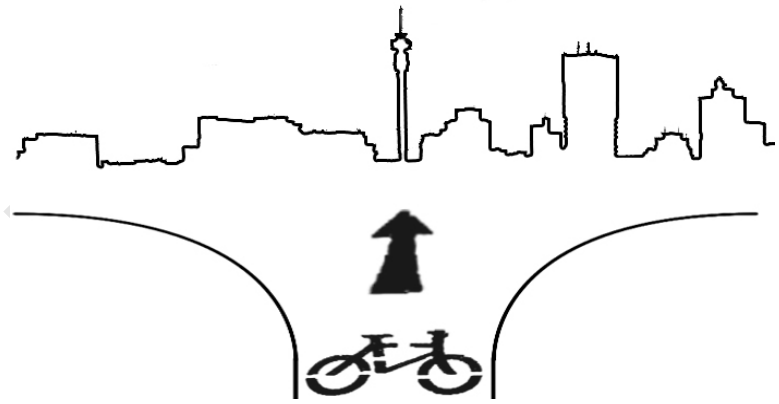
Centre for Transport Studies

Master of Philosophy Specialising in Transport Studies

Cyclists' Rights to the City:

The Realisation of Cyclists' Rights in the City of Johannesburg

Major Dissertation (CIV5000W)



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Cover Picture: Illustration of a cycle lane entering the city of Johannesburg (Source: Author)

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Summary

Cities across the globe are facing issues of traffic congestion, pollution, and the rising cost of fuel. Planners are starting to feel the impact of the automobile city and the endless problems that it produces (Newman & Kenworthy, 1996). It is for this reason that planners are attempting to reduce car dependency in cities, and are attempting to introduce other, more sustainable and efficient modes of transport, such as trains, buses, walking and cycling. Cycling forms a major part of the discussion. Some cities, such as Copenhagen and Amsterdam, have more bicycles than cars during rush hour (Kim & Dumitrescu, 2010). The City of Johannesburg is one of the few cities in South Africa that decided to build dedicated cycle lanes in parts of the city, to promote cycling. However, the lanes did not promote cycling, and in 2016, the mayor of Johannesburg decided to put a stop to these lanes, as they are seen to be a waste of money (Manyathela, 2016).

This research seeks to understand why cycling in Johannesburg did not increase, following the implementation of the cycle lanes. The research takes the stance that cyclists have a right to the city and, therefore, should be afforded the same level of planning as other modes of transport. It is the role of transport planners to ensure that cyclists have sufficient space and access within the city and within public space. The research asks the following question: 'How can planners provide cyclists with equal rights to the city'?

Literature Review

To answer the question, the research looks at existing literature on the subject of the right to the city, the importance of Non-Motorised Transport (NMT) in cities and the use of planning tools in providing cyclists with rights to the city. The research found that the right to the city, in relation to the cyclists' rights and the right to access, occupy and remain in public space, is a right that is controlled by certain powers and forces within the city. Those with power decide how much right to the city a person has. According to Harvey (2012), those who build and sustain the city, develop the city more after their own hearts desires. In this regards, the planner is identified as a key player in developing and shaping the city.

Having identified the role of planners, if the City is to provide cyclists with rights to the city, then planners need to recognise the importance and benefits of cycling in cities. The literature, therefore, emphasises the importance of NMT for cities, such as decreased congestion, decreased pollution, health benefits, social benefits, and economic benefits. Moreover, the literature explains that NMT users are the most vulnerable road users and that planners need to accommodate and design for the most vulnerable users first (World Health Organisation, 2017). What can be found today is, on most streets, pedestrians and cyclists are marginalised by vehicles.

In principle, development in the city is guided by a set of planning tools, such as frameworks, guidelines and development plans. According to South African planning tools, cities are required to focus on the development of NMT, meaning that the mandate of planners is to plan for an NMT friendly city. To explain the concept of NMT friendly cities, the research discusses six international cities wherein cycling

mode share has increased, due to strategic planning interventions. The strategic interventions are derived from the planning tools; meaning that the different guidelines, plans, and frameworks each have a set of strategies. The literature explains the planning process, which these cities adopted in order to shift from planning for cars, to planning for alternate transport. The different strategies within each city are listed in Table 1, along with the key planning tools in Johannesburg. The table provides an overview of some of the most important strategies which planners have used to increase cyclists' rights in their respective cities.

Table 1: Summary of strategies in precedent cities and in Johannesburg

Strategy	Implementation of strategy in precedent cities (number of cities)	Johannesburg's planning tools • 2009 NMT Framework • Complete Streets Guideline • NMT Facility Guideline
Cycling/ NMT Master Plan	6/6	3/3
Specific budget for cycling projects	6/6	1/3
Government subsidies for cycle projects	4/6	0/3
Cycling or NMT office	6/6	0/3
Vehicle restrictions in inner city	5/6	1/3
Traffic calming	5/6	3/3
Vehicle parking fees	3/6	0/3
Tax deduction/incentive for cyclists	3/6	1/3
Green routes (separate from streets)	6/6	3/3
Coherent network of cycle routes	4/6	2/3
Dedicated cycle routes	6/6	3/3
Direct cycle routes	2/6	3/3
Attractive cycle routes	6/6	2/3
Integration with public transport	6/6	3/3
Bicycle rental schemes	6/6	2/3
Bicycle parking	5/6	3/3
Cycling promotion	6/6	2/3
Cycling education	3/6	2/3

Research Method

Having looked at the literature, it was made clear that planners are meant to address the needs of cyclists in cities, as they address the needs of all other road users. With that information, the research was able to take a closer look at Johannesburg's transport planning process. To do that, the research adopted a case study evaluation research method. As part of the method, the research identified Johannesburg as the main case study, focusing on cycling projects within the Johannesburg metropolitan area. Prior to beginning the analysis and evaluation of the cycling projects in Johannesburg, the research first introduces the case study. The study of cycling development in the City

of Johannesburg forms a crucial part of the research method process, as the research provides an overview of the cycling projects and discusses the main NMT planning tools. In order to understand why the response to the cycling lanes is negative, the lanes needed to be evaluated. In order to evaluate the case study, the research method required two sources of data, interviews and documents. As such, the research conducted interviews and gathered a range of documents and media articles. Ten respondents were identified, all of whom have knowledge of the cycling programmes in Johannesburg. Having knowledge of the programme meant that the evaluation provided by the respondents would be based on accurate information, sound knowledge and experience, and not assumptions or feelings. The research made use of qualitative, semi-structured interviews, thus allowing the researcher to get an in-depth idea of the respondent's perspective, and to ask follow-up questions based on the information that was being shared. The second source of data, documents and articles, were used to evaluate the interviews. Both, the documents and articles relate directly to the cycling projects in Johannesburg.

Cycling Within a South African Metro - Johannesburg

Johannesburg is the largest city (by population) in South Africa. It is the provincial capital of Gauteng, and the wealthiest city in South Africa. It is, therefore, one of the major attractions in South Africa, specifically with regards to job opportunities (Stats SA, 2013). What this means, is that many people move to Johannesburg, leaving the city with the highest levels of traffic congestion in the Gauteng province (Stats SA, 2013). As such, it is crucial for planners in the city to focus on alternate modes of transport, such as walking, cycling and public transport.

Chapter four discusses the various transport initiatives by the City of Johannesburg, which include NMT upgrades, bus rapid transit (BRT), Gautrain, Metrorail, minibus taxi recapitalisation and highway improvement projects. The chapter unpacks the most relative planning tools in Johannesburg, which deal with NMT planning. Some of these include the Framework for NMT (City of Johannesburg, 2009), South African Road Classification and Access Management Manual (Committee of Transport Officials, 2012), Gauteng 25-Year Integrated Transport Master Plan (Gauteng Department of Roads and Transport, 2013) and the National NMT Facility Guidelines (Vanderschuren, et al., 2014). Lastly, the chapter introduces, in more detail, the cycling projects which occurred in four different parts of the city, namely, Zandspruit, Orlando, Johannesburg inner city and Sandton.

The cycling projects, as well as the BRT and Gautrain projects, are an indication of the fact that planners in the City acknowledge the current transport challenges. The strategies which are listed in Table 1 also highlight the City's intentions to increase NMT and address congestion across Johannesburg.

Analysis of Cyclists' Rights in Johannesburg

The analysis is a compilation of the interviews, the articles and the strategies from the six international cities. The chapter is broken down into two main sections, the 'perspectives of cycling in Johannesburg', and the 'evaluation of NMT planning in Johannesburg'. The 'perspectives of cycling in Johannesburg' is an analysis of the interviews, as well as an analysis of the articles. The analysis of the interviews focused on the interviewees' response to the eight standard questions. The process highlighted certain key points which, the respondents felt, planners need to address. The first point is based on the fact that the City started the process of implementing cycle lanes without any clear strategy or coherent master plan

for cycling in Johannesburg. The previous chapter discussed the different tools which exist in the City. During the interview process, the respondents could not point to one single document which has been guiding the process. The most commonly referred to documents are the 2009 NMT Framework and the Complete Streets Guideline. The second major point indicates that, the reaction from City planners and other roads users to the cycle lanes suggests that City planners and other road users have not accepted cycling as a mode of transport in Johannesburg and, therefore, do not see the need to give up part of the street to cyclists. The analysis of the articles proved to correlate with the responses of the interviewees. The overall analysis of the articles revealed that what the City has done was not done to a satisfactory standard and that more concise planning is needed if the City is to consider reintroducing cycling to the City's agenda. A major outcome of this evaluation was that, according to this research, the mayor is not to be blamed for his decision to stop cycle lanes. Rather, it is a shortfall on the planners' side, which has led to the negative attitudes surrounding the programme and the slow uptake with regards to cycling in the city.

The second part of the analysis evaluates how planners can improve cycling programmes within the city. The research used the information from Table 1, which identifies the strategies from the international cities, and cross references these strategies with the strategies identified in Johannesburg. The strategies, from Table 1, are evaluated against the key areas of intervention, which the interviewees felt planners in Johannesburg should be focusing on. A total of six strategic principles were identified, by the research, as areas which planners in Johannesburg need to address. These principles include a cycling master plan, integration of cycling and public transport, bike rental programmes, a cycling office, green cycling routes and dedicated cycle lanes. Five out of the six principles are already mentioned in Johannesburg's guidelines and frameworks. The research, once again, reverts to the right to the city. That the powers and forces, which shape the city, ultimately decide how much of a right to the city people have. The gap which the evaluation identifies is, therefore, embedded in the planning process, and not in the planning tools itself.

Conclusion and Recommendations

The current political administration in the City of Johannesburg is not satisfied with what has been done regarding cycling. The result is that the implementation of cycle lanes has been stopped by the mayor. Transport planners in the city need to understand now, more than ever, why the implementation of the cycle lanes did not yield the desired outcome. The answer, according to this research, is due to a lack of proper planning. The City has no master plan for cycling or NMT, and the projects that have been carried out were done without any clear or coherent strategy. Based on the findings from this research, a city cannot increase cycling through a single strategy, such as patches of dedicated cycle lanes. Rather, the promotion of cycling needs to happen through the development and implementation of a complete network, guided by an overall plan, and inclusive of public transport integration, green routes, cycle lanes, etc. The international cities are proof of the success of the planning process in promoting cyclists' rights, and the transport planners in these cities have increased the cycling mode share through the application of the correct strategies. On the other hand, the history of transport planning in Johannesburg is proof of how the planning process limits cyclists' rights in that, in the 1930's, planners replaced bicycles with cars.

The main research question is answered in two ways. Firstly, there is the influence of power and dominance in the city which plays a major role in shaping the city. Therefore, transport planners need to understand the importance of NMT in cities and need to start considering the rights of the most vulnerable road users. Unfortunately, since the advent of the car in the 1900's, cars have been made the priority in cities. As per the New Urban Agenda and the NMT Facility Guideline, the focus needs to shift to more sustainable and efficient transport. Part of this shift is sharing the road space and ensuring the safety of NMT users. The second part of this answer is based on the methods of planning. It is clear that the current cycling programmes do not follow a specific guideline or framework. Based on the lessons from the precedent cities and the views of the interview respondents, if planners are to correct the process, they need to develop a master plan, which focuses on implementing specific strategies, which ensure that complete, coherent and integrated networks of cycling routes, and other cycling facilities, are implemented across the city.

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1 Introduction

1.1 Background to Study

A city is defined as a large town; it is the municipal centre which is incorporated by the state or province (Oxford Dictionary, 2017). The city is designed and developed for people; these are the citizens of the city. It consists of a town centre wherein lies the economy of the city, residential areas where the people stay, and recreational spaces. All of these spaces in the city are connected to each other through transport systems (streets) which make it easy for people to traverse the city. Not all spaces in the city are open and accessible to everyone as the city has both public and private spaces. Private spaces are limited in terms of who has access and who can use these spaces. However, public space is free and should be accessible for everyone to use. According to Macdonald (2011) it is often found that, when reference is made to public space, people often think of parks, public squares and public buildings. However, the space occupied by parks, public spaces and public buildings does not equal the amount of land occupied by public rights-of-way; streets. It is estimated that streets typically represent 25% to 35% of all developed land in developed cities (Macdonald, 2011). Streets are the largest public space within cities and they are referred to as public rights-of-way, due to the fact that everyone has a 'right of way' within that space; including drivers, pedestrians and cyclists.

City transport planners regulate how drivers, pedestrians, cyclists and all other road users move around within streets, giving certain rights and preferences to the different modes of transport. This is done in order to ensure safety and to reduce conflict. For instance, within the city centre, there is more focus on pedestrians, as these are meant to be social spaces where the sidewalks become a place of meeting and socialising. Other streets, like highways, prioritise vehicle movement, as these are meant to connect different parts of the city and to allow the efficient and rapid transport of goods and people. In residential areas, the street is meant to accommodate both vehicles and pedestrians, as people need to move in and out of these areas in order to reach places of work, school, etc., while other people enjoy morning and evening walks and meeting neighbours. While some streets may prioritise vehicle movement and others may prioritise Non-Motorised Transport (NMT) movement, all users, whether motorised or non-motorised users, should have safe designated space on shared streets.

Since the introduction of the automobile, cities transformed from being transit orientated wherein trains, trams, walking and cycling were the most common modes of transport, to becoming automobile cities, wherein the car became the priority (Newman & Kenworthy, 1996). Initially, the automobile appeared to provide a means of overcoming the transport-land use connection. It offered freedom in space and time, to live anywhere and travel with ease to any destination (Newman & Kenworthy, 1996). Newman and Kenworthy (1996) explain that transport planners merely had to provide the streets and accompanying infrastructure to make this possible. However, this unfettered automobile city 'dream' soon became a 'nightmare'. The roads and parking requirements became an endless pit that absorbs any traffic solution and, instead, provides new congestion constraints (Newman & Kenworthy, 1996). This is why in cities, including South African cities, people are now car dependant, due to the effort and funding spent on making the car convenient, while other modes of transport were side-lined; specifically

non-motorised forms of transport. This is why many streets today prioritise car movement and neglect other forms of transport.

When designing streets, transport planners use a set of guidelines, which are developed to ensure that all road users are safe and comfortable within this space. These guidelines are used in cities across the world. Some cities have different guidelines for different forms of transport, and others have a standard set of guidelines for all transport modes. Guidelines include specification related to traffic signals, lane widths, intersection design, speed regulations, street lighting and signage for all modes of transport. In the Netherlands the 'Recommendations for traffic provisions in built-up areas, ASVV', is regarded as the standard and includes the steps involved in traffic engineering design process (CROW, 1998). In South Africa, there is the South Africa Road Classification and Access Management Manual (Committee of Transport Officials, 2012), as well as the NMT Facility Guidelines (Vanderschuren, et al., 2014). These documents are important in ensuring that the rights of all road users are taken into consideration when planning and designing.

When promoting NMT, It is important to look at practices in countries like Denmark and the Netherlands, as NMT modal share is higher than any other transport mode, and because they have been involved in the process of including NMT for a long time, whereas countries like South Africa are only starting to do this now. By reviewing the processes in these countries, it may help to identify gaps in the processes used in South Africa, and make the planning process more successful.

1.2 Problem Statement

According to the most recent National Household Travel Survey (NHTS) done in South Africa in 2013, cycling mode share in Johannesburg is at 0.2% (Stats SA, 2013) and has not increased since the 2002 Gauteng Household Travel Survey (GHTS) (GPDRT, 2002). This percentage is extremely low in a city where the majority of the population cannot afford cars (City of Johannesburg, 2011). However, the recent cycle lanes, which were developed across Johannesburg, were only completed in 2015 and the percentage of cyclists may, or may not, have increased since. Additionally, there are ongoing NMT projects which are being carried out around the city. However, according to recent research in the Johannesburg area, many people are still afraid to cycle and do not see cycling as a viable mode of transport (Dos Santos et al., 2015; MyNews24, 2015). Adding to this, in recent (post-August, 2016) articles, the cycle lanes have been negatively portrayed by certain City officials, such as the newly elected mayor of Johannesburg, as well as by other road users. The lanes are seen to be a waste of money, as cyclists do not make use of them and they take up space from vehicles, therefore, adding to the existing nightmare of traffic congestion (Manyathela, 2016). It is for this reason that this research explores cyclists' rights to the city, explaining that planning for cyclists is not optional. It is as important as planning for any other mode of transport, and transport planners, as well as governments, need to ensure that the process undertaken, when planning for cyclists, ensures cyclists are given an equal right to the city.

Cyclists, as other city dwellers, have a right to the city. Following from the early literature of Henri Lefebvre, David Harvey, in his book Rebel Cities, attempted to relate much of this early literature to a more current context. Harvey (2012: 4), formulates that the right to the city is far more than a right of

individual access to the resource that the city embodies: it is a right to change ourselves, by changing the city, more after our heart's desire. This emphasises the need for every individual to shape the city based on their individual needs. Therefore, when cyclists ride in public space, it is an attempt to reshape the city based on their right to the city. This is supported in South Africa where, according to Section 21 of the Constitution of the Republic of South Africa (1996), "everyone has the right of freedom of movement" and "every citizen has the right to enter, to remain in and to reside anywhere in the Republic" – this refers to public spaces within the Republic. Additionally, the notion of equal rights to the city was echoed through the Habitat III Conference, which was held in Quito, Ecuador in 2016. The conference established the New Urban Agenda, which is an action-orientated document that sets out global standards of achieving sustainable urban development, rethinking the way that cities are built, managed, and experienced (Habitat III, 2016).

Given the current constitution, the New Urban Agenda, and the rights to the city, it is difficult to understand why vehicles must be prioritised, and why providing for cyclists' is seen as a waste of money. Given that there are cyclists in Johannesburg, and that there is a need to reduce car dependency, how does the city increase cycling mode share and ensure that cyclists have a right to the city? There is a relationship between city management and the right to the city, which this research looks at. This is in reference to power and dominance, within the planning process, and how that may impact on the rights to the city with regards to NMT.

1.3 Research Question

Cycling is not an established mode of transport in Johannesburg. Those that do commute by bicycle, cycle because they cannot afford other means of transport or because they have come to recognise the benefits of cycling as a mode of transport. Nonetheless, there is a lot of work that needs to be done to improve cycling conditions, including motivational research to support the need for these programmes. While the City of Johannesburg has introduced cycling programmes, these programmes do not have the required professional or political support that they require.

There are many limitations, in terms of research projects and resources within the city with regards to cycling. This research hopes to add to those resources by advocating for the "Rights of Cyclists" and by evaluating what has been done in an attempt to improve the output of cycling development projects and thereby improve the conditions for cyclists in the city. With reference to the right to the city, this research aims to evaluate the importance of transport planning in relation to people's right to the city and how, through the planning process, those rights are addressed. The main research question, which is **'how can planners provide cyclists with equal rights to the city?'** looks at the rights to the city with focus on cyclists as a particular stakeholder group of NMT users, the planning strategies used when planning for NMT, and how these strategies have been used in other countries to ensure cyclists have a right to the city. This leads to an evaluation of the various NMT projects in Johannesburg where cycling infrastructure has been implemented. The evaluation of these different cases explains whether or not the cycle lanes provide equal rights to cyclists and where they might be falling short of reaching this objective. The process includes various discussions with transport planners and city officials to outline

how the process can be improved and to ensure that, in future, planners provide cyclists with equal rights to the city.

The following sub-questions have been identified in order to answer the main research question:

1. What does the 'right to the city' mean?
2. Who has a right to the city?
3. What are the tools in place to ensure people have a right to the city?
4. How can the City ensure that all road users have equality within the city?
5. What are the international road and NMT planning guidelines?
6. What guidelines are used when planning Johannesburg roads and when planning NMT routes?
7. How can the current cycle programmes provide cyclists with rights to the city?

1.4 Research Approach

The following research will be conducted through a number of steps, which is outlined in Figure 1. The flow diagram, in Figure 1, is a visual representation of the research and the steps taken to complete the research and answer the research question. From left to right, the flow diagram highlights the broad chapters, the key topics within these chapters, and how these filter down through the literature review and into the different data that is collected, analysed and evaluated.

The flow diagram follows the structure of the research, highlighting the key elements within each phase. The literature review is important in understanding the existing literature, but also in outlining the importance of transport planning and the cycling programmes in other cities. The research method focuses on evaluating the case studies through the interviews and other secondary data (documents and articles). The analysis combines all the information gathered; including cycling programmes in other cities and in Johannesburg, and evaluates this against the data.

In this regard, the flow diagram emphasises the importance of the different chapters and the information from these chapters. The findings and analysis are not based on what is analysed in Chapter 5 but, rather, based on what has been found in the chapters leading up to Chapter 5. This process ensures that the findings are supported through literature and context, and carried through into the analysis.

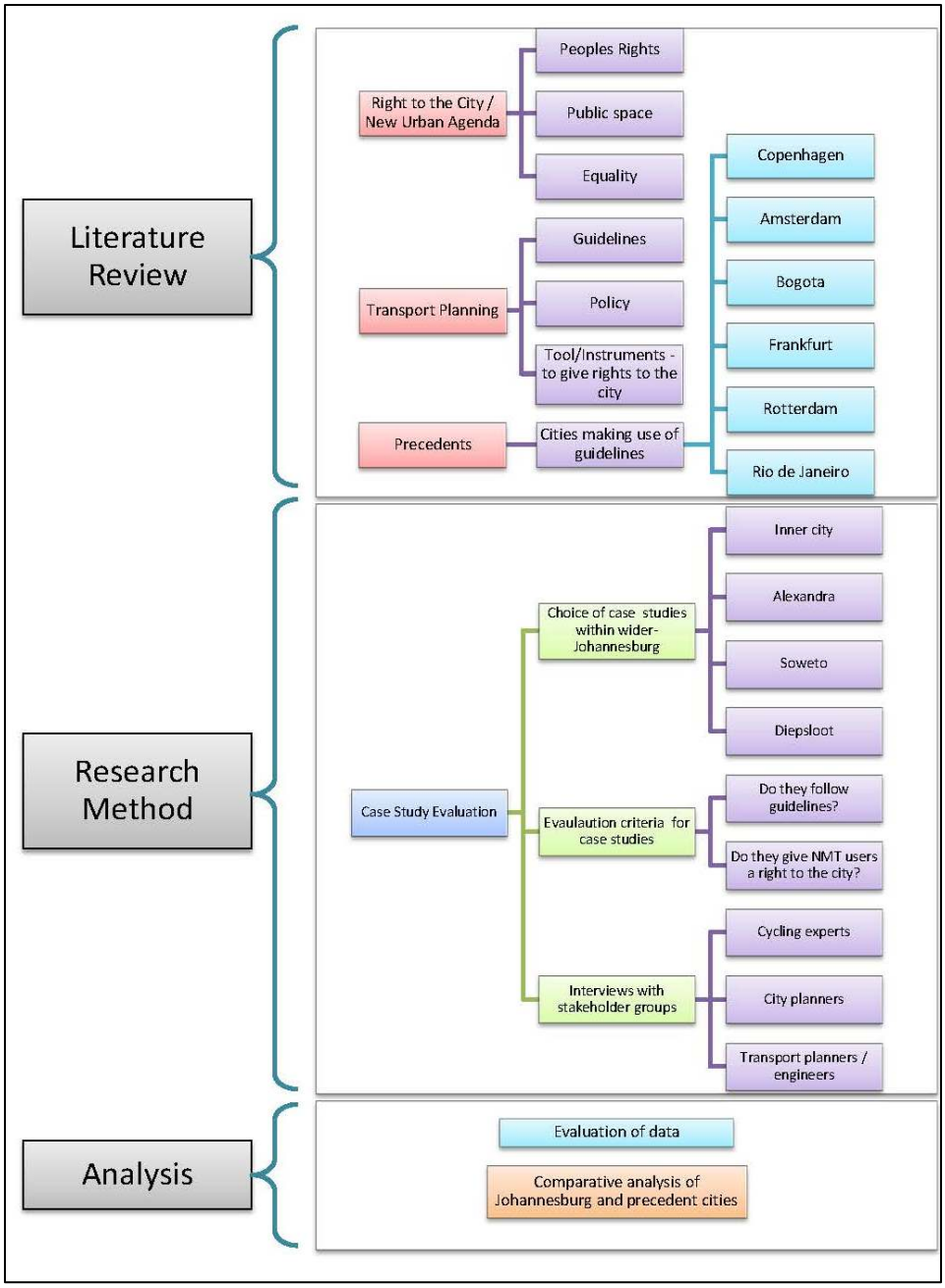


Figure 1: Flow diagram of research

1.5 Scope and Limitations

The scope of this research covers cycling programmes in the context of Johannesburg. Johannesburg is the largest city in South Africa; it is the provincial capital of Gauteng and the wealthiest province in South Africa (Stats SA, 2013). As such, Johannesburg is home to many who are seeking job opportunities in the country. As per the National Household Travel Survey (2013), Gauteng is the most congested province and has the highest population; it is also the smallest province in South Africa. As a result of the

high congestion and population growth, Johannesburg's commuters spend hours in traffic, and as 25% of the population are unemployed, there are many people who cannot afford transport (Stats SA, 2013). There has been investment in cycling in the city, however, the rate of cycling remains at 0.2% which is very low for a city wherein the majority of the residents cannot afford a car. It is for this reason that this study has chosen Johannesburg as the case study for this research.

As cycling is a recent initiative in Johannesburg, there is a limited pool of literature evaluating the implementation of cycling programmes or cycling initiatives in Johannesburg. The research relies mainly on planning policy and tools, newspaper articles, and interviews, as it is interested more in evaluating the planning process and not the actual implementation. The interviews carried out in this research are qualitative in nature, and focus on individuals involved in the cycling programmes, their experience of the planning process will directly inform the evaluation process. One of the limitations of qualitative methods is the in-depth characteristics of the interviews. It is often difficult to interpret and present the findings, which can also be challenged more easily (Neville, 2007). Additionally, as the research will rely on secondary data, one limitation is finding the correct and most accurate information, and gaining access to this information. The cycling programmes in Johannesburg have not been extensively analysed, meaning that the research will rely on reports that may allude to the cycling programmes, but none which coherently cover all aspects of the lanes. However, this research provides a clear and accurate evaluation of the cycling programme.

Lastly, the research makes use of information from international cities; however, the selected cities were not visited; meaning that the research relies completely on secondary information which can be accessed online or through the libraries. While this information may be accurate, it is not able to provide a complete analysis of cycling in these cities. As the cities that have been chosen are cities that have developed their cycling programmes, there is quite an extensive resource base for these cities; some more than others. Nonetheless, the research is concerned with the planning guidelines and strategies in these cities, and is not attempting to evaluate cycling in these cities.

1.6 Thesis Structure

The research begins by introducing the research topic, research question, and problem statement which form the basis of the research. The introduction chapter explains the rationale and motivation behind the research, explaining that cycling levels are low in the city of Johannesburg, despite recent cycling programmes. The research seeks to evaluate the importance of transport planning in addressing this issue within the city.

The second chapter, which is the literature review, starts by delving into the philosophy around the right to the city and equal rights to public space in the city. It explains how those rights are manipulated, either by those in power or those with influence. The chapter then explains what is public space and issues of access within public space. The literature then explains what NMT is and why NMT is important for the development of cities. This is then followed by an explanation of transport planning and how transport planners plan for different modes of transport. Lastly, the research reviews six precedent cities which are cycle friendly, or are attempting to become more cycle friendly, and the transport planning process within these cities.

Chapter 3 looks at the research method. The chapter starts by broadly explaining the different research designs and filters down through the different methods of data collection and, finally, the research method. The chapter weighs the different methods against what this research is trying to achieve, thus explaining why the chosen research method, which is a case study evaluation method, is the most appropriate for this research.

Chapter 4 then looks at Johannesburg as the overall case study for this research, and begins to evaluate the cycling programme within the city; this is done through an analysis of the documents relating to the programmes and through an interview process.

The fifth chapter is the analysis and evaluation of the programmes. In this chapter the interviews and the analysis of the documents are evaluated in an attempt to understand the success of the project. This is then compared to what has been done in the precedent cities in order to identify possible gaps in the programme and to understand how, if at all, these programmes can be improved.

The last chapter, which is the conclusion and recommendations chapter, presents a summary of the research. It explains how the research question was answered and provides recommendations, based on the findings, for future research to be carried out.

2 Literature Review

2.1 Introduction

This literature discusses the rights of Non-Motorised Transport (NMT) users, with specific focus on the rights of cyclists to the city. The chapter begins with an explanation of the rights to the city from a philosophical point of view, and understanding what the right to the city actually entails. The right to the city is explained with specific reference to the right to public space; this is followed by an urban planning perspective on what constitutes public space, and what are the rights of NMT users within public space. The literature then looks at the involvement of transport planners in regulating people's rights in public space through different guidelines which aim to ensure safety, access and convenience for all users in public space. This leads to a discussion of the New Urban Agenda in an attempt to illustrate the link between the right to the city and the importance of NMT and cycling prioritisation in the future of cities.

The second part of the literature review introduces cycling as a form of NMT, and discusses the importance of cycling as an alternate mode of transport in cities. This looks at the benefits of cycling for the user and for the city. These benefits of cycling are then discussed through the use of precedents, looking at cities that have already provided for cycling and are already benefiting from it. The cities are also looked at from the perspective of planning guidelines and how those guidelines aim to promote the rights of cyclists within cities. Lastly, Johannesburg is introduced as the case study in terms of which the current cycling infrastructure will be evaluated, based on NMT planning guidelines.

In understanding cyclists' rights to the city, the topic will be looked at from different perspectives. Firstly, as a cyclist, cyclists have rights and those rights must be recognised. Secondly, as government institutions and policy makers, there is a need to recognise the rights of society and to ensure that they are adequately addressed. Thirdly, as developers, planners, and engineers, to ensure that development accommodates for those rights. Each person has a responsibility to the city, which is to ensure that the city is maintained and that it has a future.

2.2 The Right to the City

2.2.1 Everyone has a Right

According to the English definition, 'right'; as a noun; can be defined as "a moral or legal entitlement to have or do something" (Oxford Dictionary, 2017). This could be to concepts of justice and due process or ownership of property (Hill & Hill, n.d). There are many types of rights, such as human rights, civil rights, marital rights, and property rights. The research focuses on human rights and civil rights. This is due to the fact that these two rights are more encompassing than any of the other rights. A 'human right' is irrevocable and inherently held by all human beings. Human rights include the right to life, education, liberty, fair trial, and the pursuit of happiness (Oatsvall, 2015). Historically, human rights were conceived shortly after World War II, particularly in regard to the treatment of Jews and other groups by the Nazis. In 1948, the United Nations General Assembly adopted the Universal Declaration of Human Rights, cementing their foundation in international law and policy (HG.org, n.d).

A civil right is different from human rights, in that a civil right arises only by virtue of a legal grant of that right. They are rights that one enjoys by virtue of citizenship in a particular nation or state (HG.org, n.d). A citizen would know their rights by understanding what has been laid out in the constitution of the country. In the case of South Africa, civil rights are stated in the Bill of Rights as laid out in the Constitution of South Africa. The Bill of Rights enshrines the rights of all people in South Africa and affirms the democratic values of human dignity, equality and freedom (Republic of South Africa, 1996). The reason for focusing on human and civil rights is due to the fact that cyclists are humans, and the roads which they ride on are governed by the laws of a nation or state.

In Section 21 of the Constitution of the Republic of South Africa (1996), it is stated that "everyone has the right of freedom of movement" and "every citizen has the right to enter, to remain in and to reside anywhere in the Republic". In article 13 of the Universal Declaration of Human Rights it is stated that "everyone has the right of movement and residence within the borders of each state" (United Nations, 2015). The South African Constitution and the Universal Declaration refer to both movement and residence, in space. Residence is when people occupy a space; it is to remain in that space, whether it is to rest, as part of a gathering, or just to socialise. Movement, on the other hand, refers to being mobile in a space; this could be within a space, between spaces, or to a space. Cycling is a form of movement and, as such, this research will be focusing more on movement as both a human right and a civil right.

There are many different forms of movement within the city, some of which are classified as legal and some are not. In South Africa, the White Paper on National Transport Policy (1996) states that "The Land Passenger Transport Policy encompasses all forms of public and private passenger movement on land, including the travel mode rail, bus, minibus-taxi, metered taxi, private motor cars, motor cycles and bicycles, as well as pedestrian movement" (DoT, 1996). Cycling is, therefore, a recognised mode of transport in South Africa. The White Paper on National Transport Policy aims to provide leadership in: "The promotion of a safe, reliable, effective, efficient, co-ordinated, integrated, and environmentally friendly land passenger transport system in South African urban and rural areas, and the southern African region, managed in an accountable manner to ensure that people experience improving levels of mobility and accessibility" (DoT, 1996). The improved levels of mobility and accessibility are stated in reference to the travel modes identified by the policy, including cycling.

At a glance, it has been established that people have a right to move, and that walking and cycling are recognised legal forms of movement. Therefore, pedestrians and cyclists, as citizens who use a recognised mode of transport, have a right to freedom of movement within South African cities. The next section looks at the spaces in which that movement takes place and how that affects the way in which people move.

2.2.2 Streets are Public Space

Moving within space can be regulated depending on the type of space; whether it is public space, private space, or semi-public space. Public space is space that is owned by the public; it is where all citizens, regardless of their income and personal circumstances, can feel equal and cared for (Garau, 2016). This is the space this research investigates, in order to understand if NMT users feel equal and cared for within public space. There is a strong link between movement and public space; the primary

space in cities in which movement takes place is the street, and the street is public space. However, the street is not only about movement, the street is a vibrant and lively part of the city in which all types of activities take place. Streets come in different shapes and sizes; they differ in the activities and behaviours they support (Mehta, 2013). The differences in their physical shapes and sizes, whether they have trees or buildings on the side, or if one is a boulevard or an avenue, will be discussed at a later stage in this research.

NMT is a form of movement, and citizens have a right to freedom of movement. Movement occurs in public spaces, which can be translated to take place in streets. It must be noted that not all streets are public. Streets can be privatised; when a street has controlled access, the street is accessible only to the people of the neighbourhood, company, or district, the street is classified as private (Mehta, 2013). All other streets are public, and these are streets in which citizens can exercise their freedom of movement.

Jacobs (1993) explains that, as a public space, streets can be used for anything and by anyone. He (Jacobs, 1993) describes streets as being lined with stores and cafes, looking over parks and having great views of the city. People go back to these streets, not necessarily for economic or functional reasons, but because of the pleasantness that they offer (Jacobs, 1993). Appleyard (1981) speaks about streets as being the most important part of the urban environment. Streets have been the places in which children first learned about the world and where neighbours met; they have been the social centres of towns and cities (Appleyard, 1981). It is the streets which shape the city and define how people interact with the city. Jacobs (1993) states that, if planners can develop and design streets so that they are wonderful fulfilling places to be, attractive public spaces for all people of cities and neighbourhoods, then they would have successfully designed about one third of the city, directly, and will have had an immense impact on the rest. In an article written by Gardner (2011) he explains that cities like Vienna, Barcelona, and even Paris with its broad boulevards, devote around 25 percent of their area to streets. This means that almost a quarter of the city is public space, excluding the public parks and public squares.

The character of streets has changed over time, and while some cities retain this rich street identity, most streets today are largely designed for movement (Macdonald, 2011). While there are many different forms of movement within the street, including vehicles, pedestrians, wheelchair users, horse-drawn carts, and cyclists, certain users have more dominance than others. One way of understanding this process is to look at the evolution of cities. The urban form evolves according to changes in the dominant mode of transport (SACN, 2014, p. 98). For instance, before the era of motorised transport, cities were generally limited with regards to a ‘walkable’ area. The emergence of rail allowed cities to spread while still creating a cluster around stations. Eventually, with the arrival of the motor car, cities were free to expand indiscriminately (SACN, 2014). Now, streets are present in all parts of the city, serving a multitude of functions; there are streets in residential, commercial, and industrial areas, in parks, and in suburbs (Mehta, 2013). As such, in residential areas and in the suburbs, there might be more people walking, whereas in a commercial or industrial area there might be more vehicles. It does not mean, however, that vehicles are the only form of movement allowed in industrial areas; all citizens still have a right of movement within that space. It is the character of the street and the space surrounding the street that determines how the street is used.

Amin (2006) explains that the free and unfettered mingling of humans in open and well-managed public space encourages forbearance towards others, pleasures in the urban experience, respect for shared commons, and an interest in civic and political life. Amin distinguishes 'public space' from the vision of 'open' and 'well-managed' public space, explaining that, it is not public space that encourages forbearance; it is 'open' and 'well-managed' public space. 'Open', in this context, refers to the space being wide, extensive and broad. The public street can be open and well-managed; it could be welcoming, with wide pavements which are continuous, open facades, slow moving vehicles, good lighting and soft edges. The more public space a person has in which to be free; the more tolerating and appreciative they become. It is human behaviour to want space; it is an expression used when a person needs to gather their thoughts, to be free, or to reboot.

The opposite of this would be what many streets have become today; narrow or non-existent sidewalks, wide roads filled to capacity, minimum lighting, and hard edges. If you are in a car, you are frustrated from sitting in traffic for long hours; if you are not in a car, you have no sense of belonging in that space. The mention that public space is a space where different people come together is critical in the sense that, if streets were truly public space, it would be a space where people come together, not fight about who owns the space. It would be a space where conflict can be worked out, and not created. Streets today are where the conflict begins; this is proven by the fact that road deaths are amongst the top 10 leading causes of deaths globally, with half of those deaths being vulnerable road users, pedestrians and cyclists (World Health Organisation, 2017).

The street becomes a neglected public space; it is designed to ease movement, but not to bring life to the city. People no longer enjoy being on the street, in fact, they fear being on the street. Truly, "if this trend continues, it will eradicate the last remaining spaces where a wide variety of people from different gender, class, culture, nationality and ethnicity intermingle peacefully" (Amin, 2006, p. 2). On the one hand, planners need to ensure that public spaces remain public, in the sense of providing a place for everyone to relax, so that people have space where interpersonal and intergroup cooperation and conflict can be worked out in a safe and public forum (Amin, 2006). While this may be referring to parks, squares, or boulevards in Paris, it relates to the common street as well. Whether you are walking, cycling, driving, or using public transport, the street should be a place for everyone to relax, without the fear of becoming another road fatality. This will only happen when streets, as public spaces, are designed for everyone.

Like any public space, simply throwing it out there, to all who wish to participate, is to give sway to the practices that may serve the interest of the powerful, the menacing and the intolerant (Amin, 2006). This can be seen with the abuse of space by taxis and vehicles. Any new space, be it an emergency lane, a bike lane and, on occasion, even a sidewalk, is used as extra parking space, as a drop-off and pick-up space, or to bypass traffic. Amin (2006) explains that planners are aware that these spaces serve the interest of the powerful, the menacing, and the intolerant, from the daily abuses suffered by vulnerable people. This is evident in streets, where half of all road deaths, globally, are vulnerable road users, as mentioned earlier by the World Health Organisation (2016).

It is this kind of consequence that has forced progressive urban planners, on many occasions, to seal off particular public spaces or parts of public space for sections of society at risk, as the history of parks reserved for children confirms (Amin, 2006). Places are then gated off for certain activities, social spaces move into malls, cycling and walking move to the parks or to the outskirts of the city, and the public space which occupies a quarter of the city is neglected, it is given to the more powerful users. Therefore, and depending on circumstances, policy efforts to promote multiplicity (variety) as a principle of urban inclusion and civic acceptance of the right of the many to public space might, indeed, necessitate making special, perhaps even separate, provision in public space for certain groups in order to ensure that multiplicity does not result in harm (Amin, 2006, p. 6). On the street, multiplicity does, indeed, result in harm. The vulnerable users, be it pedestrians or cyclists, are at the mercy of the more powerful users, be it taxis or private vehicles. In an attempt to avoid this, Amin (2006) is suggesting that public space should be separated between those who use it. Most streets already contain some measure of separation between cars and pedestrians, through a raised pedestrian walkway. However, this is not the case with cyclists, especially not in South Africa. While the concept of separated or dedicated cycle lanes is one that has been accepted and adopted in some parts of the developing world as a standard of planning, it is still seen as a luxury in cities likes Johannesburg. This will be discussed in more detail when the literature looks at South Africa; specifically at Johannesburg. The argument here is that, if cyclists are at the mercy of more powerful road users, and if this multiplicity within public space has, indeed, resulted in harm, should it not be that separate facilities are provided for cyclists, and should that not be a standard when planning streets, or at least streets that cyclists are known to make use off?

It is clear from what has been said above that all citizens have rights within the city, that public space is a space for everyone and anyone to be in, and to feel free and welcome. However, due to the change in character of public space, especially streets, from being a space of vibrancy and 'where life would happen', to being a space of movement, those with more power can be quite intimidating, to such an extent that the more vulnerable groups do not feel welcome in public space anymore. The question then arises around the notion of power; do those in power have more rights to the city than others? The next section looks at the 'Right to the City' in order to understand this better.

2.2.3 'Power' Versus 'Right'

The right to the city, so far, has been discussed in relation to public space. The street has been identified as the largest public space within cities, and as the space in which life occurs. Movement, however, has been described as the primary activity within streets; due to the changing nature of streets. There are many different forms of movement within streets; from private vehicles, to buses, taxis, pedestrians, cyclists, and even wheelchair users. Some of these are more dominant than others. In the context of South Africa, it is private vehicles and taxis that are the most dominant. As has been explained previously, those who are more dominant, who have more power, jeopardise those that are more vulnerable. However, if this is the largest public space within cities, and if public space equates to a quarter of the city, then who has a right to the city? Do some people have more rights than others?

To answer this question, one must first understand what 'the right to the city' means. There is a lot of literature associated to 'the right to the city', much of which builds on the intellectual roots of the idea

written by Henri Lefebvre (Purcell, 2002). Authors like David Harvey and Mark Purcell have attempted to relate much of the early literature by Lefebvre to a more current context. It is from these writings and others, that this literature review has attempted to understand 'the right to the city'. The literature also looks at the role of planners in relation to the right to the city because, essentially, the city is man's creation, and planners play a vital role in this process.

It should be noted that the notion of 'the right to the city' came about long before the literature. Harvey (2012) explains that the right to the city is something that rises up from the street, out from neighbourhoods, as a cry for help and sustenance by oppressed peoples in desperate times. When referring to the 'right' to the city, Lefebvre (Harvey, 2012, p. x) explains that 'the right', is both a cry and a demand. As a cry, it is a response to the essential pain of everyday life in the city. As a demand, it is really a command to look that crisis in the eye and to create an alternative urban life that is less alienating, more meaningful and playful (Harvey, 2012). Once again, the street is where it all begins. The street is where the cries would be heard, and where the demands would be made. It is a space where people can voice their opinions and share their struggles.

The city, as noted by Robert Park (Harvey, 2012, p. 4) is: "Man's most consistent and, on the whole, his most successful attempt to remake the world he lives in more after his heart's desire. But, if the city is the world which man created, it is the world in which he is henceforth condemned to live in. Thus, indirectly, and without any clear sense of the nature of his task, in making the city man has remade himself". If this notion is adopted, then the question of what kind of city people want cannot be divorced from the question of what kind of people they want to be, what kinds of social relations they seek, what relations to nature they cherish, what style of daily life they desire, what kinds of technologies they deem appropriate, and what aesthetic values they hold (Harvey, 2012, p. 4).

Theoretically, the right to the city is meant to re-orientate decision-making away from the state and toward the production of urban space (Lefebvre, 1996). The right to the city stresses the need to restructure the power relations that underlie the production of urban space (Purcell, 2002, p. 101). This means that, in theory, the right to the city is meant to overlook power relations; it is meant to move away from the state and those in power. The production of urban space is meant to be about the space, and the people who use that space, not the people who build the space. This notion is expanded by Harvey (2012, p. 4) who says that the right to the city is a collective right, rather than an individual right, since changing the city inevitably depends upon the exercise of a collective power over the process of urbanisation. In Jones (2016), it is explained that a group of individuals has a collective right, if their shared interest is sufficient to make a difference and if the interest of an individual is insufficient, by itself, for anyone to notice. As such, individual right, here, is explained to be one person having to fight for their right, while a collective right is when people come together to fight for the same rights.

Furthermore, Lefebvre (1996) explains that the right to the city relates to the right to appropriation. Appropriation includes the right of inhabitants to physically access, occupy and use urban space (Purcell, 2002, p. 103). This notion of right to appropriation is the primary focus of those who advocate the right of people to be physically present in the space of the city. Adding to this, Purcell (2002, p. 103) explains that Lefebvre imagines appropriation to be much broader; not only is it the right to occupy already

produced urban space, it is also the right to produce urban space so that it meets the needs of inhabitants.

Based on this, the kind of city people live in should complement the kind of people they want to be. On the face of it, NMT users are allowed in the city. However, allowing is not the same as accommodating. In order for the city to complement the kind of people living in it, the city must identify, accommodate and facilitate the needs of those people. For instance, if planners are to 'allow' cars in a city, but the city has no roads, parking spaces, or fuel stations, then people cannot drive in the city even if the city allows it. In the same way, to allow for cycling and walking, but not have the basic facilities in place for those activities to take place, is the same as not allowing for it. Therefore, in making the city, planners need to allow all types of movement, thereby accommodating for the needs of the people that live in the city. After all, for planners, transport is one of the basic needs within the city and, as stated earlier, the street is the foundation around which the city is developed. That is why Jacobs (1993) states that, by designing the streets correctly, planners would have successfully designed one third of the city.

The reality of streets today is that they, in many ways, are geared towards movement. There is excess space given to cars, less space given to pedestrians, and minimum or no space given to cyclists. So while people have the freedom of movement, that freedom is shaped by the way in which the city is developed. People feel more welcome and comfortable when they are in cars, so they prefer to be in cars. However, based on the right to the city, the City should not dictate how any person chooses to move, it should rather be accommodating to how you want to move. Harvey (2012, p. 4) explains this by stating that the right to the city is far more than a right of individual access to the resources that the city embodies; it is a right to change ourselves by changing the city more after our heart's desire. He argues that the freedom to make and remake ourselves and our cities is one of the most precious, yet most neglected, human rights (Harvey, 2012).

Due to these rights being neglected, it is found that the right to the city no longer holds any value; it has become an empty signifier. It all depends on who gets to fill it with meaning. It could be the rich and powerful who lay claim to it, and have a right to do so. But so do the homeless and oppressed. Essentially, the reality is that "between equal rights force decides" (Harvey, 2012). This is the reality of the right to the city, and it is the reality of the street, it is a space of equal rights but, inevitably, those with power claim to have more right. Harvey (2012, p. xvi) explains that, in order to understand and make sense of the politics of urban life, society must first understand that those who build and sustain urban life have a primary claim to that which they have produced, and that one of their claims is to the un-alienated right to make the city more after their own heart's desire.

If the right to the city is a right to change ourselves by changing the city more after our heart's desires, how is that possible if those who build and sustain urban life make the city more after their own heart's desires? Everyone has a right to the city and the city is for everyone, but force and power play a vital role in deciding how much right to the city a person has or, in the case of this research, how much right to the street a person has.

Planners, in many ways, are those who build and sustain urban life and, therefore, influence how much right to the city people have. The planning process is meant to ensure that people's basic needs are prioritised, regardless of status or income (Republic of South Africa, 1996; Habitat III, 2016). The drafting of housing, land use and transport policies are meant to ensure that this process takes place and that the resultant plans and frameworks adhere to the same set of rules and principles laid out in the policies. The plans and frameworks, such as Spatial Development Frameworks, Integrated Development Plans, Urban Design Frameworks, and Transport Master Plans, then guide the development over a selected period of time after which new plans and frameworks are produced. The plans and frameworks are meant to echo the desired future growth of the city for the coming years; they tend to focus on themes which are related to the current global and domestic issues; themes such as sustainability, resilience and local economic development. Recently, in conferences and workshops around the globe, the right to the city has been a common focus for government, civil society, professionals, practitioners and the private sector alike.

2.2.4 The New Urban Agenda

During the 2016 Habitat III Conference, the right to the city was one of the key topics of discussion, as part of the New Urban Agenda. The New Urban Agenda is the outcome document of the conference. It is an action-orientated document, which sets global standards of achievement in sustainable urban development, rethinking the way cities are built, managed, and occupied through drawing together cooperation with committed partners, relevant stakeholders, and urban actors at all levels of government, as well as the private sector (Habitat III, 2016 (2), p. 1). As the New Urban Agenda is current in the context of this research, and it deals largely with issues in the city and the rights to the city, it will be discussed in an effort to prove the significance and importance of addressing the rights of cyclists in cities today.

The vision of the New Urban Agenda states "We share a vision of cities for all, referring to the equal use and enjoyment of cities and human settlements, seeking to promote inclusivity and ensure that all inhabitants, of present and future generations, without discrimination of any kind, are able to inhabit and produce just, safe, healthy, accessible, affordable, resilient and sustainable cities and human settlements, to foster prosperity and quality of life for all." (Habitat III, 2016, p. 12)

The vision establishes a strong link between the theoretical beginnings of the right to the city and the New Urban Agenda. It is an effort to ensure that cities are for all, without any discrimination. More specifically, it aims to achieve cities and human settlements where all persons are able to enjoy equal rights and opportunities (Habitat III, 2016). This entails the right to adequate housing and fundamental freedoms, along with functional urban social and civic systems, and access to urban mobility for all. The New Urban Agenda speaks strongly about the need to ensure equal access to urban mobility and the need to enforce policies and measures to actively protect and promote pedestrian safety and cycling mobility (Habitat III, 2016).

While the focus of the New Urban Agenda is quite broad, in the sense that it tries to address all issues within cities, when looked at it in relation to NMT, the New Urban Agenda advocates strongly for

cyclists' rights to the city. The following brief review of the New Urban Agenda will explain this in more detail.

Mention is made that, by 2050, the world urban population is expected to double, and that this poses massive sustainability challenges in areas such as housing, infrastructure, health and transport, to mention a few (Habitat III, 2016). If cities are to consider current issues around over-population in urban areas, insufficient road space, road congestion and insufficient public transport capacity, it is concerning to think what would happen if the population doubles. There is, undoubtedly, a need for alternate transport modes in cities, because the streets cannot be widened anymore and the parking lots are already filled to capacity. Using alternate transport, like public transport, walking and cycling, eases the pressure on the roads as these modes require less space for movement than cars. This will be discussed in more detail in the following section.

The vision of the New Urban Agenda speaks about creating cities that meet the challenges and opportunities of present and future, cities that reduce vulnerability, recognising the needs of those in vulnerable situations, and cities that minimise environmental impacts by protecting, conserving, restoring and promoting ecosystems and natural habitats (Habitat III, 2016). If cities are to meet the challenges of the present and the future, then the dependence on vehicles needs to be reduced, as vehicles are largely responsible for the amount of harmful gases in the air which lead to a number of global issues (SACN, 2014). Reducing vulnerability would require that the rights of cyclists be addressed; cyclists should be accommodated within the road reserve, thus, ensuring their safety. In minimising environmental impact, cycling is a clean and environmentally friendly mode of transport, in that it is not harmful to the environment. In fact, cycling has been proven to lead to healthier lifestyles and communities (Tolley, 2011).

In order to achieve this vision of the New Urban Agenda (Habitat III, 2016), the document outlines a number of principles and commitments. Amongst these, it is mentioned that no individual must be left behind in ending poverty in all its forms and dimensions, by ensuring equal rights and opportunities, integration in the urban space, enhancing liveability, health and well-being (Habitat III, 2016). With regards to this, it should be noted that the majority of commuter cyclists in the developing world are of lower income groups; they cycle because they cannot afford a car or public transport (Nkurunziza, 2013). However, whether you are cycling as a choice or not, development should not disregard the needs of the lower income groups, as the objective is to ensure equal rights and opportunities.

Another principle and commitment is that of environmental sustainability, by promoting clean energy, sustainable use of land and resources in development, including adopting healthy lifestyles in harmony with nature (Habitat III, 2016). Walking and cycling are the two most sustainable modes of transport and they lead to healthier lifestyles.

The New Urban Agenda calls for leaders to stop making the city after their own hearts desires. Instead, they are to play a leading role in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development (Habitat III, 2016). It also speaks to "the equally important contributions of sub-national and local governments, as well as civil society and other

relevant stakeholders, in a transparent and accountable manner" (Habitat III, 2016, p. 15). If this is achieved, then the city would, once again, complement the people and what they choose to be. This is an effort to revive the right to the city as it was originally imagined. Realising the role played by leaders at all levels of government is a key step to ensuring the right to the city. Those that are in power shape the city and it is important that they recognise the important role they play in society.

Table 2 summarises some of the commitments made by New Urban Agenda which directly, or indirectly, deal with the cyclist's right to the city:

Table 2: Summary of commitments from the New Urban Agenda

- It commits to promote equitable and affordable access to sustainable basic physical and social infrastructure for all, without discrimination, including sustainable mobility. It further commits to ensure that these services are responsive to the rights and needs of others that are in vulnerable situations.
- It commits to promote safe, inclusive, accessible, green, and quality public spaces, including streets, sidewalks, and cycling lanes, and parks that are multi-functional areas for social interaction and inclusion, human health and well-being, economic exchange, and cultural expression and dialogue among a wide diversity of people and cultures, and which are designed and managed to ensure human development, to build peaceful, inclusive, and participatory societies, as well as to promote living together, connectivity, and social inclusion.
- It commits to promote a safe, healthy, inclusive, and secure environment in cities and human settlements for all to live, work, and participate in urban life without fear of violence and intimidation, taking into consideration persons in vulnerable situations.
- It commits to encourage urban-rural interactions and connectivity by strengthening sustainable transport and mobility, technology and communication networks and infrastructure, underpinned by planning tools.
- It commits to the generation and use of renewable and affordable energy and sustainable and efficient transport infrastructure and services, where possible, achieving the benefits of connectivity and reducing the financial, environmental, and public health costs of inefficient mobility, congestion, air pollution, urban heat island effect, and noise. It also commits to give particular attention to the energy and transport needs of all people, particularly the poor and those living in informal settlements. It also notes that reductions in renewable energy costs give cities and human settlements an effective tool to lower energy supply costs.
- It commits to adopt a smart city approach, which makes use of opportunities from digitalisation, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery.
- It will promote integrated urban and territorial planning, including planned urban extensions based on the principles of equitable, efficient, and sustainable use of land and natural resources, compactness, polycentrism, appropriate density and connectivity, multiple use of space, as well as mixed social and economic uses in the built-up areas, to prevent urban sprawl, to reduce mobility challenges and needs and service delivery costs per capita, and to harness density and economies of scale and agglomeration, as appropriate.
- It will support the provision of well-designed networks of safe, inclusive for all inhabitants, accessible, green, and quality public spaces and streets, free from crime and violence, considering the human-scale and measures that allow for the best possible commercial use of street-level floors, bringing people into the public spaces, promoting walkability and cycling towards improving health and well-being.
- It will take measures to improve road safety and integrate it into sustainable mobility and transport infrastructure planning and design. It will work to adopt, implement, and enforce policies and measures to actively protect and promote pedestrian safety and cycling mobility, and it will work to develop and implement comprehensive legislation and policies on motorcycle safety, given the disproportionally high and increasing numbers of motorcycle deaths and injuries, globally, particularly in developing countries. It

will promote the safe and healthy journey to school for every child as a priority.

- It will promote access for all to safe, age- and gender-responsive, affordable, accessible, and sustainable urban mobility, enabling meaningful participation in social and economic activities in cities and human settlements, by integrating transport and mobility plans into overall urban and territorial plans and promoting a wide range of transport and mobility options, in particular, through supporting:
    - a significant increase in accessible safe, efficient, affordable, and sustainable infrastructure for public transport, as well as non-motorised options such as walking and cycling, prioritising them over private motorised transportation;
    - equitable Transit-Oriented Development (TOD) that minimises the displacement, in particular, of the poor and features affordable, mixed-income housing and a mix of jobs and services;
    - Better and coordinated transport-land use planning, leading to a reduction of travel and transport needs, enhancing connectivity between urban, peri-urban, and rural areas.
- It seeks to encourage national, sub-national, and local governments to develop and expand financing instruments, enabling them to improve their transport and mobility infrastructure and systems, such as mass rapid transit systems, integrated transport systems, air and rail systems, and safe, sufficient and adequate pedestrian and cycling infrastructure and technology-based innovations in transport and transit systems to reduce congestion and pollution while improving efficiency, connectivity, accessibility, health, and quality of life.

(Habitat III, 2016, p. 14-29)

From the points mentioned in the New Urban Agenda (Habitat III, 2016) it is clear that there is growing support for cities to accommodate sustainable modes of transport to a greater degree, such as walking and cycling. This growing support is not only based on the sustainability, it is about making cities safer, providing for those in vulnerable situations, encouraging social and inclusive public places and promoting healthier lifestyles.

The right to the city is (variably) a call for equality, a call for recognition, it is when planners and policy makers prioritise the need and requirements of those most vulnerable in society, and find ways to make them feel included in the city. It is when the ordinary citizen feels as though the city has been built for them; it accommodates their personal needs, and helps them to progress. The right to the city is an ongoing process in which the City and the people work together to build an inclusive and sustainable city. As such, the right to the city has many owners; it belongs to the citizens, the policy makers, the planners, and the City. The citizens and City both require the right for their safety and well-being. Safety in that development meets the needs of the citizens without jeopardising the future growth of the city. The policy makers and planners have the power to provide the right while benefiting from it greatly. If the City is set on the most sustainable path, then they will not have to keep going backwards to undo what has already been done. The next section of the literature unpacks the importance of NMT as a mode of transport and why cities need to adopt NMT as an alternate mode of transport.

2.3 The Importance of Non-Motorised Transport in Cities

NMT can be defined as 'transport by any means other than a motor vehicle, including, but not limited to, walking, cycling, animal-drawn vehicles and wheelchairs' (Vanderschuren, et al., 2014, p. viiii). Basically, anyone not in a motorised vehicle (car, taxi, bus, train, motorbike) is regarded as a NMT user. Technically, however, at some point of any journey, everyone is an NMT user; whether they are walking to or from their mode of transport or they are moving from one transport mode to another. There are

two topics of discussion when reviewing the importance of NMT in cities; the first part reviews the transport challenges caused by the car-orientated city, and the second part discusses the importance and the benefits of planning for NMT within cities. The following review begins by discussing the first aspect.

2.3.1 Transport Challenges

As a general point of view, NMT as a mode of transport is not meant to cover great distances; they are useful for shorter distances, such as trips up to 7.5km or 30 minutes, or for being a first or last mile mode of transport (Batista, 2010). First and last mile refers to the movement to or from any motorised vehicle, be it a private car, a bus or a train. Due to the expansion of cities into outlying areas and the creation of districts and zones, such as residential, business and industrial districts, people are expected to travel further on a daily basis. As explained by the SACN (2014), this evolution of cities is based on what transport options were dominant during that period of time. The evolution of cities can be understood in 3 phases; the traditional walking city, the transit city and the automobile city (Newman & Kenworthy, 1996).

Briefly described, the traditional walking city is characterised by high density, mixed land use, joined together by narrow streets in an organic form (Newman & Kenworthy, 1996). According to Newman & Kenworthy (1996), these cities are approximately 5km across and, as such, all destinations can be reached on foot within half an hour. With the introduction of rail and trams, people now had the option of moving further away from the city. Essentially, the walking city is developed to accommodate a hundred to two hundred people per hectare. Once that increases, there is strain on the city and, therefore, people have to move out in order to find decent accommodation and jobs. The trams and rail allowed for this expansion to occur, but this expansion was limited to each station along the tram or rail line. At every station along the tram or railway line, medium-density, mixed-use areas were formed. These areas fed into the rail lines which, in turn, fed into the central area/city. The city, at this stage, was able to spread to around 20-30km based on the distance of the rail lines (Newman & Kenworthy, 1996).

As these transit cities grew, the city centre and the nodes along the rail lines would reach their maximum capacity and, once again, people would be forced to move out. The arrival of the automobile made this much easier as people had the option to move freely and cover greater distances, thus expanding the city into further outline areas as far as 50km from the city centre (Newman & Kenworthy, 1996). At the time, the motor vehicle was seen to provide people with freedom of space and time and, for a short period of time, it did. As cities developed, they expanded, and due to this expansion, provision had to be made for the growing number of people moving in and out of the city on a daily basis. This led to the expansion of highways and an increase in parking lots, the result of which was that many cities became dependant on the automobile, and the unfettered automobile city ‘dream’ soon became a ‘nightmare’ (Newman & Kenworthy, 1996).

The car-orientated city is increasingly posing challenges, environmentally, economically and socially, thus, planners globally have increasingly been ‘advocating’ for a shift from the car towards non-motorised modes of transport (Dekoster & Schollaert, 1999). Environmentally, the vehicle is said to produce extremely high levels of emissions (most notably Green House Gases), which can lead to health

issues from increased congestion, and to larger environmental impacts, such as global warming (Baufeldt, 2016). Economically, vehicles are expensive to maintain and to use (both as a private vehicle or public transport vehicle), especially due to the significantly high fuel prices. Socially, vehicles are a major cause of traffic congestion; they reduce road safety and increase noise pollution (Baufeldt, 2016).

The effects of the vehicle impact society as well as the city. The city becomes vulnerable, due to the increase in congestion, noise pollution, harmful emissions and decline in road safety. Social life moves indoors, and the life of the city, which was once the street, becomes an empty and unfriendly space. Additionally, cars take up a lot of space, and traffic congestion is already an issue in cities. Every year, the number of cars entering cities increase and, as mentioned in The New Urban Agenda, by 2050 the population in urban areas is expected to double (Habitat III, 2016). If the roads cannot handle current demand, what is going to happen when it doubles? Cities today are already built-up and the roads extend from one building to the next - the roads cannot be extended anymore, and the parking lots have no more space to expand. So cities are facing a dangerous situation, and the reality is that alternate transport is a major part of the solution. While there will always be space for vehicles, it is the provision of public transport and NMT that planners need to focus on in order to safeguard the future of cities.

2.3.2 Importance and Benefits of NMT

The second point of discussion is the importance and benefits of planning for NMT within cities. As a starting point for planning, it is important to recognise that NMT modes, such as walking and cycling, are apparent and exist in every city. As such, some level of planning should be done in order to accommodate the existing users. The unfortunate reality is that in the majority of cities, due to the lack of appropriate infrastructure, NMT users are forced to travel in unsafe environments. According to the World Health Organisation, pedestrians and cyclists constitute the Vulnerable Road User (VRU) group and account for nearly half of global traffic deaths (Molai & Nyarirangwe, 2010). This harsh reality means that if you travel by motorised transport then you are relatively safe but, if not, then you are vulnerable.

In theory, the planning of streets is meant to prioritise the safety of the most vulnerable road users first. The South African NMT Facility Guideline (2014) states that when planning and designing settlements, the transport user hierarchy is to be applied; that is to consider the most vulnerable users first: pedestrians, then cyclists, then public transport users, specialist vehicles like ambulances and, finally, other motor vehicles. As such, the evolution of cities has caused planners to develop cities in contradiction to the transport user hierarchy. Planners have been planning cities based on the more dominant transport modes, instead of the vulnerable modes. Dominance can be translated as being ‘in control or command over others’ or as ‘more important, effective, or prominent than others’ (Soukhanov, 1999). Dominance, therefore, can be related to those in power, such as the state. The right to the city is meant to re-orientate decision-making away from the state and toward the production of urban space. As such, planning for NMT users is important, because NMT users do exist and they are vulnerable, and the prioritisation of vulnerable road users conforms with city planning, and the right to the city.

With regards to the benefits of NMT modes of transport, such as walking and cycling, it is agreed that they are the most sustainable modes of transport; environmentally, socially, and economically. Walking and cycling are said to improve road safety and reduce road fatalities, improve health and fitness, provide social inclusion, improve traffic fluidity, offering ease, flexibility, convenience and reliability, provide point-to-point travel without being limited by fixed route transit services, extend the service areas of public transport systems, and allow for a drop in household budgets spent on car maintenance and fuel (Dekoster & Schollaert, 1999; Kim & Dumitrescu, 2010; Batista, 2010; Nkurunziza, 2013). Cycling and pedestrian infrastructure is also the most cost efficient to implement, when compared to private vehicle and public transport infrastructure. Additionally, it has been found that NMT modes can make cities more vibrant and interactive as they enhance the overall character of a place (The Scottish Government, 2010).

Based on the transport challenges, and the importance and benefits of NMT for the city and society, it can be understood why this research strongly advocates the need for increased NMT within cities. With the current challenges from a global scale to a city scale, such as global warming, carbon emission, down to traffic congestion, social inclusion and road safety, it is imperative that cities plan for more sustainable modes of transport, such as walking and cycling.

Walking is found to be much more integrated and provided for in cities. This is due to the fact that in every city, walking is a politically recognised mode of transport. In most developing countries, there are far more pedestrians than any other form of NMT. For instance, in South Africa, 18.5% of people 'walk all the way', while cycling forms part of a minority 'other' group which, combined, equates to 1.9% (Stats SA, 2013). In fact, according to the 2013 Household Travel Survey in South Africa, walking all the way is the second most used mode of transport after taxis (Stats SA, 2013). This is due to the fact that the majority of the population cannot afford a car. As such, in urban areas across South Africa, it is found that most roads have raised pedestrian walkways, and most traffic lights have a pedestrian signal as well as marked pedestrian crossings (Baufeldt, 2016).

There is no doubt that a lot more could be done to make walking safer and more integrated into the planning of roads. Walking is a major factor of NMT and, as such, it will be discussed as part of NMT improvements. However, based on the fact that pedestrians are large in number, they have more dominance, and are better accommodated for by the city. Therefore, this study has chosen to focus more on cyclists and their rights to the city. While some cities in the developing world have managed to promote cycling to such an extent that it is the most used mode of transport, other cities, like those in South Africa, have a cycling population of less than 2% (Stats SA, 2013).

This research, therefore, focuses on cyclist's rights to the city. While cycling and walking are both non-motorised and have similar benefits, there are certain scholars who argue that cycling is more sustainable than walking. While walking is the natural form of locomotion for people and is more efficient than any motorised vehicle, people on bicycles surpass those on foot, as they are able to go three to four times faster and yet use five times less energy (Nkurunziza, 2013). Additionally, it has been proven that the integration of the bicycle and bus is the strongest alternative to the use of the private car; the bicycle can increase the catchment area of public transport stations by up to five kilometres

(Adjei, 2010, p. 11). Batista (2010) and Hansen and Kotze (2012) argue that cycling is more efficient than walking with regards to the distance covered and energy being used, and it is far less costly than a train; thus, rendering the bicycle the best alternative mode of transport.

Dekoster and Schollaert (1999, pp. 9 - 10) observe that:

> *"Even if the bicycle is not the only solution to traffic and environmental problems, it surely represents a solution which fits perfectly into any general policy which seeks to re-enhance the urban environment and improve the quality of a town."*

In summary, NMT users, such as cyclists, have a right to the street, like everyone else, and they should be planned for like every other road user, just as lanes and parking lots are planned for cars, and bus stops and train stations are planned for public transport, and sidewalks and pedestrian crossings are planned for pedestrians. Additionally, planning for cyclists is not only a right of cyclists, but it is beneficial to the city and to society, making it in an important contributing factor to urban development. Globally, many cities are already reaping the benefits of promoting commuter based cycling. Cities have recorded various health benefits, decreased congestion, safer roads, and increased street life (Tolley, 2011). Some cities have always been planning for cyclists, while others had to reintroduce cycling to their cities. It should be noted that before the advent of the car, cycling already existed in cities. In fact, it was the invention of the bicycle that led to the invention of the very first automobiles (Goodyear, 2014). Penalosa (PBS e2 Design, 2013) explains that before cars, the city was made for people. When cars arrived, we should have decided that half the street would be given to cars and the other half remained for the people but, unfortunately, it was not done in this way. If, however, it had been done in this way, then planning for cyclists would be a lot easier, as cycling infrastructure would already be part of the existing infrastructure (PBS e2 Design, 2013).

Nonetheless, many cities find themselves at a point where they need to completely restart the entire process and, in doing this, it is important that planners follow the correct guidelines. Guidelines are meant to ensure that developments meet the basic requirement standards, as outlined by planners and engineers, before being approved by the City. It also ensures that the development and implementation process meets the basic requirements. For instance, the South African NMT Facility Guidelines state that, when planning and developing, the transport user hierarchy is to be applied (Vanderschuren, et al., 2014). As such, if the proposed development does not meet the City's planning requirements, it should be reworked until such time that it aligns with the set guidelines and, if this does not happen, the application for development can be revoked by the City. This is when the vision of the City and planners are aligned. The next section reviews some of the cycle design guidelines in cities across the globe, looking specifically at how these cities went about providing cyclists with rights to the city and how this has led to positive impacts for both the city and society.

2.4 The Use of Planning Tools in Providing Cyclists with Rights to the City

From a national level down to a local or municipal level of government, planners are required to develop tools which are used to guide development. These planning tools can take the form of guidelines, frameworks and development plans. Through the use and application of planning tools, cities like

Amsterdam and Copenhagen have reached a level where bicycle mode share is higher than all other modes of transport (Kim and Dumitrescu, 2010). Other cities have implemented strategies to drastically decrease the amount of vehicles on their streets; cities like Frankfurt, Rotterdam, Rio, and Bogota. These cities are realising the adverse effect of private vehicles; problems of unsustainability, traffic congestion, increased pollution, endless parking lots, increasing petrol prices; and are redirecting policy to look at alternatives to private vehicles. As a result, the planning tools advocate for public transport, walking and cycling, as a means of decreasing car dependency (Dekoster & Schollaert, 1999; Kim & Dumitrescu, 2010). NMT and general transport strategies, frameworks and guidelines acknowledge cycling as a mode of transport and place it high within the transport hierarchy. The right to the city explained the role that planners have in shaping the city. This section will demonstrate the importance of planning strategies and NMT policy in the development of cycle friendly cities. It is the first step and, possibly, the most important step in providing cyclists with rights to the city.

This section will take a closer look at Copenhagen, Amsterdam, Frankfurt, Rotterdam, Rio de Janeiro and Bogota (as shown in Figure 2). Each city has its own methods of planning, however, the overall aim is to decrease vehicle usage and increase cycling mode share. The planning tools used in these cities are briefly discussed and the main strategies from these tools are later summarised and listed as Key Performance Indicators (KPI's). The section explains the approach of these six cities and how they have improved cycling as a mode of transport. The KPI's are the key strategies which have been proven to increase cycling mode share and cycling safety within the six precedent cities.

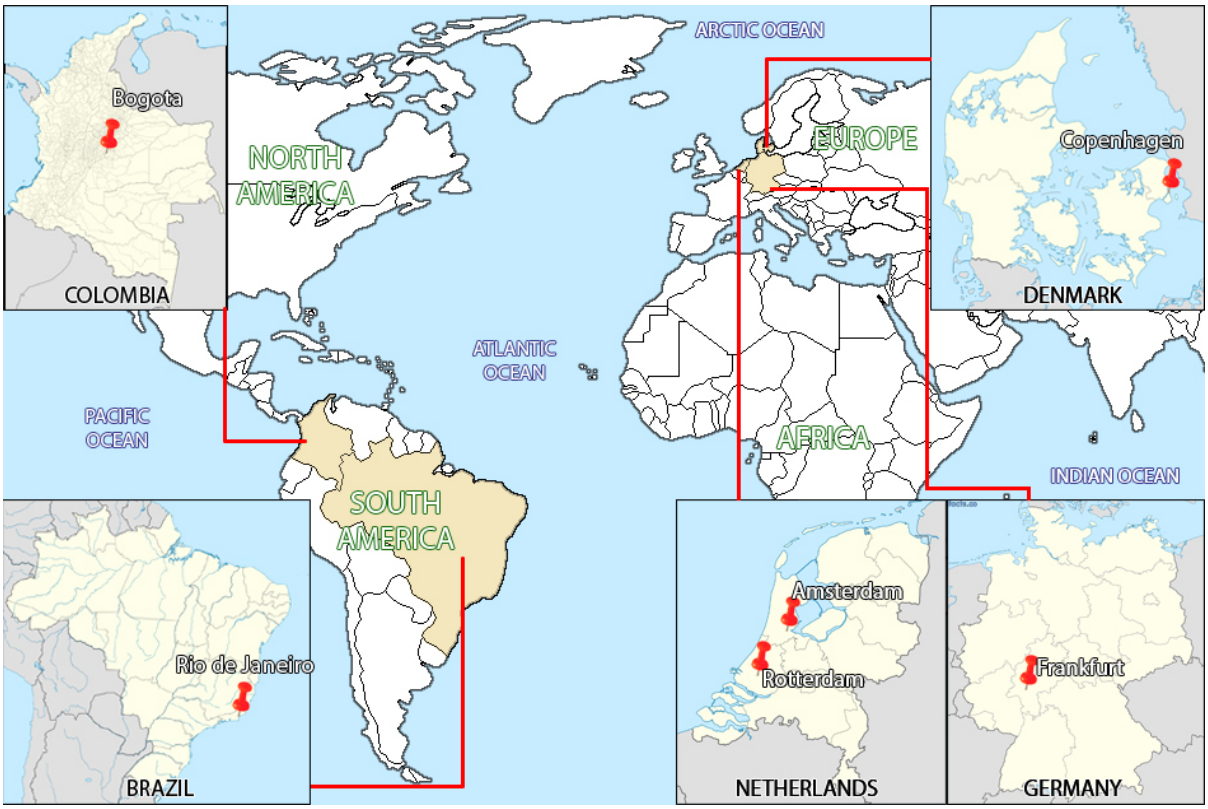


Figure 2: Location map of Copenhagen, Amsterdam, Frankfurt, Rotterdam, Rio de Janeiro and Bogota

2.4.1 Background of Cities

Table 3: Statistical background of cities

CITIES	AREA (KM^2)	POPULATION	CYCLING MODE SHARE (%)
Copenhagen	88.25	583 525	45
Amsterdam	219.3	821 752	38
Rotterdam	319.4	623 652	22
Frankfurt	284.3	717 624	13
Rio de Janeiro	1255	6 320 000	4
Bogota	1587	8 081 000	5
City of Copenhagen (2014), LCC (2011), Bautz (2011), Aichenger & Reinbacher (2010), Godefrooij, et al. (2009)			

Copenhagen and Amsterdam are both globally renowned for being the best cycling cities in the world. These cities started promoting cycling at a very early stage and are now benefiting from these investments. Copenhagen is the capital of Denmark, and is the largest city in the country. It has been named the World's Most Liveable City, and is ranked as the most bicycle friendly city (Copenhagenize Index, 2017). Like Copenhagen, Amsterdam is the capital of the Netherlands, and has the largest population compared to the rest of the Netherlands. It is known as the bicycle capital of the world (Wooldridge, 2014). Up until 2013, Amsterdam was number one in the Copenhagenize Bicycle Index, however, according to the latest index, it is now ranked as the third most bicycle friendly city, after Copenhagen and Utrecht. The Index is the world's most comprehensive inventory and ranking of bicycle-friendly cities, and is done on a bi-annual basis (Copenhagenize Index, 2017). The reason for looking at these two countries is due to their world renowned achievements for providing cyclists with rights to the city.

Frankfurt, in Germany, and Rotterdam, in the Netherlands, are both small cities with large populations. They are industrial cities with busy highways and lots of traffic due to the number of people moving into the city centre daily. Additionally, unlike other Dutch and German cities, these cities are not as popular with regards to cycling as a mode of transport (LCC, 2011; Valerie, 2016). However, the focus on cycling has increased significantly in the past few years. For this reasons, the cities bear some similarities to that of Johannesburg, which is industrial, highly populated, with the majority of its people moving in and out of the urban centres on a daily basis.

Rio de Janeiro and Bogota are arguably the most cycle friendly cities in the developing world. Since the late 1990's both these cities started to include cycling in the planning strategies for the city. While cycling mode share is not anywhere near the European cities, it has been increasing over the past few years and is continuing to do so. These cities are much larger than Johannesburg, in size and population, but the developing nature means that the issues that they are facing are very similar to that of

Johannesburg. It is useful to note that these cities were guided and supported by the Netherlands and Denmark; therefore, many of the strategies are in line with those of the Dutch and Danish cities (Brussel & Zuidgeest, 2012; Pattiasina & Pinzon, 2015).

2.4.2 Promoting Cyclist's Rights in Copenhagen

2.4.2.1 Background

Up until the 1950s, the history of Copenhagen was not very different from other European cities. Cities were compact, and the bicycle reigned supreme over all other modes of transport. It was in the 1960s that cities began to sprawl, and this was largely due to the advent of the automobile. For most cities, the arrival of the car meant the expansion of the road networks and the removal of cycle tracks. However, the distinguishing factor for Copenhagen is that it never removed any cycle tracks and cycling remained as a normal mode of transport (Krag, 2002).

Cycling mode share was impacted by the sprawling cities and road networks but, even at its lowest point, bicycles were still visible in urban traffic. The focus shifted back to cycling around 1975, due to a combination of the energy crisis, and an increased awareness of health and environmental issues. In the early 1980s, the Danish Cyclist Foundation, and close to 40 000 citizens, demonstrated in order to provoke politicians to see the value of cycling to them (Nelson & Scholar, 2007, p. 10). This demonstration was a call by citizens for the government to recognise their rights as cyclists. Since then, the City has developed new cycle tracks and the tendency to remove existing cycle lanes ended. In the early 2000's, on the busiest streets, some 20 000 cyclists, per day, passed by in each direction, and a high 34% of commuters' travel to work by bicycle (Krag, 2002). The fact that the bicycle is in such a position of power today, is owing to the people who demanded their rights, and thanks to the policies and planning efforts that were, once again, able to re-ignite that culture (Nelson & Scholar, 2007).

2.4.2.2 Copenhagen today

The 2014 Bicycle Account, which is an instrumental tool used by the Copenhagen Municipality to measure the satisfaction level of cyclists, and to assess cycling development in the City of Copenhagen, provides the latest cycling statistics and information in Copenhagen. It is published every two years and was first published in 1995 (Krag, 2002; City of Copenhagen, 2014).

According to the latest published bicycle account, 45% of all journeys to work or education are made by bicycle, which is a 25% increase from 2 years ago (City of Copenhagen, 2014). The increase in numbers is partly due to the increase in capacity by the City of Copenhagen; cycle tracks have been widened, contraflow cycling has been introduced on several roads, and bicycle/pedestrian bridges have been opened. Due to these efforts, travel time has been shortened by an average of 7% since 2012, and the number of kilometres cycled per day has increased to 1.34 million kilometres on weekdays (City of Copenhagen, 2014).

The Bicycle Account also measures the satisfaction level of cyclists with regards to cycling projects. It has recorded a significant increase in satisfaction with the amount of cycle paths. There has been an increase from 64% in 2004 to 80% in 2014. In 2012, the proportion of cyclists who felt safe when cycling

increased by more than 50% compared to 2008. This increase is largely due to the infrastructure upgrades, the increasing number of cyclists, and the cycling campaigns (City of Copenhagen, 2014).

2.4.2.3 Cycling Strategy in Copenhagen

On the one hand, cycling is increasing; however, on the other, so is car traffic. The increasing car traffic, along with other factors, led to the development of the Danish Cycling Strategy in the 1990s. The aim of the strategy is to create new bicycle traffic and to substitute urban car trips with walking and cycling. One way of achieving this, as mentioned in the strategy, is by making cycling conditions safer. The strategy itself is entitled 'Promoting safe bicycle traffic' (Krag, 2002).

Copenhagen's first cycle track plan appeared in the 1980's, and was supplemented, at a later stage, with a plan for a network of high level cycle routes. The routes are designed to enable cyclists to go faster with as few stops as possible. Part of the network made use of existing routes, but the majority of the route was built from scratch. The entire network costed an estimated 70 million Euros.

There is no doubt that street infrastructure development plays a role in how people choose to move around. Most people choose their car because it is convenient, fast, and comfortable, and this is due to the infrastructure and utilities put in place (Nelson & Scholar, 2007). Therefore, in order to balance the system between cars and other modes of transport, the infrastructure should make it possible to choose other modes instead of driving. Additionally, if driving is made to be more expensive, it will become even less attractive and other modes will become more competitive (Nelson & Scholar, 2007).

Transport planning in Copenhagen focuses on the importance of mobility for everyone. This equity is filtered through financing as well, wherein one-third of the total road budget goes towards bicycle planning and infrastructure (Nelson & Scholar, 2007). By prioritising bicycles and pedestrians in downtown planning, reducing vehicle access and increasing parking prices, Copenhagen managed to make the inner city accessible to all modes: buses, cyclists, pedestrians and cars (Nelson & Scholar, 2007). Planners developed general urban planning principles, which guide development and ensure that planning and design aim to maximise the efficiency of NMT and public transport. These principles focus on compact city forms and Transit Orientated Development (TOD), the integration of transport and land use at transit stations to ensure seamlessness and efficiency, and the attractiveness and social aspects surrounding the development of spaces in the city (Nelson & Scholar, 2007). The aim of these basic principles is to ensure that the city encourages and welcomes alternate transport, like cycling.

Through the use of these principles in Copenhagen, the bicycle has been established in the context of urban and transportation planning. The Mayor of Building and Construction Administration stated, regarding bicycle planning, "You have to make it comfortable, you have to make it secure, you have to create a climate where people would want to go on bike. And there's been for the past 30 years a political will to do this" (Nelson & Scholar, 2007, p. 10). It is obvious that a car has many advantages over a bicycle. It is comfortable, insulated from weather, and effortless (Nelson & Scholar, 2007). Therefore, in order to make cycling more viable than driving, it must have advantages over driving, such as being faster, cheaper, and more convenient to park (Nelson & Scholar, 2007). A simple example of this is the one-way streets in the central city, wherein cyclists are allowed to travel in both directions. This has

proven to be an effective method to increase competitiveness of cycling in Copenhagen. The City of Copenhagen developed bicycle planning principles (see Annexure 1), which lists a number of different measures that can be used to increase the competitiveness of cycling in the city: these include more direct routes, coherent networks, green routes, removal of on street parking, traffic calming, parking fees, and tax deduction for cyclists, to mention a few (Nelson & Scholar, 2007).

In order for these principles to have an impact, the need for a complete transportation plan is emphasised. A statement by Gardner (2007) highlights the importance of a complete transportation plan in the provision of a cyclist's rights to the city. Gardner states that "many cities build bike paths, or promote bike-and-ride commuting, or put police on bikes. But few take all of these initiatives, and fewer still coordinate these with other urban policies that affect cycling. Only when transportation is planned comprehensively - with attention to all options for managing transportation demand - will the natural place of the bicycle become evident, and the obstacles to biking be removed" (Nelson & Scholar, 2007, p. 14). This statement, once again, highlights the fact that cycling forms part of transportation planning and, if planners are serious about giving cyclists space and rights in the city, then the only way to do this is to plan comprehensively, with attention to all modes of transport.

With cycling well incorporated into Copenhagen, the City went a step further by releasing The Cycle Policy 2002-2012 (Nelson & Scholar, 2007). At this stage cycling was already increasing, but there were certain measures that needed to be taken in order to increase the number of cyclists, and to increase the comfort of those already cycling. The policy identified six areas of transport quality that needed to be addressed to further improve cycling conditions; these are explained in Table 4 below.

Table 4: Copenhagen – Cycle Policy 2002-2012

Six areas of transportation quality		
1.	A sense of security	When cyclists feel unsafe, the full potential of cycling as a mode of transport cannot be recognised. Campaigns and education are important mechanisms to increase a sense of security by encouraging new or infrequent cyclists.
2.	Safety	A critical mass of cyclists decreases accident risk because motorists become more aware of cyclists. Providing cyclists with their own space on the road increases the safety of cycling, but it is important to focus on the design at intersections where cars and cyclists meet.
3.	Travelling speed	Cyclist speed is a critical element in ensuring the competitiveness of the bicycle over the car. Cycle tracks are an important component for increasing cycling speeds. Other mechanisms, such as allowing two-way bicycling down one-way streets, and developing a network of green routes where cyclists will have priority, promote increased travelling speed.
4.	Health	Promoting daily exercise has societal benefits. Studies have found that the exercise from cycling for a half hour daily increases mean life expectancy by one to two years.
5.	Experiencing the city and its life	On a bicycle, a person directly connects with the seasons and the city. Initially, bicycle infrastructure was added to main shopping streets because it gave the cyclist a sense of the urban life and made shopping easier on the way home from work. Recreational cycling on green routes now provides Copenhageners with an alternative.
6.	Comfort	Cycle track and street surfaces must be even in order to create a pleasant cycling experience. Cleaning and maintenance are vitally important to maintain and increase the number of cyclists.
		(Nelson & Scholar, 2007, p. 14)

The policy developed a further nine focus areas, which are each given direct funding by the City to produce detailed plans. The nine focus areas develop strategies that assist in achieving the abovementioned transport quality goals. The Bicycle Account measured the progress and success in the nine focus areas. The focus areas were designed to be realistic and measurable (see Table 5 below for details on the nine focus areas).

Table 5: Focus areas of the Cycle Policy 2002-2012

1. Cycle Tracks and Reinforced Cycle Lanes	A Cycle Track Priority Plan has been established in order to finish the cycle track network in the City of Copenhagen. Painted cycle lanes can be used as a temporary measure, and places that form link-ups in the network or carry a high level of bicycle traffic will be prioritised. Cycle track width will be 2.5m.
2. Green Cycle Routes	The network will total 110km when complete, with 21 routes ranging between 2 and 8km. They will incorporate separate pedestrian and cycle paths. Green routes will be for recreation and commuting. The development of commuter routes will be prioritised, particularly if they offer short cuts through the city or provide links with areas not currently connected by the existing bicycle network.
3. Improved Cycling Conditions in the City Centre	Efforts, such as removing one-way restrictions for cyclists, establishing 40km/hour speed zones, and developing cycling link-ups, are important elements to create better cycling conditions in inner Copenhagen.
4. Bicycle Parking	A plan for bicycle parking will be developed in order to determine the need for more parking facilities in the city. Regulations are needed to ensure adequate bicycle parking for new developments.
5. Improved Signal Intersections	A cycle path until 20-30 meters before intersections, then a narrow cycle lane up to the pedestrian crossing so that cars leave room for cyclists. This will also allow for cyclists to have an advanced stop line which, along with blue-marked crossings, will improve the safety at intersections.
6. Combined Cycling and Public Transport	Public transit and bicycles, together, provide a viable alternative to private cars. Allowing bicycles on trains are of vital importance, as 5 000 cyclists bring a bicycle on board trains each day. Additionally, secure bicycle parking at train stations is important so that people feel safe riding to the station and leaving their bicycle. A repair and rental shop is located next to the parking, which provides surveillance, as well as a place to service your bicycle.
7. Better Cycle Track Maintenance	Maintenance for cycle tracks has the same standard as intersection maintenance. Approximately €1 million is spent on cycle infrastructure maintenance each year in Copenhagen.
8. Better Cycle Track Cleaning	Cycle routes have the same priority as major roads. Daily cleaning, especially along shopping streets, is essential. During the weekends, when there is no street cleaning, garbage is present on the tracks.
9. Campaigns and Information	Campaigns are inexpensive and can be effective at promoting cycling. There are three main types of campaigns: raising public awareness, targeting specific groups, and targeting individuals and households.
	(Nelson & Scholar, 2007, pp. 17-19)

These focus areas complement the already existing infrastructure; it confirms the commitment of the City and the seriousness given to cycling as a mode of transport in the city. Providing for the right of

people is an ongoing process, and policy needs to constantly adapt, change and develop in such a way that it continues to improve the lives of citizens.

2.4.2.4 Cycling Infrastructure in Copenhagen

Policy and frameworks are arguably the most important step in addressing the rights of cyclists. Following from this is the action, the implementation that brings the policy and plans to life. Overall, the provision of cycle paths serve the needs of cyclists very well, and are usually the backbone of the cycle network in Danish cities (Krag, 2002, p. 226). Amongst city planners and citizens, they are believed to be a precondition for cycling (Krag, 2002).

Figure 3: A typical Danish cycle track. Source: Krag (2002)

A typical Danish urban cycle track is situated between the roadside and the pavement and is separated from both by a kerb difference in level of ten to fifteen centimetres (Krag, 2002) (Figure 3). Prior to arrival of vehicles, cycle paths were developed to increase the comfort of cycling, as normal street surface consisted of cobble stone. However, with the arrival of the car, cycle tracks became necessary as planners needed to make way for cars to go faster. This changed in the 1950s when the main reason for cycle paths was to provide safe cycling conditions for cyclists. In the early 2000s, planners started to integrate cars and bicycles, meaning that where car speeds were kept at a moderate level, the road was shared, but where car speeds were higher, there was separation with cyclists (Krag, 2002). In Copenhagen, the busier urban streets have cycle paths; the rest of the network is low order residential and rural streets which do not require cycle tracks (Krag, 2002). According to the City, in order to develop a successful cycle network in Copenhagen, the route must be accessible and coherent, direct and easy, safe and secure, comfortable and attractive, and self-explanatory in design (Nelson & Scholar, 2007).

- A route which is accessible and coherent should not be more that 800m apart from other routes, it must link major destinations and must travel along main streets.
- A direct and easy route is easy to navigate and follow. The position of the lane must be constant in relation to cars and pedestrians.
- Safety and security relates to vehicle speeds: this is used to determine whether or not it is necessary to provide separate cycle facilities.
- A self-explanatory design helps the cyclist to form a mental map of the network: this happens when there is unity and when cycle tracks follow major and direct routes.
- Comfortable and attractive cycle lanes make cyclists more confident as they are able to enjoy the ride.

(Nelson & Scholar, 2007)

Once cycle paths are provided along main roads, the main safety areas for cyclists are intersections and side roads. General traffic rules in Danish cities treat cyclists like all other vehicles, meaning that cyclists and cars on lower priority roads give way to cars and cyclists on higher priority roads. Also, a cyclist going straight ahead at an intersection is given priority over turning vehicles and cyclists. Besides these rules of the road, there are a number of different strategies that have been put in place to ensure safety at intersections: these include advanced stops for cyclists, cycling signals at traffic lights, and marked crossings. The safety problem is, therefore, most often associated with motorists failing to watch out for and/or give way to cyclists (Krag, 2002, p. 227).

The City also developed general road rules which are recognised by the law. While the rules apply mostly to cyclists, such as using hand signals when turning or having one hand on the handlebars at all times, they relate to all road users and aim to protect cyclists as they fall within the category of vulnerable road users. While some of these have already been mentioned, other important rules are – children over 5 cannot be a passenger, lights must be used at night, and cyclists cannot ride on pedestrian-only streets or on sidewalks. While it is true that a cyclist's visibility increases as the number of cyclists increase, cyclists first need to feel safe in order for the numbers to increase. An important lesson from Danish cities is that it is very important to give all types of road users the best possible opportunities to watch out for each other (Krag, 2002, p. 227). It has been proven in Copenhagen, and other cycling cities, that an increase in the number of cyclists improves road safety, as it has proven to decrease the number of road accidents (Krag, 2002).

2.4.2.5 Cycling promotion in Copenhagen

Copenhagen transportation planners are effective in promoting cycling through dual techniques (Nelson & Scholar, 2007, p. 12). They have found that hard policies, such as developing new cycling infrastructure, have the greatest impact when combined with soft policies, such as campaigns and education (Nelson & Scholar, 2007). It is important that the two complement each other; this will lead to the best possible outcomes. Developing cycle lanes does not lead to people cycling; it is unlikely that they will cycle if they do not know how to ride a bicycle, or if they do not know what a cycle lane is.

A good example for hard and soft policies in Copenhagen is the Copenhagen City Bike project. The idea of the project is to have a fleet of public bikes which can be used by anyone through a small deposit (Krag, 2002, p. 233). The bikes and associated maintenance is paid for through advertisement campaigns on the bikes and bike racks (soft policies). The project received much support and generated lots of enthusiasm since its launch in 1989 (Krag, 2002). The municipality supplied the project with bike racks, as well as the required space (by removing car parking spots) for the project at no cost (hard policies) (Krag, 2002). The project began with 700 bicycles and 120 bike racks, and ten years later, this number increased to over 2 000 bicycles (Nelson & Scholar, 2007).

Private companies got involved by buying a City Bike and promoting their companies with bright advertising, thus giving the bikes a unique look and discouraging theft (Nelson & Scholar, 2007). Studies have shown that the bikes are used for short trips (5 to 10 minutes) and are used primarily by tourists and young men. While many bikes are left elsewhere besides the racks, and the bikes add virtually

nothing to the traffic in Copenhagen, the positive publicity has been limitless, and the idea has inspired several other cities to start similar projects (Krag, 2002).

2.4.2.6 Cycling Misconceptions in Copenhagen

Many cities complain that cycling is for the poor and the promotion of cycling can have a detrimental impact on the economy. Additionally, City's complain that there are more important transport issues that require finances, and investing in cycling will not assist the City in any way. Copenhagen has proven that all of this is not true; investing in cycling has increased the economy of the City, and it is cheaper to develop in comparison to any other mode of transport. Copenhagen does not struggle economically due to the reduced dependence on cars. In fact, it is wealthier; families and professionals choose to live in the city instead of the suburbs, even though some of them may work in the suburbs (Nelson & Scholar, 2007).

In wealthy cities, cycling is seen as an active additional choice which can easily change. Copenhagen, as well as Denmark, has managed to overcome this barrier by making cycling safe, easy and more attractive than other modes. Today, most Danes associate cycling with positive values such as freedom and health and, more recently, it has become a symbol of personal energy. The bicycle has become ultramodern again, aided by social development, successful political initiatives and conscious marketing (Ruby, 2012).

2.4.3 Promoting Cyclist's Rights in Amsterdam

2.4.3.1 Background

When mention is made regarding an alternative to private vehicles, public transport is always at the top of the list. While public transport is a viable alternative, it is also the most expensive to plan and develop. More recently, increased attention has been given to cycling, due to the realisation that cycling is the most viable solution for many of the transport issues facing cities today. One of the reasons for this realisation is, undoubtedly, due to the experience of Amsterdam (Welleman & Fietsberaad, 2002).

The history of Amsterdam is similar to that of Copenhagen, in that there was a stage in which the bicycle was on its way out. In the 1940's, there were around four million bicycles and 100 000 cars in the Netherlands. Following the Second World War, the car became the primary focus for policy makers, and cycling dropped from an 85% mode share in the 1940's to a low 25% in the 1970's (Wooldridge, 2014). What kept cycling in the city was the fact that cycling was, and remained to be, a recognised legal mode of transport; a mode of transport that also uses and makes use of public space. It was due to the fact that policy makers, planners, and ordinary citizens recognised cycling as a legal mode of transport and understood that cyclists, like other road users, belong in public space, that cycling did not disappear completely from the city. As such, the policy shift in the 1960s may have been pro-car, but it was not anti-bicycle, as it was in many other cities across the world. According to Fietsberaad (2010), the reason for high levels of cycling, in Amsterdam today, is due to it being a part of traffic policy at such an early stage.

In the 1970s the car monster started to bite its own tail (Welleman & Fietsberaad, 2002, p. 195): the city and the people started to see the impact of the car in the city and in their own lives; impacts such as, historic buildings being demolished for freeways, the rising death toll from road crashes, the significant

spikes in oil prices, and fuel shortages (Wooldridge, 2014; Welleman & Fietsberaad, 2002). All of these factors created a ground for demonstrations where people demanded the bicycle be brought back (see Figure 4). This led to the development of the Peoples Transport Plan 1976 to 1980 which included funding for cycling, demonstration and pilot projects, and extensive studies into the advantages and competitiveness of cycling over private vehicles (Wooldridge, 2014).

Figure 4: Demonstration by cyclists in the 1970s. Source: Wooldridge (2014)

Following this, in the 1990s, the government developed a new transport policy which included its first Bicycle Master Plan. The Dutch Cyclists' Union was formed to ensure the implementation of this plan; it was the active involvement of the union which made the plan become a reality. The master plan consists of three main elements. The first element is 'creating the right conditions': this refers to the municipality subsidising municipalities and provinces up to 50% for any construction or upgrades to cycling infrastructure. The second element is 'developing arguments and instruments' and refers to the research, pilot and model projects that are continuously carried out in an effort to develop knowledge, arguments and instruments to convince policy makers, interest groups, and governments to cooperate and implement cycling measures. The third element is 'promoting bicycle use' which focuses on informing and influencing associations concerned with the implementation of cycling policy (Welleman & Fietsberaad, 2002). These elements mobilised the City and its partners around cycling, making it a common goal and one of shared interest. These measures are important in creating support for cycling and for cycling related projects, because once the support structures are in place it is easier to move forward.

2.4.3.2 Amsterdam Today

Due to the efforts of the union and the local municipality in Amsterdam, it is found that, in the city centre, cycling levels today are at a traffic dominating 62%, higher than any other mode of transport. In the old town, cycling has a modal share of 48% and the broader city has a level of 38% (LCC, 2011). Most

interestingly, in the past 15 years, cycling volumes have increased by 40%, while public transport and private car mode share has dropped. The city centre of Amsterdam has a 7km radius, which is a reasonable cycling distance, and the greater region has a 40km radius. There are over 400kms of separated cycle lanes and over 225 000 cycling parking spaces. With such a strong focus on cycling, bike ownership is high, even higher than car ownership (LCC, 2011; Wooldridge, 2014). Adding onto this, it is the affluent that cycle more than the poor in Amsterdam. It seems the poorer population see the car as an important status symbol, and they see the bicycle as a poor man's vehicle. The affluent, on the other hand, find the bicycle to be fast, healthy and a convenient means of transportation without any stigma attached to it (Buehler, 2010, p. 36).

2.4.3.3 Cycling Strategies in Amsterdam

In the Netherlands, bicycle policy is considered important at every level of government and, more important, government departments are requirement to work towards a common goal. The role of national government is merely a supporting one; there is a national policy on space and mobility which sets the direction for the national plans. These plans set out frameworks, and municipalities translate these policies and frameworks into their own plans. The state is there to deal with issues which require a national approach (Ministry of Transport, 2009).

In 2009, the state released a Mobility Memorandum which contains an agreement stating the following: "All authorities will stimulate walking and the use of the bicycle as the main means of transportation and as a link in the journey chain from door to door. Municipalities, water boards, provinces and city areas will do this, amongst other things, by ensuring a bicycle network which complies with the main traffic requirements of cohesion, directness, attractiveness, safety and comfort. The authorities will also ensure parking facilities for cyclists' which meet their demands in terms of quality, quantity and location" (Ministry of Transport, 2009, p. 35). These statements set a common direction for all municipalities in the Netherlands and, as such, it establishes the position of national government, with regard to cycling, as a viable mode of transport, and the rights of cyclists in the cities. Amsterdam has shown that the supporting role of the state is an important tool in guiding the direction for cities and, as such, it is important that the state recognises the rights of those within the cities.

At a local level, each municipality is responsible for implementing its own policy. Municipalities are responsible for the majority of the facilities used by cyclists; this includes cycling paths, and also bicycle facilities at shops and schools (Ministry of Transport, 2009). The overall responsibility for promoting bicycle use in Amsterdam falls under the *Dienst Infrastuctuur Verkeer en Vervoer* (DIVV) (Department of Infrastructure Traffic and Transport). The DIVV advises, coordinates and harmonises the bicycle policy with city areas and other relevant municipal organs and organisations (Ministry of Transport, 2009, p. 31). The DIVV ensures that different organs of state are working together to guarantee the safety and comfort of cyclists, thereby highlighting the priority of cyclists within the urban space. It is clear from the Netherlands that good bicycle policy, and the implementation of such policy, works in creating a safe, enjoyable and relaxing cycling environment (Ministry of Transport, 2009)

As mentioned in the Mobility Memorandum, there are five main requirements for bicycle-friendly infrastructure in Amsterdam (see Table 6). All proposed plans and designs are weighted against these

basic requirements. These requirements relate mainly to the development and planning of cycle lanes; they are the backbone for cycling in cities. Cyclists require directness, space, and protection, and if cities are to increase the number of cyclists, then cycle paths must be attractive, more direct, and easy to navigate (Ministry of Transport, 2009). These requirements are simple and straightforward, and the impact they have can be seen across Amsterdam today.

Table 6: Bicycle-Friendly Infrastructure

1.	Safety	Routes are mixed, if possible, and separate if necessary
2.	Direct	Short and rapid routes from origin to destination, no unnecessary detours
3.	Comfortable	Good surface, generous space and little hindrance from other traffic participants; protection against weather
4.	Attractive	An attractive and socially safe environment, without smell or noise inconvenience
5.	Cohesion	Logical and cohesive routes, ease of way finding, choice of routes
		(Ministry of Transport, 2009, p. 57; LCC, 2011)

In 2017, the Netherlands released the Bicycle Agenda 2017-2020. The document was compiled by a coalition of governments, companies, civil society organisations, research institutes, and associations, all of whom are involved in bicycle policy development and promotion within the Netherlands. The aim of the agenda is to increase bicycle use by giving more priority to bicycle policy, by obtaining opportunities, and by removing obstacles (Tour de Force, 2017). The agenda acknowledges how far cities in the Netherlands have gone to promote cycling, and identifies a number of goals which can contribute to the increase in the number of kilometres cycled in cities across the Netherlands. Amongst these goals, the agenda listed 'more room for bicycles' as the demand for space by cyclists currently outweighs the supply. Cyclists are now cycling even though the infrastructure is limited; the numbers continue to grow yearly (Tour de Force, 2017). The agenda also acknowledges the need for more direct cycling routes, the need to optimise the transition between transport modes, cycling promotion, and education. The agenda acknowledges the need for cycling and public transport to be linked, in order to increase the distance that a cyclist can cover comfortably (Tour de Force, 2017).

While the agenda focuses largely on improving existing infrastructure and meeting the increased demand for parking and space in the city, there are still valuable lessons to be learnt for cities that do not have any infrastructure. The agenda refers to boosting the quality on busy and important routes by making them more direct, safe, and comfortable: these are routes used mainly by students and workers. Cycle routes and networks should be focused around where students and workers travel, as the spaces surrounding these places are generally where most commuting occurs. The agenda also makes note of public transport integration, explaining that the transition between different modes must be optimised (Tour de Force, 2017). The policy, therefore, recognises that the bicycle does have its limits; most significantly when it comes to distance, however, if the transition from bicycle to train or bicycle to bus is optimised, then the bicycle stands a better chance against the car. Lastly, the agenda gives attention to the need for cycling promotion and education/knowledge sharing. It explains that if more people know about cycling, the benefits of cycling, and if they can be convinced that cycling is cool, they might

be more willing to cycle. However, a large proportion of people do not cycle because they are scared or because they do not know how to cycle and, therefore, require the necessary education (Tour de Force, 2017).

There is no doubt that infrastructure is the backbone of cycling in cities, however, there are many other supporting factors that are just as important as the cycle lanes and cycle network. For the Dutch, nearness and compact cities are as important for cyclists as the infrastructure. The closer people live to their destinations (work, school, shops, and stations) the more likely they are to make short trips, thereby promoting walking and cycling. It is for this reason that all new residential areas are built within 3kms of town centres, due to the fact that at shorter distances the bicycle has an advantage over other modes of transport (LCC, 2011). It is interesting that even though city planning is not directly responsible for cycling, land use planners and spatial planners are also promoting cycling through the layout of the city. This is only possible due to the fact that all departments share a common goal, as set out by the state and through the emerging bicycle policy. That is why it is important that all relevant departments are aware of policy and city programmes, and that all projects are carried out in an inclusive and integral manner.

Due to the layout of the city, half of the population that work within Amsterdam live within a 7.5km radius of the city centre, 45% of whom already opt to use the bicycle over the car for their daily commute (Ministry of Transport, 2009). This shows that bicycle policy is only one arm in the process of promoting cycling in cities. In some cases, bicycle policy might even be one of the smaller arms in the larger policy cycle of spatial planning, urban development, and public transport policy. Therefore, it is extremely important that in this larger cycle, equal attention is given to cycling, and to the rights of cyclists (Welleman & Fietsberaad, 2002).

In allowing the bicycle to compete with cars, the inner city of Amsterdam reduced road capacity to make it harder for people to drive in congested areas (Wooldridge, 2014). In certain streets, lanes have been removed, or two way streets were converted to one way streets. This has been well received and the results have been positive. This is due to the fact that the city focused on making it easier for people. They developed in higher densities so that travel distances become shorter, and they provided the necessary cycling and public transport infrastructure (Wooldridge, 2014). The reduction of vehicle space does not refer to the complete removal of vehicles; rather, it is to reduce car dominance and to provide equal rights for all road users.

2.4.3.4 Cycling Infrastructure in Amsterdam

In Amsterdam, bicycle lanes have a legal status and are symbolised by a difference in colour and with the bicycle symbol. Cars may not stop or park in these lanes (Ministry of Transport, 2009). There are different types of cycle lanes in the Netherlands, and these are dependent on road classifications. Most roads in the city centre are ‘traffic arteries’ and have a maximum speed of 50km/h. These traffic arteries must have designated bicycle lanes. In residential areas, streets have a maximum speed of 30km/h and they do not require separate lanes. Thus, while cycle lanes may not always be segregated, through the different road classification, there exists a complete cycling network that cyclists can rely on. There are

no dead ends, no steps, or dismounts, every junction and every pathway has been designed with cycling in mind (LCC, 2011).

Cycle tracks are generally 2 meters wide, designed for side by side cycling or overtaking. They are mostly located on the inside of parked cars (LCC, 2011). When it comes to intersections, there have been a number of developments around the safety of cyclists at intersections: these include separate indicators at traffic lights, detection sensors at a distance to register the cyclists in advance, simultaneous green lights for cyclists in all directions, and a display timer, giving cyclists an indication of how long they need to wait (Ministry of Transport, 2009). However, with all this in place, intersections still pose a major danger for cyclists. For this reason, many transport planners are looking at alternatives, such as the traffic circle (Ministry of Transport, 2009).

Another important aspect in cycling infrastructure is safe and secure cycling parking. Cyclists, like drivers, want to park as close to their destination, and want to park where it is safe. In Amsterdam, it has become evident that once you have the necessary cycle paths, having safe parking close to destinations is the most influential factor for cyclists (Ministry of Transport, 2009).

2.4.3.5 Cycling Promotion in Amsterdam

From the experience of the Netherlands, encouraging bicycle use for shorter distances, and in peak hour, requires the involvement of municipalities and the private sector. While cycle paths and networks remain to be the most important encouraging factor, cycling can be further encouraged by companies themselves, through promotional campaigns. For instance, certain companies provide employees, who live within cycling distance, with free company bikes, while other companies compensate those who ride to work (Ministry of Transport, 2009).

A bike rental scheme is another important strategy to get more people cycling. In the Netherlands, the OV-fiets (public transport bicycle) fills a very important gap – the last mile. Due to the availability of OV-fiets at public transport stations, the usage of the public train increased by 35%, and a further 12% of commuters leave their cars at home (Ministry of Transport, 2009). This integration of bicycles and public transport has proven to provide the strongest alternative to private cars (Dekoster & Schollaert, 1999). Of all train users in Amsterdam, 42% arrive at stations by bike, and 14% continue their journey by bike (Wooldridge, 2014). This trickles down to spatial planning, as well as transport planning, which ensures that 45% of all Dutch people live no more than 3km from a station (Ministry of Transport, 2009, p. 49).

Like those in the working environment, school children also have a right to cycle. Education, information and enforcement play a supplementary role in Dutch cycling policy (Ministry of Transport, 2009). The Netherlands pays much attention to children riding to school. In primary school, around 49% cycle, 37% walk, and 14% are dropped off and picked up by car (Ministry of Transport, 2009). Traffic education forms part of the curriculum in primary school - students focus on traffic regulation and rules of conduct for cyclists. To ensure that all children have an equal experience, the municipality makes bicycles available to the schools (Ministry of Transport, 2009). At age 11, these children undertake a written and practical exam that includes an observed ride on local roads (LCC, 2011, p. 6). Policies around schools

aim to concentrate cycle routes in the vicinity of the school, due mainly to the fact that most students live very close to school (Ministry of Transport, 2009).

2.4.3.6 Cycling Misconceptions in Amsterdam

Cyclists, like pedestrians, are amongst the most vulnerable of road users. In the Netherlands, however, the safety of cyclists has been improving steadily over the past few years. Even more interesting, is that this has been concurrent with the increase in both car and bicycle usage. Since 1980, the annual number of road accidents has halved, both in terms of cyclists and cars. Statistically, the increase in cars and bicycles translates to an increase in potential confrontations between the two; however, this has been the opposite in the Netherlands. Based on the graph (Figure 5), in countries with higher bicycle usage, the risk of cyclists being injured in a traffic accident is lower than in countries with fewer cyclists (Ministry of Transport, 2009). There are a number of reasons for this, relating to the conduct of road users based on the number of cyclists and the attention that planning pays to cyclists safety. Due to the increase in cycling, planning policy pays more attention to cycling, thereby increasing the amount of time and money invested in creating a safer cycling environment (Ministry of Transport, 2009).

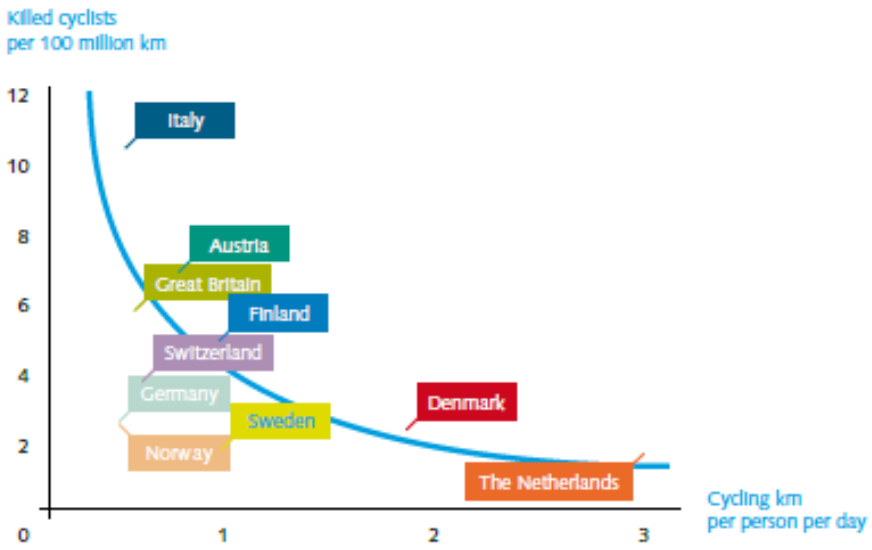


Figure 5: Relationship between accidents and bike usage (Ministry of Transport, 2009)

In many countries, cyclists are seen to be the danger, which ends up producing anti-cycling policy. However, in the Netherlands, the philosophy is the opposite - cyclists are not dangerous, drivers are, so car drivers take the responsibility for avoiding collisions with cyclists (Ministry of Transport, 2009, p. 19).

Another misconception around cycling is the negative impact cyclists have on the retail market. It is often perceived that vehicle access to retail spaces is important for shopkeepers. However, this is not the case, as has been proven in the Netherlands. While cyclists do spend less per visit, they do come more often to spend. Thus, the amount spent over time is actually greater than the amount spent by a single car visit (Ministry of Transport, 2009).

2.4.4 Promoting Cyclist's Rights in Rotterdam

2.4.4.1 Cycling in Rotterdam – History, Strategies and Infrastructure

Rotterdam is the second largest city (by population) in the Netherlands; however, it is the largest in size, and has a cycle mode share of 22%. This, when compared to the rest of the Netherlands, is relatively low. During the Second World War, Rotterdam was destroyed to such an extent that there were only two buildings left standing. As a result, following the war, the city had to be rebuilt (LCC, 2011; Wooldridge, 2014). The city planners rebuilt the city after the example of American cities, which was based on the demands of fast moving traffic, with multi-lane city boulevards and high rise buildings, which were unknown in any of the neighbouring Dutch cities (Hembrow, 2011). Rotterdam also has the most established metro system, compared to any other Dutch city, which may be due to the influence of American planning methods (LCC, 2011).

Nonetheless, like other cities in the Netherlands, Rotterdam eventually set itself on a path to promote non-motorised transport. In fact, in the early 1950s, Rotterdam developed its main shopping area around the world's first fully pedestrianised street, which eventually became an example for car-free shopping streets around the world. Towards the late 1950's, all new wide streets included separated cycling infrastructure (Hembrow, 2011). Also, the city of Rotterdam is divided by a river, and all crossings into the city have separated cycle paths. New tracks are 2.5m for one-way lanes and 3.5m for two-way lanes. The widest cycle track is a 4m two-way cycle track which is along the harbour, and runs along the waterside (LCC, 2011).

The city is well known for its port, which is the busiest in Europe (Hembrow, 2011). Due to the port, and the fact that Rotterdam is an industrial city, one third of all air pollution is from traffic. As a result, many people around the port and highways suffer from traffic-related health problems. More recently, the maximum speed on most highways was dropped from 120km/h to 80km/h which resulted in a drop in air and noise pollution (Godefrooij, et al., 2009).

Around 2007, the City of Rotterdam developed a five year cycling policy and action plan. While there was a lot of cycling infrastructure, the City was still not happy with the low rate of cycling. An investigation into the matter showed that many people were not cycling due to the fact that the city had exceptionally good public transport systems, and there was a general low interest in cycling. Also, the cycling network itself was not well connected and in line with other Dutch cities, and there was a lack of bike parking facilities (Hembrow, 2011). Like car users, cyclists are interested in convenience; if it is not convenient to use the bicycle, they will use that which is more convenient to them.

Like the Bicycle Account in Copenhagen, Rotterdam cyclists were asked how cycling can be improved, and the new cycling policies, aimed to address the issues, were raised. This is illustrative of the fact that the city should work for all of its citizens. In the case of Rotterdam, the policy aims to make cycling more attractive by making cycle routes safer and faster. It also increased parking facilities around the city and developed campaigns targeting specific user groups. The policy led to an increase in cycling from 2007 to 2011, which was apparent in the streets of Rotterdam (Hembrow, 2011).

Following this, many new plans and strategies were put in place to increase cycling mode share. Due to most of them being in Dutch, they cannot be discussed in detail. However, some of the measures and strategies put in place included the removal of cars in the inner city streets, a new station compound with 5 000 bicycle parking spaces, cycling underpasses bypassing all major highways, and the introduction of the OV-fiets cycle hire programme, which is also available in Amsterdam (LCC, 2011; Wooldridge, 2014; Hull & O'Hollleran, 2014). Additionally, on the outskirts of the city, there are a number of recreational cycling routes. These are funded from a separate budget to the urban cycle routes but are fully integrated into the rest of the cycling network. Due to these efforts, cycling in the city has increased, and so has the use of the public transport systems. Almost 40% of all train users use a bike at one or both ends of their trip (LCC, 2011).

The impact of strong national policy can be seen when comparing Rotterdam and Amsterdam. Even though there may be significant differences in the history or the layout of the cities, they are both heading in a similar direction, when it comes to the promotion of NMT as an alternative mode of transport.

2.4.5 Promoting Cyclist's Rights in Frankfurt

2.4.5.1 Cycling in Frankfurt– History, Strategies and Infrastructure

While cycling may be more popular in the Netherlands and in Denmark, it was in Germany in 1817 that the bicycle was first invented. The Germans had always been interested in new ideas and new ways of travelling and, as such, the focus soon shifted from bicycles to trains, and soon after to automobiles. However, when the first bicycle boom started in the 1860's, Germany, along with the Netherlands, was one of the first countries to embrace the cycling culture (Wilson, 2004).

Frankfurt is the largest city in the German state of Hesse and is situated along the River Main. In the mid-19th century it was the capital of Germany, and was an important industrial city. As such, it was a prime target during World War II. Due to the extensive damage to the city during the war, the city was largely rebuilt following the end of the war. As such, much like Rotterdam, Frankfurt was built in the image of the modern American city (History.com, 2009). The car reigned supreme and still does; however, recently there has been a political shift towards the promotion of cycling as an alternative to the car.

In 2002, the Federal Government developed a ten year National Cycling Plan which created a framework for all cities to promote and improve cycling conditions. As such, the Federal Government sets the Frameworks for states and municipalities, they provide funding opportunities in support of cycling projects, and they establish the road traffic laws for the country. On a local scale, transport planning is divided between three main departments; these are the Department of Urban Planning, Civil Engineering, and Regulatory Agencies. The Civil Engineers deal with the infrastructure and the Urban Planners are left to design an integrated transport network, inclusive of information systems, bicycle rentals, a complete cycling network, and integration with other forms of transport. Both these departments are required to work together and that is ensured by the Regulatory Agency (Bautz, 2011).

Even if National Policy does set a framework which requires local authorities to promote cycling as one of their objectives, it did not happen due to the fact that cycling planning is not a compulsory task. As such, city planners often overlooked the need for bicycle planning. This was the case in many German cities, until a number of cities, including Frankfurt, appointed a 'cycling coordinator'. The appointment of such a person meant that cycling would always be on the agenda. The cycling coordinator has many tasks, the most important of which is to support the strategic planning and implementation of cycling projects (Bautz, 2011). The coordinator is also the 'go to' person for any cycling related issues, for officials and for the general public. He/she is in charge of promoting and enforcing bicycle safety, representing the interests of the cycling community, and ensuring that cycling-related issues are not excluded from the planning process (see Table 7) (Bautz, 2011).

Table 7: Cycling Coordinator

Job description and responsibilities of the cycling coordinator:

- Conduct public outreach activities like cycling campaigns
- Strengthen relationship with City and State Governments, as well as individual businesses
- Represent cyclists' interests in cities
- Create new ideas or concepts for environment, air quality and economic development issues related to cycling
- Support in the fields of education, safety and security of cyclists and other road users
- Support to increase the number of people who walk or ride bicycles
- Promote the co-benefits of cycling for the urban transport system
- Develop print and media information, providing important news and information for pedestrians and cyclists
- Plan and promote cycling related events, conferences and workshops
- Propose and design bike routes, bike lanes and bike paths
- Plan for repairing damaged roads and sidewalks, creating sites for parking bicycles
- Suggest regulation or traffic rules, such as speed limits or new stop sign (in order to ensure the safety of pedestrians and cyclists)
- Act as a link between City and State law-makers and to propose necessary legislation that will support the needs of pedestrians and cyclists and the goals of the cycling programme.

(Bautz, 2011, p. 8)

In addition to the cycling coordinator, in 2009, Frankfurt established a Cycling Office. The office became a central contact point for all matters relating to cycling, and became the voice of cyclists within the City. As such, the cycling office is centrally located within the Road Traffic Department (Bautz, 2011). The cycling office is established on the following principles: to increase the attractiveness of cycling, to increase cycling mode share in Frankfurt, for cycling to become a form of mobility that imprints the

urban life, to increase the integration of cycling and public transport, and to improve road conditions for cyclists (Bautz, 2011).

The cycling coordinator and the cycling office was a significant step for Frankfurt. It created a direct contact for citizens, opening up a communication line between the city and its citizens. For Frankfurt, the best way to promote cycling was by ensuring that cyclists are satisfied and, by 2011, Frankfurt reached a cycling mode share of 13%. These soft policies went a long way to ensuring that the rights of cyclists are always on the cities agenda (Bautz, 2011).

Today, Frankfurt is an economic hub and is one of the cities in Germany with the highest population, partly due to the amount of commuters moving in and out of the city every day (Valerie, 2016). The city streets cannot handle the number of vehicles, nor can the parking lots and other transport amenities. The city is doing a significant amount to increase public transport usage and cycling, and to integrate the two modes as well. For instance, bicycles are allowed for free on buses and trains during peak hour (depending on available space), and there are 221 bike-and-ride stations (Valerie, 2016).

In Germany, cities like Berlin, Munich, and Hamburg are amongst the most cycle friendly cities. Frankfurt is a lot lower down in the hierarchy; this may be due to the late start in planning for cycling and the modern city layout, due to the devastation caused by the war. However, it is clear that the city is moving in the right direction. There is a clear link between the strategies and policies implemented in Frankfurt, and those implemented in Copenhagen, Amsterdam and Rotterdam. It is for this reason that certain strategies were not explained in detail as they were explained in the cities before.

2.4.6 Promoting Cyclist's Rights in Rio de Janeiro

2.4.6.1 Cycling in Rio de Janeiro – History, Strategies and Infrastructure

Like most developing cities, Rio de Janeiro is a city with high levels of inequality. There is a growing gap between the wealthy and the poor, and there is widespread poverty across the city. The history of vehicles is much like other cities wherein, in the 1950's, the building of roads became a criterion for progress. Buses replaced trains, trams were phased out and the car industry was developed. During this time, public investment neglected the bicycle, even though there were many who cycled. As such, the city continued to prioritise motorised transport over NMT movement, until the 1990's. In 1997, the Brazilian traffic legislation listed NMT as a separate section. This was one of the first steps in improving the policy situation concerning bicycles in the entire country. Three notable points in the legislations in favour of cycling were, to make it illegal for cars to drive closer than 1.5 metres to a bicycle, allowing bicycles to share sidewalks with pedestrians wherever it was signalised for them to do so and, most importantly, giving preference to bicycles over motorised transport on roads where there is no bicycle facilities (Batista, 2010).

This needed to be filtered down to the lower spheres of government, wherein it could be actioned. However, the urban planning culture in many Brazilian cities continues to prioritise the car. This culture is justified by the right of people to come and go, in which it is assumed that the car is the only method to achieve this (Batista, 2010). However, the right to come and go does not belong to the vehicle; it belongs to the person, no matter how that person chooses to move. Due to the prioritisation of car by

city planners in Brazilian cities, and in the rest of the developing world, bicycle usage is characterised as a leisure activity, a professional sport, and a transportation mode for the lower income (Batista, 2010).

Rio has been leading in terms of cycling policy and cycling planning in Brazil. Even before the Brazilian Traffic Legislation in 1997, the Rio Municipality established a local planning committee for bicycle-traffic planning in 1992. The committee consisted of municipal secretariats from environment, transport, parks, urbanism, and the planning department, as well as the local NGO (Aichenger & Reinbacher, 2010). By 2004, 140km of bicycle infrastructure was constructed in Rio; however, this network ran mostly along the beaches, benefiting the rich and the recreational riders. A few years later, in 2008, Rio introduced the first Public Bicycle System called SAMBA, comprising of 8 stations and 80 bikes (Brussel & Zuidgeest, 2012; Institute for Transportation and Development Policy, 2016).

Rio has a current population of over 6 million people and is the second largest city in Brazil. It is recognised as one of the most bicycle-friendly cities in Latin America, with a cycling mode share of around 4% (Aichenger & Reinbacher, 2010; Brussel & Zuidgeest, 2012). The planning committee has been committed to making cycling more comfortable for cyclists in Rio. The City now makes provision for cycling in special wagons on trains; there are also around 5 000 bicycle parking spaces available at train stations. Bus-Rapid Transit (BRT) stations also introduced bicycle parking at some of the major stations. The bicycle-sharing scheme was renamed BiciRio and increased its capacity to 60 stations with 600 bikes, and additional cycling paths were developed which increased the cycle network to 450kms (Batista, 2010; Institute for Transportation and Development Policy, 2016).

With regards to strategies, it is without a doubt that cycling became a part of City policy at a much later stage in Rio, as compared to cities in Germany, Netherlands and Denmark. However, in a short space of time, Rio was able to become one of the most cycle-friendly cities in Latin America. This was only achievable through the commitment made by the planning committee, which was appointed in the 1990's. The experience of Rio has shown that the introduction of cycling policies, based on cooperation between the municipality and NGOs, guided the City to develop cycling infrastructure. It raised awareness amongst planners, politicians and the public. Even though there has been improvements and increased concentration in NMT, at a local level, the vehicle remains a priority in the city (Aichenger & Reinbacher, 2010). Through experience and studies, Rio has found that, due to the large size of the city, cycling paths are not, necessarily, the best way to increase cycling in the city. The most effective method in Rio has been to integrate cycling and public transport; this has been done through connecting cycling routes with stations, by providing parking at stations, and by providing public bicycle systems at train and BRT stations (Brussel & Zuidgeest, 2012; Aichenger & Reinbacher, 2010).

2.4.7 Promoting Cyclist's Rights in Bogota

2.4.7.1 Background

Up until the mid-1990's, Bogota is said to have been an incredibly difficult place to live in and was plagued with problems. The city had an extremely high population which was fast approaching 10 million. The city expanded far beyond its borders, it was highly congested, crime was rampant throughout the city, and the quality of life dropped quickly (Bicycle Times, 2012). The city was in a constant traffic jam, there were hardly any public spaces, cars occupied sidewalks, public transport was

chaotic, bicycle usage was extremely dangerous, and the number of cyclists was insignificant (Godefrooij, et al., 2009).

There was a major shift around 1995, when political leaders brought changes to the city of Bogota, and it became the city it is today, a city that people want to live in and are proud of (Godefrooij, et al., 2009). It was mayors Antanas Mockus (1995-1998) and Enrique Penalosa (1998-2001) who had a vision for Bogota, and who were able to drastically change Bogota in just a couple of years. In this period, from 1995 to 2001, hundreds of kilometres of quality sidewalks were built; roads were narrowed, and street crossings were elevated, all in an attempt to promote NMT and to create awareness that NMT users have priority (Godefrooij, et al., 2009).

2.4.7.2 Bogota Today

In Colombia, and in Latin America as a whole, Bogota is at the forefront when it comes to planning for cyclists; they have the largest network of cycle paths. There are a lot more bicycles on the streets and there are more people talking about cycling. While recreational cycling is a big part of cycling, especially due to the Ciclovia, which takes place every Sunday, there is also a change in perspective with regards to cycling as a mode of transport. The reality of the modern motorised transport has impacted the city greatly; main road networks are blocked, traffic jams causing hours of delays, and the environmental impact have become evident (Pattiasina & Pinzon, 2015). The damage caused by motorised transport is evident in most cities across the world. When comparing developing cities to developed cities in Europe, it is clear that this realisation came at a much later stage in the developing world. However, when comparing Bogota to the rest of the developing world, Bogota is at the forefront. This is due to the promotion of cycling through the Ciclovia and the combined interest shown by the citizens and the City administration of Bogota.

The state of cycling is not great, even with the changes in policy and the promotional events. Many people still see cycling as a recreation event, or as a poor man's car. Cars usually do not give way to cyclists, or pedestrians; this is despite the priority given to NMT users in policy. Car users do not acknowledge this shift, and the car remains the king of the road (Pattiasina & Pinzon, 2015).

2.4.7.3 Cycling Infrastructure and Strategies

At a national level, the Columbian Department of National Planning and the Ministry of Transport guide cycling planning (Pattiasina & Pinzon, 2015). While there is a lot of enthusiasm at a national level, through various policy manuals, the implementation at a municipal level is slow, except for certain cities, such as Bogota. Bogota has included cycling in the mobility master plans and has developed specific departments to deal with cycling (Pattiasina & Pinzon, 2015).

One of the oldest strategies in Bogota, to promote NMT in the city, is the Ciclovia, an initiative which started in 1974 and is continuing today. It was started by Columbian born Ortiz Marino who studied Architecture and Design in the United States. Upon returning home, Ortiz was sad to see that the car had taken over the city. He invented the Ciclovia as a way of doing something about that. For Ortiz, the bicycle symbolises "individuality, civil rights, women's rights, urban mobility, simplicity, and environmental consciousness" (Jenkins, 2015). In many ways, Ortiz understands the rights of cyclists to

the city and the Ciclovia is a way to make politicians and citizens understand it as well. This is very similar to the public demonstrations that occurred in Amsterdam and Copenhagen after the car took over the streets.

Ciclovia is now a part of Bogota and takes place every Sunday. Over 120km of main roads are closed off from motor vehicles for seven hours. The street becomes a space wherein over 1.5 million people can enjoy, socialise, and move around freely on bicycles, skateboards, and on foot (Godefrooij, et al., 2015).

With regards to infrastructure, there are over 400kms of cycle lanes in Bogota. This network was planned through the urban master plan and transport strategy. The City developed what they call a CicloRuta system which, at the moment, comprises of three separate cycle route networks. The main network connects the city centre to the most populated residential areas. The second network connects residential areas to parks, attractions, and to the Transmilenio (BRT) stations. The third route is a complementary network that runs along riverbanks and wetlands surrounding the city (Development ASIA, 2016). The bike paths run along major roads; in some instances the sidewalks were widened to accommodate both pedestrians and cyclists. The City built the 'Alameda', a 17km NMT promenade, in a low income neighbourhood which links schools, parks, day-care centres, and libraries. They also built the 'Juan Amarillo' Greenway, a 45km park inclusive of cycle paths, which connects the poorer areas with the more affluent parts of the city (Development ASIA, 2016).

While the development of the cycle lanes sounds very successful, there are still major improvements that need to be done. The cycle lanes on major roads are usually placed on sidewalks or on former car lanes; the sidewalks lead to conflict between cyclists and pedestrians, and the former car lanes are used by cars as parking space. There are many instances when the cycle lane suddenly terminates, leaving cyclists to ride on the road. The same occurs at intersections; the cycle lanes are usually not marked in intersections. The integration of the bicycle network is a priority highlighted by the government and by the users (Pattiasina & Pinzon, 2015). However, while there is still a lot of work to be done, through the implementation of the cycling infrastructure, Bogota managed to increase cycle mode share from 1% to 5% in less than 5 years (Development ASIA, 2016; Godefrooij, et al., 2009).

Efforts have also been made to integrate cycling with the public transport systems, such as the Transmilenio (BRT) system. Bicycle parking is provided at major stations, giving passengers the option of riding to and from stations. Also, a bike share program has been linked to the bus stations, allowing passengers to complete their journey by bike. Both these initiatives have proven to be very successful (Pattiasina & Pinzon, 2015).

While implementing ways to make cycling safer, Bogota also implemented strategies to make vehicle usage more difficult. Firstly, the segregated bus lanes and cycle paths reduced the space for vehicles on the road, creating more congestion for vehicles in an already congested space, and allowing bicycles and buses to pass by freely. Secondly, the City limited car usage during rush hour on weekdays through licence plate restrictions (Development ASIA, 2016).

Bogota recognises the importance of the city and its citizens in promoting cycling as a mode of transport. The development of the CicloRuta and the standardisation of the Ciclovia event every Sunday

and public holiday was no easy achievement for government; it took several City administrators and more than 10 years to get cycling to where it is today. Additionally, even though the Ciclovia may be a government initiative now, it was started by cycling activists, and it helped to bring about many of the pro-bicycle policies that exist in the city today. The Ciclovia also brought about many advocacy groups who, today, assist the City in promoting and implementing cycling friendly strategies, and ensure that cycling remains on the cities agenda (Development ASIA, 2016).

A misconception, which came about when Bogota decided to plan for cyclists, was that most people were of the opinion that the city was too big and distances were too long for cycling. However, after conducting a travel survey, it was found that more than 50% of all trips were less than 7kms, which is a reasonable cycling distance (Godefrooij, et al., 2009).

2.4.8 Key Performance Indicators

The abovementioned cities have been successful in increasing cycling mode share and, as such, it can be deduced that, to some extent, they have managed to improve cyclists' rights to the city. This was done through recognising the need for alternate transport and the benefits of cycling for the city. As such, the objective in these cities is not only to accommodate those who cannot afford a car, or those that already cycle, but it is to promote cycling and make it more efficient and viable than using a vehicle. Table 8 summarises the most important strategies used in these cities, which have already been discussed and presents them as Key Performance Indicators (KPI's).

Table 8: Key performance indicators present in the six precedent cities

Strategy	Cities						Number of cities
	Copenhagen	Amsterdam	Rotterdam	Frankfurt	Rio de Janeiro	Bogota	
Cycling/ NMT Master Plan	✓	✓	✓	✓	✓	✓	6/6
Specific budget for cycling projects	✓	✓	✓	✓	✓	✓	6/6
Government subsidies for cycle projects	✓	✓	✓	✓			4/6
Cycling or NMT office	✓	✓	✓	✓	✓	✓	6/6
Vehicle restrictions in inner city	✓	✓	✓	✓		✓	5/6
Traffic calming	✓	✓	✓	✓		✓	5/6
Vehicle parking fees	✓	✓	✓				3/6
Tax deduction/incentive for cyclists	✓	✓	✓				3/6
Green routes (separate from streets)	✓	✓	✓	✓	✓	✓	6/6
Coherent network of cycle routes	✓	✓	✓			✓	4/6
Dedicated cycle routes	✓	✓	✓	✓	✓	✓	6/6
Direct cycle routes	✓	✓					2/6
Attractive cycle routes	✓	✓	✓	✓	✓	✓	6/6
Integration with public	✓	✓	✓	✓	✓	✓	6/6

transport							
Bicycle rental schemes	✓	✓	✓	✓	✓	✓	6/6
Bicycle parking	✓	✓	✓	✓		✓	5/6
Cycling promotion	✓	✓	✓	✓	✓	✓	6/6
Cycling education	✓	✓	✓				3/6

It is evident, in Table 8 and in the literature, that a lot more has been done in the European cities and there is a much larger pool of literature from these cities as well. This is important for studies such as this research. Table 8 illustrates that the development of cycling in these cities is a result of the commitment to cycling made by the cities. This can only be achieved once cities recognise cyclists' rights to the city, and develop the necessary strategies and plans to implement and promote cycling. The table illustrates that, in order for cities to promote cycling effectively, there are a number of strategies that need to be introduced and implemented. It is a combination of these factors that makes cycling a viable alternative to cars, and it is the combination of these strategies that provides cyclists with access to the city.

2.5 Résumé

The reality of the right to the city is that those with power and dominance, those who build and sustain the city, develop the city more after their own hearts desires. The result of this is that vulnerable groups suffer at the hands of the more powerful. The reality of the right to the city can be seen in the street, wherein the more vulnerable users, being the pedestrians and cyclists, are marginalised by the more powerful users; motorised vehicles. However, the city is meant to be guided by a set of planning tools, and through these tools, planners emphasise the need for City planners to address the needs of the vulnerable users first. Based on this, this chapters illustrates, through the use of examples, how planning can address the needs of vulnerable road users, cyclists, by following the strategies laid out in the various planning tools. These strategies are then listed in Table 8 as key performance indicators, which have successfully proven to address the needs of cyclists and grant cyclists' rights to the city.

The next chapter discusses the research methodologies; this will lead to an evaluation of the cycling projects which have been carried out in the city of Johannesburg. The outcome of the evaluation will be analysed and compared to the key performance indicators used in the six cities at outlined in Table 8. This will be done in order to identify possible gaps in the Johannesburg cycling projects.

3 Research Method

3.1 Introduction/Background to Research Methods

This research looks at planning tools used when planning for cyclists in the city. In this scenario, planning is positioned as the technique: the method for providing cyclists with rights to the city. Similarly, research methods are the tools and techniques used by researchers when carrying out research (Walliman, 2011). This is not a straightforward process; there are a variety of different tools that have been created. This is similar to a toolbox, where it is the researcher who needs to identify which tool/method will get the job done. Research can be carried out in a number of different ways; this is based on the research topic and the research question – is the research investigating, exploring, analysing, understanding, or comparing? Researchers have developed various research methods which make the research process a lot more concise and systematic.

According to Neville (2007, p. 5), the research method refers to the specific tools or way data can be collected and analysed. The research methodology, on the other hand, refers to the overall approach and perspectives to the research process as a whole (Neville, 2007). The research method provides the researcher with ways to collect, sort and analyse the information. If the researcher follows this process and identifies the most suitable research method, then the conclusions and recommendation are more convincing, as the new knowledge that has been created is considered to be soundly based (Walliman, 2011). The rest of this chapter will explain, from a broad analysis, how the research methods used in this research was identified and chosen.

3.2 Flow Diagram of Research Methodologies

The flow diagram (in Figure 6) is a summary of the process that is, the research methodology, used to identify the most suitable research methods. The process begins with the research first identifying the most appropriate research designs for the research – involving both a comparative and an evaluative research design. The research then looked at the different methods of data collection associated with these research designs. It was established that the main source of data collection is qualitative data; however, the research does include quantitative data as well. The qualitative data is both primary and secondary data and includes semi-structured interviews, as well as the analysis of existing material. The quantitative data is only secondary data and includes the analyses of existing statistical data. The primary and secondary data contextualises and outlines the case study, which is Johannesburg. The case study is further analysed through an evaluation and comparison of the primary and secondary data in the context of the case study. The research process is, therefore, inclusive of both a case study research method and an evaluation research method; which is explained further as a case study evaluation research method. The rest of this chapter explains each step of this process in more detail.

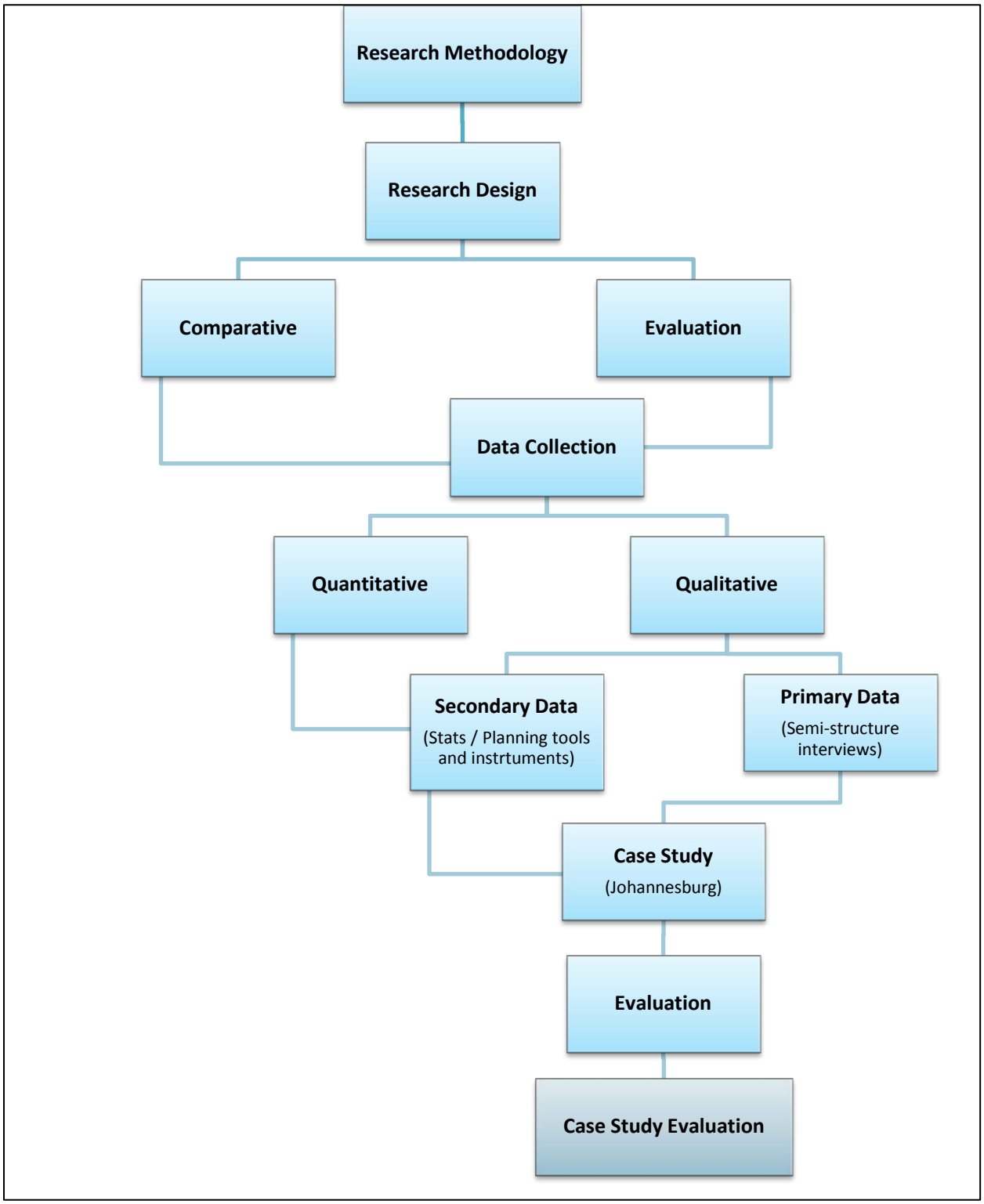


Figure 6: Flow diagram of research methodology

3.3 Research Design

There are a number of different methodologies which have been created for research, all of which are appropriate for the different types of research that can be carried out. The aim of this research is to evaluate transport planning in Johannesburg, in relation to the NMT projects and, to evaluate the success of those projects. The choice of which method to use depends on the nature of the problem that has been identified and the aims and objectives of the research (Walliman, 2011). The problem that has been identified by this research is that cycling in Johannesburg is extremely low for a city wherein the majority of residents cannot afford a car (Stats SA, 2013). From a broad perspective, research can be grouped into the following categories (Table 9), each of which has a range of research methods (Walliman, 2011):

Table 9: Summary of research design approaches

Historical	A systematic and objective evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events. This method makes use of primary historical data, as well as documentary sources of the past.
Descriptive	An examination of a situation in order to establish the norm and to understand what can be expected to happen again, under the same circumstances. It, therefore, uses observation as means of collecting data. The method makes use of interviews, questionnaires, visuals, sounds, and smells. The observations are recorded and written down in order to be analysed.
Correlation	Used to examine the relationship between two concepts. This can either be an influential relationship (where there is some kind of influence of one on the other) or a causal relationship (where one causes changes to occur in the other). The correlation between two concepts can either be none, positive or negative.
Comparative	A comparison between past and present or different parallel situations. The research can look at situations at different scales, macro or micro. An analogy is used to identify similarities in order to predict results. As such, this design is used to explore and test what conditions were necessary to cause certain events.
Experimental	An attempt to isolate and control every relevant condition, which determines the events investigated, and then observes the effects when the conditions are manipulated. Usually, this requires a hypothesis (prediction) to be formulated beforehand, in order to determine what variables are to be tested and how they can be controlled and measured.
Simulation	This requires the production of a smaller simplified model of the system, which can then be manipulated to gauge the effects. It is, therefore, similar to the experimental designs in respect of manipulation, but it provides a more artificial environment, in that it does not work with the original materials at the same scale. The performance of the model is measured against the real system to check that the results are reliable. This design enables theoretical situations to be tested.
Evaluation	Aims to makes sense of the myriad human, political, social, cultural and contextual elements involved in a project. It is used to examine the working of projects from the point of view of level of awareness, costs and benefits, cost-effectiveness, attainment of objectives, and quality assurance. The results can be used to prescribe changes to improve and develop the situation.
Action	Used to deal with a specific problem found in a particular situation. What are seen to be useful changes are made, and then constant monitoring and evaluation are carried out to see the effects of the changes. The conclusions from the findings are applied immediately, and further monitored to evaluate their effectiveness. There is no attempt to separate the problem from its context in order to study the situation.

Ethnological	A research method which focuses on people. The researcher is interested in how the subjects of the research interpret their own behaviour, rather than imposing a theory from outside. The research takes place in the undisturbed natural settings of the subjects' environment. The context is equally important as the actions being studied.
Feminist	This is more of a perspective than a research design that involved theory and analysis that focuses on the differences between the lives of males and females.
Cultural	Used to provide methodologies that allow a consistent analysis of cultural texts in order to compare, replicate, disprove, and generalise.
	(Walliman, 2011, pp. 9-13)

The abovementioned research designs are broad, and there are a number of different research methodologies for each of these. Based on these research designs, the research that has been carried out is based on an evaluation, as well as a comparative research design. The evaluation makes sense of cyclists' rights in the context of Johannesburg and the various transport projects that have been carried out in relation to NMT. It then examines the projects based on whether or not the objectives have been achieved, as well as the quality of the projects, based on the provision of cyclists' rights. To accomplish this, the research looked at the various frameworks and strategies guiding the projects. This, together with the use of secondary data, such as newspaper articles, transport statistics and planning tools, and the primary data, such as the interviews, provided a complete evaluation of the different programmes. The use of primary and secondary data will be explained further on in this chapter. The comparative design is useful as the research is comparing what has been done in Johannesburg in relation to the six precedent cities discussed in the literature review. These six cities have, in some way, provided for the rights of cyclists, and by comparing this to Johannesburg, the research will be able to identify the differences in the programmes and identify key strategies that could be used to improve the programmes. On the other hand, it might find that these programmes are similar and there are no obvious gaps, which would indicate that Johannesburg is doing what is necessary to provide for cyclists' rights in the city. The research reviewed the six precedent cities and listed the main strategies as key performance indicators, which have been instrumental in increasing cycling in these cities. Through a comparison of the key performance indicators and the evaluation of Johannesburg, the research is able to draw conclusions and provide suitable recommendations.

Walliman (2011) explains that it is the research interests which decide the nature of the research problem which, in turn, will indicate the appropriate research design to follow. "Research design provides a framework for the collection and analysis of data and, subsequently, indicates which research methods are appropriate" (Walliman, 2011, p. 13). The data collection process is, therefore, the next step in explaining the research method chosen for this research.

3.4 Data Collection

In any research, the researcher is either required to count things and/or talk to people (MacDonald & Headlam, 2008, p. 8). This is the next filter that will be used to explain the research method used in this research. If the researcher is involved in counting, the research is using a quantitative method of collecting data. If the researcher is talking to people to gain a better understanding, then the research is using a qualitative method to collect the data (MacDonald & Headlam, 2008). Both comparative

research designs and evaluation research designs can be done using both qualitative and quantitative methods.

Quantitative methods are used when the researcher is attempting to quantify data and generalise results from a sample population of interest. The research looks to measure the incidence of various views and opinions of a chosen sample, or to aggregate results (MacDonald & Headlam, 2008). This research will not be making use of primary quantitative methods, as it is not measuring incidences or various views. However, this research does look at quantitative data briefly when analysing the NMT statistics in Johannesburg, but the statistics will be sourced from secondary data.

Qualitative methods are concerned with the quality of the information. It aims to gain an understanding of the underlying reasons and motivations for actions and establish how people interpret their experiences and the world around them. These methods provide insight into the setting of a problem, generating ideas and/or a hypothesis (MacDonald & Headlam, 2008). This research uses qualitative methods to understand the various NMT projects that have taken place in Johannesburg. The reason for the qualitative methods, rather than quantitative, is based on the fact that the research aims to provide an in-depth analysis of transport planning in order to gauge the effectiveness of the NMT projects in providing for cyclists' rights. The qualitative method allows for the researcher to analyse cycling in the city of Johannesburg, as well as talk to those professionals involved in the projects, and other transport experts and researchers who have knowledge of the projects, in order to understand their perspectives on why cycling mode share is so low in the city.

MacDonald and Headlam (2008) explain that qualitative methods can make use of questionnaires or interviews to gather a variety of different types of information. This can be used to evaluate a programme in which a wide range of projects have been carried out, and when the researcher wants to gather the views of project managers, or even if the researcher is trying to measure the impact of an initiative in a specific geographical area. This research makes use of interviews to evaluate the programmes in which cycling based transport projects have been carried out. The viewpoints being gathered are those of project managers, City officials, NMT researchers and cycling advocates. The viewpoints of the interviewees are crucial in measuring the impact of the cycling based transport projects and transport planning methods used in these projects. If the interviewees feel as though a lot can be done to improve the planning methods, this will help to answer the overall research question.

Interviews are one of the most popular and frequently used methods of gathering information from people. There are a variety of techniques for carrying out interviews; they may be informal chats or formal interviews which are highly structured, taped and transcribed (MacDonald & Headlam, 2008). Researchers are cautioned when conducting interviews, as interviews are an interpersonal process and, as the investigator, it is important to be aware of one's own behaviours and assumptions in this context (MacDonald & Headlam, 2008). There are also ethical issues that need to be considered when conducting interviews, which will be outlined in this chapter. Interviews can be carried out in three different styles – structured, semi-structured, or unstructured (as explained in Table 10):

Table 10: Different styles of interviews

Structured interviews	Follows a set of specific questions, which are worked through systematically. This type of interview is used when the researcher is attempting to acquire information where the responses can be directly compared.
Semi-structured interviews	Commonly used when the researcher is attempting to follow key themes rather than specific questions. It allows a certain amount of flexibility for the researcher to respond to the answers of the interviewee and, therefore, develop the themes and issues as they arise.
Unstructured interviews	Such interviews do not follow any predetermined questions or themes; rather, the interviewer will address the issues as they emerge in the interview. This can be useful when the researcher is attempting to explore the full breadth of a topic
	(MacDonald & Headlam, 2008, p. 40)

The interviews which have been carried out in this research are semi-structured, as the researcher was not attempting to compare answers directly, but rather get a broad sense of the projects and understand the various perspectives of the interviewees. The semi-structured interviews allows the researcher to ask follow-up questions in order to better understand certain key themes during the interview process, which have been useful in the case of this research. Neville (2007) explains that semi-structured interviews are useful methods for research projects that are exploratory and explanatory in nature; this is when the researcher aims to discover the 'why' (reasons/motives) for things. This research explores the effectiveness of the different NMT projects in order to understand why and how they were planned and implemented, and to gain insight into the motives behind these projects, the process which was followed, and whether or not these projects are fulfilling their mandate.

Thus far, the chapter has indicated that the most appropriate research methods will be inclusive of an evaluation and comparative research design, it will be qualitative in nature, and it will include semi-structured interviews. As explained, the research also used existing quantitative data as part of the evaluation process. The semi-structured interviews form one part of the evaluation process. The research looks at Johannesburg in more detail, through the use of secondary data - these are documents, plans, frameworks, policies, and articles relating to the various projects.

According to Walliman (2011), data comes in two main forms, primary data or secondary data. Primary data is data that has been observed, experienced or recorded close to the event (Walliman, 2011). Based on this, the interviews will form part of the primary data in this research. Secondary data refers to written sources that interpret or record primary data (Walliman, 2011). Secondary data forms a strong component of this research as the research reviews much of the primary data developed during the time of the projects.

There is a lot of secondary data that can be found, according to Walliman (2011). Secondary data can either be written material (such as reports, notes, publications, journals, newspapers, etc.); they can be non-written (such as radio or television programmes, documentaries, recordings, etc.); or they can be survey data (such as census or population data, surveys and forecasts). Essentially, secondary data is

information that has been wrapped, packed and summarised in order to make it more digestible for the reader. The quality of the data depends on the source and the methods of presentation (Walliman, 2011). “A major aspect of secondary data is making an assessment of the quality of the information or opinions provided” (Walliman, 2011, p. 71). This can be done by reviewing the evidence and arguments presented, and the reputation and qualifications of the writer and presenter (Walliman, 2011). The research uses policy documents and frameworks, as well as newspaper articles, which are from reputable sources and have been written by professionals in the field.

Comparing the data is another useful tool recommended by Walliman (2011). In the case of this research, the interview process, as mentioned earlier, is a crucial part of the evaluation process, and will be compared to the secondary data. These two methods are presented as providing a holistic evaluation of the cycling projects in Johannesburg.

3.5 Choosing the Case Study Evaluation Research Method

Based on the above literature, the research method most appropriate for this research is a case study research method, an evaluation research method, or a combination of both. The case study is useful as the research looks at several cases or projects in Johannesburg, Johannesburg being the context in which the research will be carried out. The evaluation research method is useful as the research looks to evaluate these cases, comparing them to each other and to the information collected in the literature review, in which the six precedent cities have been outlined. This section looks into the case study research method and the evaluation research methods, and explains why this research has chosen a method which includes aspects from both these methods – which is a case study evaluation method. The case study evaluation method is introduced as the chosen research method for this research.

3.5.1 Case Study Research Method

Yin (1994, p. 1) explains that case studies are the preferred method of choice when ‘how’ or ‘why’ research questions are being posed, when the researcher has little control over events, and when the focus is on a contemporary phenomenon within some real-life context. Some of the situations, in which case study research methods are useful, include when the researcher is researching policy, political science, and public administration research, and for city and regional planning research, such as the study of plans, neighbourhoods, or public agencies (Yin, 1994, p. 1). As this research looks at the right to the city, there is a political perspective which is being investigated. This relates to the problem statement which is concerned about the low level of cycling in the city of Johannesburg. More importantly, the research looks specifically at city planning, at the planning process and the impact of that process in the specific neighbourhoods in which they were implemented. The transport projects are a product of the planning system, which is laid out through the development strategies, filtered down to the transport frameworks and developed within different levels of government.

The research question is the first, and most important, condition for differentiating among the various research strategies (Yin, 1994). The most common research questions can be categorised as ‘who’, ‘what’, ‘why’, ‘how’, and ‘where’ questions (Yin, 1994). Based on the research question it is easier to identify if the research will be experimental, survey based, analytical or historical in nature. The question being asked in this research is ‘how can planners provide cyclists with equal rights to the city’? Yin

(1994) explains that 'how' and 'why' questions are likely to favour the use of case studies, experiments, or histories. The research question is one of the most important steps in the research study as it identifies the research method.

This research is interested in understanding the transport planning process in Johannesburg. The reason for using a 'how' question is due to the fact that 'how' is concerned with understanding the underlying process. Johannesburg has a transport planning process focused on promoting cycling, and that process has been carried out, but it has not been successful in increasing the level of cycling. Therefore, the research is evaluating the process to understand the gaps and to compare the process to transport planning processes in cities where cycling has been successfully integrated into the transport network.

Yin (1994) further explains that there is a distinction when looking at 'how' research questions. This is based on the control which the researcher has over the events being studied. If there is virtually no access or control over the events, then it is likely for the research to look at a histories research method. The researcher is dealing with the 'dead' past, meaning that there are no relevant persons alive to report on what occurred, and the researcher is dependent on secondary data (Yin, 1994). If, on the other hand, the researcher can manipulate behaviour directly, precisely, and systematically, then the research is experimental in nature. This is commonly used in a laboratory setting or in a field exercise, where an experiment is carried out and the results are then examined (Yin, 1994).

Lastly, a case study research is preferred when the researcher is investigating contemporary events, and the researcher does not have control over these events. The case study method relies on many of the same sources as histories, but it adds two sources of evidence which cannot be included in histories; this is direct observation and systematic interviewing (Yin, 1994). The cases being evaluated in this research are contemporary, and as the research is engaging in interviews, the case study method is a suitable method for this research.

As a research method, a case study is an empirical study that investigates contemporary events within its real-life context. Contextual conditions are imperative to the case study method, meaning that the researcher is interested in the events occurring within a particular context (Yin, 1994). Johannesburg is the context of this study, and the research is concerned with cyclists' rights within the city of Johannesburg. Cycling levels are very low, yet there are cycling based transport planning projects which are trying to deal with the situation. The research looks at the various cycling projects to understand the process and to evaluate these projects against the interviews and the literature from the literature review. This means that this study is not looking at a single case, but at several cases within the context of Johannesburg.

A case study research can be done using a single-case design or a multiple-case design; the decision of which design is going to be used needs to be decided prior to data collection. As has been explained, there are several areas in Johannesburg in which cycling projects have been carried out, and this research is looking at all of these cases. The reason for this is due to the fact that the planning process has developed with each new project, making each case different in nature, as the processes and methods may vary between each case. The first project was done in 2007 and was driven by the

municipal and provincial government. The second project was done before 2010, which was when Johannesburg held the FIFA Soccer World Cup, thus, the project passes one of the World Cup stadiums in Orlando, Soweto. The third project was done in the inner city of Johannesburg in 2012 and linked different university campuses. The last project was done in 2015 around the time of the Eco-Mobility World Festival, which aimed to encourage alternative transport methods within the Sandton precinct. The cases all had different objectives, but were carried out in the city of Johannesburg; the result of which is several individual cases that are scattered across Johannesburg. It should be noted that some of these projects were still running during the time of this research.

The case study design, whether single-case or multiple-case, can be either holistic or embedded. A holistic single-case study examines a single critical case, or an extreme or unique case. An embedded single-case study occurs when, within a single case, attention is also given to a sub-unit or sub-units (Yin, 1994). Yin (1994) explains that this could occur when the case study might be about a single public programme; the analysis of that programme might include the outcome from individual projects within the programme. This seems to be in line with the study, as the research is studying cyclists' rights within the city of Johannesburg, thus, the cycling programmes in Johannesburg can be defined as the overall programme being studied. Within Johannesburg, there are various sub-units of the project which, as explained, are scattered throughout the city. Thus, the resulting study would be indicative of an embedded case study design.

A multiple-case design looks at cases in which there may be independent innovations occurring at different sites; thus, making each site the subject of an individual case study, and the study as a whole would have used a multiple-case design (Zainal, 2007). Zainal (2007, p. 2) explains that multiple-case designs can be adopted with real-life events that show numerous sources of evidence through replication rather than sampling logic. A multiple-case design can be embedded when each individual case consists of multiple embedded cases, meaning that the study may require a further case study investigation in each site. As each site in this research is linked to a single programme within the city, it is not necessary to treat each case as individual cases, but rather as sub-units of the same case. Yin (1994) explains that a multiple-case design may require extensive resources and time beyond the means of a single researcher, thus, there are limitations that need to be considered when doing a multiple-case study. This study looks to examine the various sub-units as part of the broader programme, and not focus on each sub-unit as an individual case study. Essentially, the research is interested in understanding why cycling levels are low in Johannesburg, as a city, and not in each individual unit/site.

3.5.2 Evaluation Research Method

The research is evaluating each of the cases to understand the effect of the implementation on the overall program. According to Rossi, et al. (1999), in evaluation research, explanations from evaluations can link program implementation with program effects. Evaluation research can be defined as the use of social research procedures to systematically investigate the effectiveness of social intervention programmes (Rossi, et al., 1999, p. 4). Evaluation researchers make use of evaluation research methods to study, appraise, and help improve programmes in aspects of the problems they intend to address, their conceptualisation and design, their implementation and administration, their outcomes, and their

efficiency (Rossi, et al., 1999). It is often found and, specifically in the case of this research, that policymakers, planners, and programme managers need to distinguish worthwhile programmes or revise existing programmes in order to achieve certain desirable results. Planning for cyclists is seen to provide positive results in most cities, and cyclists have a place in the city as a normative mode of transport, like all other road users. Therefore, it is important for the City not to become despondent because cycling levels are still low and the lanes are largely empty and used by other vehicles. Instead, there is a need to revise and improve existing programmes in order to ensure that the correct approach is applied.

The origin of evaluation research goes back to World War II when resources were scarce and, due to limited resources, it was critical that any investment into programmes would yield the desired benefits (Rossi, at al., 1999). In the case of this research, cycling in Johannesburg is not considered a priority in the City and, therefore, spending extensively on cycling programmes without results has caused political dispute regarding further investment in the programmes. An evaluation of the programmes would be a progressive step for the City in providing evidence that the programmes can be planned and implemented in a way that will benefit the city and its people. The fact that the City initiated these programmes is evidence of the fact that the need to address cyclists' rights is on the City's agenda; however, in order for these programmes to continue, the desired results are an important motivational factor for the City.

Programme evaluation requires that appropriate dimensions of its performance or characteristics be described and then judged against standards or criteria. Rossi, et al. (1999, p. 22) explain that programme evaluation involves assessment of at least one or more of five programme areas: (1) the general need for the programme, (2) the design of the programme, (3) the programme implementation and service delivery, (4) the programme impact or outcomes, and (5) the efficiency of the programme. This research will not be able to cover all five areas. Mainly, the implementation and service delivery are not necessary to evaluate, as this study is not concerned with the implementation itself, it is more concerned with the process which led to the implementation. The researcher is evaluating the impact and outcome based on primary and secondary data, and is not carrying out the evaluation on site, as this would require time and resources that this research does not have. In evaluation research, the evaluator helps to sharpen and shape the conceptualisation of the programme, to make it more explicit and to identify key issues of programme performance (Rossi, et al., 1999). The literature review has already identified key performance indicators for cycling programmes, which will be evaluated against the cycling programmes in Johannesburg.

The role of the programme evaluator is to provide answers on how the programme can be revised. The evaluator would need to provide answers about what the programme is doing and, more importantly, about how well it is being done and whether it is worthwhile to continue with the programme (Rossi, et al., 1999). There are different reasons for why a programme evaluation is done, such as programme improvement, accountability, knowledge generation, and political ruses or public relations (Rossi, et al., 1999). While this research is interested in programme improvement, it is not directly involved with the stakeholders and, as such, programme improvement is not a definite outcome. This research is based on

knowledge generation. Rossi, et al. (1999) explain that some evaluations are not intended to directly inform decisions but, rather, mainly describe the nature and effect of an intervention for broader academic purposes. Dissemination of such evaluation research is most likely through scholarly journals, conferences, and other professional outlets, as is the intention of this research. As an academic researcher, the evaluator is free to establish their own definitions of what the programme is about, its goals and objectives, and what questions should be addressed. In all other circumstances, these aspects are provided by the stakeholders, who are meant to form an empirical part of the research process (Rossi, et al., 1999).

In understanding the view of Rossi, et al. (1999), it is clear that the process of evaluation research is to inform stakeholders, policy makers, and planners on the outcome of the programme, and to evaluate these programmes carefully in order to make unbiased conclusions as to whether these programmes are worthwhile to continue. The process of evaluation is explained to be time-consuming as the evaluator needs to ensure that these programmes are thoroughly investigated from initiation to conclusion. While this research intends to evaluate the programmes, it does not have the resources to ensure a vigorous process is carried out at each case site. The case sites, or sub-units, which are being evaluated, are done through the use of interviews with various stakeholders and articles related to the programme.

3.5.3 Case Study Evaluation Research Method

According to Yin (1994) there is a distinctive place for evaluation research within case study research. Case studies are intended to reveal details about a process and the outcomes at certain sites; however, it reveals littles about the programme's overall impact. This is avoided when the researcher compares the results from multiple case studies or embedded case studies. This comparative study is a case study evaluation; it begins to clarify the impacts that a programme either achieved or did not achieve, thus, providing useful information for programme revisions (Balbach, 1999). A case study can be particularly useful for evaluating programmes when programmes are unique, or when established programmes are implemented in a new setting. The cycling programmes implemented in Johannesburg are unique in that they are the first of its kind in the Johannesburg context; however, while the programme is new in the context of Johannesburg, it is an internationally established programme which has proven to be successful in other cities, as has been discussed in the literature review. In this instance, Balbach (1999) explains that the point of the case study evaluation is to understand how the programme is working in a new setting.

In designing a case study evaluation, the researcher must decide how to select the cases to be studied. Additionally, it is important to study how the programme is working in several sites, thus, referring to multiple-case designs or embedded single-case designs (Balbach, 1999). While there are many ways of selecting sites, such as random samples, or convenience samples, Balbach (1999) explains that case study evaluations almost always use purposive sampling. The reason for this is that in order to study the reasons why something did or did not happen, the evaluator must be sure that the sub-units have the potential to reveal those reasons (Balbach, 1999). The sub-units chosen in this research are based on the most established cycling programmes in the city of Johannesburg. The first programme is a shared NMT lane in Zandspruit, which runs along a major corridor in the city, which is Beyers Naude Drive. The

second programme is a dedicated cycle lane in Orlando, which runs from Noordgesig to Orlando West, and links schools to social amenities and public transport. The third programme is a dedicated cycling lane in the inner city of Johannesburg. The initial project measured up to 15kms of dedicated cycle lanes and passes through Brixton, Auckland Park, Braamfontein, Hillbrow and Doornfontein. Extensions of the project include Sophiatown, Langlaagte and Westdene. The fourth and final programme is a dedicated cycling lane between Alexandra and Sandton, including a dedicated NMT bridge passing over the M1 highway (a more detailed map of these routes can be found in the next chapter).

Data collection in case study evaluation methods are designed to answer the basic questions, which are who, what, when, where, and why. As such, the research needs to know (Balbach, 1999, p. 7):

1. Who was involved in the programmes?
2. What did the programme do?
3. In what context were these initiatives working?
4. When did the programme activities take place?
5. Where did the activities take place?
6. Why did participants do what they did?
7. What, if anything, about the actions taken caused the observed changes to take place (if, indeed, there were changes)?

In answering these questions, the chief source of data in case study evaluations is interviews, observations, and documents. This research does not engage in an observation analysis. Balbach (1999) explains that case study evaluations can be done without documents or observations, however, it is rare that it is done without interviews. It is for this reason that interviews form the foundation of case study evaluations. Interviews are significant for understanding what happened from the perspective of those involved, and what the reaction was to the programmes (Balbach, 1999). As has been mentioned, the interviews in this research are carried out in a semi-structured format. Balbach (1999) explains that case study evaluation usually uses semi-structured interviews, as the researcher has a better chance of understanding the perceptions and experience of those who are being interviewed through asking open-ended questions.

In choosing interviewees, the interviewer is advised to identify respondents who know a lot about the programme and are willing to be reflective about it. Additionally, because the case study is done for purposes of evaluation, it is useful for the interviews to include some of the people for whom the programme was developed (Balbach, 1999). Table 11 is a summary of the interviewees which were chosen for this study. As can be seen in Table 11, the interviewees were from the public and private sector, and either worked directly on the cycle programmes, or conducted research on the programmes. One respondent is from an NGO and worked as a consultant on some the programmes, while another is from an NPO, and is a transport planner who has written quite extensively about transport in Johannesburg.

Table 11: List of interviewees

No.	Gender	Age	Job Sector	Job Position	Closest Cycle Route (km)	Do You Cycle
1	Male	30-39	Public	Development Manager	<15	No
2	Female	40-49	Private	Director	<15	Yes
3	Male	40-49	Public	Researcher	4-7	Yes
4	Male	50-59	Public	Director	<15	Yes
5	Male	50-59	NGO	Consultant	0-3	Yes
6	Female	50-59	Public	Director	4-7	No
7	Female	50-59	Private	Manager	4-7	Yes
8	Male	40-49	Public	Director	0-3	Yes
9	Male	30-39	NPO	Manager	0-3	Yes
10	Female	30-39	Public	Researcher	0-3	Yes

Eight out of the ten respondents are cyclists, with some being avid commuter cyclists and others being recreational or occasional cyclists. The two who are not cyclists are from the public sector and have been involved quite extensively in the development and/or implementation of the cycling programmes. Most of the respondents are directors or managers, with ages ranging from 40 to 59, thus, alluding to the fact that they have lots of experience and are quite instrumental and key figures in these programmes. The key criteria in selecting these respondents was based on their knowledge of the cycling programmes, either from being directly involved, or as transport specialists or activists who have either been affected by these programmes, or who have studied the programmes. A list of the questions asked to the interviewees can be found in the annexures[1].

With regards to the second phase of data collection, Balbach (1999) explains that in case study evaluation, the interviews are often complemented by observation or an analysis of documents. Both of these methods are useful supplements to the interviews and, in fact, depending on the nature of the programme, they could, at times, turn out to be more informative than the interviews. Analysing documents complement the data collection process as they could guide the development of the interview protocol, confirm comments made by respondents, or provide a secondary observation of an event (Balbach, 1999, p. 12). Additionally, documents can shed additional light on the outcome of the programme, however, the researcher must validate these documents, as it is often found that paper trails can obscure events. This is commonly found in press releases, as these mainly reflect what an organisation wants to be true, which might be contested by those outside the organisation. Sometimes, however, documents are of paramount importance, as is the case with media coverage and newspaper articles, which are effective in relaying the tone and general atmosphere surrounding an event or programme (Balbach, 1999).

[1] In order to ensure the anonymity of the interviewees, the full transcripts are not included in the research. They can be formally requested from the researcher directly.

The role of the evaluator in case study evaluations is to act as both the data collector and the analyst. This brings about certain opportunities and threats. The threat is that the evaluator might develop preconceived notions and beliefs which could be used to sway the argument. The challenge for the evaluator is to prove that these notions and beliefs are incorrect by finding evidence that disproves these preconceptions (Balbach, 1999). In the example of this research, the researcher believes that there are gaps in the cycling programmes which have led to a lack of cycling uptake, and the negative attitudes towards cycling programmes, by both the government and citizens. Thus, the research needs to focus more on trying to prove that the programme is working and there has been a positive impact.

The opportunity of being the data collector and analyst is that, with the right amount of flexibility, the evaluator can respond to new avenues of inquiry as they are presented. This allows the evaluator to make quick decisions, and take advantage of new opportunities (Balbach, 1999, p. 13). In the case of this research, there is ongoing research being done into the cycling programmes and NMT programmes, in general, all of which provide new insight into the research. Through the data collection phase, the evaluator starts to build a theory about what is going on, and then begins to think about how that theory can be confirmed (Balbach, 1999).

Part of confirming this theory is to prove that the initial preconceptions and beliefs are incorrect. Through this process, the evaluator searches for evidence that would contradict the initial preconceptions. If the evaluator fails to find this, then the theory and the case study can be strengthened. The final step in the evaluation is for the evaluator to make responsible judgements about the links between the programmes, as it was delivered, and the impacts of the programme; analysed through the documents. This step is fundamentally a process of interpreting the data; it is important for the evaluator to make it known where interpretations are being made. This research interprets the data by comparing the data from the interviews with the documents being analysed. This is then evaluated against the existing programmes in the precedent cities.

3.6 Résumé

Johannesburg, being the key focus of this research, is identified through this chapter as the case study. However, as this chapter explains, the research is not only studying the cycling projects, it is also evaluating the projects. For this reason, the research identifies the case study evaluation as the selected research method. In order to carry out the case study evaluation, the research unpacks the different cycling projects, conducts qualitative interviews, reviews secondary data relating to the projects, and evaluates the data against the KPI's from the six precedent cities. This process begins in the next chapter, which introduces Johannesburg as the case study. The chapter first provides a status quo of transport in Johannesburg, before explaining the different planning documents, and the resultant cycling projects.

4 Cycling within a South African Metro -Johannesburg

4.1 Introduction

This chapter presents Johannesburg as the context of this study. Johannesburg started as a mining camp in 1886; it then evolved from a village into a town, a city and finally, a metropolis (Beavon, 2001). Today it is the largest city in South Africa, it is the provincial capital of Gauteng, and the wealthiest city in South Africa (Stats SA, 2013), and it is also the focus of this study. According to the 2013 National Household Travel Survey, the Gauteng Province is the most congested province with the highest population, and is the smallest province in geographic size (Stats SA, 2013). While these statistics are four years old and these numbers may have changed, Johannesburg nevertheless faces major transportation challenges, as all of the people living in this city are trying to get somewhere every day. The City has realised the need to address this problem by focusing on alternate transport methods, such as public transport, walking and cycling (Morgan, 2017). This chapter looks at how the City attempted to introduce cycling as a mode of transport. The map in Figure 7 represents the location of Johannesburg in the context of South Africa and Gauteng.

4.2 A Brief Transport History

Like all major cities, Johannesburg evolved from a walkable city to a transit city and, eventually, into the automobile centred city it is today. Transport has always been integral in the development of Johannesburg, as the establishment of the city was based on the discovery of gold which, of course, needed to be transported. As such, initial transport systems were mainly focused on transporting raw materials. It was only in 1890 that Johannesburg saw the inauguration of the first light railway, which had some facilities for passengers, but was primarily used to transport raw materials. With around 66 000 passengers using the light rail service in 1890, this was the main mode of transport for non-whites into the city. In 1891, Johannesburg's first public transport system was introduced as horse-drawn trams; this system served to bring people from the surrounding white residential suburbs into the city (Beavon, 2001). Even though this was before formal apartheid segregation was implemented, non-whites were only allowed to use the 'black' horse drawn trams and, later, the 'black' electric trams. Nonetheless, the tram was seen to be successful, as by 1896 the tram fleet was carrying around 2.5 million passengers a year and covering 1 600km per day (Beavon, 2001). In 1906, the electric trams were introduced and this brought about extensive development north of the city, as the electric trams could travel further. The trams extended as far north as Rosebank, which can be seen in Figure 7 (Beavon, 2001).

Around the same time, cars were beginning to gain popularity, meaning that lower density suburbs began to develop even further away from the city to areas not serviced by the tram. Cycling was a major part of transportation as well, where in 1933, the city had around 31 000 registered bicycles and only 27 500 registered vehicles (Beavon, 2001). It can be argued that this was an era in which public transport, private transport and NMT were equally accessible in the city of Johannesburg, although not equally to all races.

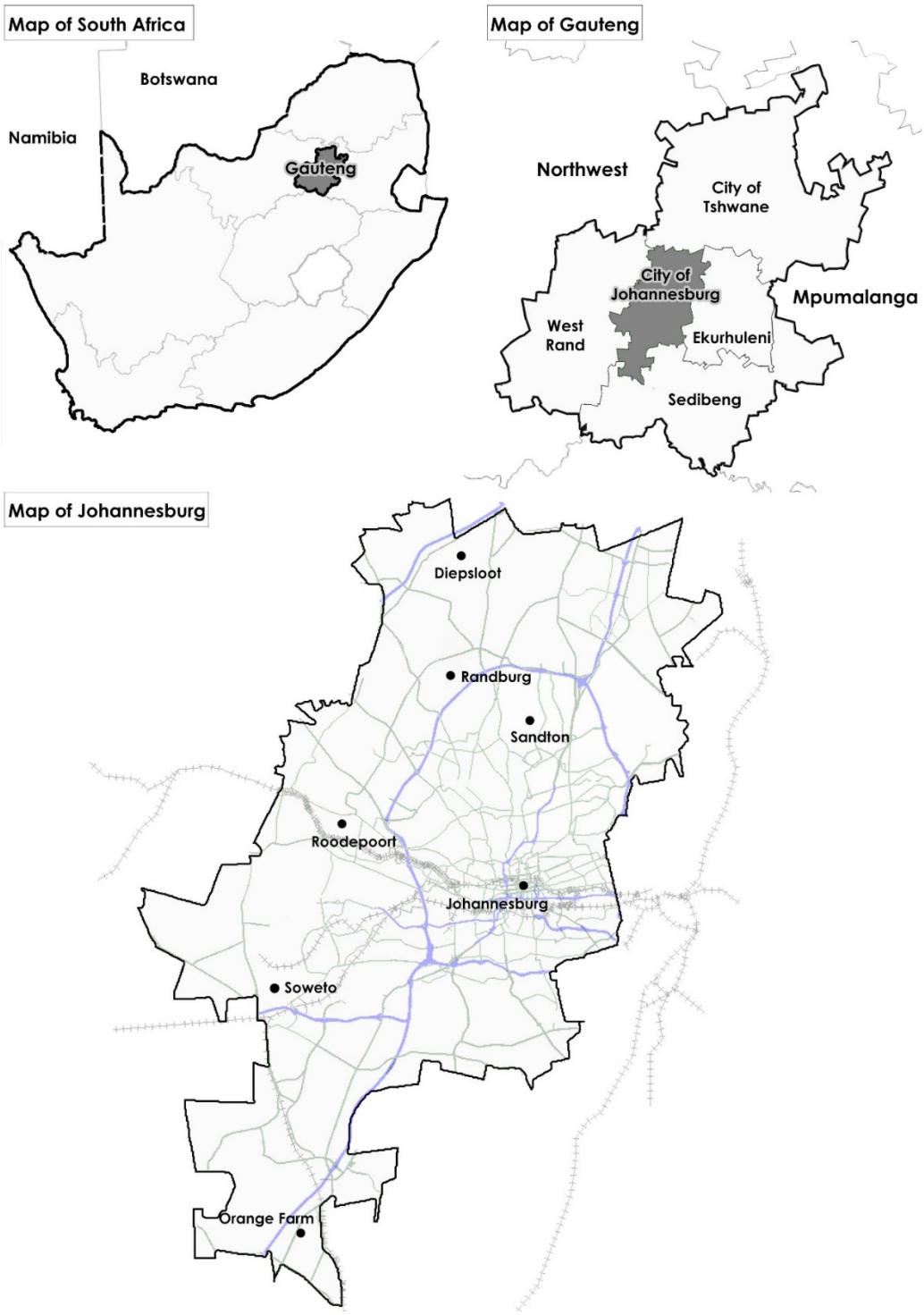


Figure 7: Location of Johannesburg, highlighting major roads, highways and railway lines (Source: Author)

As time progressed, as was the case in the precedent cities, car usage continued to increase, roads began to widen, bridges were built and the City focused on increasing vehicle access into the city. In Johannesburg, this expansion was complemented by the removal of the tram system in 1948. Once the tracks were lifted, the road widths doubled, which caused the volumes of motor vehicles to rise

dramatically over a short period of time. The main investments in roads, however, focused on the north of the east-west railway lines, which was where the main white residential suburbs were located. Adding to this, in the 1950s, the City constructed ten bridges from north to south and east to west in order for people to pass through the city unimpeded. All of this meant that by 1964 the number of registered motor vehicles jumped to 179 800 (Beavon, 2001).

It was inevitable that the Johannesburg Central Business District (CBD) would reach a stage where it could no longer handle the amount of people and businesses that crowded the space. With the growing economy and the congested CBD, businesses started to move further north, creating new economic hubs which were less congested and more accessible for those already in the north (Beavon, 2001). Therefore, while apartheid spatial planning split the city between north and south, making it inaccessible to the majority of the population, this was not the only reason Johannesburg is as dispersed as it is today. While moving away from the CBD may have alleviated congestion, initially, it eventually led to the same or an even greater amount of congestion and inaccessibility in the north, causing the city to fragment even further.

4.3 The Current State of Johannesburg

The street has become an unfriendly and dangerous space for all those not in cars. Currently, approximately 14 000 people die on South African Roads every year; 40% of those people are pedestrians (Harber & Parker, 2018). Harber and Parker (2018) note that the engineered emphasis on the car, the lack of affordable and reliable public transport, and the absence of NMT friendly design, are all contributing factors to this. The latest Gauteng Household Travel Survey (GPDRT, 2016) indicates that, in the most congested province in South Africa, Johannesburg has the lowest level of walking and cycling, when compared to other municipalities in Gauteng (see Table 12), thus, supporting the fact that the city is completely car-orientated. Additionally, car usage in Johannesburg is higher than any other mode of transport, and when you add all motorised modes within the city (taxi, car, company transport, lift club, bus, metered taxi, and motorcycle), Johannesburg has the highest percentage of motorised transport across all other municipalities; a figure of 69.4%. This does not mean that the economy of Johannesburg is improving and more people are able to afford motorised transport; in fact, the majority of the people in Johannesburg do not own cars (City of Johannesburg, 2011). Therefore, the majority of people are reliant on motorised public transport to get around the city, and those that cannot afford public transport are left with no other alternative but to walk for long distances. It is for this reason that we find that, in a dispersed city like Johannesburg, walking is still the second most used mode of transport after the car. As such, there is an obvious need to improve the conditions for walking and cycling and to better integrate them with public transport; as these are the most affordable modes of travel for the poor.

Table 12: Mode of travel by municipality

Municipality	Commuter Taxi/Minibus Taxi	Walk All the Way	Car	Company Transport	Lift Club	Bus	Train	Bicycle	Metered Taxi	Motorcycle	Other	Grand Total
Tshwane	16.4%	29.7%	38.2%	0.6%	1.6%	10.9%	1.3%	0.6%	0.5%	0.2%	0.0%	100%
Johannesburg	26.1%	27.2%	35.5%	0.9%	1.5%	5.1%	2.5%	0.1%	0.2%	0.1%	0.4%	100%
Ekurhuleni	19.3%	30.8%	35.2%	1.3%	1.2%	5.2%	3.8%	0.3%	0.2%	0.2%	1.4%	100%
Sedibeng	19.0%	37.3%	34.0%	0.8%	1.0%	5.0%	0.8%	0.2%	0.2%	0.0%	1.8%	100%
West Rand	16.4%	39.0%	26.6%	2.7%	1.7%	11.4%	0.4%	0.1%	0.0%	0.1%	1.6%	100%

(GPDRT, 2016)

In the early 2000's the City of Johannesburg started to investigate alternatives to private car usage. This was in response to the increasing array of social, environmental, public health and transport equity problems caused by an over dependence on cars (Morgan, 2017). The high day-to-day costs of travel, the unavailability of public transport in many of the peripheral areas, and the poor home-to-work connections, because of badly defined routes and weak intermodal integration, all impact severely on the poor, especially in a city like Johannesburg, which has high levels of poverty and spatial dislocation (Wray & Gotz, 2014, p. 1).

The City intended to address these issues through transportation projects which focused mainly on increasing public transport, walking and cycling. Wray and Gotz (2014) explain that transport planning appeared to be entering a new, dramatically more energetic era, which they refer to as the 'golden era' of transport planning. There have been a number of major projects and innovative plans which form part of this shift. Some of these are:

- The Gautrain Rapid Rail Link: while the Gautrain was led by province, the project connects the Johannesburg CBD to the Johannesburg International Airport and to the northern suburbs, such as Rosebank and Sandton. It is a fast-rail network with 80 kilometres of track and 10 stations placed at key urban centres in the Gauteng Province, including Tshwane and Ekurhuleni. Costing around R25 billion, the Gautrain is one of South Africa's largest transport infrastructure investments (Wray & Gotz, 2014). The first phase of the project was already up and running in 2010, just in time for the 2010 soccer world cup. Due to the success of the project, in economic terms, there are current plans to extend the project to the South and West of Johannesburg.

- Bus Rapid Transit (BRT) – Rea Vaya: Construction of the Rea Vaya started around 2007. Phase 1A of the project, which connected Soweto and Johannesburg, was completed in 2009 before the 2010 soccer world cup, while phase 1B, which connects the two main universities in Johannesburg, was completed in early 2014 (Wray & Gotz, 2014). The Rea Vaya system is meant to be a fast and affordable public transport system which runs on dedicated trunk routes across

the city. The Rea Vaya network has been extended using a feeder system, which runs into the residential areas along the route feeding commuters into the main trunk routes. In 2014 the City launched the next phase which runs to Alexandra in the north of the city. This phase is still under construction (Wray & Gotz, 2014).

- Passenger Rail Agency of South Africa (PRASA) rail modernisation: The Johannesburg Metrorail is one of the most extensive public transport networks in the city; it covers the entire metropolitan region and focuses largely on connecting lower income suburbs to economic areas. Currently, PRASA is undertaking a complete overhaul of the commuter rail system in Gauteng. This follows many years of under-investment in the system, which has led to the system becoming unreliable and dangerous. In fact, the last time the company procured new trains for the system was in the mid-1980s (Wray & Gotz, 2014). The new modern trains were meant to hit the tracks in late 2017 but, due to irregularities in the design, this was put on hold. PRASA is currently involved in a legal battle with the company it bought the locomotives from to recover the R2.6 billion (Koyana, 2017).

- Taxi Recapitalisation Programme (TRP): the TRP is an intervention by government to bring about safe, effective, reliable, affordable and accessible taxi operations through the introduction of new minibus taxi vehicles in the minibus taxi industry (Government Communications (GCIS), 2016). As shown in Table 12, minibus taxis are the most used public transport mode in the city, and the minibus taxi industry is not government owned. The government led project seeks to create a link between the taxi industry and the government by scrapping old minibus taxis and helping taxi operators to benefit constructively through empowerment. By June 2015, the Department of Transport scrapped around 60 000 old minibus taxis and paid the taxi industry an estimated R3.5 billion in scrapping allowances (Government Communications (GCIS), 2016).

- Gauteng Freeway Improvement Project: this project is being led by the South African National Roads Agency (SANRAL). It seeks to improve and upgrade Gauteng's freeways through a multi-billion rand project. The project was initiated in 2007 and includes the widening of several of Gauteng's major highways and key interchanges (Wray & Gotz, 2014). As part of the project, SANRAL introduced an electronic tolling system (E-toll) which was meant to recoup the costs of the improvements. However, this was met with much controversy by road users, who refuse to pay for using the roads (Wray & Gotz, 2014). While Electronic Tolling has proven to be successful, in many countries, as a method to reduce car-dependency and encourage road users to use alternative transport, the system in South Africa seems to have a different agenda, as it seems to improve car travel, and charge users for the improvements.

4.4 The State of NMT in Johannesburg

The abovementioned projects do not deal with NMT; rather, they are focused on improving motorised transport, including rail. In a dispersed city like Johannesburg, public transport plays a major role in the transport industry, as travelling distances are not always suitable for NMT. According to Adjei (2010) it is the integration of NMT (specifically cycling) and public transport that has been proven to provide the strongest alternative to private motorised transport. Basically, the car provides users with a door to door service, which is a service that public transport cannot provide for, but when you integrate walking and cycling with public transport, you have a competitive transport alternative to private car usage. Cycling, specifically, can be more efficient than walking because cyclists can cover more distance than pedestrians. This is explained by Dekoster and Schollaert (1999, p. 20) who note that, through the use of bicycles, the catchment areas of public transport stations can be increased to as much as 32km^2, whereas the catchment area for pedestrians is around 2km^2 (see Figure 8).

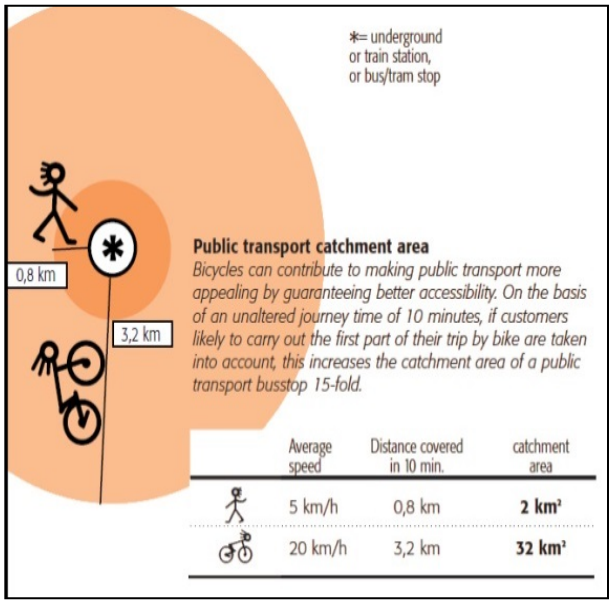


Figure 8: Cycling increasing the catchment area of transit stations (Dekoster & Schollaert, 1999, p. 20)

As such, public transport investments should be accompanied by NMT investment. This notion is supported by Culwick (2014) who explains that, due to the sprawling nature of cities like Johannesburg, distances are generally too far for NMT uses, but the integration of NMT and public transport is likely to play the most important role in facilitating the uptake of NMT in Johannesburg. Since the shift in the early 2000s, by the City of Johannesburg, to invest in alternate transport, there have been investments in NMT projects as well. In addition, parallel to these projects, there has also been a sequence of national, provincial, and local planning tools which seek to guide and support these projects. These tools, be it plans, frameworks or guidelines, are developed to guide the large scale infrastructure investments that cities are making. Table 13 summarises some of the recent planning tools which deal with NMT:

Table 13: List of transport planning tools which address NMT planning

Year	Document	Outline
2006	National Land Transport Strategic Framework	The National Land Transport Strategic Framework (NLTSF) suggests that planning authorities need to build, expand and maintain continuous networks of formal walkways and dedicated bicycle lanes along lines of high demand (Vanderschuren, et al., 2014, p. 8)
2007	National Public Transport Action Plan (NPTAP)	This Action Plan aims to address the problems in local and long distance public transport through implementing a Phase 1 (2007-2010) Catalytic Integrated Rapid Public Transport Network Project, in up to 12 cities and 6 districts that addresses the need for high quality services that can retain current users and attract new users. (National Department of Transport, 2007)
2008	Draft National NMT Policy	The primary objectives of this NMT policy are, among others, to increase the role of NMT as one of the key transport modes, integrate NMT as an essential element of public transport, and provide a safe NMT infrastructure and allocate adequate and sustainable funding for the development and promotion of NMT (National Department of Transport, 2008)
2009	Framework for Non-Motorised Transport	This document aims to present a policy comprising a set of objectives and strategies to realise an improved NMT environment in Johannesburg. In addition, the document identifies key principles which determine the zones and routes that should be considered as priority areas for implementation of NMT infrastructure (City of Johannesburg, 2009)
2012	South African Road Classification and Access Management Manual	This manual provides guidance to National, Provincial and Municipal spheres of government on the functional classification of roads and the methodology according to which such classification must be undertaken. It also gives guidance on how a road must be managed in order to function effectively, in accordance with its classification. This manual establishes a uniform and integrated classification system for the country, which will underpin and inform the planning, development and management of roads. (Committee of Transport Officials, 2012)
2013	Gauteng 25-year Integrated Transport Master Plan	The Gauteng road network remains one of the most important infrastructure assets of the province that underpins and supports local economic growth and the resultant growth in job opportunities within the identified corridors and nodes. It is, thus, vitally important that the Gauteng Province **develop** and **maintain** an integrated road network (Gauteng Department of Roads and Transport, 2013)
2013	City of Johannesburg Complete Streets Design Guideline	Complete Streets refers to roads designed to accommodate diverse modes, users and activities, including walking, cycling, public transport, automobiles, nearby businesses and residents. Such street design helps create more multi-modal transport systems and more liveable communities. (City of Johannesburg, 2013)
2014	NMT Facility Guidelines	These Guidelines define a new way of thinking about designing South African streets and roads, and re-balancing these to address safety and sustainability issues experienced daily by NMT users. (Vanderschuren, et al., 2014)

The intention for developing the tools listed in Table 13, is to guide transport planning and development within the city. As such, the research is investigating the extent to which these tools focus on the planning and development of NMT within the city of Johannesburg. To understand this, this section discusses each guideline, framework and plan in more detail, as a means of measuring Johannesburg's commitment to invest in NMT, and to improve the rights of cyclists within the city. As has been mentioned, some of these documents were developed in parallel with the NMT projects, meaning that the process was not chronological and the development did not take place after the documents were produced; rather, both processes ran simultaneously. The documents will be discussed chronologically as listed in Table 13.

4.4.1 National Land Transport Strategic Framework

The NLTSF promotes planning for all modes of transport, including NMT modes. It suggests that transport planners assess the status quo and the needs for NMT infrastructure, and follow this up by planning for its design, implementation and maintenance. The framework states that planners must consider NMT, both as a main mode of transport and as a feeder mode, linking communities to public transport facilities (Vanderschuren, et al., 2014).

The strategy also indicates that NMT (walking and cycling) should be promoted as the preferred mode of transport in South African cities for appropriate distances. To achieve this, governments must promote walking and cycling with the expanded provision of NMT infrastructure as the preferred mode of choice over short distances. In addition, where people are currently walking extensive distances, transport planners should assess the scope for measures to support cycling, as an alternative to walking (Vanderschuren, et al., 2014).

4.4.2 National Public Transport Action Plan

The National Public Transport Action Plan, as explained in Table 13, seeks to address the problems in local and long distance public transport usage. The Action Plan recognises the importance of NMT by stating that part of phase 1 of the plan is to provide and improve NMT facilities within the Integrated Rapid Public Transport Network (IRPTN) (National Department of Transport, 2007). More specifically, the plan states that these improvements would include the incorporation of appropriate infrastructure and design elements into the IRPTN plans to cater for walking and cycling passengers. Some of these elements include (National Department of Transport, 2007, p. 61):

- The identification of a network of NMT route facilities, such as sidewalks, cycle paths and lanes,
- Lighting to improve security on feeder routes and at stations,
- Landscaping and street furniture, and
- Bicycle parking.

Additionally, the plan speaks about implementing and supporting NMT programmes in order to ensure NMT usage is maximised. This can be done by ensuring that other NMT programmes are introduced to support and encourage the use of cycling and walking as alternative modes, which are well integrated into the overall transport system (National Department of Transport, 2007). These supporting programmes include (National Department of Transport, 2007):

- Develop Bicycle Taxi Schemes,
- Bicycle Rental Schemes,
- Information and Awareness Programmes,
- Increased distribution of bicycles,
- Modify institutional structures to support NMT implementation, and
- NMT interventions in rural areas.

4.4.3 National Draft Non-Motorised Policy

The vision of the National Draft NMT Policy is for NMT to be a sustainable and stimulant mode of transport for social and economic development within an integrated efficient transport system. This will be done through addressing the needs of marginalised communities and NMT users through the provision of a safe, secure, and reliable transport system (National Department of Transport, 2008, p. 15).

The policy recognises that NMT related initiatives in the country are currently done on an ad hoc basis, without adherence to a set of guidelines and policy directives. It also acknowledges that planning is fundamental to the success of NMT provisions, and that inadequate planning could result in problems, such as insufficient allocation of resources, wastage of resources and ineffective implementation of NMT programmes (National Department of Transport, 2008).

With regards to cycling infrastructure, the policy states that the development of road networks and other transport infrastructure is a necessary condition to facilitate cycling in cities. As part of its policy statement, the National Department of Transport aims to ensure that road infrastructure is improved to accommodate the needs of cyclists, and that future road development incorporates cyclists' needs, where necessary. It aims to ensure that cycling is integrated into the transport network and that it is included in future transportation policies (National Department of Transport, 2008). Additionally, the policy states that all Integrated Transport Plans (ITP) should cater for cycling, with appropriated modal split and set concrete goals and methods to achieve this modal split. With regards to modal integration, the policy recognises the efficiency of integrated cycling and public transport, stating that this is beneficial to both the passenger and public transport operator (National Department of Transport, 2008).

4.4.4 Framework for Non-Motorised Transport

The City of Johannesburg's Framework for NMT was developed in 2009 and is one of the key documents for this research, as it identifies proposed priority areas for the investment of NMT infrastructure, some of which were later implemented by the City. The framework begins by outlining the major constraints in the city, which may be mitigating against the use of NMT. These factors include (City of Johannesburg, 2009):

- Road safety (40% of all road fatalities in South Africa involve pedestrians),
- Security (unsafe environments),
- Distance and topography (low density urban form),
- Climate (Johannesburg is known for summer evening storms),
- Supporting infrastructure and facilities (provision for cyclists at work and institutions),

- Status and convenience (cycling associated with recreation or poverty, a change in attitudes), and
- Competition for space (motorised vehicles are the current priority with regards to road space).

The framework then looks at some of the opportunities for NMT in the city (City of Johannesburg, 2009):

- NMT integration to support strategic transport projects (BRT, Gautrain, Metrorail, Shova Kalula bicycle distribution projects, major taxi ranks),
- NMT integration with strategic development projects (2010 World Cup precinct upgrades, Alexandra renewal project, Orlando, Inner City, and Cosmo City),
- NMT to release economic potential (links to tourist sites, job creating, links to shopping centres, affordability of NMT),
- NMT to support movement to and from education institutions (majority of learners walk to and from school and tertiary institutions),
- NMT to assist in improving air quality, and
- Expansion of the recreation routes through open spaces (link recreational cycling routes to commuter network).

The Framework also provides a list of primary interventions, which are to be pursued in the city (City of Johannesburg, 2009):

- Develop a dedicated NMT network at regional and neighbourhood scale (regional network to be focused around mobility spines and public transport modes, while the neighbourhood network is to focus on linking social services, tourist sites, amenities, and schools),
- Integration with public transport (bicycle storage and public bicycle system),
- Adopt Urban Design and Technical Standards (adopt design standards for proposed routes and interchanges),
- Review NMT provision requirements as part of land use applications (NMT facilities should be indicated on site development plans),
- Consider incentives for retrofitting of existing developments,
- Investigate Carbon Trading potential as an alternative funding source for NMT infrastructure,
- Implement signage (promoting safety and directions),
- Develop a NMT forum to evaluate proposed routes,
- Obtain base level statistics for comparison and evaluation purposes (measure the success of NMT programmes), and
- Establish a database of NMT projects.

Table 14: Outline of strategic sector responses

Role Player	Sector Responsibilities
COJ Transportation / Johannesburg Roads Agency	• Develop a technical design of a metropolitan NMT network and design local area networks for selected priority routes • Upgrade existing pedestrian facilities and public realm • Adapt and develop technical design guidelines and standards • Amend parking policy to include cycle parking and facilities • Implement traffic calming measures in strategic locations • Adopt NMT specific maintenance program
Gautrain & SARCC	• Make provision for cycle parking and lockers in stations • Allocate areas for public bike system within/ adjacent to stations • Implement directional signage / local area map per station
BRT	• Make provision for cycle parking and lockers in strategic stations • Implement directional signage / local area map per station
Education	• Safety and NMT promotion at schools • Promotion of cycle proficiency test for school children • Evaluate NMT requirements at schools and provision of cycle storage where appropriate
Environment	• NMT to be incorporated in Environmental Sector Plan and Air Quality Management Plans
City Parks	• Evaluate existing NMT network through public open spaces and upgrade and extend key routes to tie into local area NMT networks on roads
JMPD	• CCTV to be installed and monitored along key routes / Law enforcement
	(City of Johannesburg, 2009)

Based on the strategic sector responses (Table 14), the list of constraints, opportunities, and primary interventions, the City of Johannesburg identified and proposed 10 priority areas for NMT investment within the city. These priority areas were identified through the use of 11 key principles, which are (City of Johannesburg, 2009):

- Public transport areas,
- Access for marginalised areas,
- Education networks,
- Tourism networks,
- Recreation networks,
- Air quality,
- Strategic development projects,
- 2010 projects,
- Concentration of potential NMT users,
- Visibility, and
- Space and cost.

These principles were mapped out and concentrations/clusters of priorities were spatially depicted. The resultant spatial distribution and concentration of principles helped to determine 10 priority areas for implementation. These principles are analysed in the next chapter, alongside the key performance

indicators identified in the precedent cities in Chapter 2. The 10 priority areas are as follows (City of Johannesburg, 2009):

1. Soweto network,
2. Inner City network,
3. Alexandra – Wynberg – Sandton – Linbro Park network,
4. Rosebank precinct,
5. University of Johannesburg route,
6. Zandspruit / Cosmo City priority route to Northgate,
7. Diepsloot priority route,
8. Ivory Park route to schools and Midrand,
9. Orange Farm priority school zones, and
10. Braamfontein Spruit route.

Out of these 10 priority areas, the City has already started to implement four of these routes, which include dedicated cycle paths in Zandspruit, Soweto, Braamfontein, Auckland Park, Westdene, Sophiatown, Alexandra, and Sandton. These routes form a central part of this research and are discussed and mapped out later in this chapter.

4.4.5 South African Road Classification and Access Management Manual

As explained in Table 13, this manual is meant to guide governments on the functional classification of roads and, on how roads must be managed in order to function effectively, in accordance with its classification (Committee of Transport Officials, 2012). The manual defines two types of roads; mobility roads and access/activity streets. It explains that mobility roads are higher speed routes on which mobility is dominant, and access and pedestrian crossings are limited to defined and clearly demarcated positions at widely spaced intervals. These are the vehicle-priority routes in a road network (Committee of Transport Officials, 2012).

Access, or activity streets, on the other hand, cater specifically for land access as well as associated activities. It is the provision of access for both vehicles and NMT users from the street to adjacent land and the activities, which is the predominant function. As such, the function of these streets is not only to provide land access, but provision must also be made for pedestrians and cyclists (Committee of Transport Officials, 2012).

The manual makes use of a six-class rural and urban road classification system. The first three classes are mobility roads while the second 3 are access streets (see Table 15):

Table 15: Six-class road classification (Committee of Transport Officials, 2012)

Number	Function	Description
Class 1 Class 2 Class 3	Mobility	Principal arterial Major arterial Minor arterial
Class 4 Class 5 Class 6	Access/activity	Collector street Local street Walkway
(Committee of Transport Officials, 2012)		

The manual explains that, in general, pedestrian and bicycle facilities should be provided anywhere where there is a reasonable expectation that such facilities will be used, even if the number of NMT users are relatively low. However, on Urban Class 4a, 4b and 5a streets (in urban Class 5b streets NMT users use the roadway) pedestrian footways and bicycle lanes should be standard. The standard of the facilities should be adequate enough to promote increased pedestrian and cycle usage (Committee of Transport Officials, 2012).

Urban Class 4 streets are collector streets and are used to penetrate local neighbourhoods with the purpose of collecting and distributing traffic between local streets and arterial systems. Class 4a streets are found in areas with commercial, business, industrial, shopping and mixed-use residential developments. Ideally, these are your CBD streets, shopping centre streets, activity spines and industrial distributors. Class 4b streets are found in residential areas and almost exclusively serve residential traffic and public transport (Committee of Transport Officials, 2012).

Urban Class 5 streets are local streets which provide access to individual properties. Class 5a local streets are found in areas with commercial, business, industrial, shopping and mixed-use residential developments. They often carry a high percentage of heavy vehicles which use the street to access loading areas or bus stops. Class 5b local streets are found in residential areas and almost exclusively serve residential traffic and, possibly, some public transport, as well as refuse and small delivery trucks (Committee of Transport Officials, 2012).

Class 6 streets are urban walkways which give priority to pedestrians at all times. These are classified into 6a “pedestrian priority” streets and 6b “pedestrian only” streets (Committee of Transport Officials, 2012). As these streets are NMT focused, NMT users generally have space and safe passage on these streets, however, there may still be a requirement for dedicated lanes and other supporting infrastructure for different NMT users.

Lastly, the manual also mentions that one-way cycle lanes of 1.8m wide (1.2m minimum) should be provided, where necessary, on mobility roads (Class 1 to 3) by widening the carriageway or alongside the pedestrian footpath, if there is one. Two-way cycle lanes need to be 2.5m to 3.5m wide. Table 16, which is adapted from the manual, describes each road class in more detail.

Table 16: Urban Access Management Requirements and Features

Basic Function	Description		Requirements		Typical Features		
	Class no	Class Name	Design Typology	Access to Property	Typical Cross Section	Public Transport Stops	Cycle Lanes
Mobility	1	Principal arterial	Freeway	Not allowed	4/6/8 lane	No	No
	2	Major arterial	Highway	Not allowed	4/6 lane divided, kerbed	Yes, at inter-sections	Yes – widen roadway
	3	Minor arterial	Main road	Not allowed	4 lane divided or undivided, kerbed	Yes, at inter-sections	Yes – widen roadway
Access / Activity	4a	Collector street, commercial	Commercial major collector	Yes (larger properties)	4 lane, median, boulevard, CBD one-way	Yes, at inter-sections or midblock	Yes, widen road or on verge
	4b	Collector street, residential	Residential minor collector	Yes	2/3 lane undivided	Yes anywhere	Yes, on road or verge
	5a	Local street, commercial	Commercial access street	Yes	2 lane plus parking	If applicable, anywhere	Use roadway
	5b	Local street, residential	Local residential street	Yes	½ lane mountable kerbs	If applicable, anywhere	Use roadway
	6a	Walkway, non-motorised priority	Pedestrian priority	Yes	Surfaced	If applicable, anywhere	Rare
	6b	Walkway, non-motorised only	Pedestrian only	Yes	Block paving		Yes
Adapted from Committee of Transport Officials (2012)							

4.4.6 Gauteng 25-year Integrated Transport Master Plan (ITMP)

The Gauteng 25-year ITMP does not deal directly with cycling; however, it does speak about the need to provide for NMT on class 2 to 5 road networks. Under road standards, the plan stresses the lack of NMT facilities along a large percentage of the current road network, and that this should be addressed and all new class 2-5 roads should specifically prioritise formalised NMT facilities. The Gauteng Province is currently working on finalising the Gauteng NMT Master Plan, which seeks to encourage municipalities to promote cycling as an alternative mode of transport.

The draft NMT master plan proposes priority areas for interventions. These interventions are divided into infrastructure projects and non-infrastructure projects (Gauteng Department of Roads and Transport, 2014). With regards to infrastructure, the draft plan states that this should be done at two levels. The first level is to improve NMT conditions by reducing the dominance and threat of motorised transport. The second level is to create specific NMT facilities, such as new cycle lanes (Gauteng Department of Roads and Transport, 2014).

With regards to non-infrastructure projects, the plan proposes the following recommendations (Gauteng Department of Roads and Transport, 2014):

- Update policies, guidelines and standards to create uniform implementation of NMT facilities in Gauteng,

- Develop a baseline data and NMT inventory,
- Further Policy Development,
- NMT road safety and security strategy,
- Funding and budgeting for NMT projects,
- Strengthen institutional setup and capacity building,
- Access to bicycles,
- Community participation, marketing and awareness and training and education,
- Local economic development and job creation, and
- Land use and development.

4.4.7 City of Johannesburg Complete Streets Design Guideline

The Complete Street Design Guideline was developed to guide the City of Johannesburg in developing a street system that is in line with the concept of liveability by encouraging walking and cycling, catering for all user groups, and encouraging the use of public transport (City of Johannesburg, 2013). In essence, this guideline is meant to guide the City into developing streets that will accommodate all road users and decrease the reliance on private motor vehicles.

The guideline is extremely detailed and deals with design guidelines for pedestrians, cyclists, public transport, motor vehicles, road verge, surface treatment, storm water drainage, landscape planting, gravel roads, and on-street trading (City of Johannesburg, 2013). While many of these aspects play an important role in making streets safer and accessible for all road users, including cyclists, this research focuses mainly on those primary and secondary aspects which deal with the planning and designing of safer spaces for cyclists. The primary aspects are aspects related to specific cycling interventions, while the secondary aspects deal with aspects which are directed at other road users, but have a significant impact for cyclists.

The notion of the Complete Streets Guideline is based on a few guiding principles which are meant to guide planners and engineers to design inclusive and liveable streets. The guideline seeks to balance the needs of all road users within the public right-of-way (roads), by providing safe and convenient travel access to cyclists, public transport users and operators, heavy vehicles and car drivers, and people of all ages and disabilities. It seeks to promote active living by providing safe and attractive conditions for walking and biking, and it seeks to improve air quality by reducing car use (emissions) and incorporating trees and vegetation (City of Johannesburg, 2013, p. 4).

Complete Streets recognises that not all streets are able to accommodate all road users, but it adopts the same functional road classification guidelines as mentioned in the South African Road Classification and Access Management Manual (as discussed in Table 16). This means that class 2-5 roads are recognised as streets which should accommodate cyclists, either with variable standards or with high standards (City of Johannesburg, 2013).

In explaining the process used to achieve complete streets, there are three main points which need to be considered in an effort to achieve a complete street. Firstly, to identify the current modes of transport appropriate for the areas. Secondly, to determine the complete street gaps – those design elements such as facilities, and other transportation components, that are necessary for a complete

street. Lastly, to identify the right-of-way width and determine the appropriate number of vehicular, transit, and bike lanes (City of Johannesburg, 2013). The guideline develops the notion that cycle lanes are not based on space, traffic requirements, or percentage of users, but rather that cycle lanes are to be considered as part of road design. It is a matter of how many, and what width of lanes, not whether they should or should not be developed.

This is mentioned in the guideline classifications which states that, in the complete street concepts, streets are categorised into broader typologies that account for NMT road users (pedestrians, cyclists, and public transport) as well as land use context and environmental factors. These typologies are seen to complement the complete street paradigm as they allow for a more comprehensive understanding of a street's existing and desired functions (City of Johannesburg, 2013).

4.4.7.1 Designing for cyclists

With regards to designing for cyclists, the guideline proposes four different classes of bicycle roads (City of Johannesburg, 2013):

- Class 1 bicycle roads – a bicycle road has an independent alignment in a cycle reserve.
- Class 2 bicycle ways – provided within the road reserve of a street or road, either on or adjacent to the carriageway.
- Class 3 bicycle lanes – specifically marked on the roadway pavement, usually unprotected (streets with 80km/h speed limit).
- Class 4 bicycle routes – accommodated on the roadway, shared with vehicular traffic and indicated by road signs only (maximum vehicle speeds of 50km/h, but preferably lower than 40km/h)[2]

4.4.7.2 Designing for Public Transport

With regards to public transport design, many of the abovementioned policies mention the integration of cycling and public transport through cycling feeder routes to increase the catchment area of transit stops. With regards to the Complete Street Guideline, the guideline only mentions the need to design for park and ride facilities at transfer points where a large number of public transport users are located beyond walking distance, or where they cannot be served effectively by a feeder service (City of Johannesburg, 2013).

4.4.7.3 Designing for Motor Vehicle

As part of designing for motor vehicles, the guideline considers that when designing on-street parking, the parking should not encroach onto bicycle lanes. Mainly, though, the guideline considers the importance of cyclists when it comes to designing motor vehicle intersections. It states that intersections should be designed so that they are understandable, safe, and as easy to use as possible for a wide range of road users, including cyclists. To achieve this, the guideline suggests that intersection design should reduce crossing distance for pedestrians and cyclists (where possible), install appropriate pedestrian and cyclist markings, signage, and signals, and prioritise pedestrians and cyclists over turning

[2] According to the South African Road Classification and Access Management Manual, Class 4 roads have a speed limit of 60km/h (Committee of Transport Officials, 2012)

vehicles (City of Johannesburg, 2013). Similarly, as part of traffic circle designs, the guideline suggest that roundabouts should be designed to encourage cyclists to control the circulating roadway (City of Johannesburg, 2013).

4.4.8 National Non-Motorised Transport Facility Guidelines

Like the Complete Street Design Guideline, the NMT Facility Guideline is probably South Africa's most detailed NMT guideline and deals with the development and promotion of NMT in all aspects. Unfortunately, this research cannot go into all the detail within this guideline, however, it does attempt to provide a brief summary of what the guidelines recommend with regards to improving cyclists' rights in South African cities.

The NMT policy looks to encourage planners to improve NMT conditions by planning complete networks of NMT routes. This can be done through translating NMT needs into complete networks and by looking at other constraints, such as road classifications and user types. Once the areas for NMT are identified and the programmes are in place, the planning process needs to consider the appropriate facilities. These can be broken down into route planning and intersection planning (Vanderschuren, et al., 2014).

In general, planners either need to add NMT networks into already developed areas, or they are planning for new developments with NMT in mind. In the case of new developments, the NMT policy states that NMT should be the first input considered by planners as it requires certain fundamentals which need to be adhered to (Vanderschuren, et al., 2014). Unlike motorised transport, NMT requires more physical effort, therefore, the route and network plans for NMT users need to have low gradients, and need to consider user functionality with easily controlled access. Additionally, these developments should be planned in such a way that NMT can be considered as the primary mode of transport for short trips (Vanderschuren, et al., 2014).

While some of these aspects are important when planning networks in developed areas, it is hard to consider road gradients and short distance trips when these are already predefined, based on the current layout of the area. Planning for NMT in developed areas needs to follow a more detailed process of understanding the current context; this process includes a status quo assessment, situational analysis, needs assessment, budget constraints and the development of required programmes and necessary plans (Vanderschuren, et al., 2014).

When it comes to cyclists, the NMT policy defines three different types of cyclists; neighbourhood, commuter and recreational cyclists, each of which may require different considerations. Commuter cyclists are, generally, young and less adept on their bicycles and, therefore, need greater protection and more careful planning to ensure they are safe in the transport environment. The recreational cyclist rides for enjoyment and, therefore, seeks out open spaces, boulevards, parks and green routes separated from traffic. They also cycle over longer distances and at higher speed, meaning they require more space on major arterials (if they are to cycle on roads). The neighbourhood cyclist rides over a short distance within the suburban neighbourhoods, which are generally characteristic of quiet streets. They require road space and traffic calming to ensure visibility and lower vehicles' speeds (Vanderschuren, et al., 2014).

Table 17 identifies the three types of cyclists and the considerations for planners (Vanderschuren, et al., 2014, p. 28):

Table 17: Cyclists' considerations

Neighbourhood Cyclists	Commuter Cyclists	Recreational Cyclists
• The highest degree of safety • Comfort and personal security • Low traffic speeds and traffic volumes • A good separation from traffic on busy roads • Minimal gradients • Facilities for crossing busy roads • Secure parking at destinations • Good street lighting	• High quality road surfaces • Direct and coherent routes • Minimal delays • Facilities that give them their own space • Intersections that minimise conflict with other traffic • Good street lighting • Secure parking at, or close to, destinations • Facilities, such as change rooms, lockers and showers at destinations	• Comfort • Good surfaces • Minimal gradients • A high degree of safety and personal security • Routes that are pleasant, attractive and interesting • Screening from weather and wind • Parking facilities at start points or at attraction sites

(Vanderschuren, et al., 2014)

Johannesburg has a large number of recreational cyclists, which can be seen in the numerous cycling events which are held throughout the year. However, the current plans in Johannesburg are focused around cycling as a mode of transport, which includes both neighbourhood cyclists and commuter cyclists. Similarly, this research focuses on the rights of commuter cyclists; it is concerned more with cycling as a mode of transport rather than as a recreational activity. As has been mentioned already, there is an unfortunate perception that cycling is either for the poor, who cannot afford a car, or for the rich who cycle recreationally. However, when planning for cyclists, it is important that planners consider the fact that recreational cyclists are possible commuter cyclists who may opt to cycle more frequently if cycling conditions are improved.

The NMT policy defines certain key steps that need to be taken when planning a cycle route network. These are (Vanderschuren, et al., 2014):

- Develop an inventory (current and potential cyclists, demand for cycling, amongst others),
- Determine the needs for cyclists (based on the considerations mentioned in Table 17),
- Map existing facilities, routes, bicycle-related accidents and bicycle volumes,
- Map main infrastructure barriers and identify missing connections,
- Assess and understand potential demand,
- Prioritise bicycle network structure, including route components, and
- Develop sketch plans for bicycle network infrastructure (this is based on translating the information from the previous step onto a map and making the connections).

These key steps point to a process which needs to be undertaken by cities before actual implementation begins. It is important to develop a complete and coherent cycling network, based on current cycling conditions and projects in cities. This will ensure maximum connectivity and it will ensure that the needs of cyclists are being addressed through the planning process.

Furthermore, the NMT policy also considers the design concepts, which need to be considered when designing for cyclists. The concepts are meant to allow for integration of cycling with other modes of transport and provide a network where mobility routes, bicycle lanes and walkways complement one another and function within the context of their location. Part of these design concepts is the aspect of road classification, which has been discussed in many of the previous documents. The NMT policy proposes that NMT facilities should be provided on three classes of roads. These are based on the South African Road Classification and Access Management Manual and include the following (Vanderschuren, et al., 2014):

- Mobility spine (Class 2 and 3 roads),
- Collectors (Class 4), and
- Access (Class 5).

Lastly, the NMT policy looks at the actual road design and the design of cycle routes. The policy mentions that the roads need to accommodate all modes of transport and users in a safe and comfortable manner. The policy deals with aspects of universal design requirements for bicycle facilities, separation and the different degree of separation based on road classifications, drainage designs, bridges and underpasses, intersection design requirements, signage and road markings (Vanderschuren, et al., 2014). As mentioned, the policy is extremely detailed with regards to planning for NMT; however, this research cannot go into the detail of the design as it is more concerned with the framework which promotes the rights of cyclists.

It is clear from all the above mentioned policies that the City of Johannesburg, and South Africa in the broader context, are attempting to shift policy to recognise the importance of NMT as a mode of transport. The policies discuss the importance of balancing resources and sharing road space between different users. They also speak about the importance of detailed planning when it comes to NMT networks and coherent routes for NMT users. Lastly, in a space like Johannesburg, the policies recognise the spatial configuration of the city and the need to integrate NMT with other forms of public transport. It has been over ten years since some of these policies have been introduced and, since then, the City has started to introduce cycling projects. These projects are discussed in the next section, and they form an integral part of this research in explaining how Johannesburg attempted to improve cyclists' rights to the city.

4.5 Current NMT Projects in Johannesburg

Based on the above mentioned policy and legislative frameworks, the City of Johannesburg began to roll out cycling projects across the metropolitan area. Figure 9 shows the four different areas in which cycling projects have been concentrated: these are the Zandspruit Cycle Route, the Soweto Cycle Route, the Central Johannesburg Cycle Route, and the Alex to Sandton Cycle Route. The literature that follows is an introduction to these projects, explaining what has been done. This is not an analysis of the projects; it is a background. The analysis of the projects forms part of the next chapter.

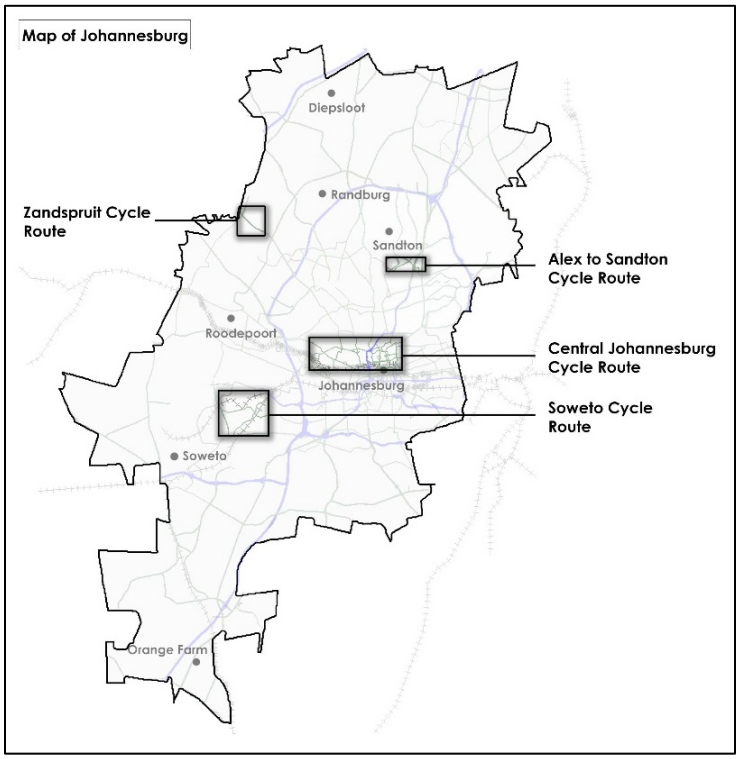


Figure 9: Map showing the location of the cycle projects within the Johannesburg Metropolitan Area (Source: Author)

The Zandspruit Cycle Route was the first cycle lane project in the city of Johannesburg. The project started in October 2007 and has seen the implementation of a 3.4 kilometre shared NMT space for both cyclists and pedestrians. Figure 10 shows the extent of the NMT lane which runs alongside Zandspruit Extension Nine along Marina Street and Beyers Naude Drive. Marina Street is a well-used minibus taxi route, as neither the Metrobus nor Rea Vaya service the route. Beyers Naude Drive is a North South connector route which runs directly into Central Johannesburg, making it an important link to the city. Although this project was initiated before the 2009 NMT framework, the framework still identifies Zandspruit as a priority route. 'Area six' of the framework looks at a route connecting Zandspruit and Cosmo City to Northgate (City of Johannesburg, 2009). Cosmo City is a large informal settlement just west of Zandspruit, while the Northgate Precinct is west of Beyers Naude. The framework looks to link the two settlements to Northgate, as residents could benefit from the amenities, economic

opportunities and public transport networks in the Northgate Precinct (City of Johannesburg, 2009). The images in Figure 11 show the width and paving of the NMT shared lane. The shared lane is separated between pedestrians and cyclists by a red brick line. The shared lane is further separated from the road reserve by either bollards or concrete barriers. The community is using the pathway as an economic opportunity, with informal trading bordering almost the entire path.

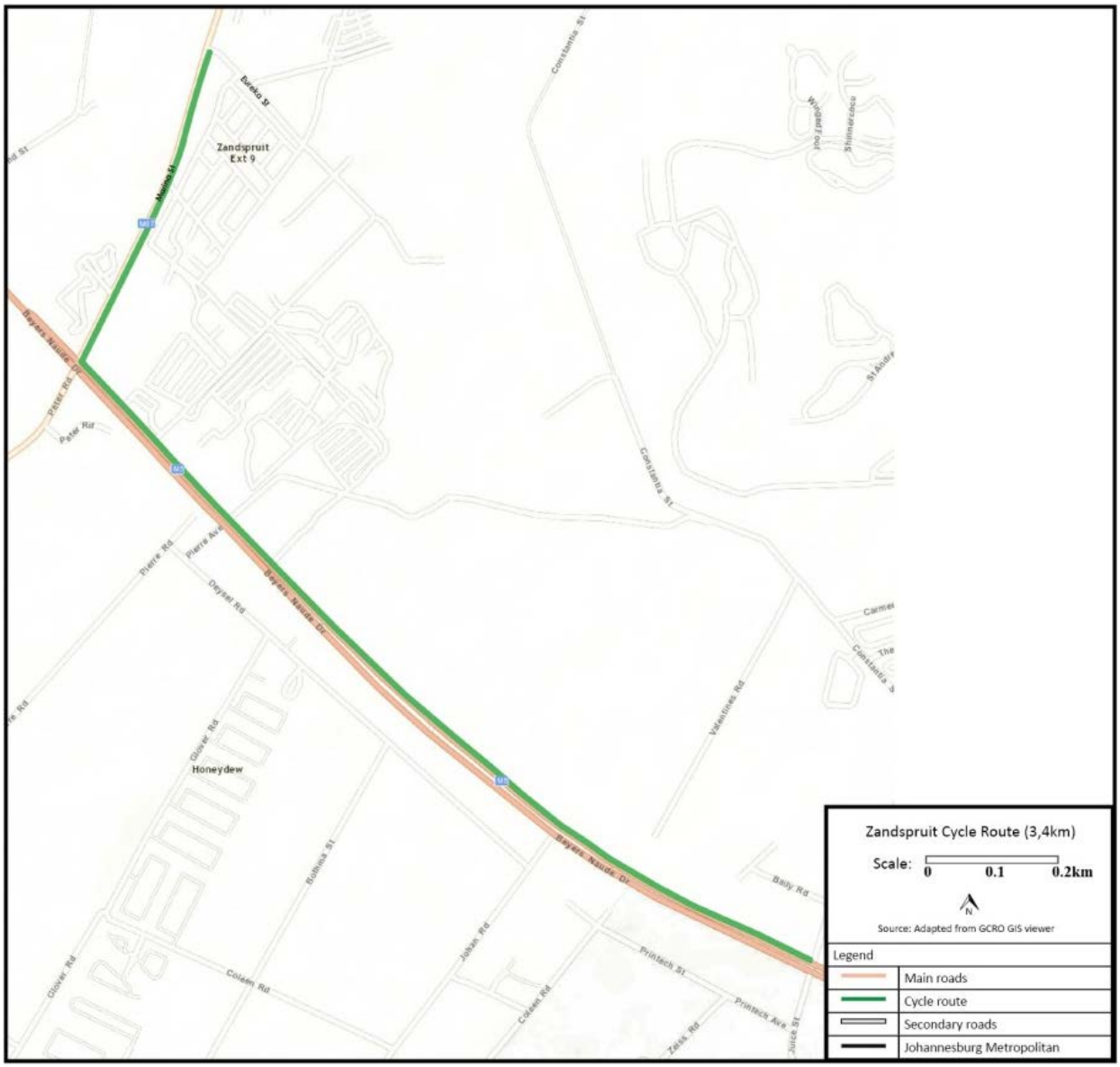
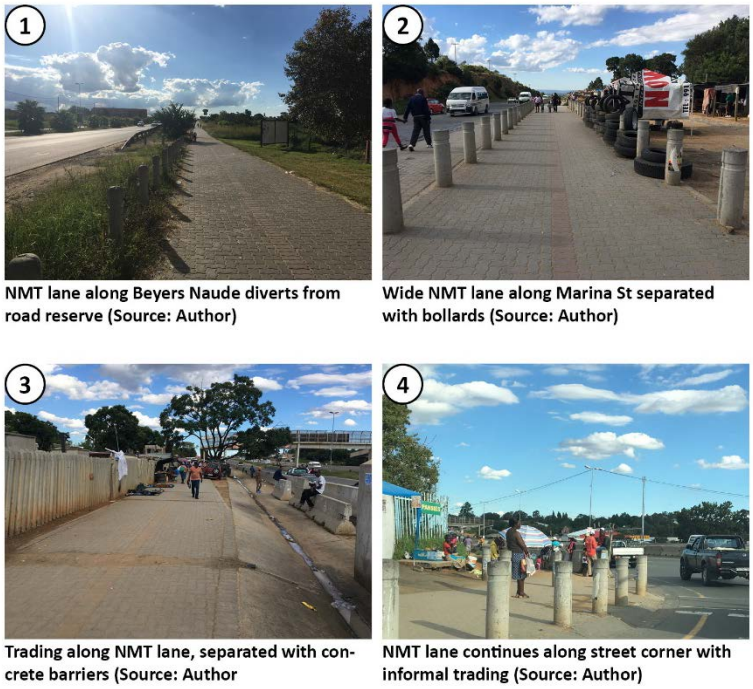


Figure 10: Map pf Zandspruit cycle lane (Source: Author)



NMT lane along Beyers Naude diverts from road reserve (Source: Author)

Wide NMT lane along Marina St separated with bollards (Source: Author)

Trading along NMT lane, separated with concrete barriers (Source: Author

NMT lane continues along street corner with informal trading (Source: Author)

Figure 11: Images illustrating the design of the Zandspruit cycle lanes

The second project, initiated by the City of Johannesburg, is the Soweto cycle route. The first phase of the project was completed in October 2014 and included 5 kilometres of dedicated cycle path in Orlando East, Soweto (City of Joburg, 2014). The project was guided by the 2009 NMT Framework. The Soweto network is the first of the ten priority areas for intervention, identified in the framework. The policy states that 40% of the Johannesburg population reside in Soweto; as such, it is a key area for intervention. The 5 kilometre route linked residential areas with schools, clinics, police station, the Orlando Stadium, as well as Rea Vaya and Metrorail Stations (Magangane, 2014).

However, as illustrated in Figure 12, the project did not stop at 5 kilometres. Following the launch of the first phase, the City started a bicycle distribution project, which focused on the schools that were being serviced by the bike lanes. Due to this initiative, the City decided to extend the cycle lane project to the surrounding areas to the East of Orlando, into Dube and Lakefield. The extended lanes run through the residential areas and link to a number of schools in the area, as well as to major tourist destinations; like Vilakazi Street; home of former president Nelson Mandela and Archbishop Desmond Tutu, and the Hector Pieterson Memorial and Museum which exemplifies the struggles of the youth during apartheid. The total length of the network, including the extended lanes into Dube and Lakefield, is approximately 13 kilometres.

The design of the Soweto cycle lanes (as shown in Figure 13) are based on two different designs, the first is a paved pathway with bollards, and the second is a green paved pathway. Both of these occur along the sidewalk and do not form part of the road reserve (Pictures 1 to 6). The differences in the designs

are based on the different phases of the project. Pictures (1) and (2) (Figure 13) show the first phase of the Soweto project which, like the Zandspruit route, provides a brick paved cycle lane and bollards to separate the lane from the road. Pictures (4), (5) and (6) (Figure 13) show the extended project into Dube and Lakefield, which provide a green paved pathway for cyclists with no bollards. This change in design is most likely the result of new policy, specifically, the Complete Street Design Guideline (City of Johannesburg, 2013). The design guideline states that StreetBond CL, which has been applied in Australia and USA, is the least expensive way of marking cycle lanes while, at the same time, providing a skid resistant surface with enhanced visibility (City of Johannesburg, 2013). The 'green' cycle lanes have now become a standard and have been adopted by the NMT Facility Guidelines as well, and can be found in other parts of Johannesburg, as well as in other cities in South Africa, such as Cape Town.

The images in Figure 13 also show that the lanes have signage and markings, and there are on-street markings where the path crosses the road. Pictures (2) and (5) show the cycle lane passing a school in Dube and in Orlando East. As mentioned, the Soweto network seeks to link schools in the area.

Picture (2) shows the yellow 'Qhubeka' bicycles, which are part of the cities bicycle distribution project. Pictures (3) and (4) indicate that, at some points along the route, the cycle lane merges into a shared NMT pathway.

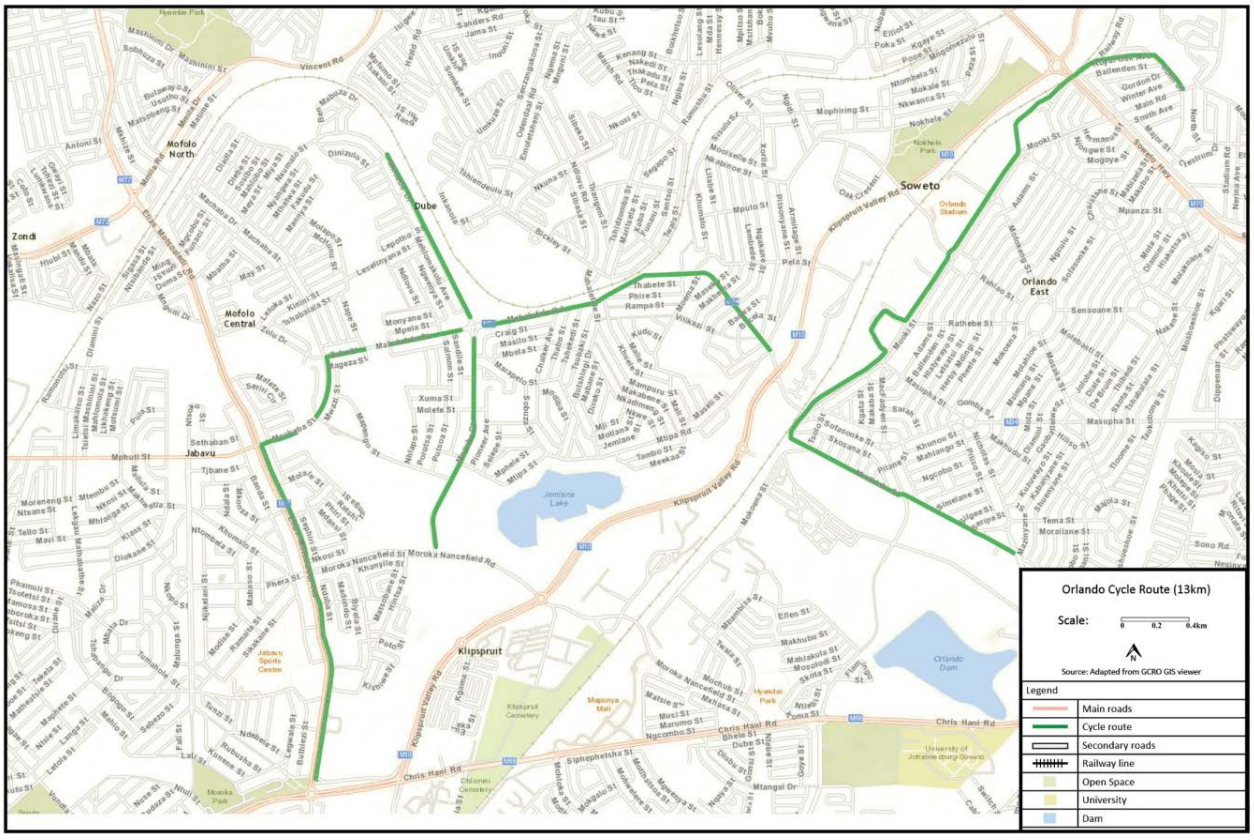


Figure 12: Map of Orlando cycle lane (Source: Author)

Figure 13: Images illustrating the design of the Orlando cycle lanes

The third project which was initiated around 2012 is the Inner City Network, and is the largest cycling project in the Metropolitan of Johannesburg. The project was done in three different phases; the last of which was completed in 2016. Maps 1 and 2, in Figures 14 and 15, show the full extent of the cycle lane, which runs from Doornfontein, on the west of the CBD, and ends in Coronationville, to the east of the CBD. The total length of the route is approximately 20 kilometres, however, as can be seen, there are a number of gaps along the network, which are largely based on the different phases of the project. Based on the NMT Framework, the route corresponds to 'area two', which is the Inner City Network, and 'area five' which is the University of Johannesburg (UJ) Route.

The route shown in Figure 14 (Map 2) consists largely of the first phase of the project, which was launched in 2014. The route passes the UJ Doornfontein Campus and Wits University. It also runs along some of the BRT routes and passes the Gautrain Park Station. It runs through the CBD, at some points, along Joubert Park, and continues to run along the north end of the CBD through Hillbrow and Braamfontein. The route was given priority due to the area being concentrated with amenities, economic activity, institutional facilities and public transport facilities (City of Johannesburg, 2009).

Map 1 (Figure 15) largely focuses on the extended project, which are Phases 2 and 3. The map does include aspects of Phase 1, such as the UJ Bunting Road and Auckland Park Campuses. The areas to the

east and south of the map are extensions aimed to link the cycle routes to the Langlaagte Metrorail Station and to schools in Westdene, Sophiatown and Coronationville.

The images in Figures 16 and 17 provide a sense of the different types of cycle lanes that can be found within the Inner City Network. The different designs are based on the Complete Street Guideline. As such, all routes in the inner city are green paved cycle paths with yellow markings. Around the CBD, the lanes are on-street and are either divided from motorised traffic with yellow rumble strips (as seen in Pictures 1 and 3) or with parallel parking and rumble strips (Picture 2). Around Auckland Park, there are some lanes which form part of the raised sidewalk, but are separated from pedestrian traffic with a planted median (Pictures 5 and 6).

In Sophiatown, Westdene and Coronationville, you find a standard design where the cycle lane is at a street level but separated from both vehicles and pedestrians by a raised kerb (see Pictures 7 to 12). The images (10, 11 and 12) also show the transition from the cycle path to road reserve at intersections and pedestrian crossings. Picture (7) shows a wheelchair user making use of the cycle lanes, giving evidence to the fact that the transition from the road and sidewalk to the cycle path is smooth and can be navigated by wheelchair.

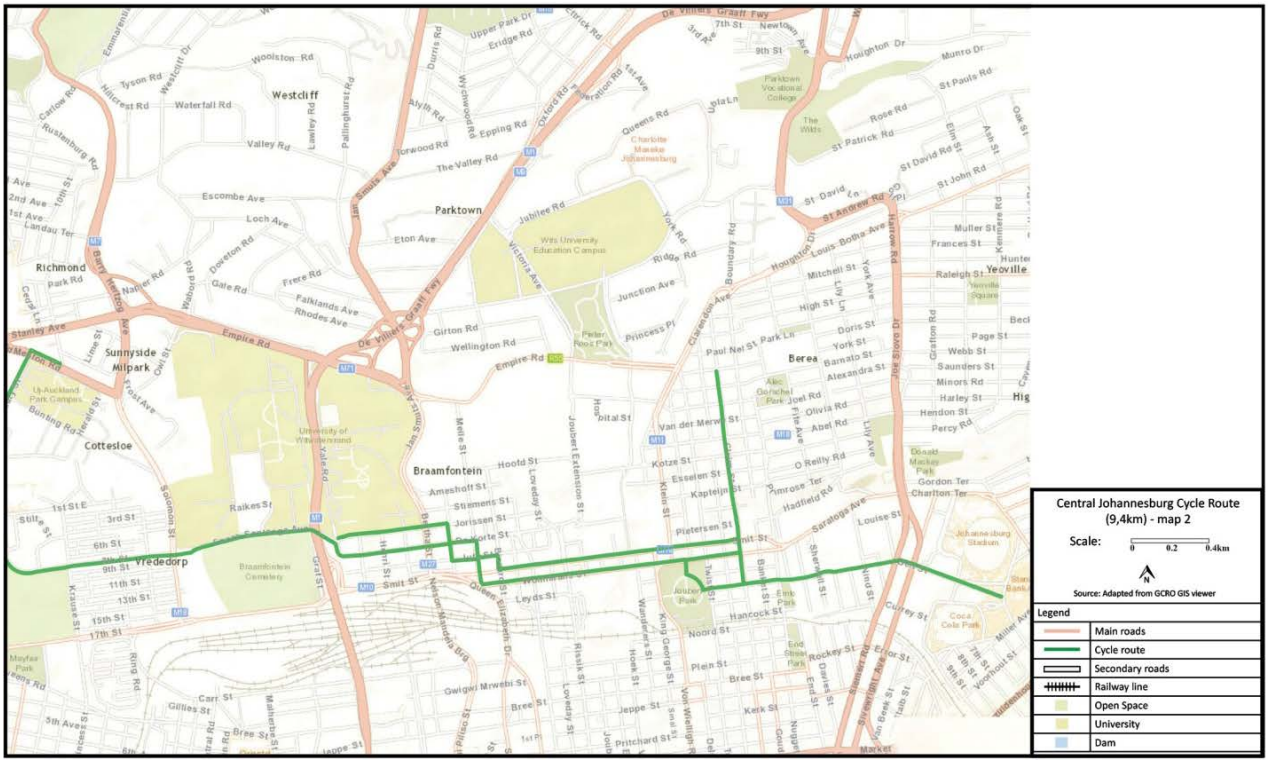


Figure 14: Map 2 showing the first phase of the Central Johannesburg cycle lanes (Source: Author)

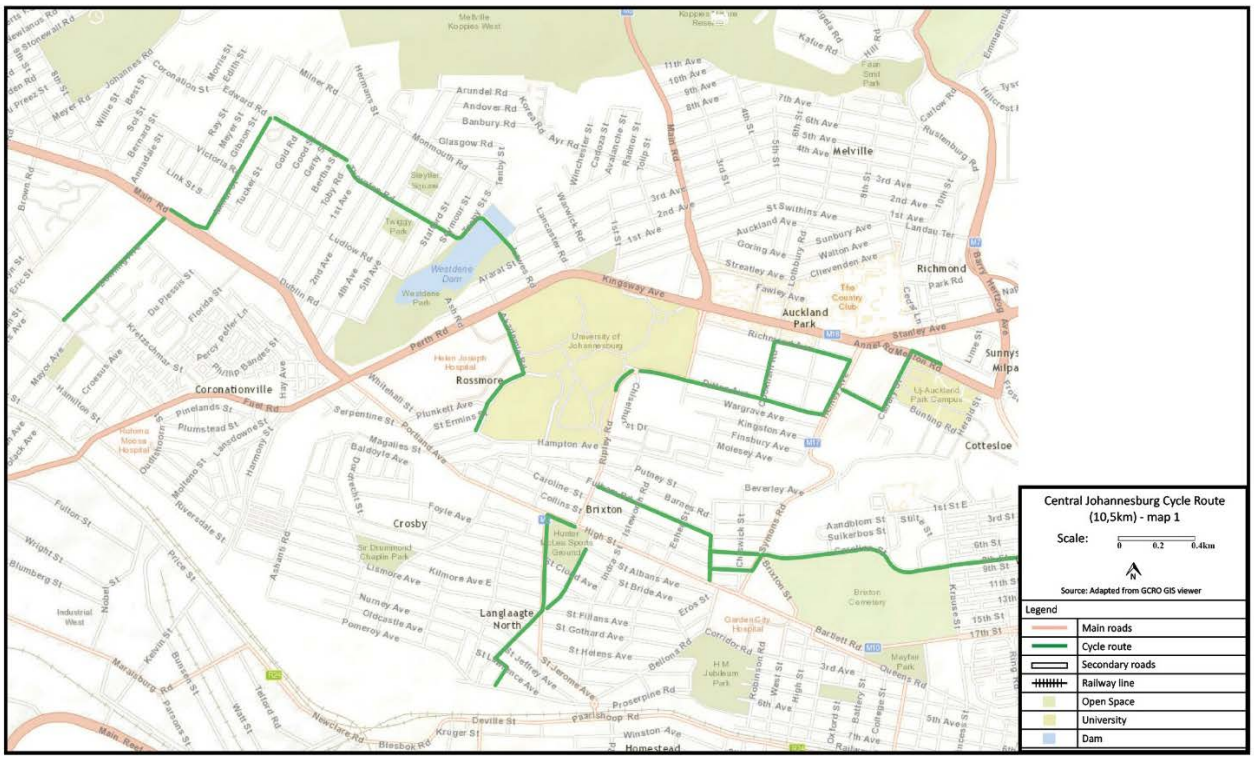


Figure 15: Map 1 showing the second phase of the Central Johannesburg cycle lanes (Source: Author)

On-street cycle lane with rumble strips passing Wits University (Source: JUCA)

Rumble strips stop cars from parking on cycle lane in Braamfontein (Source: JUCA)

Quiet residential street with rumble strips in Brixton (Source: JUCA)

Kerbed separation between cyclists, vehicles, and pedestrians (Source: JUCA)

Clear separation between pedestrians and road reserve (Source: Author)

Paved cycle path on sidewalk in Auckland Park (Source: Author)

Figure 16: Images 1 to 6 showing cycle lanes along Map 1

Wheelchair user making use of cycle path in Sophiatown (Source: Author)

On-street cycle lane with kerb separation (Source: Author)

Cycle lane in Westdene along street corner (Source: Author)

Cycle lane in Coronationville running alongside a school (Source: Author)

Signage, bollard and road markings at intersection (Source: Author

Easy transition from pedestrian crossing onto cycle lane (Source: Author)

Figure 17: Images 7 to 12 showing cycle lanes along Map 2

The fourth, and most recent, project is the Alex to Sandton cycle route, which is around 3.8 kilometres long, as shown in Figure 18. The cycle lane runs along Grayston Drive and crosses over the M1 freeway, which has been a major barrier for NMT users commuting to Sandton from Alex. As part of the project, the City initiated a secondary project to develop a dedicated NMT bridge over the M1 freeway. The bridge is a major step in prioritising NMT movement in the city and in choosing the most direct and coherent route for NMT users. Like the other projects, the project is based on the NMT Framework and is in line with 'area three' of the framework, which looks to implement a route linking Alexandra, Wynberg, Sandton and Linbro Park. Linbro Park is not in the network, as yet, and the current extent of the lanes ends on the boarder of Alexandra and Wynberg, and does not actually enter into Alex.

The images in Figure 19 (Pictures 1 to 6) show that the layout and infrastructure of the lanes are similar to that seen in the Inner City Network and in the second phase of the Soweto network. However, there are two major differences in the project. The first is the bicycle traffic signal, as seen in Picture (5). Intersections are seen as conflict points for all road users, by installing dedicated traffic signals along the path; it alludes to the fact that more recent cycling projects are recognising the need for controlled movement at intersections.

The second major difference is the NMT bridge across the M1. This bridge is seen as an iconic walkway linking one of the poorest communities in Johannesburg to the richest square mile in Africa (Sun International, 2014). It has already been mentioned in this chapter that a large proportion of Johannesburg's residents cannot afford cars and, due to this, walking is still one of the most used modes

of transport. Many residents from Alex commute across the Grayston M1 bridge, which is extremely congested by vehicles, in order to get to their places of employment in Sandton and the surrounding suburbs. While the majority of them walk or use public transport, there are some that use bicycles. With the implementation of the Alex to Sandton network, it provides an opportunity for the City to invest in a more safe and coherent option for NMT users. This is significant because many of the dedicated cycle lanes occur along lower class residential streets where roads are wide enough and space already exists. However, this is a major investment and an entirely new dedicated NMT bridge which prioritises the movement of vulnerable road users. As can be seen in Picture (3), the bridge is split equally between a two-way cycle lane and a pedestrian footpath; both of which continue on either side of the bridge and connect to the rest of the cycle network, as mapped out in Figure 18.

Figure 18: Map of Alex to Sandton cycle lane (Source: Author)

Cycle lane along sidewalk in Wynberg (Source: Author)

Signage and bollard along cycle route (Source: Author)

NMT bridge across M1 highway connecting Alex and Sandton (Source: Author)

Raised two-way cycle lane along Katherine St in Sandton (Source: JUCA)

Cycling traffic signal along Linden St in Sandton (Source: JUCA)

Transition between road and cycle lane with bollards (Source: Author)

Figure 19: Images illustrating design of the Alex to Sandton cycle lanes

The maps, images, and explanations, provided above, are an indication of the work that the City of Johannesburg has done in an attempt to promote cycling in the city. As can be seen from the maps, some of the lanes are quite extensive, the longest being 20 kilometres (Inner City), while others are relatively short; 3.4 kilometres (Zandspruit). The maps also show the continuity in the lanes, where it is clear that there are some gaps in the longer routes; however, the shorter routes in Sandton and Zandspruit seem to be continuous.

The images show the differences in the design of the lanes as well. The first design is a paved brick lane situated along the sidewalks, separated from motorised traffic by bollards. These are the lanes which were done first in Zandspruit and Orlando (Phase 1). The second design can be seen in the inner city (Map 1) and in Orlando (Phase 2). These are green painted lanes along the side of the road reserve which are separated from motorised traffic by yellow rumble strips. The last design, which is evident in the inner city (Map 2), and in the Sandton to Alex lanes, are also green painted lanes but are separated from motorised traffic by a raised pavement kerb.

The different lanes are an indication of the City attempting to find the most user friendly and appropriate infrastructure for these spaces. It is not clear if this has been found, but based on the NMT Facility Guideline, there is an indication that the green asphalt lanes will be standardised throughout the country, as these can be found in Johannesburg and Cape Town (Vanderschuren, et al., 2014). The last

project, which is the Sandton to Alex route, has brought about significant political conflict, due to the iconic NMT Bridge, which has cost the City millions of Rands (this is discussed further in the next chapter). The bridge is also seen to be iconic, as it is completely non-motorised; making it a statement by the City to show its commitment to prioritising NMT needs.

4.6 Résumé

Johannesburg has a rich history, due to the apartheid planning systems. The fact that planning was used as a means of crippling the city shows the power of planning in the providing and limiting of 'the right to the city'. The current state of transport in the city of Johannesburg is shocking, in the sense of how much congestion there is, yet how few people can afford cars. This, together with the fact that the city is so fragmented, emphasises the need for efficient public transport and NMT planning. Both of these aspects are strongly emphasised in the tools that have been listed and discussed in this chapter.

The positive aspect, portrayed in this chapter, are the cycling programmes identified in the NMT Framework, which led to the implementation of dedicated cycling infrastructure in four areas across the city. This shows that the City has identified the problem, and there is initiative by the City to address the problem. The chapter ends after introducing these projects, as the next step is analysing the impact of the projects. In promoting cyclists' rights to the city it is important to provide infrastructure but, more importantly, is to identify whether or not the infrastructure has achieved the desired impact. This is the basis of the discussion in the next chapter.

5 Analysis of Cyclists' Rights in Johannesburg

5.1 Introduction

To this point, several of the research sub questions have already been answered. The research explained the notion of the right to the city and discussed who has a right to the city. With regards to streets and transport planning, it was explained that all road users have an equal right to use public rights-of-way (streets) and that all road users should be accommodated for in the street space. The task for city planners is to improve access and safety for vulnerable road users in the street space. The research also looked at the importance of NMT for the future development of cities and the negative impacts of automobiles in cities. Consequently, the research supports the view that NMT planning should be further prioritised in the future development of cities.

Furthermore, the research discussed the planning tools; i.e. the policies, plans and frameworks, which aim to ensure that planning and development follows specific guidelines aimed to ensure that all road users are catered for equally. The research looked at international planning guidelines and developed a set of Key Performance Indicators (KPIs) which outline certain planning principles, which can be found in the six precedent cities. Chapter 4 introduces Johannesburg as the context and unpacks the different planning tools that exist in South Africa, and in Johannesburg.

Throughout the research, it has been reiterated that cyclists, like all other road users, have a right to the city, and that planning should consider the needs of NMT users (vulnerable road users), such as cyclists and pedestrians, as a priority when planning streets. In Chapter 4, the research produced evidence that Johannesburg has progressed with regards to cycling planning, in terms of cycling policy and strategies, and with regards to implementation of cycling based projects.

This chapter is an analysis and evaluation of this information. It answers the two outstanding sub-questions, which are: 'How can the City planners ensure that all road users have equality within the city?' and 'How can current cycle programmes provide cyclists with rights to the city'? As explained in the research methods, this research is an evaluation of cyclists' rights in the city. As such, the chapter analyses the primary and secondary data and compares it to the KPIs from the literature review, which is then combined and used to evaluate the planning tools outlined in the Chapter 4.

5.2 Perspectives of Cycling in Johannesburg

It is clear from the previous chapter that certain tools have been instrumental in the development of NMT and cycling based projects, across Johannesburg. However, have planners, through these programmes, been successful in addressing the rights of cyclists? This is in line with the main question of this research, which seeks to understand 'how can planners provide cyclists with equal rights to the city'?

The evaluation is divided into two sections. The first section is an evaluation of the primary data (interviews) complemented by the analysis of secondary data (articles). As explained by Balbach (1999), in case study evaluations it is useful to supplement the interviews with an analysis of documents, as they

could confirm comments or provide a secondary observation of the event. The second section of the evaluation is an assessment of the case studies based on the policies, strategies and KPIs.

5.2.1 Analysis of Interviews

The interview process focused on gathering qualitative data from individuals dealing with transport planning or cycling programmes in Johannesburg. These individuals are either from public or private sector, non-profit organisations (NPO's) and non-governmental organisations (NGO's), meaning that the analysis provides an outsider perspective, as well as a perspective from within the Johannesburg Municipality. It is useful to compare these perspectives to see if there is agreement across the sectors, or if there are differences of opinions as to what is being done and what should be done with regards to cycling planning and addressing the rights of cyclists in the city. In total, there are ten questions in the questionnaire, each of which is discussed in detail.

1. *Have you ever been a commuter cyclist in Johannesburg, (please elaborate as to when, where and why)?*

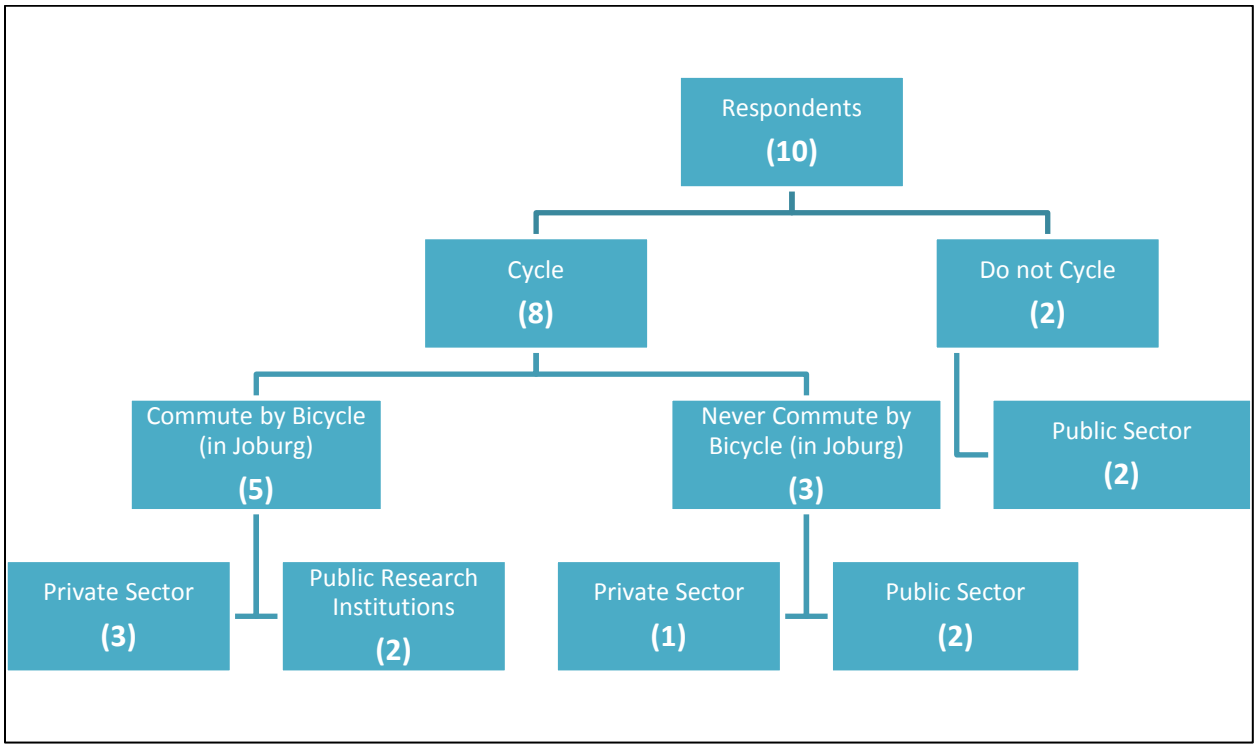


Figure 20: Diagram of responses to Question One

Figure 20 explains that, out of the ten respondents, eight respondents do cycle and two respondents do not. From the eight that do cycle, five are commuter cyclists and three are recreational cyclists. The two respondents who do not cycle are both from the public sector. This is not an overview of the public sector, as there are six respondents from the public sector, of which four do cycle. However, from the four that do cycle, only two are avid commuter cyclists and the other two are occasional recreational riders who cycle during City activations, but have never commuted in Johannesburg. What is concerning is that the two respondents that are commuter cyclists are researchers who work for public institutions

outside of government, while the other two, who do not cycle, hold high positions in government. The reason for asking this particular question is because this research seeks to speak to individuals who are, or have been, directly involved with cycling in the city of Johannesburg, and it is important to know whether or not these individuals have experience in commuting by bicycle or not. Out of all the respondents, it is comforting to know that eight out of the ten do use a bicycle. However, it is still concerning that the four respondents who are involved directly in the development, planning and design of cycling projects in the City, are not commuter cyclists. As one of the interviewees mentioned, planning can be a very difficult task to do if what is being planned is unfamiliar to those carrying out the task.

2. *As a transport planner/city official/cycling advocate, do you think cycling is a good alternative to private transport in Johannesburg (please elaborate)?*

The respondents are all in agreement that cycling is a good alternative. However, the general feeling is that the viability of it is dependent on the space (context) and the distances. There is an overall sense that Johannesburg can be a difficult city to cycle in, due to the long travelling distances and the dangerous environments. Those who feel strongly about cycling, and who commute regularly, feel that cycling is possible regardless of the conditions, but the City can do a lot more to make the conditions better. There is also a sense that cycling could work as an alternative in certain spaces, like around the inner city and/or in townships and suburbs. However, the respondents are all positive about cycling as an alternative to vehicles, just not in the current conditions.

Some of the important points highlighted by the interviewees are as follows:

- Cycling is a great alternative from a social, environment and economic perspective (commuter).
- Cycling has an advantage over the cars when amenities are in close proximity (non-cyclists).
- Due to high levels of unemployment, bikes can be a dangerous commodity to have in lower income communities as the metal is a tradeable commodity (public sector).
- People have a right to safety first and, if we can ensure this, then cycling can grow (public sector/female).
- There is a need to create a critical mass of cyclists; only then will cyclists be seen as an alternative. Without the mass, it is difficult to convince people (recreational cyclist).
- There are lots of cyclists in Johannesburg; they can be seen in many of the lower income areas like Thembisa, Diepsloot, Tembelihle; even in the city, one can see that cyclist numbers are increasing; there are no statistics to prove this (as the cycling statistics in Johannesburg have remained unchanged) but the increase in cycling can be seen every day (public sector).
- Johannesburg has a long history of prioritising vehicle movement (this can be seen in the urban form and the structure of the city) making it difficult to want to cycle. Regardless, I know many people that do cycle. When you speak to people who do commute via bicycle in Johannesburg, they speak vey poetically about their experience, despite the conditions (commuter, researcher).
- Not in the current road environment of the city; there is no specific provision for bicycles in terms of legislation, road space and road user culture (commuter).

- Cycling makes the city more attractive, and it is a means of giving people freedom; not everyone can afford the freedom of a car (public sector).
- The increasing congestion and petrol price might make the convenience of using the car fall away (public sector).

3. Are you familiar with the planning strategies which were used when planning the cycle lanes around Johannesburg (please elaborate)?

There are a number of policies relating to NMT and cycling in Johannesburg; these have been mentioned in the previous chapter. The most common document referred to by the interviewees is the 2009 NMT Framework. This is due to the document identifying ten areas for cycling interventions, which included Zandspruit, Soweto, Inner City and Alexandra. Five of the respondents felt as though planners relied on the 2009 NMT Framework as the main guideline for cycle planning in the city. One of the respondents, who is a developer, and who has been involved in cycling related developments since 2014, stated that his team relies on the Complete Streets Guideline. Another respondent, who is a director in the public sector, mentioned the Growth and Development Strategy (GDS) 2040, saying that the document highlights specific issues relating to NMT and cycling; such as traffic congestion, pollution, the need for public transport integration and the affordability of transport. The remaining respondents and, in fact, even those mentioned already, feel as though there is a need for Johannesburg to develop a standard guideline, such as a cycling master plan for the city, and the need for this is evident in the inconsistencies and lack of clear direction in the Johannesburg cycling projects.

Some of the important points highlighted by the interviewees also include:

- In the early 2000's, national government developed the Shova Kulula bicycle distribution plan. Fairly soon after this, Cape Town developed a Bicycle Master Plan. Cape Town was the first to have a bicycle master plan, while Johannesburg started to focus more on pockets of development, such as the cycling corridors, and the Alex and Soweto projects. There is a need for Johannesburg to develop an overall master plan, take what has been done and add new info, in terms of lessons learned, and develop an overall plan (consultant).
- The Gauteng Integrated Transport Master Plan 25 (ITMP25) asks all Gauteng Municipalities to develop 10kms of cycle lanes per year. Not many municipalities are living up to this. It seems it is followed more strongly in the larger municipalities, such as Ekurhuleni, Joburg and Tshwane. But the smaller cities are finding it more difficult (public sector).
- Shova Kulula is still ongoing, and this has been a strong movement by National and Provincial Government (public sector).
- When I started dealing with the City, it did not appear that there were existing strategies guiding the NMT agenda. Initiatives seemed to be very ad-hoc. The 2009 NMT Framework was the first of its kind in Johannesburg and, despite critiques regarding the document, it had good elements and it was the first to deal with cycling in detail (researcher).

3a. If so, do you think the strategies address the needs of cyclists in the city of Johannesburg?

Out of ten respondents, nine answered this question, seven of whom felt that there is a need to refine the policies and strategies in the City. These seven respondents, who are from the private and public sector, feel as though the projects that have been completed have been done prior to there being a clear plan or a clear direction for cycling in the City. Two of the respondents from the public sector indicated that both provincial and local government are working on developing NMT Master Plans and Cycling Manuals, thus, indicating that the City and the Province have realised this gap and are already attempting to provide the necessary tools required to fill the gap and ensure cyclists' needs are better catered for in the future.

From the two respondents who did not feel the need to refine the policies, the one who is a researcher in the public sector felt there is an effort being made to draw on best practice, and that the City did extensive homework prior to starting the programme. The feeling from this respondent is that Joburg was not, and is not, designed for cycling, so it is a difficult task for anyone to undertake. The example of some of the existing lanes was used to explain that – "even in areas where cyclists' needs are being addressed, other road users deliberately invade that space". So Johannesburg is a challenging city and a difficult space for cyclists and transport planners. The other respondent felt as though the strategies do address the needs of cyclists. He pointed to the Complete Streets Guideline, mentioning that, in terms of design guidelines, the document is very detailed and it is what his team has been using. The Complete Street Guideline is a detailed document. Based on what the interviewees have stated, it can be deduced that the 2009 NMT Framework identified the ten key areas for intervention, and the Complete Street Guideline provides the detailed information required for intervention in these areas.

Some of the important points highlighted by the interviewees are as follows:

- If planners follow the strategies, it will work. According to the Dutch cycling model, if you build bike lanes correctly, cycling will increase. For this to happen, the construction of the lanes must be professional. This can only be done with the development of a clear strategy or a master plan. Johannesburg's framework did not achieve increased levels of cycling in the city. This is because the strategy is incomplete on its own; the City needed an overall master plan to guide the framework. The City needed a team of experts who understand cycling and the interface with other forms of mobility. What has been done was the low hanging fruit, it was not thought through effectively enough. However, even though this was a poor effort, it is a start, and it has created awareness. It is sometimes hard to wait until the plans are perfect; if the process has started already, the best thing to do is learn along the way, and be better next time (consultant).
- Road planning is a complex and long process; providing cycle lanes needs to be done in a way in which the road space is more equally shared and the safety of other road users is not affected, and ensuring the infrastructure, surface, drainage and gradient is not compromised (public sector, director).
- The inner city project was awarded to an engineer consulting firm to design, who did not know much about cycle lanes. This was the case with most SA firms, at the time. The project had lots of community participation, from the Johannesburg Urban Cyclists Association (JUCA), and other

community based organisations, but the project had many issues to be addressed with little experience. Some mistakes were made in terms of design (public sector, director).

- It seems the science of design and construction of cycling lanes is only coming after the projects have been done, and this is unfortunate, as now there is no funding in the City for cycling projects (public sector, director).
- There are three tiers/levels of planning, in government, which need to be followed. The first is a strategic level, wherein the policies and strategies are outlined, and government provides a clear direction. The second is the planning level, where the necessary master plans and frameworks are developed, based on the policies and strategy. The third level is the implementation; this is when the infrastructure is laid out and the regulations are put in place. This process has not been followed and, due to this, there is no continuity or clarity of the position of the City, because there is no clear strategic direction (private sector, manager).
- One of the main issues is the space divide in streets which is very one sided. It is clear that cars are the priority, and the laws that are in place do not deal with this sufficiently. This is a portrayal of the power imbalances in government; the approach taken to planning and implementation is one sided as well. This creates the perception that cyclists do not belong on the street. This means cyclists have to fight for their right on the street, and many of them are not prepared for this (researcher).

3b. If not, from the outlook, do you agree with what has been done for cyclists? Why?

From the ten respondents, only five responded to this question, four of which responded to the previous question too. The response to this question was not because the respondents did not know any strategies, it was because there is uncertainty about which strategy are being followed. Three of the respondents, one from public sector and the other two from the private sector, indicated that the positive side is that something is being done and that is a start. The other two respondents raised concerns about whether or not those who are planning the lanes actually cycle the streets of Johannesburg? The feeling is that those planning it cannot do so adequately, as they do not cycle and, therefore, are unaware of the needs and dangers facing cyclists, or the benefits of cycling.

Some of the important points highlighted by the interviewees are as follows:

- By starting and placing some infrastructure, the City has created some awareness, both politically, and amongst the general public (private sector).
- The most recent project in Lakeview (Soweto) has been better in terms of the design detail and specifications, but there are still physical gaps in terms of connectivity. So we are learning and getting better, but we are learning on the job, which is not ideal (private sector).
- There is no doubt that the current mayor's negative attitude towards cycling in the city does tip the scale and makes it hard for the City to do more work or allocate a budget to cycling projects, but projects have not stopped. Certain projects are still ongoing, so there are some projects and they are still trying, but it is not a strategic message coming from the top down (private sector).

4. *Lefebvre (1996) explains that the right to the city relates to the right to appropriation. Appropriation includes the right of inhabitants to physically access, occupy and use urban space. Streets make up the largest public space within cities, meaning that it is a space where all citizens, regardless of their income and personal circumstances, can feel equal and cared for. Section 21 of the Constitution of the Republic of South Africa (1996) states that "Everyone has the right of freedom of movement", and "every citizen has the right to enter, to remain in and to reside anywhere in the Republic". Based on this, do our current planning strategies, and policies take account of cyclists and cyclists' rights to the city (elaborate)?*

There is a sense from the interviewees that cyclists do not have their own particular cycling rights, rather, their rights form part of the rights for all road users. However, this right to all road users is addressed differently. Firstly, as a road user, cyclists have the same rights as vehicles, and if everyone adhered to this, there would not be a safety problem. Secondly, as road users, people must consider that the rights to safety on roads must be the same for all road users. Lastly, there is the one sided focus and prioritisation of cars, so while in the constitution all road users have equal rights, in practice this is not the case. One respondent had a different opinion; he felt as though current planning strategies and policies adequately address cyclists and cyclists' rights to the city, and this is visible in the Johannesburg CBD wherein certain projects are reducing vehicle lanes to provide more space for pedestrians and cyclists.

The opinion of the respondents is that cyclists do have rights; like all other road users, it is a matter of having safe access and improving the conditions for cycling in the city. One respondent used the example of gated communities, saying that by gating communities, rights are being taken away. Similarly, there is nothing that says cyclists are excluded from the city, but are they being included in the city? Another respondent stated that it may be more important to reflect on the policy choices, which are being made to give effect to this right and to identify where cycling features in those policy choices. His sense is that cycling does receive policy prioritisation and, thus, should be considered more prominently in strategies with the required funding and implementation strategies made available.

Some of the important points highlighted by the interviewees are as follows:

- Cycling must become its own mode of transport, so that it can be addressed on its own (private sector).
- It's the public that are not accepting cyclists, and the shift towards cycling; they are not aware of the rights of road users as they are not being educated about it. They do not understand the fact that the road is for everyone to use. Therefore, public education is important, motorists have not changed; they have a bad attitude towards other road users and towards giving other road users space (public sector).
- The absence of the right to the city, and the fact that cycling, as a mode of transport, is marginalised, is a reflection of the City itself and the power distribution in cites (researcher).
- Under the current DA administration, the rights of cyclists are more stagnant, but there are still projects running, like the Sandton, Alex project (public sector).

- The challenge is that, when there is a new administration, the City's priorities are likely to change, so there is no continuity. There is a socio-economic situation, which is affecting the City and decisions that the City makes (public sector).
- Does the infrastructure actually ensure the right, or does it undermine it? When you look at some of the lanes where cyclists' rights are provided, and other road users deliberately use the lane, it is an intentional and direct removal of that right. It is a dedicated bicycle lane and cars and buses actively invade that space. Whereas, on a regular road without any cycle lanes, the space is a shared space for cars, buses, taxis and cyclists, so when other users leave no space for cyclists, it is not actively being removed, it is dominance and power in that shared space. So, in a way, the current lanes are actually undermining cyclists' rights.

5. *If the City had to restart this process, what are the three most important changes that you would advise planners to consider when planning for cyclists?*

For this question, interviewees were provided with a list of prompts and were asked to identify the three most important aspects that they think should be considered. Due to the qualitative nature of the interviews, this resulted in a conversation around the prompts, rather than a straight forward answer, which was more informative for the purpose of this research. The prompts which were provided are as follows:

- Green routes (separate from roads),
- Cycling campaigns and education,
- Traffic calming along cycle routes (speed bumps and traffic circles),
- Integration with public transport,
- Car restriction in cities,
- Direct cycle routes (shortest distance), and
- Coherent cycling network.

While the respondents felt that all of the prompts were important and should be addressed (either in parallel or through an agreed process based on a planning strategy), most interviewees felt that the need for clear direction from planning before starting was the most important aspect. This is in line with some of the responses in the previous questions, wherein respondents felt that the City first needs a clear strategy or master plan. Based on the individual responses, it was clear that the respondents felt strongly about the need for bicycle awareness programmes, and education campaigns too; at schools, businesses, and in government. Some of the respondents added that these awareness programmes and campaigns should focus on cycling safety as well; for cyclists and other road users.

Respondents also mentioned some of the following strategies, which should be considered if the process is restarted:

- Area based planning wherein you focus on populating cycling in specific areas first (public and private sector)
- Availability of bikes - have more affordable options and rental programmes (NPO, public and private)

- The City must start from the grass roots, engage with communities and interest groups about the programme and the possible location of cycling infrastructure in the area (researcher)
- A proof concept (similar to area based) – proof that cycling can work in the city (researcher, public and private)
- Public transport integration - with the Gautrain, and other modes of public transport, this will impact both lower and upper class; it is a matter of first and last mile services (researcher, public and private).

6. *Going forward, given the current state of NMT projects in Johannesburg, what do you think could change the direction of cycling in Johannesburg?*

This question brought about a distinction between those in the private sector and those in the public sector. The public sector feels that cycling needs more champions from outside of government, more community involvement and advocacy in order to ensure that the City pursues the cycling agenda. In the private sector there is a feeling that there needs to be greater political will, and that the City needs to provide a plan for cycling and for the recognition of cycling in the city. This is not a matter of passing the blame around; rather, there is a sense of recognition on both sides that there is a need for cycling advocacy, community involvement, and political will. Another interesting factor, mentioned by one of the respondents, is the aspect of by-laws. The respondent stated that cars need to respect cycle lanes, and for this to happen, the correct enforcement needs to be in place. Another respondent mentioned that the City should prioritise marketing like the province did for the Gautrain, with billboards and adverts which target congestion. Cycling also needs to be marketed as an alternative to the car.

7. *Given that cyclists have a right to the city, how do you think cycling, as a mode of transport, can gain political support from the City; to prioritise cycling and NMT planning over and above private transport?*

There is a general sense, from the private and public sector, that there is a need for general awareness within the City regarding the benefits of cycling for the city and for the people. There needs to be a greater focus on marketing and educational campaigns within government. A sense from both the public and private sector is that cycling has proven to have more momentum within the City when it is linked to larger themes, such as sustainability, climate change, and green cities. Another aspect, which was raised by three of the respondents, was access to bicycles. Bicycles need to be made more accessible to lower and middle income groups if they are to compete with cars. Lastly, two of the respondents felt that cycling, as a mode of transport, needs to be recognised as a normative and standalone mode of transport in the City's policies and by-laws. This will ensure that cycling is not seen as a marginalised mode of transport.

8. *Based on what has been done in Johannesburg to date, what are the gaps that Johannesburg needs to address if it is to correct or improve what has already been done, and what would, in your view, get more people cycling?*

This question was provided as a concluding question, wherein interviewees were asked to summarise their thoughts on what the gaps are and how to improve going forward. Overall, there are five main points which the respondents continuously highlighted. These are:

- The need for a complete and systematic cycling strategy or a master plan for cycling in Johannesburg – to go back to the drawing board.
- A sense that there is a gap in the market, with regards to accessing affordable bicycles, or bicycle rentals.
- A need for law enforcement and by-laws, which encourage all road users respect cyclists' space, as well as legislature around speed limits in cycling areas or in suburbs.
- A need for education and awareness campaigns, both in and outside of government.
- The need for good and reliable public transport, integrated with cycling, due to the fragmented nature of Johannesburg.

Some of the other important points highlighted by respondents:

- It is important to literally close the gaps in the NMT network, to make the network more coherent and complete (private sector).
- There should be a mind-shift change from the current planning methods to more area based planning (private sector).
- Getting a proof of concept is important, to develop cycling in an area and attract people to come and see and experience the difference (researcher).

The interview process provided extremely useful information to this research. This is, mainly, due to the fact that these respondents have an existing understanding of cycling in Johannesburg and are, therefore, best placed to provide insight into how planners can ensure cyclists' rights are addressed and improved in the city. There are a number of major points which have come out of the interview process. These will be discussed below.

The first point is the fact that, while all of the respondents are aware of the strategies and policies, a variety of different strategies were mentioned, and not one standard strategy or plan, meaning that there is no clear direction for the City. The most commonly mentioned guideline is the 2009 NMT Framework and, based on one interviewee, the Complete Streets Guideline. Even though it is only one interviewee that mentioned the Complete Street Guideline, this specific respondent is directly involved in the development and implementation of the programmes. There is no mention of the National NMT Guideline which, as mentioned previously, is likely to be the most detailed document regarding cycling and NMT planning. It is the most recent document, as it was published in 2014. However, as mentioned by the interviewees, some projects are still continuing in the city, and these projects have the opportunity to adopt the National NMT Facility Guideline. Nonetheless, based on the responses, the research looks more closely at the 2009 NMT Framework and the Complete Streets Guideline in relation to the projects.

The second point is based on the final question and the five main points which were continuously highlighted by the respondents; the need for a cycling strategy or master plan, access to affordable bicycles and bicycle rentals, the need for by-laws and enforcement, the need for education and awareness campaigns and the need for public transport integration. The need for a proper strategy, master plan, and for public transport integration is indicative of the fact that urban and transport planning in Johannesburg has not engaged and recognised the need to address these factors, as yet.

Cycling has been on the City's agenda since the early 2000's and, in all these years, planners have not yet developed a clear strategy for cycling in Johannesburg. This alludes to the fact that planners in the City are not giving the same attention to cycling planning as they do to other modes of transport. If planners were prioritising cycling as a mode of transport, then, like the Gauteng Freeway Improvement Project, and the BRT and Gautrain projects, there would have been detailed planning and a clear strategy for cycling before the actual implementation started.

Still on the second point, the five points highlight a lack of cycling recognition by law enforcement and policy makers. Policy makers and law enforcement officers need to ensure that cyclists, as vulnerable road users, are protected and a cyclist's space on the road is respected by other road users. There is also a lack of cycling recognition in the private sector and by market drivers; the need to develop a strong market for affordable bicycles and develop bicycle rental schemes, has not yet been done. The fact that the market has not fully engaged commuter cycling, in Johannesburg, means that commuter cycling is not being seen as a marketable opportunity in the city. Finally, there is a lack of cycling recognition amongst other road users, meaning that other road users have not yet recognised (commuter) cyclists and, therefore, need to be made aware of their presence on the road through education and awareness campaigns. These points provide an indication that the respondents feel as though the City planners, and its people, have not accepted cycling as a mode of transport.

This research is, essentially, looking at the rights of cyclists in the city of Johannesburg, and if the outcome of these interviews is that cyclists are not even recognised by the planners, the City, or the people, then how can cyclists have rights in this city? Of course, if cycling was a new concept in Johannesburg, one could argue that it needs time to develop and gain recognition, which it does, but cycling is not a new concept. Cycling was, at one stage, the dominating mode of transport in Johannesburg, but it has been watered down to such a level that it now needs to be reintroduced in the city. The next part of this section focuses on some of the secondary data which consists largely of articles relating to cycling in Johannesburg. This provides an alternative perspective to the interviews, and either strengthens or contradicts some of the above points.

5.2.2 Analysis of Articles

There are a large number of articles around cycling in Johannesburg. While the vast majority of these articles are related to sports cycling and major cycling events, which have grown significantly in Johannesburg, there are also quite a few relating to commuter based cycling. As this research is focused on the commuter cycling programmes, and their impact on cyclists' rights in the city, it focuses on those articles directly relating to the cycling programmes.

A total of 33 articles were collected through an online search, starting in 2012 and ending in 2017. Given that the Zandspruit project started in 2009, it is possible that there are articles regarding commuter cycling programmes prior to 2012, however, nothing was found online. A significant number of articles were found online, from the City of Johannesburg and on Independent Online (IOL). The 33 articles discussed in this section, therefore, represent a large proportion of the views and concerns surrounding commuter cycling and the development of cycling programmes in Johannesburg. Table 18 is a summary of the articles based on the date and title of the articles.

Table 18: Timeline of cycling articles in Johannesburg

Date		Article Title
2012	March	Can the Buffalo change Africa's bicycle culture
2013	January	Cyclist's wife 'cradled him at scene'
	February	Safety for cyclists
		Cyclists have a right to be on the road, too
	April	Get bike wise
	June	Gautengers urged to hop onto bikes
	September	Cyclist's family appeal for witness
	October	The struggle for a cycle friendly city
2014	October	Soweto residents cycle to a new future
		Cycle paths launched in Orlando
		Off-road route through Orlando
	November	Cycling proving popular: Cycling market growing
2015	July	JDA brings cycle lanes to Sophiatown
	November	Johannesburg working to reduce traffic congestion
2016	March	Cycling is still an uphill battle
	May	Can Johannesburg reinvent itself as Africa's first cycle-friendly megacity
	June	Malema rages against … bicycle lanes?
	September	Herman Mashaba puts brakes on bicycle lanes project in JHB
		Parks Tau suspects EFF behind scrapping of Jozi bicycle lanes project
		Johannesburg halts South Africa cycle lanes to build roads
		Better to keep Joburg cycle lanes - Parks Tau
		R70mil for bicycle lanes in Sandton diverted for basic services in Alexandra
		Cycle lanes and a tale of three men
		Bike lanes for Joburg
		Mashaba, vast majority of Joburg bike riders are poor
	October	How bike lanes became an issue of race and class in Johannesburg
	November	Sandton bicycle lanes still on agenda
		More and improved cycle lanes coming to Sandton
		Black people need cycle lanes too, Mr Malema
2017	March	Where are the users of Johannesburg's bicycle lanes
	April	Why Joburg's bicycle lanes have no bicycles in them
	June	Joburg's bike lanes - Are they effective?
	October	Bike sharing helps Johannesburg township commuters beat the traffic

(Source: Author)

Table 18 lists the articles by year and month, and highlights certain periods during which there is a larger concentration of articles. Based on these peaks, there are certain influential themes which stand out; these themes have been colour coded. The diagram in Figure 21 represents the number of articles in each theme to highlight the influence of certain events in the media.

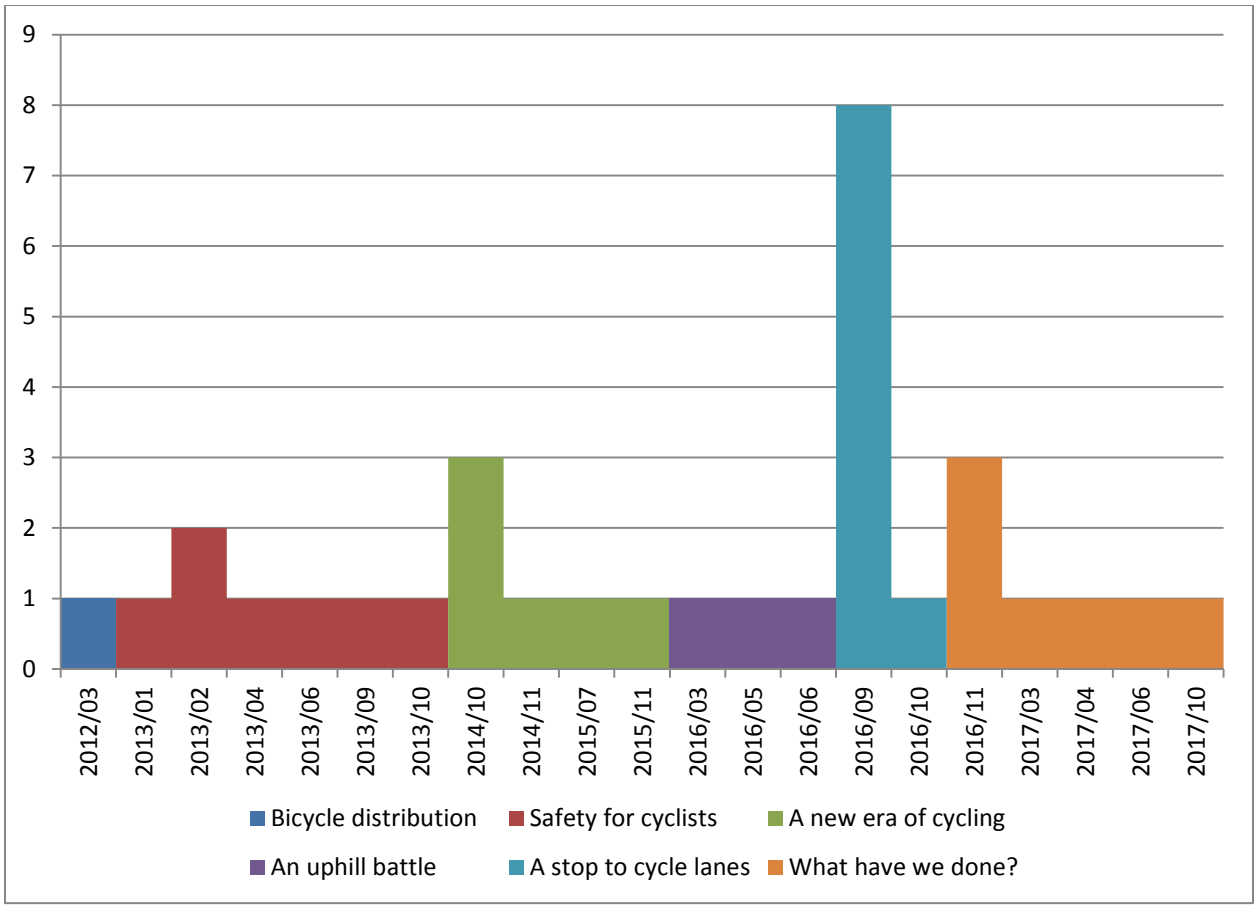


Figure 21: Trend in article dates and key themes

Through the process of dating each article, the above trend became evident in the articles, highlighting certain key themes or topics in time. The first theme, which is 'bicycle distribution', is an important theme in Johannesburg and in South Africa, due to high levels of poverty. It is also one of the very first initiatives by the City to promote cycling, which is still ongoing. As per the statistical data, many people cannot afford cars and/or public transport and are, therefore, required to walk for long distances to get to work or school. The 2012 article highlights one of the country's initiatives which is carried out at national, provincial, and local levels of government. Since its initiation in 2012, the 'Buffalo' bicycle has gained lots of popularity and can be seen in many of the rural areas and townships across South Africa (see Figure 22). These bicycles are tough hard-wearing bicycles which were initially being brought to South Africa through the World Bicycle Relief (WBR) programme (Hamilton, 2012). WBR eventually partnered with a local company in the country (Qhubeka), who then established a production plant and is now distributing to most of Southern Africa. Currently, the Qhubeka Buffalo bicycles are being distributed on a large scale throughout the city of Johannesburg as part of the municipalities bicycle distribution programme in partnership with Qhubeka (the researcher is personally involved in these programmes). The bicycle distribution programme was highlighted as one of the key factors during the

interviews, as many of the interviewees view this as one of the important measures to promote cycling and create a cycling culture in the city.

Figure 22: A Qhubeka Buffalo bicycle being used on the cycle lanes in Orlando, Soweto (Source: Author)

The next period in the articles has been titled as 'safety for cyclists' as it is largely centred on the death of one of South Africa's best International sport cyclists, who used to commute by bicycle to and from work as well. Barry Stander was knocked down by a minibus taxi in 2013, in Shelly Beach, Kwa-Zulu Natal while commuting home during the afternoon rush hour. The incident united cyclists across South Africa in the struggle for cyclists' safety on South African roads (Pillay & Madlala, 2013). Riders across the country, in Johannesburg and other cities, held mass rides in remembrance of the cycling star and to raise awareness about cycling safety. In the months preceding his death, there were articles titled 'safety for cyclists', 'cyclists have a right to be on the road', and 'get bike wise', which focused on bringing attention and awareness to cycling in Johannesburg and in South Africa. In September of 2013, another cyclist was knocked down and killed just outside of Johannesburg. In October of the same year an article was released talking about 'the struggle for a cycle friendly environment'. According to the article, the risk of losing your life or being mugged is among the main reasons why commuter cycling is struggling in South Africa (Stones, 2013). From this time period, it can be seen that safety is a major aspect for improving cycling conditions in Johannesburg – safety with regards to other road users and with regards to criminal activity. The interviews emphasised the need for law enforcement, recognition of cyclists by other road users, respect for cyclists' space, and education and awareness campaigns. All

of these have a role to play in increasing safety for cyclists. As has been explained in the literature around Johannesburg, in general, Johannesburg's roads are not safe, and in many instances cyclists are forced to share that unsafe space with cars, buses and taxis.

In this time period, there is one article which does not focus on cycling safety, but introduces the next theme, which is 'a new era of cycling'. In June 2013, the Gauteng MEC for Roads and Transport urged Gauteng residents to start cycling. This appeal came after the Census 2011 statistics, which showed that Gauteng was the largest province, by population, and that this number was only going to keep growing (Ndaba, 2013). The Gauteng MEC said that the City should be focusing on Transit-Led growth, wherein transport planning is synchronised with spatial planning to ensure greater densification (Ndaba, 2013). The aspect of mixed use development and TOD featured strongly in some of the precedent cities, wherein the correct application of the two can shorten travel distances, promote public transport integration and NMT friendly environments.

This led to 'a new era of cycling', which started with the launch of the Soweto cycle lanes in October 2014. October is labelled as transport month in South Africa and, as such, it was only appropriate for Johannesburg to launch the newly developed lanes in October. As can be seen in Figure 21, there was a spike in articles during this month. There was quite a bit of coverage surrounding the launch of the cycle lanes, as the former Mayor of Johannesburg and the Gauteng MEC for Roads and Transport both attended the launch and spoke positively about the role of cycling in the future of the city (City of Joburg, 2014; Magangane, 2014). Then, in November of 2014, an article was released which highlighted the market's response to a growing cycling tradition. Although the article is focused largely on recreational cycling, it speaks about the growing interest in commuter cycling as well. It is mentioned in the article that commuting by bicycle seems to be more popular in the mid to upper income groups. According to the article, one of the biggest obstacles is the cost of bicycles, even though there is a growing market of decent second hand bicycles (Hardisty, 2014). Cycling as a sport is rapidly growing and, as the article points out, the market is responding to this growth. There are a number of cycling events around the country which, as the article states, has put South Africa on the world cycling map (Hardisty, 2014). These statements correspond with the interviewees' responses, as well as the gap in the market with regards to commuter bikes and bicycle sharing schemes. Clearly, the market has not responded to commuter cycling as it has to sports cycling, as there has not been significant growth in this sector. However, as the economy has proven in this article, given the demand, the market is likely to respond. With regards to the launch of the cycle lanes, the City was able to use the opportunity as an awareness and education campaign. The peak in the graph shows that the media responded to the campaign as well. As has been pointed out in the interviews, the campaigns are useful to bring about awareness to promote the cycling agenda and an important strategy for the City to continue to pursue.

In July of 2015 an article was released regarding the community participation process undertaken by the Johannesburg Development Agency (JDA), which allowed for Sophiatown residents to have their say in the planned NMT routes. A discussion was held in Sophiatown and residents were presented with the NMT upgrade plans. According to the articles, the conversation focused around infrastructure, spending and repairs (Mpholo, 2015). Again, in this article, the City is introducing the new era of cycling to the

people of Sophiatown, and trying to get their support in actively promoting cycling in the city. Finally, to end this theme, in October of 2015, the City of Johannesburg held the EcoMobility World Festival. The festival was part of a worldwide initiative to reduce car usage and promote sustainable transport in cities. As part of the festival, certain main roads in Sandton limited car usage for the entire month, thus, persuading people to consider using alternatives, such as public transport and NMT. In an article released in November, it was stated that through a survey conducted in November, it was revealed that cycling increased by between 6% and 7% in Sandton, while car usage in Sandton dropped from 90% to 68% (SAnews.gov.za, 2015). This was a reflection of the cities administrations intentions to reduce car usage and promote safer, sustainable and environmentally friendly streets. Again, the City and the former mayor, Parks Tau, positively campaigned for cycling during this period in an attempt to promote the cycling agenda.

Through the launch of the cycle lanes during the EcoMobility month, there was lots of talk about cycling in Johannesburg and, with this attention, many questions were asked regarding the viability of cycling in the city; this is 'the uphill battle'. In an article in the Mail and Guardian, one cyclist, who is a Professor at the Wits School of Architecture and Planning, tells her story about how the cycle lanes in the inner city affected her morning commuting to work. Huchzermeyer (2016) explains that, for her, the development of the cycle lanes between Brixton and Wits University was ideal, as this was along her daily route to work. She (Huchzermeyer, 2016) explains that, her experience of the route was met with both positives and negatives. However, she decided to focus on the positives and still continues to cycle. With regards to her commute, Huchzermeyer (2016) explains that, while the dedicated lanes were provided, it seemed that they were often used by taxis and other vehicles to by-pass traffic, or to pick up or drop off passengers; they were also used by pedestrians, and by informal recyclers. She found that a large part of her journey was spent in avoiding other users along the route, or ringing her bell in the hope that they would give her space. Huchzermeyer (2016) noted that the protective rumple strips always ended before intersections, leaving cyclists to their own devices when approaching the conflict zone (Huchzermeyer, 2016). A key point from this article is the disregard for the cycle lanes shown by other road users. As was raised by one of the interviewees, on a street without cycle lanes, there is no deliberate removal of cyclists' rights, as it is a shared space, but when cycle lanes are provided and other road users deliberately and actively invade that space, these users are actively removing cyclists' rights.

In May of 2016, an encompassing article about cycling in Johannesburg talked about some of the difficulties facing cycling in Johannesburg. The article begins in the North of Johannesburg, along William Nicol Drive, which is known as Johannesburg's busiest cycling street. However, the street does not accommodate for cyclists, and it is an extremely busy motorised street (see Figure 23). Every morning and afternoon, around 100 cyclists, living in the informal areas along William Nicol Drive, coordinate their journeys to ensure they ride together to create safety in numbers. One cyclist already lost his life on this road and another was badly injured (Van Mead, 2016). The article talks to the City of Johannesburg and the Johannesburg Urban Cyclists Association (JUCA), who explain some of the challenges facing cycling in the city. These issues concentrate around aspects, such as the attractiveness of the car and the need to address other more pressing issues in the city, such as housing and crime. The article brings attention to the fact that cycling is an affordable mode of transport and that the current

trend in Johannesburg, with regards to cars, is not sustainable for the future growth of the city. Emphasis in the article is also given to the political support, and what the City has achieved through the support of former mayor, Parks Tau (Van Mead, 2016).

Figure 23: Cyclists along William Nicol Drive with no space on the road and no sidewalk for safety (Van Mead, 2016)

The last article in this theme is, again, introducing the next theme which is 'a stop to cycle lanes'. In June of 2016, one of the leaders of a prominent political party, Julius Malema of the Economic Freedom Fighters (EFF), raised a concern with regards to the EcoMobility Festival. Malema said that the rich people in Sandton should be ashamed that they want bicycle lanes when there are people who do not have water, electricity and flushing toilets. He raised the point that the money being used to provide the cycling infrastructure should be used to provide basic services to the people in Alexandra (Madibogo, 2016). It cannot be denied that basic services, such as water, electricity and basic sanitation are a major concern in South Africa. In terms of the City's budget, funds should be allocated to ensure that each sector in government is able to provide the most basic of services to the people of the city. Included in these funds is a budget for mobility, and since the census has shown that the majority of Johannesburg's residents cannot afford a car, and are walking long distances daily, to get to school or to work, the funds should be spent improving the NMT infrastructure for these people, not in tarring the roads. After all, cycling has proven to be the most affordable and cost-effective mode of transport, and is much cheaper to implement than any other form of transport.

In 2016, the political shift surrounding cycling in Johannesburg manifested rapidly. This was the year when commuter cycling gained most of its popularity and, unfortunately, this was largely based on negative attitudes towards cycling. In September of 2016 (the highest peak of cycling articles, as illustrated in Figure 21), the newly elected mayor of Johannesburg announced that he was stopping all cycling projects until all roads had been tarred (Manyathela, 2016). The mayor, who forms part of the Democratic Alliance (DA), together with the Economic Freedom Fighters (EFF), felt as though the African National Congress (ANC) wasted money in developing cycle lanes when there are more pressing issues facing the people of Johannesburg. The DA stated that they were shocked to learn that over R70 million was allocated for the proceeding three years to complete the Sandton project (Manyathela, 2016). In an article by the BBC, it was stated that, while the news to stop the cycle lanes received mixed reactions, it has largely been welcomed. The article also states that the decision does show the influence of the EFF in the current DA administration (Fihlani, 2016). This sentiment was also echoed by the former mayor, Parks Tau, who said that he believes the decision was a mistake and that is was largely initiated by the EFF (Cox, 2016).

In a follow up conversation with 702 Talk Radio, Mashaba stated that, while bicycle lanes are needed, he cannot allow the City to spend money on infrastructure in places which are already well-equipped with basic services, while the poor continue to live in undesirable conditions (Lindeque, 2016). Gauteng MEC for transport shared former mayor Parks Tau's concern, saying the mayor's decision, to stop cycling until all roads are tarred, is short-sighted. Vadi explained that Gauteng Provincial Government's policy is that all cities in the province (which includes Johannesburg) must have at least 30 kilometres of NMT lanes, explaining that this is not just about cyclists. In emphasising the need for NMT infrastructure, the MEC further explained that the recent household survey showed that 10% of people walk to work on a daily basis (Pheto, 2016). He stated that he is concerned that Johannesburg, which is normally leading the country, is taking a backwards step. He believes that the previous administration failed to advocate for the proper use of NMT and did not create the necessary support structure to enable a cycling culture in the city (Pheto, 2016).

As mentioned by Fihlani (2016), the decision to stop the cycle lanes received mixed feelings. One article, which was published on Politicsweb, revealed that the City took a year to build a bicycle lane between UJ, Wits and Doornfontein, and nobody used it, except motorists to park their cars, or taxis to overtake in traffic (Kane-Berman, 2016). The article strongly supports the decision of Mayor Mashaba and the statement by Malema, stating that Johannesburg will not get a bicycle culture without a more extensive, efficient, predictable, and safer public transport system (Kane-Berman, 2016). It further states that there is nothing wrong with encouraging cycling as a hobby, or a commuter mode of transport, but the private car has done as much for freedom of movement around the world, as have all the guaranteed constitutional rights to such freedom (Kane-Berman, 2016). The article concludes by mentioning that the government has forgotten that adult citizens in democracies and free societies are entitled to make choices, and to have their choices respected, not punished by tax or regulation (Kane-Berman, 2016). Another article in the same month took the opposite stance, stating that the vast majority of Joburg bike riders are poor. The article argues that the sustainable transport is an important agenda for the City and

one that should not be stopped. It argues that NMT links are for pedestrians, cyclists, wheel chair users, trolley pushers, and other NMT users (Du Preez, et al., 2016).

In October 2016, an article was released which asks the question as to why bike lanes became an issue of race and class in Johannesburg? The article states that, for the poor, biking has always been a way to dodge one of the major financial drains faced by the poor – transportation (Brown, 2016). The article states that, according to Stats SA, the city's poorest residents spend more than 20% of their income simply to get to and from work (Brown, 2016). Following the political conflict and mixed feelings, the articles started to ask a new question, 'what have we done'? The DA and the EFF were correct to raise concerns about how much money was being spent and the fact that the cycle lanes were empty, but this should not discredit cycling as a mode of transport. As mentioned by the interviewees, for planners, it is a matter of going back to the drawing board and developing a plan and strategy, which is coherent, complete, consistent and cost-effective.

The next theme in the table is a series of articles, which focus on the way forward. They recognise the fact that there will be no new cycle lanes under the current administration and that the current cycle lanes are not used. The articles try to understand why these attempts have failed and what could be done to show that cycling is important for the future of the city. In November of 2016, the City of Johannesburg provided some clarity with regards to the mayor's statement, saying that current projects will be completed. It was also noted in the article that a trial bike rental programme in Sandton has proven to be quite successful, showing that there is willingness from people to use bicycles to move around the business district (Wyngaardt, 2016). In a 2017 article, Morgan (2017) tries to understand 'where are the users of Johannesburg's bicycle lanes'? He explains that bicycle lanes do not mean people will cycle; bicycle lanes can be understood as one of the necessary elements required for a vibrant commuter cycling culture (Morgan, 2017). The lanes act as a magnet, which attracts cyclists to a neighbourhood; it is not a catalyst that encourages non-cyclists to shift transport modes and become cyclists (Morgan, 2017). In another article, dated June 2016, Harris (2016) talks about the effectiveness of the lanes; he states that the policymakers should have foreseen that cycle lanes were not the right intervention for Johannesburg in the first place. The mistake, he believes, was that the City tried to import a successful mechanism (infrastructure) from a different context and expected it to have the same effect here (Harris, 2016). Harris (2016) explains that if the City's intention was to alleviate traffic congestion, they should have done a thorough analysis of where people live and work, how far they travel and why they chose their preferred modes of transport. One factor, that might reveal itself in this regard, would be the spatial segregation caused by apartheid and, as such, the people most affected by the traffic problems in the city live too far from their workplace to even consider cycling as a feasible solution (Harris, 2016).

The last article, which this research draws on, is an article written in October of 2017, elaborating upon bike share schemes, which helps people from Alex to get to Sandton where they are employed (Makoye, 2017). According to the article, a young 27 year old entrepreneur, Jeffrey Mulaudzi, rents out around 100 bicycles to commuters travelling from Alex to Sandton, daily, saving them up to 30% of their monthly travel costs. The initial idea of the rental scheme was to help students, but it seemed that

others wanted to benefit from the project as well. According to Mulaudzi, bike sharing makes sense for crowded townships, not just because of the cost benefits, but because most people have too little space in their home to store bicycles. Another correspondent in the article, who cycles from Alex to Randburg to get to school, says that she likes cycling as she gets to school fresh and early and it saves her mother about R200 per month (Makoye, 2017). In this final theme, there are aspects which speak largely to what many of the interviewees have spoken about. There is the market's response with the introduction of the trial bike rental scheme in Sandton and Alexandra, the need for public transport integration is mentioned, and there are statements referring to the need for proper planning to be done, prior to lanes being implemented.

The articles portray an encompassing view of cycling, cycling infrastructure, and cyclists rights in the city of Johannesburg. It is extremely interesting to unpack the different views and perspectives from those who aim to promote cycling, and from those who feel Johannesburg is not a city for cycling. From the analysis, it is clear that both perspectives must be considered, especially if planners seek to address the issue and create a more progressive environment for cycling. Additionally, the articles provide a useful analysis of the cycling programmes, specifically the Soweto, Inner City, and Sandton programmes, allowing the research to create a useful comparison between the interviews and the articles.

This research takes the perspective that cyclists' have an equal right to the city, as do all other modes of transport. As such, with regards to evaluating the articles, it focuses more on those articles which provide input as to how things could be done differently, those articles which identify the flaws and gaps in what has been done, and those articles which suggest alternative solutions to transport in the city. There is, therefore, a strong correlation between the interviews and the articles. Much like the interviews and the discussion from the precedent cities, the articles support the fact that power and force influence planning in the city. On a practical level, the articles and interviews are evidence of the fact that, what has been done, was not done to a satisfactory level, and this has caused political conflict with regards to cycling planning.

5.3 Evaluation of NMT Planning in Johannesburg

A review of the planning tools, in both Johannesburg and abroad, highlighted certain planning strategies and indicators for NMT planning. The indicators from abroad are based on what the literature uncovered in the six precedent cities; these were represented in Table 8 at the end of Chapter 2. It is clear from the international cities that the strategies being applied have managed to increase cycling mode share and create safer cycling environments, thereby improving cyclists' rights in the city.

The NMT planning tools used in Johannesburg were then discussed in Chapter 4, wherein the main cycling planning principles were highlighted. Johannesburg has the strategies, some of which have been applied, to some degree, during the implementation of the cycling projects. However, unlike the international cities, whether or not these strategies are effective in bringing about the desired impact, is still unclear. Based on the interviews and articles, the desired impact has not been achieved and, in fact, the mayor has stopped cycle lane projects in the city, saying that the money could be used to address more serious issues, like tarring roads (Manyathela, 2016). While the mayor could be questioned about this decision, so can the planners. If the consequences of the projects have proven to be unsatisfactory

to the new administration, and to the people of the city, does that not imply that somewhere in the planning and implementation processes, there is a problem? The possibilities are:

- The guidelines and frameworks are missing principles of cycling planning and, therefore, certain steps were not carried out or completed,
- The planners, engineers, and developers did not follow the guidelines when planning, designing, and implementing the projects and, therefore, overlooked certain steps, which resulted in the undesirable outcome of the project, or
- The entire premise was incorrect and, regardless of what was done, cycling is not a viable alternative mode of transport in Johannesburg, at the moment.

The last point is a radical perspective but is also unlikely, because in both rich and poor countries, cycling has proven to be efficient, sustainable and cost-effective. Besides, Johannesburg already has cyclists, even if they are a minority. Therefore, there is either a flaw in the strategies, or there is poor workmanship by the professionals.

In evaluating the strategies, the research compares the KPIs from Table 8 to the strategies mentioned in the Johannesburg planning tools. The planning tools that are evaluated are, the 2009 NMT Framework, the 2013 Complete Streets Guideline, and the 2014 National NMT Facility Guideline. The NMT Framework and the Complete Street Guideline are both municipal documents, developed by the City of Johannesburg, and feature quite strongly in the interviews, as strategies which have been referred to and used by developers and planners.

The National NMT Facility Guideline is a national document and, while it was mentioned in previous chapters as being one of the most comprehensive NMT guidelines for planners in this country, it was not mentioned by any of the interviewees. This might be due to the fact that the guideline was only released in 2014. However, as the document was published in the same time period that certain projects were still running, or were not even started, it is useful to evaluate the Guideline to understand if it is, in fact, comprehensive and could possibly have a positive impact on future projects. The list of key performance indicators from Table 8 is reproduced in Table 19 in order to evaluate them against the planning tools in Johannesburg.

Table 19: Comparison of strategies and planning tools between Johannesburg and six precedent cities

Strategies	Precedent Cities	Johannesburg's Planning Tools			
		2009 NMT Framework	Complete Streets Guideline	NMT Facility Guideline	No.
Cycling/ NMT Master Plan	6/6	✓	✓	✓	3/3
Specific budget for cycling projects	6/6	×	×	✓	1/3
Government subsidies for cycle projects	4/6	×	×	×	0/3
Cycling or NMT office	6/6	×	×	×	0/3
Vehicle restrictions in inner city	5/6	✓	×	×	1/3
Traffic calming	5/6	✓	✓	✓	3/3
Vehicle parking fees	3/6	×	×	×	0/3
Tax deduction/incentive for cyclists	3/6	✓	×	×	1/3
Green routes (separate from streets)	6/6	✓	✓	✓	3/3
Coherent network of cycle routes	4/6	✓	×	✓	2/3
Dedicated cycle routes	6/6	✓	✓	✓	3/3
Direct cycle routes	2/6	✓	✓	✓	3/3
Attractive cycle routes	6/6	×	✓	✓	2/3
Integration with public transport	6/6	✓	✓	✓	3/3
Bicycle rental schemes	6/6	✓	×	✓	2/3
Bicycle parking	5/6	✓	✓	✓	3//3
Cycling promotion	6/6	✓	×	✓	2/3
Cycling education	3/6	✓	×	✓	2/3

Table 19 presents an interesting analysis of the Johannesburg planning tools, compared to the strategies from the international cities. It should be noted again that, the strategies in the international cities have been implemented, applied and proven. The strategies listed in Johannesburg's tools are only based on what the guidelines state, and not on what has actually been done in the city. Nonetheless, Table 19 shows that there is a level of similarity between Johannesburg and the international cities.

During the interview process, respondents were asked about what they think the City should prioritise, or what should be done going forward to improve cycling in the city. By comparing the interviewees' answers to the strategies listed in Table 19, the research is able to get a sense of what aspects should be concentrated on. This is based on whether there is a connection between the most common strategies in the international cities and the interviewees' responses. Looking at the analysis of the interviews, the respondents feel the need for the City of Johannesburg to focus on the following strategies:

- Overall master plan or strategic development plan for cycling/NMT,
- NMT coordinator (who is a commuter cyclists) / By-laws and enforcement,
- Complete network of lanes (too many gaps in current projects) / Area or neighbourhood networks,
- Education, awareness and safety campaigns (for public sector, motorists and cyclists),
- Bike share / rental schemes, bike distribution, and availability of bicycles in the market, and
- Public transport integration.

When compared to Table 19, there is 100% alignment from all six international cities, with regards to the following strategies: NMT Master Plan, NMT office (NMT coordinator), Bike share / rental schemes, and public transport integration. With regards to the other points, four out of the six cities have coherent networks, and three out of the six have worked extensively on cycling education. When this is cross referenced with Johannesburg, there is a 100% consistency with regards to master plans and public transport integration, as these are mentioned in all three documents. Two out of the three planning tools in Johannesburg mention cycling education, bike share and complete networks, and none of them speak about an NMT office or coordinator. Lastly, the following strategies are listed in the six precedent cities and in the three local planning tools; NMT master plans, green routes, dedicated cycle routes and integration with public transport.

Through cross referencing, the research is able to identify the following key strategic principles, which need to be looked at more carefully in the case of Johannesburg:

1. NMT/Cycling Master Plan (100% of precedent cities, interview analysis, and 100% of Johannesburg's planning tools),
2. Integration with public transport (100% of precedent cities, interview analysis, and 100% of Johannesburg's planning tools),
3. Bike share / rental schemes (100% of precedent cities, interview analysis, and 66% of Johannesburg's planning tools),
4. NMT / cycling office / coordinator (100% of precedent cities, interview analysis),
5. Green routes (100% of precedent cities and 100% of Johannesburg's planning tools), and
6. Dedicated cycle lanes (100% of precedent cities and 100% of Johannesburg's planning tools).

The first, and most important, principle is a NMT master plan. This aspect is actually the first step of any planning process. A master plan is a planning tool, which provides an overview of the entire project, from beginning to end, including long and short term objectives. It provides strategic direction for the project, outlines the aims and objectives, and provides a detailed plan of how these will be achieved. The detailed plan is meant to address all factors within the system, including policy, budgets, management, layout plans, designs, implementation, and monitoring and evaluation. From the precedent cities it is clear that a master plan is important, as it lays out the City's agenda from the very beginning, providing clear direction to both the City and the people. The fact that Johannesburg does not have a master plan was highly emphasised by the interviewees. Those in the public sector stated that both the Province and the Municipality are developing NMT master plans. Those in the private sector felt as though the City should have spent the initial funding on developing a master plan, rather than to have rushed into implementing the cycle lanes.

What is concerning, with regards to the master plan, is that the three planning tools mention the need for a master plan or complete cycling plan, yet it has not been developed. The 2009 NMT Framework mentions the need for a strategic development plan and a city wide network plan, therefore, not pointing directly to a master plan (City of Johannesburg, 2009). The Complete Street Guideline and the NMT Facility Guideline call for the City to develop an NMT master plan. The Complete Street Guideline states that connectivity in the network must be ensured through the development of a cycling master plan (City of Johannesburg, 2013). The NMT Facility Guideline refers to Section 35 of the National Land Transport Act 5 of 2009, which states that:

> "*A detailed strategy to promote and encourage NMT in rural or urban areas, if so requested by the relevant planning authority (municipality), which must include an NMT policy, a cycling master plan, a walking master plan and an animal drawn transportation plan, if ADT is significant in the province."*
> NLTA in National NMT Facility Guidelines (Vanderschuren, et al., 2014)

Based on the evaluation of this aspect, the absence of a NMT master plan is a major gap in Johannesburg. The reason for the gap is not due to the planning tools, but due to inconsistencies in applying the strategies mentioned in the planning tools.

The second point is integrating cycling with public transport. It has proven to improve cyclists' rights in all six of the precedent cities. It is clear from the literature review too, that integration with public transport is extremely valuable, in terms of allowing cycling and public transport to compete with private vehicles. Additionally, the integration of the two has proven to improve public transport usage and cycling mode share. Integration of cycling with public transport means that cycle networks/paths connect with major transit stops, cyclists are able to safely store their bicycles at these transit stops, and cyclists are allowed to take their bicycles onto the public transport system. If cyclists are not allowed to take their bicycles on the bus or train, then a bike share/rental scheme should be provided at destination points for cyclists, as a first and last mile service. Additionally, integration with public transport increases cyclists' safety, as cyclists can choose to use public transport should they be travelling at an unsafe time, or if weather conditions are not conducive for riding.

Most of the interviews stated the need for public transport integration, due to Johannesburg being a fragmented city, and all three of the key planning tools highlight the need for public transport integration. Due to the history of the city, travel distance to work can be extremely long, according to the Household Travel Survey; the average travel time is 46 minutes by motorised transport (GPDRT, 2016). According to Batista (2010), cycling is appropriate for trips of up to 7km or 30 minutes by bicycle. Thus, on average, as assumed by Harris (2016), distances are too long for cycling to be considered as an option in the city.

Therefore, in a city like Johannesburg, for cycling to be considered, there is a need for reliable, fast and affordable public transport, which is integrated with NMT. To a large extent, none of this has been done. Chapter 4 discusses the current state of public transport, the fact that minibus taxis are the most used mode of transport, and that all public transport modes combined comprise the highest modal share in the city, not because people choose to use it, but because they have no other choice. There is significant

work that needs to be done to improve public transport in the city before planners can integrate the two modes.

Many of the interviews addressed the issue of public transport and the integration of cycling and public transport. Firstly, both the Gautrain and BRT systems, which are the most recently implemented public transport systems in the city, do not allow bicycles on board, and neither do any of the older systems, such as Metrorail, Metrobus, or minibus taxis. The Gautrain allows bicycles to be taken on board so long as the bicycle is in a bag, which is rather difficult if you do not have a fold up bicycle. When it comes to parking provisions at the public transport stations, Metrorail, Metrobus, minibus taxi ranks and BRT stations do not have secure bicycle parking facilities at the stations. Gautrain does provide bicycle racks in the parking area. However, this accommodates for a very small number of bicycles. Lastly, with regards to cycle paths, there has been consideration with regards to connecting the cycle paths to Gautrain and BRT stations, at least in the inner city, Sandton, and Orlando routes. Commuters are unlikely to ride to the stations if there is no secure bicycle parking at the stations, if bicycles are not allowed on board, or if there is no last mile bike rental programme. Based on the evaluation of the aspect of cycling and public transport integration, the lack of integration between the cycling and public transport, is another major gap in Johannesburg. Like the first point, it is due to inconsistencies in applying the strategies stated within the planning tools.

The third principle highlighted is that of bike share or bike rental schemes. Bike rentals are also part of public transport integration, as they are usually offered as a first or last mile service. The provision of a bike share scheme is something that appears in all of the precedent cities, and also featured strongly in the interviews. The interviewees are concerned that cycling is not increasing in Johannesburg because bicycles are not accessible to everyone. The last two news articles that were discussed refer to two bike share schemes in Sandton and Alex. The articles indicate that the programmes have proven to be quite successful. While the Sandton scheme was a trial programme which ended, the article seems to suggest that the trial was successful. The article, unfortunately, does not provide clarity as to whether the programme will be implemented permanently.

Two out of the three planning tools make mention of bike rental schemes. From the precedent cities, there is a sense that the bike rental schemes are often privately driven and, in some cases, subsidised by government. Users are charged to rent out the bikes for a certain period of time, making it a business opportunity. A feasibility study, done in Johannesburg in 2015, suggested that bike share is not yet a feasible option for the city (De Beer & Valjarevic, 2015). However, based on the articles, it has proven to be successful in 2017, so there is a need to review the feasibility of such programmes in the city. Based on the evaluation, the non-existence of bike share is another gap in Johannesburg and is, partly, due to those applying the planning tools and due to a study revealing that it is not feasible for the city.

The next point is the need for an NMT office or NMT coordinator in the City. This particular principle does not appear in any of Johannesburg's planning tools. However, it does appear in the six international cities and was raised as a point of concern by some of the interviewees. The reason that the interviewees mentioned that Johannesburg needs to have an NMT office, or coordinator, is the same reason why the precedent cities implemented the strategy. The sense from some of interviewees

is that those who planned, designed and implemented the cycle programmes in Johannesburg, did not actually cycle the proposed routes before development started and, in fact, do not commute in Johannesburg at all. There is also a sense that planning for cyclists can be a very difficult task to do if the people planning it do not cycle.

As mentioned in the interview analysis, none of the respondents, who are in the public sector and are directly involved in the cycling programmes, have actually commuted by bicycle in Johannesburg. While they cannot be blamed for this, it is clear from the precedent cities that the City needs to provide an NMT coordinator who is a commuter cyclist, as this person will ensure that planning prioritises the needs of cyclists, and that cycling remains a priority on the City's planning agenda. This aspect is a gap in the planning tools and has been overlooked by City planners.

The fifth point, which is green routes, is again another gap in the city of Johannesburg. It is implemented in all of the precedent cities, it appears in all threelocal planning tools, and it was mentioned by a few of the interviewees. There are, currently, green routes in the city of Johannesburg; the most used of these is the Braamfontein Spruit. The route follows a small water stream and is, therefore, relatively flat. It is also completely separated from roads, making it a safe and attractive NMT environment (with regards to safety from other road users). The Spruit is a common commuter route for cyclists and pedestrians as it cuts through some of Johannesburg's major economic nodes. However, as pointed out by some of the interviewees, these routes have not been a part of the city's cycling programme. They are often cleaned up through community initiatives, but they pose as a major security (crime) risk for NMT users, as there are not many eyes, or lighting, on the route.

The last aspect, identified from Table 19, is the aspect of dedicated cycle lanes. As mentioned in Chapter 2, many of the precedent cities find that implementing dedicated cycle lanes does not, on its own, increase cycling. This is mentioned by Morgan (2017) in his article about the empty cycle lanes in Johannesburg. One of the interviewees also mentioned that dedicated lanes should be prioritised on major and direct transport routes, while smaller arterials and feeder routes can benefit from painted lanes (based on the road classification and the speed differentials). This statement is supported by the principles from the precedent cities, wherein it is mentioned that this method, of painting cycle lanes, is used to prioritise the completion of the network and prioritise funding. Should funding permit, these painted lanes are converted to dedicated lanes, at a later stage. The basic principle is that, where car speeds are kept at a moderate level, the road is shared, and where car speeds are higher, cars and cyclists are separated (Krag, 2002). In the case of Johannesburg it is extremely important for transport planners to be cost-effective in their planning methods.

It is clear that Johannesburg does have dedicated cycle lanes in certain parts of the city, and it is, possibly, for this reason and because of the amount of critique surrounding the lanes, that the interviewees did not mention it as a key principle. However, it was mentioned that the City has shown initiative and that something has been done. From the articles and interviews, it is evident that the lanes were not very well received in the city. However, cycle lanes should not be disregarded as they are an important part of cycling promotion, which is why they appear in all the precedent cities. What should be noted is that cycle lanes might not be the first step or the most important step, and they do not have

to be dedicated along the entire route. Instead, it is more important for there to be a complete and coherent network that is integrated into, and supported by, other transport initiatives; be it NMT or public transport initiatives. For instance, in Rio de Janeiro it was the public bicycle scheme that prompted people to use the bicycle lanes. While in Bogota, the increased use of the cycle lanes was due to the Ciclovia event, wherein every Sunday over 120kms of roads are closed for NMT use only, and the integration of the cycling with the BRT system (Transmilenio). Based on this aspect, the dedicated cycle lanes is not a gap in Johannesburg. Rather, it is the lack of supporting strategies which populate the existing cycle lanes.

An additional factor, which is strongly discussed by the interview respondents, is the aspect of coherent cycling networks. This forms part of master planning, cycle lanes, green routes and public transport integration. According to the interviews, the absence of a master plan, or clear strategy in Johannesburg's cycling projects, is responsible for the incomplete and incoherent networks that currently exist. Some of the interviewees stated that the lanes were done because it was a low-hanging fruit, and the City received funding, therefore, they are very ad-hoc and inconsistent. Morgan (2017) mentions the fact that cycle lanes are only one part of the process; the lanes need to be supported by other initiatives; this sentiment was shared by the interviewees as well. The feeling is that the dedicated cycle lanes in the four project areas have not promoted cycling. The lanes are incomplete, there are major gaps in the routes, and they do not form a clear or coherent network. However, they may have improved cycling conditions along these specific routes. Interestingly, all three of Johannesburg's key planning tools do state the need for planners to develop complete cycling networks, either in neighbourhoods, or along mobility spines. However, the analysis of data seems to state that this was not done by the planners. There is recognition, in both the articles and interviewees, that the cycle lanes are a start, and it is a step in the right direction. While this is true, the City and its planners have realised that the disjointed cycle lanes are not producing the desired result and, therefore, need to consider how this can be improved to be better connected and integrated. This may require other supporting interventions, based on the principles mentioned above, to support and improve what has been done.

The six points mentioned above, appear in the precedent cities, the interviews, and the local planning tools. However, as mentioned in Chapter 2, all of the principles in Table 8 have been identified as KPIs, due to their success in promoting the rights of cyclists in the precedent cities. As such, all of these factors should be considered by transport planning in Johannesburg. Based on the context, limitations and requirements in the city, planners need to decide what should be prioritised. Prioritisation is an important aspect in planning, and it is a key factor of any master plan or strategic development plan in the city.

Other important principles, mentioned in Table 8 (Chapter 2), which transport planners need to consider as key principles, include:

- Specific budget for cycling projects (100% of precedent cities),
- Attractive cycle routes (100% of precedent cities),
- Cycling promotion (100% of precedent cities),
- Traffic calming (100% of Johannesburg's key planning tools),

- Direct routes (100% of Johannesburg's key planning tools), and
- Bicycle parking (100% of Johannesburg's key planning tools)

5.4 Résumé

This chapter analysis compares, and evaluates, cycling in Johannesburg, and answers the two remaining sub-questions. The first of these is 'how can the City ensure that all road users have equality within the city'? The chapter makes it clear that cycling, as a mode of transport, needs to be planned for correctly through strategic plans or master plans. There is a sense that Johannesburg is in need of political will and education campaigns within the City, and there is a need for cycling advocacy and community support from the people. If the City provides a clear strategic direction and the people are able to see how cycling will benefit the city, it is possible that the initiative will be better supported, both internally and externally. Also, the use of the planning tools are important; as explained in this chapter, many of the key planning tools cover the basic strategies for cycling planning. However, in the case of the existing projects, the analysis finds that many of these strategies have been overlooked and have not been applied or implemented, thus, indicating that the planning tools are encompassing of the correct strategies, but the programmes did not use the tools correctly.

The second question that this chapter answers is 'how can current cycling programmes provide cyclists with rights to the city'? In answering this question, the chapter looked at three different components; the KPIs from the precedent cities, the local frameworks and guidelines, and the analysis of the primary and secondary data. The KPIs were used as the baseline for the comparison, as these strategies have been implemented in the precedent cities and have proven to promote cyclists' rights. The analysis of the primary data was used to support the KPIs, as these views are from transport planners, researchers and officials in the City. These are professionals who are aware of what has been done on the ground, and what could be done to improve the situation. The analysis of the secondary data supports the primary data in explaining what has been done on the ground and what the impact of it has been in the city, making the secondary data a supporting component to the evaluation.

Through comparing the KPIs and the primary data, and evaluating it against the local planning tools, the research identified gaps in the planning process and listed them. The analysis indicates that having the correct planning tools can only have an impact if there is political support for planners, and if planners do not overlook certain key strategies within the tools. In the case of the existing projects in Johannesburg, the analysis finds that many of these strategies from the planning tools have been overlooked. As such, if current programmes take the key strategies identified in this chapter, into consideration, and if planners act on these strategies, then, based on the experience of the precedent cities and the input from the respondents, it is likely that these programmes will promote cyclists' rights in Johannesburg.

6 Conclusion and Recommendations

NMT and, in particular, cycling, have played a big role in cities across the globe. The impact of cycling can be seen to decrease congestion, greenhouse gas emissions and travel times but, more importantly, in a city like Johannesburg, cycling can be seen as a way of alleviating poverty, providing freedom of movement, decreasing travel costs, and improving accessibility (to jobs or schools). The process, as this research has explained, is not as straight forward as providing cycle lanes and cycling will increase; rather, it requires careful planning and consideration in order to ensure that the process is beneficial to the city and to the people of the city. The process is challenging, and the biggest challenges in Johannesburg are the low percentage of cyclists, the high dependence on motorised transport, and the extremely high budget used for existing cycling infrastructure.

The current City administration is not satisfied with what has been done regarding cycling. As such, it is of critical importance for planners to evaluate the cycling infrastructure programmes and improve it. The notion that investing in cycling infrastructure must stop, is incorrect. Rather, it is imperative to improve the process because cyclists, like other road users, have a right to be in the city. Therefore, this research set out to investigate "how can planners provide cyclists with equal rights to the city"?

6.1 Beginning to End

From the problem statement, in the introduction of this research, it was clear that the study intended to find out why cycling did not increase, despite the attempts to facilitate cyclists, and how the City administration could decide to stop cycle lanes, when cyclists have a right to the city. It was discovered that having a right is aspirational, everyone has rights, but not everyone has access to these rights. This led to a discussion around the right to the city and accessing public space. It was mentioned that the right to the city is a right that should be awarded to every citizen but, in reality, it is controlled by those who are in power and by those who plan the city. Apartheid South Africa is an example of this, wherein planning was used as a means of physically placing people of colour on the periphery of the city in an attempt to limit their access to the city centre. In modern day Johannesburg, gated communities are an example of how power removes the right to access public space.

The aspect of planning was then discussed in more detail, on the basis that planning can be used as a strategy, through which rights are granted or denied. In the international precedent cities, it was proven that, through the use of the correct strategy, transport planners were able to successfully promote cycling, and increase cycling access, safety and security in the city. Planning for cyclists in Johannesburg acquired a different outcome, as mentioned by an interview respondent; the lanes provided an opportunity for more powerful road users to undermine the rights of cyclists even further. This is portrayed when private cars, taxis and buses deliberately invade the cycle lanes, thereby removing cyclists from that space. This illustrates how power and dominance play a crucial role in accessing the right to the city. As such, it was noted that cycling in Johannesburg did not increase after the implementation of the cycling programmes and, based on the experience of the precedent cities and responses from the interviewees, this is due to there being certain gaps in the planning tools and in the application of the strategies.

The research methods identified a process to evaluate the planning tools. This process required the information from the precedent cities as a basis for the evaluation, an outline of the planning tools which exist in Johannesburg, together with an overview of the four cycling programmes in Johannesburg. Chapter 2 explains the cycling development process in the precedent cities and provides a list of key performance indicators, which highlight the main planning principles. Chapter 4 provides context of transport in Johannesburg and outlines the major NMT planning tools and, the resultant cycling programmes. It was discovered, in this section, that in the 1930's, Johannesburg was dominated by cycling but, after the advent of the car, planners made space for cars in the city and the bicycle was slowly pushed out.

The final part of the research method required the analysis of the primary data and the semi-structured interviews. The interview analysis pointed to two key planning tools in Johannesburg, which were used in the development and implementation of the cycling programmes; the NMT Framework and Complete Streets Guideline. The research added an additional guideline to this group of key tools, as it was identified, in Chapter 4, as being the most comprehensive and most recent planning tool in the City: "The National NMT Facility Guidelines". The three local planning tools where used as the basis for comparison in Johannesburg. The evaluation process was given further direction from the interview respondents, who pointed to certain key principles, which they felt are important for transport planners to consider. These included: the development of a master plan, the need for cyclists in the management and planning of the lanes, public transport integration, coherent cycling networks, education and awareness campaigns, and access to bicycles. The articles supported the views of the interview respondents and provided proof of the fact that the cycling programmes fell short of achieving its objective in Johannesburg.

Having analysed the information, it was clear that the problem was within the planning process, either in the planning tools or in the application of the strategies mentioned in the planning tools. The research then evaluated the three local planning tools using, as a baseline for the evaluation, the KPIs from the precedent cities and the responses from the interviewees. When these were evaluated and cross referenced to find common features or gaps, the research uncovered certain problems with the application of the strategies mention in the Johannesburg planning tools.

Firstly, the three key planning tools state the need for transport planners to develop a master plan or strategic plan. However, there is currently no cycling or NMT master plan in Johannesburg, and the programmes that have been carried out, to date, were done without the existence of a clear strategic direction from the City. Based on the responses from the interviewees and the information from the precedent cities, this is one of the main reasons why cycling programmes are successful in other cities. Through the master plan, other aspects of cycling are addressed, such as the provision of cycling networks, integration with public transport, bike share schemes, etc. The absence of such a plan, in the opinion of the respondents, is why the new Johannesburg administration does not see the value of what has been done, and why the people do not see the value of the lanes.

Secondly, integration of cycling with public transport was identified as essential. This aspect is extremely important, as it was the only factor that is stressed by the interviewees, all of the precedent cities, and

all three local planning tools. Additionally, in Chapter 4, every NMT planning tool that is listed emphasises that public transport integration is important in Johannesburg, as the city is dispersed. The bicycle has limits; most significantly, when it comes to distance. However, we still find that cycling in Johannesburg has not been fully integrated with public transport. As explained, to an extent, Gautrain provides minimum parking space at its stations, and certain cycle lanes connect to Gautrain and BRT stations. However, the majority of the population do not use Gautrain and BRT; they use the Minibus taxis, Metrobus and Metrorail. As such, cycling integration must be implemented across all modes of public transport. In order for cycling to even be considered as an alternative mode of transport in Johannesburg, it must have advantages over the car. Therefore, if public transport in the city is improved, and the transition between cycling and public transport is optimised, only then will cycling stand a chance in the city.

The aspect of involving cyclists in the planning and development of the programmes is another key aspect. This has proven to be extremely useful in international cities. The cycling coordinator is likely to ensure that cycling remains a priority on the City's agenda. In Johannesburg, this is important, as cycling is fast losing its popularity within the municipality. Additionally, cyclists are aware of the daily challenges which are encounter in the city. As an example, two important aspects, emphasised by interviewees, who are transport planners and cyclists, are the need for cycling networks to follow the most direct routes (an aspect emphasised by the Johannesburg planning tools, as well as some of the more developed precedent cities), and for dedicated cycle lanes to be concentrated on busier streets with higher speed limits (as these are where cyclists feel threatened); while painted lanes are used for quieter streets with lower speed limits. In doing this, the City will save on infrastructure costs and a complete and direct cycling network can be created. This ensures that priority is given to cyclists' access, security and safety. Having cyclists involved in the planning and implementation can go a long way in bringing the required expertise and support for cycling in the city, and in saving the City on over spending on unnecessary infrastructure.

Lastly, the six precedent cities and the Johannesburg planning tools highlighted dedicated cycle lanes as a key strategy for planners. In Johannesburg, due to the condition of the current lanes, this aspect is not supported by the City. This research highlighted this as a problem; however, it is possible that stopping the development of cycle lanes may push transport planners to reconsider what has been done in Johannesburg, and improve the planning methods going forward. It was made clear, in Chapter 5, that the provision of cycle lanes does not attract more people to use bicycles. Cycle lanes need to be part of a broader plan, which is supported by other transport interventions. In fact, the provision of cyclists' rights cannot be achieved through the application of a single strategy, such as dedicated cycle lanes, or any of the public transport integration. Each strategy needs to be supported by other strategies, in order to ensure that a safe, convenient and integrated cycling environment is created. This process of combining the different strategies must be guided by an overall master plan for the city.

6.2 Answering the Research Questions

Through the six chapters of the research, the research addresses the seven sub-questions identified in Chapter 1. These sub-questions guided the research in accumulating the information needed to answer the main research question. Following is a summary of the answers:

1. What does 'right to the city' mean?

There is no simple meaning to the 'right to the city'. It is, according to this research, the ability to develop and create urban spaces that meet the needs of inhabitants. Unfortunately, this is not the case, because the right to the city is controlled by those who develop and shape urban space. It is influenced by those with power, and by those who dominate urban space.

2. Who has a right to the city?

Everyone has a right to the city and the city is for everyone, but force and power play a vital role in deciding how much right to the city a person has or, in the case of this research, how much right to the street a person has. Planners are the centre of this process, as they have the ability to shape and reshape urban spaces.

3. What are the tools in place to ensure people have a right to the city?

Since the development of the cities, planners used planning tools to guide the layout and development of urban space. These tools are guidelines, frameworks or development plans. The research used six international cities to indicate how these tools are used by planners, to improve the conditions for cyclists within these six cities.

4. How can the City ensure that all road users have equality within the city?

Based on Sub-Question 3, the research used the six international cities to explain how these cities have ensured equality between different transport modes. This process created equality within the street, because planners managed to address the needs of all road users. In order for this to happen, the City administration and the road users must first recognise that all road users have an equal right within the street, and that the need of vulnerable road users must be addressed first.

5. What are the international road and NMT planning guidelines?

This question is summarised in Table 8 which highlights the key performance indicators within the six precedent cities. Table 8 does not list the road and NMT planning guidelines. Instead, it breaks down the strategic principles within these guidelines. The most prominent of these principles are, NMT master plan, budget for cycling projects, cycling office, green routes, dedicated cycle routes, attractive cycle routes, integration with public transport, bicycle rental schemes, and cycling promotion.

6. What guidelines are used when planning Johannesburg roads and when planning NMT routes?

Table 13 is a list of the transport planning tools in Johannesburg which address NMT planning. The research discussed the documents in more detail in order to measure Johannesburg's commitment to NMT planning. The research found that, while all the planning tools show a certain level of commitment

from the City, there are three planning tools which really focus on NMT development. These are the 2009 Framework for NMT, the 2013 Complete Streets Design Guideline, and the 2014 NMT Facility Guidelines. From the interview process, it was established that the Framework for NMT, and the Complete Street Design Guideline, were used by the City to plan, design and implement the cycling routes in Johannesburg.

7. How can the current cycle programmes provide cyclists with rights to the city?

The last sub-question was answered through the evaluation process which compared the KPIs, from Table 8, against the three NMT planning tools from Table 13, and the interview analysis. Through this process, the research was able to identify gaps in the planning process. These gaps were found to be in the implementation process, and not in the planning tools. As such, in order for the cycle programme to have an impact, planners need to address the gaps and understand the importance of NMT planning within the city.

Based on the process of this research, from beginning to end, the research answered the main research question: 'how can planners provide cyclists with equal rights to the city'? There are two parts to this answer; the first of which is related to the right to the city. The influence and general use of power and dominance in the city, by planners and officials in municipalities, play a major role in shaping the city. As such, transport planners need to consider how a specific intervention will impact the city and its users, considering the most vulnerable users first. The planning tools in Johannesburg and the strategies from abroad are clear in explaining this, stating that the most vulnerable road users must be prioritised first when planning streets. For planners in Johannesburg, it can be difficult to implement these strategies, especially in a city where the car has been the priority since its inception. However, planners need to change their own priorities. The priority for planners, as has been mentioned in the New Urban Agenda, is for cities to be developed in such a way that it prioritises the needs of present and future generations (Habitat III, 2016). Currently, cars are not prioritising the needs of the present, or the future. Johannesburg, which is Gauteng's smallest city by area, yet its most populated and congested city, is being burdened by the increased usage and dependence on vehicles. Congestion keeps increasing, regardless of the number of highways and street lanes that are added. As stated by Newman and Kenworthy (1996, p. 6), "The problem is not the automobile in itself, but an overuse and dependence on it". *The city has evolved* from walking cities and transit cities into automobile dependant cities. Cities are dispersed and travelling times are continuously increasing. Motorised transport is, therefore, essential to traverse cities, and planners need to prioritise planning for alternate transport, in order to reduce dependence on private cars and safeguard our cities for future generations.

The second part of the answer, to the research question, is based on the methods of planning. Planning is a process of providing the necessary tools, be it plans, frameworks or guidelines. These are tools which are meant to guide planners, developers and designers. It is clear from the analysis that the four cycling programmes in Johannesburg do not follow any specific planning tool, nor do they align with the strategies from the precedent cities or the responses from the interviewees. While there are some gaps in the existing tools, which have been identified and explained, the strategies mentioned in the planning tools do consider most of the KPI's. Moreover, the City has indicated that it is working on a Cycling

Manual, and on a NMT master plan. Therefore, for planners to improve the way in which cyclists' rights are being provided, they need to focus on implementing the strategies from the planning tools, policies and guidelines which they already have.

As per the New Urban Agenda, no individual must be left behind in ending poverty in all its forms and dimensions, by ensuring equal rights and opportunities, integration in the urban space, enhancing liveability, health and well-being (Habitat III, 2016). Planning can be used as a tool to achieve this, in the international precedent cities, it is proven that, with political support, transport planners were able to successfully promote cycling, reduce car-dependency, and create a safer and more sustainable city. Planning for cyclists in Johannesburg acquired a different outcome, as mentioned by an interview respondent; the lanes provided an opportunity for more powerful road users to undermine the rights of cyclists even further. Additionally, the cycling projects became a point of political conflict, illustrating the role of power in deciding how much of a right to the city people have.

6.3 Recommendations for Further Research

As mentioned in the scope and limitations, there is small pool of research in South Africa, with regards to cycling planning and NMT planning. This has been increasing over the past few years, but there is still scope for a lot more work to be done.

This research focused on Johannesburg, and finding information in Johannesburg, with regards to monitoring, evaluation, or analysis of the cycle lanes or cycle mode share, is difficult. There is scope for further research in all major cities in South Africa, so that researchers can conduct comparisons and recognise trends within these cities. For example, in a recent (2017) study into the effects of NMT facility implementations and upgrades, in Cape Town, it was found that cycling facilities in Cape Town had limited, or no, impact in terms of encouraging the number of cycling trips (Baufeldt & Vanderschuren, 2017)[3]. It is useful to know the impact of cycling planning in Cape Town, as well as in other major South Africa cities, in order to conduct local comparisons. While comparing with international cities is always useful, planning recognises that local context is an important aspect for successful planning. As such, it is more useful to compare with cities in South Africa, but the literature does not allow for this.

Another difficulty in this research was in understanding the different planning tools, and the relation and application of these planning tools, in the planning environment – at a national, provincial, and local level. The link between the documents, in terms of application, is difficult to follow. It is unclear how successful these planning tools are in achieving their objectives, and whether or not these planning tools are respected and adhered to by the government. The application and relevance of the planning tools, at the municipal level, is also unclear, specifically when there is a change in city administration. It would be useful to conduct research investigating these links and processes, and outlining the transport planning process, with regards to transport development frameworks, integrated transport plans, transport facility guidelines, and transport master plans.

[3] The results of study were not included in this research due to it being a recent publication.

Lastly, this research focuses on cycling, however, through the research, the importance of public transport has been strongly emphasised. While there is a significant amount of research with regards to public transport, there is scope for research with regards to optimising the efficiency of these public transport modes, especially the minibus taxi industry, which is the dominant mode in all South African cities.

7 Reference List

Adjei, E. (2010). *Multi-Modal Urban Transport: Integrating Non-Motorised and Bus Transport.* The Netherlands: International Institute for Geo-Information Science and Earth Observation.

Aichenger, W., & Reinbacher, E. (2010). *Cycling Policy and Practice in Meg-Cities, Rio de Janeiro and Cairo: A Case Study.* Ain Shams University, Egypt: Vienna University of Technology, Austria.

Amin, A. (2006). Collective Culture and Urban Public Space. *Inclusive Cities: Challenges of Urban Diversity.* South Africa: Development Bank of Southern Africa and the CCCB.

Appleyard, D. (1981). *Liveable Streets.* California: University of California Press.

Balbach, E. D. (1999). *Using Case Studies to Program Evaluation.* California: California Department of Health Services.

Batista, E. A. (2010). *Bicycle Sharing in Developing Countries: A Proposal Towards Sustainable Transportation in Brazilian Median Cities.* Stockholm: Royal Institute of Technology .

Baufeldt, J. L. (2016). *Investigation into the Effects of Non-Motorised Transport Facility Implementations and Upgrades in Urban South Africa.* Cape Town: University of Cape Town, Centre for Transport Studies.

Baufeldt, J., & Vanderschuren, M. (2017). An Investigation into the Effects of NMT Facility Implementation and Upgrades in Cape Town. In W. V. Mitullah, M. Vanderschuren, & M. Khayesi, *Non-Motorised Transport Integration into Urban Transport Planning in Africa* (pp. 112-125). Oxon: Routledge.

Bautz, N. (2011). *Planning for Cycling in Germany: Cycling Coordinators and Office - A Short Survey from Frankfurt am Main.* Eschborn: Federal Ministry of Economic Cooperation and Development (BMZ).

Beavon, K. (2001). *The Role of Transport in the Rise and Decline of the Johannesburg CBD, 1886-2001.* Pretoria: Department of Geography and Geoinformatics, University of Pretoria.

Bicycle Times. (2012, October 17). *The Rebirth of Bogota as a Cycling City*. Retrieved from Bicycle Times: http://bicycletimesmag.com/rebirth-bogota-cycling-city/#h

Brown, R. L. (2016, 10 28). *How Bike Lanes Became an Issue of Race and Class in Johannesburg.* Retrieved from The Independent: https://www.independent.co.uk/news/world/africa/how-bike-lanes-became-an-issue-of-race-and-class-in-johannesburg-south-africa-a7385641.html

Brussel, M., & Zuidgeest, M. (2012). Cycling in Rio de Janeiro? *ITC News, Alumni Magazine, Issue 2012-2*, 6-8.

Buehler, R. (2010). Cycling to Sustainablity in Amsterdam. *Sustainable Communities*, 36-40.

City of Copenhagen. (2014). *Copenhagen City of Cyclists: The Bicycle Account 2014.* City of Copenhagen.

City of Joburg. (2014, 10 22). *Soweto Residents Cycle to a New Future.* Retrieved from City of Joburg: https://www.joburg.org.za/media_/Newsroom/Pages/2014%20Articles/Soweto-residents-cycle-to-a-new-future.aspx

City of Johannesburg. (2009). *Framework for Non-Motorised Transport.* Johannesburg: City of Johannesburg.

City of Johannesburg. (2011). *Joburg 2040 Growth and Development Strategy (GDS) .* Johannesburg: City of Johanneburg Central Strategy Unit.

City of Johannesburg. (2013). *Complete Streets Design Guideline.* Johannesburg: City of Johannesburg.

Committee of Transport Officials. (2012). *South African Road Classification and Access Management Manual.* Pretoria: The South African National Roads Agency Ltd.

Copenhagenize Index. (2017, June 14). *The Copenhagenize Bicycle Cities Index 2017*. Retrieved from Copenhagenize Design Co.: http://copenhagenize.eu/index/index.html

Cox, A. (2016, 9 15). *Better to Keep Joburg Cycle Lanes - Parks Tau.* Retrieved from IOL: https://www.iol.co.za/news/politics/better-to-keep-joburg-cycle-lanes-parks-tau-2068365

Crow. (1998). *Recommendations for Traffic Provisions in Built-Up Areas, ASVV.* Netherlands: Centre for Research and Contract Standardisation in Civil Engineering.

Culwick, C. (2014). Transitions to Non-Motorised Transport in Gauteng. In C. Wray, & G. Gotz, *Mobility in the Gauteng City-Region* (pp. 131-153). Johannesburg: Gauteng City-Region Observatory.

De Beer, L., & Valjarevic, D. (2015). Bike Sharing in Johannesburg - Trendy Idea But is in Financially Feasible? *South African Transport Conference*, (pp. 499-518). Johannesburg.

Dekoster, J., & Schollaert, U. (1999). *Cycling: The Way Ahead for Towns and Cities.* Belgium: European Commission.

Development ASIA. (2016). *Case Study: A Strategy for Creating a Bicycle-Friendly City.* Asian Development Bank: Institute of Transportation and Development Policy.

DoT. (1996). *White Paper on National Transport Policy.* Pretoria: Department of Transport.

Du Preez, D., Morgan, N., & Suleman, M. (2016, 9 22). *Mashaba, Vast Majority of Joburg Bike Riders are Poor.* Retrieved from IOL: https://www.iol.co.za/the-star/mashaba-vast-majority-of-joburg-bike-riders-are-poor-2071748

Fietsberaad. (2010). *The Bicycle Capitals of the World: Amsterdam and Copenhagen.* Utrecht, The Netherlands: Fietsberaad.

Fihlani, P. (2016, 9 14). *Johannesburg Halts South Africa Cycle Lanes to Build Roads.* Retrieved from BBC News: https://www.bbc.com/news/world-africa-37360543

Garau, P. (2016). *Public Space - Think Piece.* UCLG Committee of Urban Strategic Planning.

Gardner, C. (2011, December 12). We are the 25%: Looking at Street Area Percentages and Surface Parking. *Old Urbanist*. Retrieved October 24, 2016, from http://oldurbanist.blogspot.co.za/2011/12/we-are-25-looking-at-street-area.html

Gauteng Department of Roads and Transport. (2013). *25-Year Integrated Transport Master Plan.* Johannesburg: Gauteng Department of Roads and Transport.

Gauteng Department of Roads and Transport. (2014). *Draft Gauteng Non-Motorised Transport Master Plan.* Johannesburg: Gauteng Department of Roads and Transport, GIBB.

Godefrooij, T., Pardo, C., & Sagaris, L. (2009). *Cycling-Inclusive Policy Development: A Handbook.* Utrecht: Interface of Cycling Expertise.

Goodyear, S. (2014, December 1). *The Secret History of Cars Begins With Bicycles*. Retrieved from Citylab: https://www.citylab.com/transportation/2014/12/the-secret-history-of-cars-begins-with-bicycles/383254/

Government Communications (GCIS). (2016). *South Africa Yearbook 2015/2016.* Pretoria: Government Communications (GCIS).

GPDRT. (2016). *Gauteng Province Household Travel Survey 2014.* Johannesburg: Gauteng Province Department of Roads and Transport.

Habitat III. (2016 (2)). The New Urban Agenda Explainer. *UN-Habitat* (pp. 1-5). Quito, Ecuador: United Nations.

Habitat III. (2016). *New Urban Agenda.* Quito: United Nations Conference on Housing and Sustainable Urban Development.

Hamilton, R. (2012, 03 15). *Can the Buffalo Change Africa's Bicycle Culture?* Retrieved from BBC News: https://www.bbc.com/news/world-africa-17115923

Hansen, L., & Kotze, P. (2012, September). Transportation and Place-Making: The Contribution of Public Transport Initiatives to the Qauility of the Urban Environment in Gauteng. *Architecture South Africa: New Directions for Urban Design and Architecture*(57), 18-22.

Harber, J., & Parker, A. (2018). Streets as Public Space. In J. Harber, & A. J. Parker, *Taking Streets Seriously* (pp. 5-12). Johannesburg: Gauteng City Region Observatory.

Hardisty, C. (2014, 11 1). *Boom Time for Cycling.* Retrieved from Sports Trader: http://www.sportstrader.co.za/pages/issue%20articles/2014November/boomtimeforcycling.php

Harris, C. (2016, 6 5). *Joburg's Bike Lanes: Are They Effective?* Retrieved from Eye Witness News: http://ewn.co.za/2017/06/05/opinion-joburg-s-bike-lanes-are-they-effective

Harvey, D. (2012). *Rebel Cities.* Brooklyn: Verso.

Hembrow, D. (2011, March 24). *Rotterdam Remedies a Lower Cycling Rate.* Retrieved from A View from the Cycle Path: http://www.aviewfromthecyclepath.com/2011/03/rotterdam-remedies-lower-cycling-rate.html

HG.org. (n.d). *What is the Difference Between a Human Right and a Civil Right?* Retrieved from Legal Resources: https://www.hg.org/article.asp?id=31546

Hill, G., & Hill, K. (n.d). *Legal Terms and Definitions*. Retrieved from LAW.COM: http://dictionary.law.com/

History.com. (2009). *Patton takes Frankfurt*. Retrieved from History.com: http://www.history.com/this-day-in-history/patton-takes-frankfurt

Huchzermeyer, M. (2016, 3 11). *Cycling is Still an Uphill Battle*. Retrieved from Mail and Guardian: https://mg.co.za/article/2016-03-10-cycling-is-still-an-uphill-battle/

Hull, A., & O'Hollleran, C. (2014). Bicycle Infrastructure: Can Good Desgin Encourage Cycling? *Volume 2, 2014 - Issue 1, An Open Access Journal*, 696-406.

Institute for Transportation and Development Policy. (2016, June 1). *Rio de Janeiro*. Retrieved from Institute for Transportation and Development Policy: https://www.itdp.org/city-transformations/rio-de-janeiro/

Jacobs, A. B. (1993). *Great Streets.* Cambridge: MIT Press.

Jenkins, M. (2015, August 17). *How a Columbian Cycling Tradition Changed the World*. Retrieved from Bicycling: https://www.bicycling.com/culture/advocacy/how-colombian-cycling-tradition-changed-world

Jones, P. (2016, June). *Group Rights*. Retrieved from The Stanford Encyclopedia of Philosophy: <https://plato.stanford.edu/archives/sum2016/entries/rights-group/>

Kane-Berman, J. (2016, 9 19). *Bike Lanes for Joburg?* Retrieved from Politicsweb: https://irr.org.za/media/articles-authored-by-the-institute/bike-lanes-for-joburg-2013-politicsweb-19-september-2016

Kim, P., & Dumitrescu, E. (2010). *Share the Road: An Investment in Walking and Cycling Road Infrastructure.* Nairobi: UNEP and FIA Foundation.

Koyana, X. (2017, March). *PRASA's New Trains Remain off Tracks Due to Irregularities*. Retrieved from Eyewitness News: http://ewn.co.za/2016/12/01/prasa-s-new-trains-remain-off-tracks-due-to-irregularities

Krag, T. (2002). Urban Cycling in Denmark. In H. McClintock (Ed.), *Planning for Cycling: Principles, Practice and Solutions for Urban Planners* (pp. 223-236). Cambridge: Woodhead Publishing.

LCC. (2011). *Lessons from the Netherlands: Report from the London Cycling Campaign Study Tour of Three Dutch Cities.* London: London Cycling Campaign.

Lefebvre, H. (1996). *Writings on Cities.* Oxford: Blackwell Publishers.

Lindeque, B. (2016, 9 15). *R70 Million Allocated to Bicycle Lanes in Sandton Diverted to Alexandra to Assist with Basic Services.* Retrieved from GoodThingsGuy.com: https://www.goodthingsguy.com/business/bicycle-lanes-sandton-diverted-alexandra/

Macdonald, E. (2011). Streets in the Public Realm. In T. Banerjee, & A. Loukaitou-Sideris, *Companion to Urban Design* (pp. 419-431). Oxon: Routledge.

MacDonald, S., & Headlam, N. (2008). *Research Methods Handbook: Introductory Guide to Research Methods for Social Research.* Manchester: CLES.

Madibogo, J. (2016, 6 10). *Malema Rages Against ... Bicycle Lanes?* Retrieved from Business Live: https://www.businesslive.co.za/rdm/politics/2016-06-10-malema-rages-against--bicycle-lanes/

Magangane, N. (2014, 10 24). *Cycle Paths Launched in Orlando: Residents Can Now Cycle Freely and Safely on a Designated Cycle Lane.* Retrieved from Soweto Urban: https://sowetourban.co.za/14994/cycle-paths-launched-orlando/

Makoye, K. (2017, 10 28). *Bike Sharing Helps Johannesburg Township Commuters Beat the Traffic.* Retrieved from IOL: https://www.iol.co.za/business-report/bike-sharing-helps-johannesburg-township-commuters-beat-the-traffic-11727796

Manyathela, C. (2016, 09 13). *Herman Mashaba Puts Brakes on Bicycle Lanes Project in JHB.* Retrieved October 24, 2016, from Eyewitness News: http://ewn.co.za/2016/09/13/Herman-Mashaba-puts-brakes-on-bicycle-lanes-project

Mehta, V. (2013). *The Street: A Quintessential Social Public Space.* USA and Canada: Routledge.

Ministry of Transport. (2009). *Cycling in the Netherlands.* The Netherlands: Ministry of Transport, Public Works and Water Management, and Fietsberaad.

Molai, L., & Nyarirangwe, M. (2010). An Analysis of the Extent to Which the Needs of Vulnerable Road Users are Addressed and Prioritised in Land Use, Transport and Infrastructure Provision Decisions in South Africa. *29th South African Transport Conference.* Pretoria: Document Transformation Technologies.

Morgan, N. (2017). Cycling Infrastructure and the Development of a Bicycle Commuting Socio-Technical System: the Case of Johannesburg. *Applied Mobilities*.

Morgan, N. (2017, 3 14). *Where are the Users of Johannesburg's Bicycle Lanes?* Retrieved from Cycle Friendly Cities: https://cyclefriendlycities.org/2017/03/14/where-are-the-users-of-johannesburgs-bicycle-lanes/

Mpholo, A. (2015, 7 16). *JDA Brings Cycle Lanes to Sophiatown.* Retrieved from Northcliff Melville Times: https://northcliffmelvilletimes.co.za/202974/jda-brings-cycle-lanes-to-sophiatown/

National Department of Transport. (2007). *Public Transport Action Plan.* Pretoria: National Department of Transport.

National Department of Transport. (2008). *Draft National Non-Motorised Transport Policy.* Pretoria: National Department of Transport.

Ndaba, B. (2013, 6 4). *Gautengers Urged to Hop on to Bikes.* Retrieved from IOL: https://www.iol.co.za/motoring/bikes/gautengers-urged-to-hop-on-to-bikes-1526706#comments_start

Nelson, A., & Scholar, V. (2007). *Liveable Copenhage: The Design of a Bicycle City.* Centre for Public Space Research, Copenhagen: University of Washington, Seattle.

Neville, C. (2007). *Introduction to Research and Research Methods.* University of Bradford, School Management, Effective Learning Service.

Newman, P. W., & Kenworthy, J. R. (1996). The Land Use-Transport Connection. *Land Use Policy, 13*(1), 1-22.

Nkurunziza, A. (2013). *Sustainable Transport in Dar-es-Salaam: The Potential for BRT and Cycling from a User Perspective.* University of Twente: ITC Printing Department.

Oatsvall, A. J. (2015, April 22). *How to Tell the Difference Between a Right and a Privilege*. Retrieved from Voices of Liberty: https://voicesofliberty.com/2015/04/22/how-to-tell-the-difference-between-a-right-and-a-privilege/

Oxford Dictionary. (2017). *Oxford English Dictionary*. Retrieved May 2017, from http://www.oed.com/

Pattiasina, N., & Pinzon, C. (2015). *Cycling in Colombia: Report of a Fact Finding Mission by the Dutch Cycling Embassy.* The Hague: Dutch Cycling Embassy.

PBS e2 Design. (2013, Sep 20). *Bogota: Building a Sustainable City*. Retrieved from You Tube: https://www.youtube.com/watch?v=CZE3ClCA1m4&index=6&list=LLUl9HTQuefGVMPFT2WbbqVw

Pheto, B. (2016, 9 16). *Cycle Lanes and a Tale of Three Men.* Retrieved from Fourways Review: https://fourwaysreview.co.za/243662/cycle-lanes-and-a-tale-of-three-men/

Pillay, K., & Madlala, M. (2013, 1 4). *Cyclist's Wife 'Cradled Him at Scene'.* Retrieved from IOL: https://www.iol.co.za/news/south-africa/kwazulu-natal/cyclists-wife-cradled-him-at-scene-1447719

Purcell, M. (2002). Excavating Lefebvre The right to the City and its Urban Politics of the Inhabitant. *GeoJournal*, 99-108.

Republic of South Africa. (1996). *Constitution of the Republic of South Africa No.108 of 1996.* Pretoria: Statutes of the Republic of South Africa.

Rossi, P. H., Freeman, H. E., & Lipsey, M. W. (1999). *Evaluation: A Systematic Approach.* California: SAGE Publications.

Ruby, L. (2012). *How Denmark Became a Cycling Nation*. Retrieved September 29, 2016, from http://denmark.dk/en/green-living/bicycle-culture/how-denmark-become-a-cycling-nation

SACN. (2014). *How to Build Transit-Oriented Cities: Exploring Possibilities.* Johannesburg: South African Cities Network.

SAnews.gov.za. (2015, 11 12). *Johannesburg Working to Reduce Traffic Congestion.* Retrieved from Property24: https://www.property24.com/articles/johannesburg-working-to-reduce-traffic-congestion/23101

Soukhanov, A. H. (1999). *Encarta English Dictionary.* New York: St. Martin's Press.

Stats SA. (2013). *National Household Travel Survey.* Pretoria, South Africa: Statistics South Africa.

Stones, L. (2013, 10 4). *The Struggle for a Cycle Friendly City.* Retrieved from Mail and Gaurdian: https://mg.co.za/article/2013-10-04-00-the-struggle-for-a-cycle-friendly-city

Sun International. (2014, October 26). *The History of Africa's Richest Square Mile*. Retrieved from Sun International: https://www.suninternational.com/maslow/stories/travel/masl-the-history-of-africas-richest-square-mile/

The Scottish Government. (2010). *Designing Streets: A Policy Statement for Scotland.* Edingburgh: Scottish Government.

Tolley, R. (2011). *Good for Business. The Benefits of Making Streets More Walking and Cycling Friendly.* Australia: National Heart Foundation.

Tour de Force. (2017, January 27). Bicycle Agenda 2017-2020. The Netherlands.

United Nations. (2015). *Universal Declaration of Human Rights.* United Nations.

Valerie. (2016, April 20). *Cycling in Frankfurt*. Retrieved from The Veloyo Blog: https://www.veloyo.com/en/blog/cycling-in-frankfurt/

Van Mead, N. (2016, 5 24). *Can Johannesburg Reinvent Itself as Africa's First Cycle-Friendly Megacity?* Retrieved from The Guardian: https://www.theguardian.com/cities/2016/may/24/johannesburg-africa-first-cycle-friendly-megacity-bicycles

Vanderschuren, M., Phayane, S., Taute, A., Ribbens, H., Dingle, N., Pillay, K., Zuidgeest, M., Enicker, S., Baufeldt, J., and Jennings, G. (2014). *Non-Motorised Transport Facility Guideline.* Pretoria: SMEC, UCT, National Department of Transport.

Walliman, N. (2011). *Research Methods: The Basics.* London and New York: Routledge.

Welleman, T., & Fietsberaad. (2002). An Efficient Means of Transport: Experience with Cycling Policy in the Netherlands. In H. McClintock, *Planning for Cycling: Principles, Practice and Solutions for Urban Planners* (pp. 192-207). Cambridge: Woodhead Pubishing Ltd.

Wilson, D. G. (2004). A Short History of Bicycling. In *Bicycling Science* (pp. 3-35). MIT Press.

Wooldridge, C. (2014). *Netherlands Cycling Study Tour: Observations and Reflections Report.* Western Australia: Department of Transport.

World Health Organisation. (2017, May). *Media Centre*. Retrieved from World Health Organisation: http://www.who.int/mediacentre/factsheets/fs358/en/

Wray, C., & Gotz, G. (2014). Introduction: A New 'Golden Era' for Transport Planning? In C. Wray, & G. Gotz, *Mobility in the Gauteng City-Region* (pp. 1-15). Johannesburg: Gauteng City-Region Observatory.

Wyngaardt, V. (2016, 11 3). *Sandton Bicycle Lanes Still on the Agenda.* Retrieved from Engineering News: http://www.engineeringnews.co.za/article/sandton-bicycle-lanes-still-on-agenda-2016-11-03

Yin, R. K. (1994). *Case Study Research: Design and Methods, Second Edition.* University of Michigan: Sage Publication.

Zainal, Z. (2007). Case Study Research Method. *Jurnal Kemanusiaan bil.9*.

8 Annexures

8.1 Annexure 1: Copenhagen – Bicycle Planning Principles

Measures to Increase Bicycling	
Plan for Cyclists	• Direct cycle routes • Coherent networks • Cycle plans • Green routes to link schools, parks and workplaces • Cyclist facilities at workplaces • Dense, mixed-use development pattern • Two-way cycling on one-way streets
Information, Campaigns and Events	• Safety and enforcement campaigns • Cycle to work campaigns • Cycling for health campaigns • Education on the societal costs of cars • Campaigns targeted at children
Restrictions on Car Driving	• Remove surface and on-street car parking • Reduce speed limits on residential roads • Create parking fees • Ticket illegally parked or stopped cars blocking cycle areas
Road Safety	• Integrate road safety planning with bicycle planning • Perform road safety audits • Redesign black spot areas
Competence Development	• Hold conferences about cycle planning • Research and development • Offer data for specialists
Bicycle Schemes	• City bikes or other free bicycle program • Company bikes campaigns • Bicycle couriers • Cycle basket/trailer deposit zone in shops
Safer Road Layout	• Traffic calming, particularly at intersections • Cycle crossings, advanced stops, pre-green lights • Focus on barrier areas, such as bridges
Link Bicycles and Public Transit	• Allow bicycles on trains or buses • Provide adequate parking at transit hubs
Enhance· Road Maintenance	• Smooth surfaces • Better sweeping • Adequate winter-time maintenance
Increase Bicycle Parking	• Bicycle parking funds • Provide bicycle racks to meet different needs, including covered and locked areas
Economic Incentives	• Tax deductions for cyclists • Deductions for workplaces which provide cycle facilities
(Nelson & Scholar, 2007)	

8.2 Annexure 2: Ethics Clearance

Application for Approval of Ethics in Research (EiR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/ebe/research/ethics1

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Muhammed Suleman
Department		Engineering and the Built Environment
Preferred email address of applicant:		**muhammed2809@outlook.com**
If Student	Your Degree: e.g., MSc, PhD, etc.	MSc
	Credit Value of Research: e.g., 60/120/180/360 etc.	180
	Name of Supervisor (if supervised):	Marianne Vanderschuren
If this is a researchcontract, indicate the source of funding/sponsorship		Click here to enter text.
Project Title		Cyclists' Rights to the City

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Muhammed Suleman		**20 Nov 2017**

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	M Vanderschuren		20/11/17
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours).			
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	R Behrens		22Nov17

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8.3 Annexure 3: Research Questionnaire

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Faculty of Engineering & the Built Environment
Department of Civil Engineering

Research Questionnaire

Name of researcher: MUHAMMED SULEMAN

Title of research project: CYCLISTS' RIGHTS TO THE CITY

Name of interviewee						
Company/Association						
Gender	Male			Female		
Age	20-29	30-39	40-49	50-59	60-69	Older
Job sector	Private	Public		NGO	NPO	
	Other:					
Job position	Associate	Manager	Director	Other:		
Closest cycle route	0-3km	4-7km		8-15km	< 15km	

Please note: The following questions will be asked to transport planners, city officials, as well as cycling advocates, during an interview with the researcher. This forms part of a qualitative research methodology. All questions are open ended questions, the answers of which will be recorded by the researcher and used in the research report. The interviewees are not expected to fill in the research questionnaire.

1. Have you ever been a commuter cyclist in Johannesburg, (please elaborate as to when, where, and why)?

2. As a transport planner/city official/cycling advocate, do you think cycling is a good alternative to private transport in Johannesburg (please elaborate)?

3. Are you familiar with the planning strategies which were used when planning the cycle lanes around Johannesburg (please elaborate)? (see 3a and 3b)

3a. If so, do you think the strategies address the needs of cyclists in the city of Johannesburg?

3b. If not, from the outlook, do you agree with what has been done for cyclists? Why?

4. Lefebvre (1996) explains that the right to the city relates to the right to appropriation. Appropriation includes the right of inhabitants to physically access, occupy, and use urban space. Streets make up the largest public space within cities, meaning that it is a space where all citizens, regardless of their income and personal circumstances, can feel equal and cared for. Section 21 of the Constitution of the Republic of South Africa (1996) states that "Everyone has the right of freedom of movement", and "every citizen has the right to enter, to remain in and to reside anywhere in the Republic". Based on this, do our current planning strategies and policies take account of cyclists and cyclists' rights to the city (elaborate)?

4a. Is it provided?

4b. Does it need to be provided?

5. If the city had to restart this process, what are the three most important changes that you would advise planners to consider when planning for cyclists?

	Prompts	Priority
	Green routes (separate from roads)	
	Cycling campaigns and education	
	Traffic calming along cycle routes (speed bumps and traffic circles)	
	Integration with public transport	
	Car restriction in cities	
	Direct cycle routes (shortest distance)	
	Coherent cycling network	

6. Going forward, given the current state of NMT projects in Johannesburg; what do you think could change the direction of cycling in Johannesburg?

7. Given that cyclists have a right to the city, how do you think cycling as a mode of transport can gain political support from the city, to prioritise cycling and NMT planning over and above private transport?

8. Based on what has been done in Johannesburg to date, what are the gaps that Johannesburg needs to address if it is to correct or improve what has already been done, and what would, in your view, get more people cycling?