematic evaluations for most of the promotion campaigns. Most of the surveys conducted by the GMA were aimed at ongoing improvement of the quality of services. The *Freedom Ride* and JUCA also implemented online surveys with the aim of improving subsequent *Freedom* Ride events as indicated in the discussion (see Sections 4.2.5 and 4.2.6). From the primary data sources, the interviewees had no knowledge on choice and decision-making processes as suggested by the responses on the question on human behaviour models applied in the various campaigns.

On the last sub-question, the study discussed alternative nudging and framing techniques as guided by the prospect theory. These were mainly based on understanding heuristic biases that exist in choice and decision-making process such as availability and representativeness heuristics. Nudging and framing techniques were proposed because of the hypothesis that there were choice and decision-making related gaps/deficiencies in the promotion campaigns for PT and NMT in the GCR.

5.6 Interpretation of findings

In this study, the key assumed model of human behaviour in the promotion campaigns of PT and NMT was found to be the rational model. This was done with an intention to find if the assumed model affects the transition to PT and NMT use in order to reduce the emission of GHG gases and address climate change. However, the study managed to identify the predominant model but could not establish the impacts of the assumed model based on the delivered promotion campaigns especially due to the absence of evaluation data on the campaigns studied (see Section 1.7 on Delimitations and limitations of the study). The study extended to find the

gaps/deficiencies in the promotion campaigns and provided improved options in conceptualizing and implementing the promotion campaign based on prospect theory as discussed in Chapter 2.

The activities of the campaigns were done by teams with no prior knowledge of the rational or non-rational models of human behaviour. The absence of the evaluation data affected the outcome on understanding the impacts of the assumed model of human behaviour in the conceptualization and implementation of the PT and NMT promotion campaigns. Further, the analysed promotion campaigns did not have adequate data on pre- versus post-promotion data as indicated in sub-Section 1.7. It was therefore, not possible to arrive on a finding with regard to change in ridership which could solely be attributable to the promotion campaigns, for example, factors such as petrol hikes, bad weather and restrictions in lane availability during the *Ecomobility Festival* were highlighted by the GMA interviewees as factors that could have also contributed to change in train ridership.

5.7 Conclusion

Most of the promotion campaigns focused on providing information to consumers as a way of persuading and encouraging them to use PT. Having such information disclosures about products meant more choices and more information but this was not effective in terms of behavioural change because non-rational agents experience limitations on their information processing capacity which possibly contributed to failure in commuters recognizing PT and NMT as the ideal forms of transport. This resulted in suboptimal outcome in response to the promotion campaigns. The commuters' minds also took a longer time (possibly through delayed choice) to process the information, thus resulting in the slow shift to PT and NMT.

The other reason could be that commuters' minds were constrained or depleted by other decision-making processes. Hence, commuters

optimised under constraints of available resources and possibly used short-cuts since decision making ordinarily resorts to mental short-cuts during adverse cognitive capacity conditions. Therefore, more choices and information would be more likely to result in people becoming cognitively paralysed. People might ignore too much information behind products such that more choices might lead people to switch to a product with fewer options as argued in Soman (2015).

The manner of information presentation might also result in choice deferral and thus ignoring the presented information. Provision of information regarding choices to be made (for example, the *Rea Vaya* Smart card and loyalty points promotion) meant that there possibly was a conceptualisation of human beings as the unicorns of the decision-making world which is characterized by an infinite computational ability and the capability of assigning utility to every service or product. Therefore, it is important to note that policymakers and marketers expect people to behave in a certain way whereas people act in ways that are different from marketers' expectations. There is therefore high possibility of a major disparity between what commuters do/how they behave and how they would be expected to behave in the process of conceptualizing the promotion campaigns analysed in this study.

This chapter has also demonstrated the assumed models of human behaviour in the promotion campaigns of PT and NMT in the GCR and how the conceptualisation and implementation of the promotion campaigns were characterised by contradictions between rational-agent model assumptions and the reality of non-rational behaviour model as explained by prospect theory. Choice and decision-making featured also an ad hoc mix of informal prospect theory heuristics. In particular, the transport sector can be viewed as continuing to be characterised by heuristics that continue to maintain the status quo such as loss aversion and endowment effect.

Chapter 6: Consolidation of findings, conclusion and recommendations

6.1 Overview

Arising from the initial theoretical analysis of the models of human behaviour in the promotion campaigns of PT and NMT, the working hypothesis was that the conceptualisation and implementation of the PT and NMT promotion campaigns was based on the rational-agent model while in reality choice and decision-making among targeted commuters is often based on intuitive, emotive and non-rational behaviour as demonstrated by the prospect theory. Various aspects of the theoretical analysis relating to models of human behaviour were introduced and discussed in Chapter 1 and Chapter 2. These include rational choice theory, choice and decision-making approaches under risk and uncertainty (prospect theory); and the predominant themes in the field of choice and decision-making.

The preliminary theoretical analysis led to the study question stated: “What is the predominantly assumed human behaviour model applied in the promotion campaigns for public and non-motorised transport in the GCR and how might this have influenced responses to such campaigns and overall the transition towards PT and NMT oriented cities in the region?” The data analysis procedure carried in Chapter 5 relied on the primary data as well as the secondary data from Chapter 1, 2 and 4. The data analysis procedure led to the sub-findings as discussed in Chapter 5 in order to derive overall findings on the main research question.

Sub question 1: What are the main promotion campaigns of PT and NMT initiated in the GCR in the last ten years?

The first finding in relation to answering the first sub-question was that the key promotion campaigns used activities and messages which ranged from pure marketing to incentive based approaches. The approaches were implemented using posters, billboards, radio or social media competitions. The key promotion campaigns initiatives identified for the BRTs included

the *Ecomobility Festival* (2015), the "Switch and tap" promotion, "You make *Joburg* great" and the road safety campaigns. For the *Gautrain,* the "Discover Gauteng the sleeping giant" promotion, "Jump on the gift train" and the "…season to give" were some of the key promotion campaigns. The PT promotion campaigns date back to the period before 2010 while the NMT promotion campaigns started from end of 2013 to the beginning of 2014. Most of the promotion campaigns attempted to change behaviour through more consciously-oriented techniques such as personal selling and education or speeches, conferences and exhibitions regarding PT and NMT.

The GMA implemented a few promotion campaigns for the *Gautrain* where most of them were done towards the end of the year because ridership decreases between December and January (as reported in Kesagee, 2016). The promotion campaigns for the cycling entities were common. Some of these include the *Ecomobility Festival*, "Cycle Jozi week" and the *Freedom Ride*. Further, the promotion campaign initiatives and approaches enabled the study to identify the assumed models of human behaviour as analysed in Chapter 5. Five of the promotion campaign entities did not have specific taglines during the campaigns except for *A re Yeng* and *Rea Vaya's* "Switch and tap" and "Loyalty points" promotion. Therefore, messages and activities of the promotions were analysed for those that did not use specific taglines during the campaigns. Table 5 provides a summary of the key promotion campaigns for PT and NMT.

Sub-question 2: How can models of human behaviour (implicit or explicit) be identified within the promotion campaigns of PT and NMT in the GCR?
The study finds that it is vital to define the key attributes/criteria of rational versus non-rational model (see Table 2) in order to be able to identify the assumed model within the activities and messages of the promotion campaigns.

The diverse range of tools and channels used during the promotion campaigns included advertisements, information sharing, joint activities and sales promotions with instruments such as billboards, posters, partnerships and free rides/items (respectively) being the main mechanisms for delivering the promotion campaigns as presented in sub-Section 2.1.1 and Figure 3. From the primary data analysed, the BRTs conceptualised their own initiatives such as the “Travel for less” with *Rea Vaya/A re Yeng* points. The GMA adopted its initiatives from developed nations based on their success rates but they modified them to suit their target audience.

Sub-question 3: What is the predominantly assumed model of human behaviour in the promotion campaigns of PT and NMT in the GCR?

With regards to this sub-question, the finding was that the rational model of human behaviour was the most predominantly assumed model of human behaviour in the conceptualisation and implementation of the promotion campaigns. Even though there were some instances where both the non-rational and the rational models were evident, the absence of adequate and proper evaluations of the promotion campaigns made it impossible to arrive at findings on the most effective model with regard to effecting a transition to PT and NMT.

Sub-question 4: What are the related transitioning impacts of the assumed model in the promotion campaigns of PT and NMT?

The study could not determine the impacts of the assumed model in the promotion campaigns of PT and NMT because of inadequate evaluation data as discussed in Section 1.7 on delimitations and limitations of the study. As an alternative, the study identified gaps within the promotion campaigns and better ways of delivering the campaigns guided by prospect theory concepts as discussed in Section 5.5.

The study concludes that most of the promotion campaigns focused on providing information to consumers as a way of persuading and encouraging them to use PT. Having such information disclosures about products meant more choices and more information but this did not work in terms of behavioural change because non-rational agents experience limitations on their information processing capacity which possibly contributed to failure in commuters recognizing PT and NMT as the ideal forms of transport. This resulted in suboptimal outcome in response to the promotion campaigns. The commuters' minds also took a longer time (possibly through delayed choice) to process the information, thus resulting in the slow shift to PT and NMT. The other reason could be that commuters' minds were constrained or depleted by other decision-making processes. Hence, commuters optimised under constraints of available resources and possibly used short-cuts since mental short-cuts are resorted to during adverse cognitive capacity conditions. Therefore, additional choices and information would be more likely to result in people becoming cognitively paralysed. People might ignore too much information behind products such that supplementary choices might lead people to switch to a product with fewer options as argued in Soman (2015).

The manner of information presentation could have resulted in choice deferral. Provision of information regarding choices to be made (for example, the *Rea Vaya* Smart card and loyalty points promotion) meant that there possibly was a conceptualisation of human beings as the unicorns of the decision-making world which is characterized by an infinite computational ability and the capability of assigning utility to every service or product. Hence, the marketing teams could have assumed that the commuters would read and understand the information as well as value the given incentives (loyalty points). Therefore, it is important to note that policymakers and marketers expect people to behave in a certain way whereas people act in ways that are different from marketers' expectations. There is therefore high possibility of a major disparity

between what commuters do/how they behave and how they would be expected to behave in the process of conceptualizing the promotion campaigns analysed in this study.

The overall finding of this study can be captured as follows: The rational agent model of human behaviour was the predominantly assumed model in the promotion campaigns for PT and NMT. However, the study could not tell whether the assumption of this human behaviour model in the promotion campaigns is the cause of the slow shift to PT and NMT and in some cases the stalling of PT use as analysed in sub-Sections 1.2.2 and 2.1.2. In addition, the promotion campaigns have not been effective because the use of IMT and other modes of PT (such as mini bus taxis) continues to increase as analysed in the indicated sections. The study concludes that the predominance of the rational agent model was likely to have played a key role in the failure of the campaigns to take off/to be sustained. However, there could be other factors that need to be considered and which could in their own way have constrained the transition to PT and NMT, which raises an area for further investigation.

6.2 Conclusion

The predominant assumption of the rational agent model promoted the endowment effect and status-quo bias as additional risk factors which reinforced the “do nothing” heuristic such as inertia. This could be used to substantiate the reason that there is still traffic congestion along the major highways as addressed in the literature reviews and background chapters (1 and 2). Furthermore, the sustainability-related benefits of PT and NMT were not easily measurable to the individual consumer in a recognisable unit of measurement. Based on perspectives such as mental accounting, prospect theory and loss aversion, with PT and NMT as reference points, it can be concluded that the choice and decision to switch to PT and NMT (which is considered as loss) looms larger than the promised higher gains of sustainable transport (Thaler and Sunstein, 2008).

Based on data on promotion campaigns, it can be concluded that public policy makers are finding it difficult to change long-term individual behavioural patterns such as car dependence. From a behavioural science perspective, it has been highlighted that while government policies have traditionally focused on the rational dimensions of human decision-making, which are triggered by the provision of information, regulations and financial incentives (System 2 thinking), it is noteworthy that a significant portion of human behaviour is in fact shaped by unconscious prompts (System 1 thinking) which include emotional aversion to loss, tendency to prioritise short term gains over long term needs, humans' tendency to fit-in with what others are doing, and collective preference for the status quo over change (John *et al.,* 2011). These prompts could be used to explain the hesitance by motorists to give up their vehicles in favour of PT and NMT. Commuters still prefer to maintain their current status no matter how attractive PT and NMT modes are.

Further, GCR commuters might be slowly adopting the Western culture which rates high on individualism as highlighted in Section 2.6, therefore, promotion campaigns of PT which foster a sense of collectivism may not be easily registered in the minds of the prospective commuters. In addition, the promotion of sustainable development (using sustainable transport as a channel towards sustainability) is a common goal which promotes the needs and interests of the current and future generations, as a result, the use of PT and NMT modes may not be a priority in individualist cultures.

Most of the promotion campaign marketers tend to sub-consciously assume the rational agent model which has been proven to have only limited relevance. Traffic congestion and the number of IMT users (see sub-Section 1.2.2 on the statistics of car users in the GCR) seem to indicate that the rational model approach has failed to achieve the expected transition. This calls for a fundamental paradigm shift in the

promotion campaign approaches towards a better balance between rational models and non-rational agent models.

The study demonstrates that the current promotion approaches have not been successful in the encouragement of PT and NMT in the GCR. Further, the study demonstrates that bounded rationality, prospect theory heuristics and biological mechanisms such as emotions, feelings and intuition play a more important role in choice and decision-making than previously allowed for in theory of choice and decision-making. The study therefore concludes that most of the promotion campaign related interventions in their current structure do not attract much attention in triggering the non-rational mechanisms or satisficing processes in choice and decision-making towards PT. Therefore, such efforts in the promotion of PT and NMT are likely to be ignored.

The predominant rational-agent model assumes that the decision maker is independent and cannot be influenced or manipulated towards making collective and sustainable decisions and choices. However, it is clear from this study that nudging or framing are common practices of influence and manipulation that could enhance choice and decision-making outcomes as also supported by Gichia (2014). In this study, nudging and framing techniques as highlighted in Chapters 2, 5 and 6 could be used towards the conceptualization and implementation of more effective campaigns to facilitate the transition to PT and NMT.

6.3 Recommendations

The application of prospect theory insights on human behaviour towards influencing behaviour-change for effective policy in developing countries is still at a moderate stage. Behavioural insights have been applied to improve on social welfare issues such as poverty and HIV/AIDS as indicated in the World Bank Report (2015). Nevertheless, as demonstrated in this study, the application of such interventions in the PT and NMT sector is still moderate (as also discussed in Section 2.8). In this study, the promotion campaigns (as means of behavioural change towards the shift

to PT and NMT) indicated that behavioural insights are not explicitly recognised and neither are they purposefully engaged towards conceptualisation of more effective campaigns. In cases where they were applied, they only featured due to circumstances such as the need to cut costs. In addition, the study finds that approaches that indicate awareness of cognitive abilities (rational agent model) were only applied because they were easier to implement in terms of the required resources such as finances and technical know-how. It is only through studies such as this that policy makers and managers in the GCR are able to understand and apply the non-rational agent behaviour insights in order to promote sustainable behavioural change in the transport sector.

In addition to the alternative ways of addressing the gaps within the promotion campaigns (as analysed in sub-Section 5.5), the following recommendations can be considered in order to ensure better results in the transition to PT and NMT in the GCR:

- Policy makers and program implementation teams such as marketing teams need to be aware of the emerging human behavioural insights in order to understand commuters' behaviour. This would enable the teams to implement the right initiatives and approaches in order to effect sustainable mobility transitions.
- In relation to the individual versus the collective mentality as discussed in Section 2.6 and 6.2, it is worthwhile to note that such cultural orientation can also be a good predictor of environmental behaviours. Therefore, relevant marketing channels/tools should be developed with an understanding of the different cultural values or mentality.
- There is a need to test the effectiveness of conceptualised interventions on a small population group before moving to a full-scale implementation of intervention or promotion campaign.
- Further, the conceptualising and implementing teams need to measure the effectiveness of the promotion campaigns in terms of

costs and ridership impact before and after the promotion campaigns. This would facilitate for a better understanding of the impacts of the promotion activities as well as which assumed model channels/mechanisms work better than others.

- The study found that in few cases where evaluations were done, they were not representative of the population and were not linked to the promotion campaign itself but more focused on general quality of service of the targeted mode of transport.
- The study found that the promotion campaigns have not been effective towards the shift to PT and NMT and proposes that further research should be conducted in this area.
- The study could not tell if the absence of improvement in the shift towards PT and NMT use in the GCR was due to the assumption of the rational agent model in the conceptualisation of the promotion campaigns as discussed in Section 1.7 and Chapter 5. This also indicates an area for further investigation.

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Appendices

Appendix 1: Interview questions for NMT and PT case studies

1. Could you please tell me about the promotion campaigns that you have implemented in the Gauteng City Region, in the past 10 years? Are the promotions initiated before and after the launch of the transport facilities?

2. Which initiatives do you use and are they adopted based on the success rates? Are they conceptualized by the teams or adopted from various institutions which have used them and proven to be successful?

3. What promotion approaches and methods are used in the promotion campaigns and why?

4. What human behaviour assumptions or models are applied in the conceptualization and implementation of the promotion program?

5. How efficient are the promotion campaign programs in terms of costs and benefits?

6. Are the programs evaluated and what type of evaluation and performance indicators are used in the evaluation? What type of study is used to determine the effectiveness of the program?

Appendix 2: Research interviews and interactions

Institution/organisation	Date	Type of interview
Gautrain Management Agency	22nd July 2016	Face to face
C.O.J-Cycling	08th August 2016	Face to face
Freedom Ride	23rd August 2016	Face to face
C.O.J-ReaVaya	29th August 2016	Face to face
Fixin' Diaries	01st September 2016	Face to face
JUCA/*Freedom Ride*	06th September 2016	Face to face
City of Tshwane-*A re Yeng* BRT	22nd November 2016	Electronic mail

Appendix 3: Ethics clearance certificate

SCHOOL OF ARCHITECTURE AND PLANNING
HUMAN RESERCH ETHICS COMMITTEE

SCHOOL OF ARCHITECTURE PLANNING

CLEARANCE CERTIFICATE
PROTOCOL NUMBER: SOAP111/12/07/2016

PROJECT TITLE:	Assumed human behaviour models in public and non-motorised transport promotion campaigns in the Gauteng City Region.
INVESTIGATOR/S:	Nyasha Muzhizhizhi (Student No. 1319868)
SCHOOL:	Architecture and Planning
DEGREE PROGRAMME:	MArch in Sustainable and Energy Efficient Cities (March SEEC)
DATE CONSIDERED:	06 October 2016
DECISION OF THE COMMITTEE:	APPROVED
EXPIRY DATE:	06 October 2017

CHAIRPERSON _____
(Professor Daniel Irurah)

DATE: 10.10.2016

cc: Supervisor/s: Prof Daniel Irurah

DECLARATION OF INVESTIGATORS
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Signature _____ **Date** 12th Dec 2016

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