Non-motorised transport as a key element of an integrated rapid public transport network: The Cato Manor case

by

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DECLARATION

I, Nomfundo Gugulethu Precious Cele (student number: 35472928), declare that **"Non-motorised Transport as a key element of an Integrated Rapid Public Transport Network: The Cato Manor Case"** is my original work and that all the sources that I have quoted or used have been indicated and acknowledged by means of complete references. The dissertation is submitted in accordance with the requirements for the degree of Master of Commerce in Transport Economics.

…….. 14 June, 2019 ……

Signature Date

(NGP Cele)

ABSTRACT

In South Africa, non-motorised transport (NMT) modes such as cycling and walking are generally used by poor people to access centres of employment, public services (for example, library, educational institutions, public transport) and other amenities as well as for recreational activities. Notably, the lack of integration among the different public transport modes (namely, NMT, bus, train and minibus) creates a major obstacle in the provision of an integrated, sustainable and effective public transport system. Likewise, the absence of proper recognition of NMT in government and social strata creates a problem in the supply of a satisfactory public transport service, that is, a public transport service that meets the needs of all users.

Motivated by the gap in NMT integration with the overall public transport system, the study was undertaken to explore enabling factors to integrate NMT as a key element of the Integrated Rapid Public Transport Network (IRPTN). Social and political factors were explored, specifically, post-modern theory in urban transport planning and policy. In addition, the study explored enabling factors to integrate NMT as a feeder service and key element of an IRPTN from the perspectives of the participants of the study.

The results of the study showed that infrastructure, the environment, promotion, and safety and security were identified as enabling factors to integrate NMT as a key element of an IRPTN. According to the results, government needs to promote NMT use. Subsequently, construction and the repair or widening of sidewalks and roads needs to be done. The results also showed that attractive NMT environments are necessary as well as adequate safety and security measures along NMT routes. It is suggested that a seamless, safe, inclusive, affordable, effective and reliable public transport system could be provided once these enabling factors are in place. Further research is advised, within the wider public transport population in eThekwini, as well as other NMT and public transport systems. The emphasis of this research should be on finding out whether the broader public transport population responds in the same way to the idea of integrating NMT and public transport.

Key words: sustainable development, sustainable transport, non-motorised transport, integrated rapid public transport network, urban renewal

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DEDICATION

To the Holy Spirit who has enabled me to conduct this study, to my dear children *Ukhona, Ntsika, Kwethu and Liyema,* to my dear mother *Miss Thokozani Cele*, and to my loving grandmother *Mrs Helena Nkonyeni* for their love, patience and guidance in facing the trials and tribulations of life.

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ABBREVIATIONS

CBD	Central Business District
CMDA	Cato Manor Development Association
ETA	eThekwini Transport Authority
ITP	Integrated Transport Plan
IRPTN	Integrated Rapid Public Transport Networks
IRTN	Integrated Rapid Transport Networks
NLTA	National Land Transport Act
NMT	Non-motorised Transport
PTP	Public Transport Plan
TND	Traditional Neighbourhood Development
TOD	Transit Oriented Development
USA	United States of America

DEFINITION OF KEY TERMS

Sustainable development

Sustainable development means that present development should not harm the benefits intended for future generations (Mc Cormick, Anderberg, Coenen and Neij, 2013: 4).

Sustainable transport

The Centre for Sustainable Transport (in Black, 2004:8) defines sustainable transport as one that: "allows the basic needs of individuals to be met safely and in a manner consistent with human and ecosystem health, with equity within and between generations; is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy."

Non-motorised transport (NMT)

According to the UN Environment Programme (2016:5) NMT is cycling, walking, intermediate transport, animal-drawn transport, skateboarding or other non-motorised transport modes.

Integrated Rapid Public Transport Network (IRPTN)

The City of Cape Town (2014:16) describes an IRPTN as, "a system in a particular area that integrates public transport services between modes, with through-ticketing and other appropriate mechanisms to provide users of the system with optimal solutions to be able to travel from their origins to destinations in a seamless manner with integrated pedestrian access for all passengers."

Urban renewal

Urban renewal involves various practices and economic activity procedures ranging from inner city regeneration and informal settlements upgrade to urban centre revitalisation. Urban regeneration is a practice where an area is rehabilitated and improved (Mngadi, 2013:16).

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Selala and Musakwa (2016:587) describe non-motorised transport (NMT) as a fully human-powered transport mode. The authors explain that NMT includes cycling, walking, per-ambulating, using horses, donkeys, human-drawn trolleys and rickshaws. Cycling and walking are called active, human powered or non-motorised transport (Litman, 2016:16). The purpose of the study was to identify and explore non-motorised transport as a key element of an integrated rapid public transport network (IRPTN), with reference to Cato Manor. In this chapter the background and motivation for the study is presented. This is followed by the problem statement, the study site context and the purpose and scope of the study. The objectives of the study are presented. The research design, methodology and methods used in the study are briefly described. An outline of the remainder of the study, by chapter, is provided and the chapter ends with a summary.

1.2 BACKGROUND AND MOTIVATION FOR THE STUDY

A non-motorised transport strategy is established to promote non-motorised transport (NMT) modes, such as walking and cycling, as preferred modes for short distance journeys and as an environmentally sustainable feeder mode for public transport (Salleh, Rahmat and Ismail, 2014:290). Salleh, Rahmat and Ismail (2014:290) further mention that the choice of walking and cycling as feeder modes can increase the catchment area for public transport and enlarge the coverage of buses to remote areas. Mngadi (2013:16) recognises that enhancing and refining communities could, for example, stimulate positive change in attitude towards the future, and increase likelihoods for physical activity.

Van Kann, Kremers, de Vries, de Vries and Jansen (2016) explored the relations between parental active transportation routines (PATRns) and children's active school transportation (AST) use. The authors also explored the role of PATRns as a moderator of the association

between neighborhood characteristics and parental influences and AST. The study emphasised the importance of PATRns. The study sample consisted of 722 eight to twelve-year old children and their parents living in the Netherlands. Their research found that the social environment in which a child functions should be considered when studying determining factors of active transportation use. Furthermore, the effect of parental routines and habits on children's behaviour should be recognised in involvements to promote AST thus inspiring an integrated approach to encourage such transportation. Hitge and Vanderschuren (2015) investigated the core elements of transit time of an integrated public transport system, and compared that with transit time in the private vehicle transport system in Cape Town. The authors highlighted the need to shift towards an integrated, multimodal public transport system that can compete with the private vehicles.

Active Living Research (2016) focused on how policies in the United States of America (USA) can encourage walking and cycling. The study was intended to assist in enabling a shift towards active transportation. Larsen (2016) explored the varied work involved in the making of a pro-cycling metropolis, as well as the contemporary co-production of bicycle procedures in Copenhagen. The study examined how and why cycling practices in Copenhagen attract so many practitioners. It found that Copenhagen is an exemplary city in terms of cycling and has invented its own unique understanding and 'methods of cycling.' Larson (2016), however, warned that it is not necessarily advisable or easy to simply adopt the Copenhagen cycling policies and procedures into a local context.

Bickford (2013:15) aptly commented that the lack of modal policy integration results in transport systems which are not spatially and operationally integrated. The complex and unclear institutional arrangements and responsibilities between the various spheres of government make integration even more challenging (Bickford, 2013:13). For instance, Walters (2014:4) indicated that the principal reasons for the failure of the transport policy-building procedures in the South African context are insufficient attention for policy implementation, lack of expertise and capacity in government, and poor political leadership.
South Africa (SA) has its own national NMT policy. Many provinces and most major municipalities have, in place, an NMT policy, strategy, framework or other form of regulatory document (Jennings, 2015:487). Bickford (2013:15) acknowledges that cities in South Africa have gradually begun to understand and realise the importance of integrating public transport with NMT and believes that once cities understand the importance of NMT,

they can enhance their planning and implementation of NMT infrastructure. The author further asserts that NMT policy emphasis and objectives of the Integrated Rapid Transport Networks (IRTN) are expected to be prepared by municipalities (Bickford, 2013:15). This, according to the author, has meant that municipalities have had difficulty in addressing the non-integration of transport systems. There seems to be a dearth of research exploring enabling factors that may contribute to a successful integration of public transport and NMT. Following the call by Labuschagne and Ribbens (2014:204), future research should explore the factors that may facilitate the integration of public transport and NMT.

The study sought to identify and explore the factors that might enable a successful integration of public transport and NMT and enable effective co-ordination between responsible institutional spheres, good governance and capacity development. It also sought to identify aproaches to increase safety and security for NMT users, and investigate ways to regenerate land-use developments to accommodate NMT modes. Finally, the study aimed to create awareness on NMT modes and to improve the behaviour of both NMT users and motorists in Cato Manor, a township located in the eThekwini Municipality.

1.3 STUDY SITE: CONTEXTUAL VIEW OF CATO MANOR

Cato Manor is a township located in the eThekwini Municipality. It is situated about 7 kilometers west of the eThekwini CBD. Cato Manor is enclosed by service amenities comprising the Pavilion Shopping hub near Sarnia Road and the N3 which links the precinct to the University of KwaZulu-Natal - Howard College campus, Westville Prison and the area of Manor Gardens (Mncwabe, 2013:3). EThekwini Municipality has a population of 3.58 million people (just above one third of KwaZulu-Natal's population), and it covers approximately 2 300 km^2. EThekwini Municipality is the largest economic hub in the province of KwaZulu-Natal and the city accounts for sixty percent (60%) of economic undertakings within the province (eThekwini Transport Authority, 2010:1.1). Cato Manor encompasses municipal wards 29 and 30.

Figure 1.**1** shows the aerial view of the Cato Manor area.

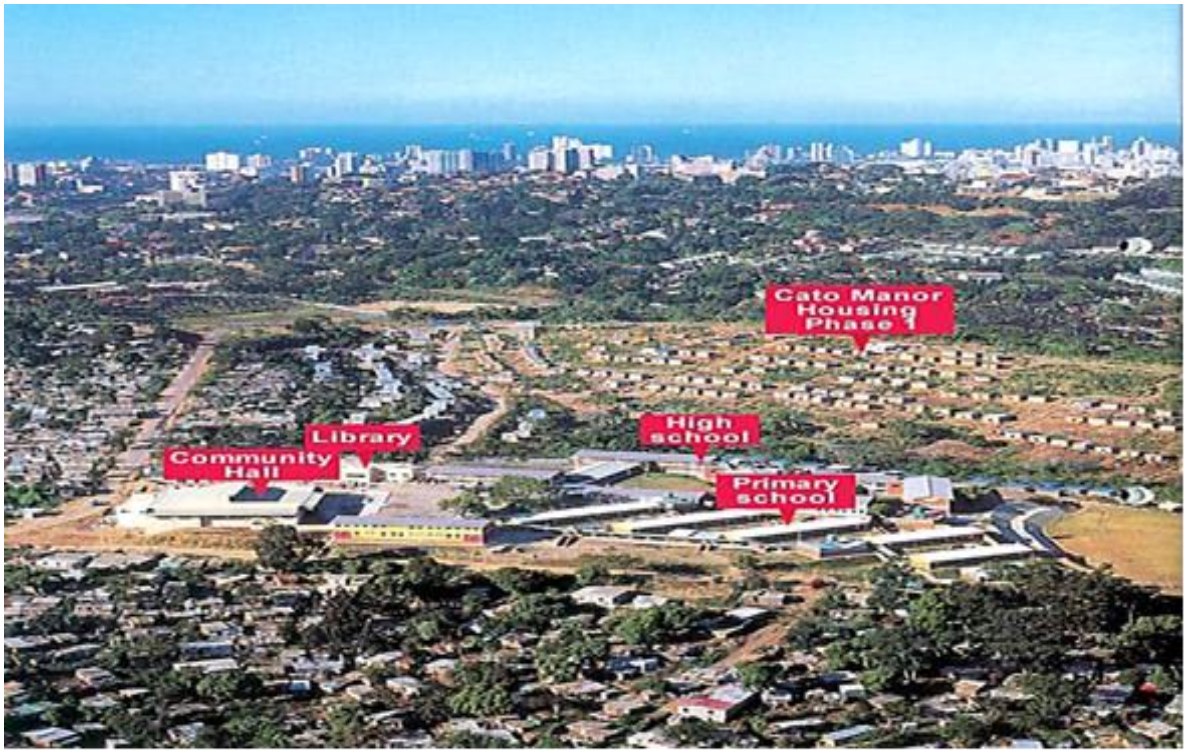

Figure 1.1: Aerial view of Cato Manor and its proximity to central eThekwini
Source: Beall and Todes (2004: 305)

Cato Manor, a reminiscent name in the region of KwaZulu-Natal, has potent associations with the fearful past of the dispossessed in SA, and signifies the destruction and heartbreak done by apartheid (Gray and Maharaj, 2017:4). Cato Manor was an area that had many informal settlements which lacked water and sewer provision and was viewed by authorities as disease-ridden and filthy (Popke, 2001:745). In 1993, a company referred to as the Cato Manor Development Association (CMDA) was chosen to administer the renewal of Cato Manor (Naidoo, 2015:30). The chief objective of this initiative was to upgrade the area to match the surrounding areas and the Durban CBD and in doing so afford the poor the opportunity to settle in close proximity to socio-economic opportunities, and to facilitate entrepreneurship and job opportunities (Ross, 2008:38). The Cato Manor Development Project was successful in the delivery of services (such as road and water), service infrastructure (such as libraries, schools and clinics) and the development of sustainable housing (Odendaal, 2007:939).

According to Robinson (2003:5), "CMDA's intended model was to plan, facilitate, strategise but only undertake the physical development as a last resort. However, CMDA was forced to

play a bigger role – that of facilitator, coordinator and developer, undertaking the planning, packaging and preparation of projects, which were then contracted out." Furthermore, Cato Manor being situated close to the CBD, allowed the local authority to instigate integrated development planning for this area within the eThekwini Municipality. One of Cato Manor's characteristics is mixed land-uses that comprise industrial or commercial land development and residential space (Mncwabe, 2013:55). The development approach of the project was multifaceted with large-scale delivery of basic service infrastructure (specifically, water and roads) and the provision of housing, social facilities (libraries and schools), local economic development opportunities, capacity building, human resource development and land reform. In 2003 the CMDA was dismantled, allowing Durban's local government, now recognised as the eThekwini Municipality, full control over development in the area (Odendaal, 2007:939-940). The timeline in Figure 1.2 shows the different developments in Cato Manor over a period of nearly three decades.

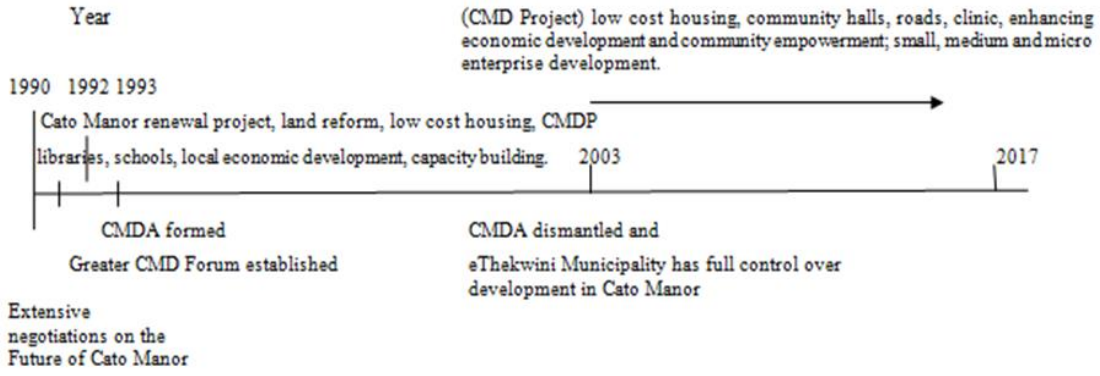

Figure 1.2: Timeline of different developments in Cato Manor
Source: Author

The majority of people in Cato Manor are poor, and most of the people walk to and from work on a regular basis. Central Cato Manor (Wiggins and Bonela area) is situated approximately 2.3 km from the bus stop on the main road of Cato Manor (Bellaire Road). The area is 7 km from the CBD and approximately 3.5 km from the Pavilion Shopping Centre. NMT modes are suitable for distances between 3 km and 7 km, making the Cato Manor area suitable for NMT development.

Cato Manor is characterised by social fragmentation and prominent levels of unemployment. As a result, the researcher endorses NMT as a catalyst for change in the public transport system of Cato Manor. Besides, eThekwini Municipality, in line with the City's 2030 vision, introduced the Integrated Rapid Public Transport Network (IRPTN) initiative that aims to provide an accessible and affordable transit system to eThekwini residents. The IRPTN will offer a high performance, flexible rapid transport system that includes integrated feeder services, where NMT functions as a feeder mode to the IRPTN.

1.4 PROBLEM STATEMENT

Generally, African countries have feeble institutional support for NMT, as government expenditure and policies do not promote the use of NMT modes (Mokitimi and Vanderschuren, 2017: 4803). On the other hand, cities around the world have called for active transport (such as running, cycling and jogging) (Gauteng 25-year Integrated Transport Master Plan, 2013:2). According to Newman, Kosonen and Kenworthy (2016: 433) most international metropolises are trying to regain, in their city centres, the seamless street patterns and concentrated urban activity linked with walkability. In the light of this, there is a vigorous policy mandate to restructure the spatial segregation and socio-economic imbalances that are present in South African metropolises and which have been intensified in the post-apartheid period by the continuous sprawling urban development taking place as well as the isolated focus of transport planning practices (Bickford, 2013: 12).

Selala and Musakwa (2016) explored the potential of strava data to contribute to NMT planning in Johannesburg. The authors believe that transportation is a challenge of urban development in our cities and those cities around the world are shifting towards NMT and other sustainable transport modes. The study explored the ability of geolocation centred services to make available information which can be beneficial in planning for NMT. An example of geolocation centred services is the Strava Metro application. Lekgothoane (2015), using Johannesburg as a case study, focused on the feasibility of cycling in moving away from the automobile-centric city. The study found that Johannesburg was challenged by mobility difficulties that were connected with the municipality's built environment. The problems were the result of the current city structure that neglects NMT and supports vehicle-oriented transport.

Labuschagne and Ribbens (2014) conducted a study on the mainstreaming of NMT in SA. The authors believe there is a gap in NMT integration with the IRPTN. Boulle (2013) investigated the role, in line with low carbon development, of bicycles and bicycle empowerment centres in enhancing the livelihoods and mobility of low-income societies. The study found that there was a lack of integration of public transport networks in Cape Town and much more needed to be done in promoting the use of public transport and NMT modes, more specifically, in improving the livelihoods and mobility of the poor through NMT modes.

The problems in the eThekwini Municipality that contribute to the slow take-off of integrating NMT with public transport relate to the general environment, insufficient infrastructure, safety and security (eThekwini Municipality, 2013:71). Notably, a majority of the urban poor walk to and from work on a regular basis but little is done to improve their walking environments. Walking is a primary mode of transport for most disadvantaged people in Cato Manor and it needs to be enhanced in order to improve the lives of the poor. Existing NMT infrastructure is limited to sidewalks which are of an inadequate standard (eThekwini Municipality, 2013:8). It becomes an area of interest to explore enabling factors to integrate NMT as a key element of an IRPTN. There was thus a need to explore and understand the key factors that need to be in place in order to enable integration of NMT into the overall public transport system to enhance urban mobility within the Cato Manor area of the eThekwini Municipality. It was anticipated that the study could add value to the field of transport economics in terms of expanding the global and local literature on transport and NMT policy implementation.

The following research questions were addressed in the study:

1) What is the nature of transport and NMT?
2) What are the enabling factors that need to be in place to enable integration of NMT into the overall public transport system?
3) What are the enabling factors, as identified by Cato Manor participants that can enable successful NMT and public transport integration?
4) What is the proposed theoretical model for integrating NMT with public transport?
5) What are the recommendations for successful NMT and public transport integration?

1.5 PURPOSE AND SCOPE OF THE STUDY

The purpose of the study was to explore enabling factors (social and political), specifically, post-modern theory in urban transport planning and policy and NMT as a feeder service to integrate NMT as a key element of the IRPTN. Furthermore, to suggest key factors, that is, current thinking, institutional framework, funding, NMT friendly urban structure, marketing and implementation, that need to be in place in order to enable the integration of NMT into the overall public transport system.

The study was limited to a particular South African urban location, namely, the township of Cato Manor located within the eThekwini Municipality in the Province of KwaZulu-Natal, South Africa. The study was restricted to locals above the age of 18 and below the age of 65.

1.6 RESEARCH OBJECTIVES

1.6.1 Aim of the study

The aim of the study was to explore the enabling factors to integrate NMT as a key element of an IRPTN, with reference to Cato Manor.

1.6.2 Objectives of the study

To achieve the aim of the study, the following objectives were addressed:

1. To explore the nature of transport and NMT.
2. To determine the factors that need to be in place to enable integration of NMT into the overall public transport system.
3. To determine the enabling factors to integrate NMT as a key element of an IRPTN from the perspective of participants in the study.
4. To propose the theoretical model for integrating NMT with public transport.
5. To provide recommendations for successful NMT and public transport integration.

1.7 RESEARCH DESIGN AND METHODOLOGY

1.7.1 Research approach

A qualitative exploratory approach was followed, as this approach allows for an in-depth study of participants.

1.7.1.1 Qualitative research

The research adopted a qualitative methodology. Qualitative methods can provide knowledge and understanding about phenomena that have not been explored or that are not understood (Frey, 2018:2).

1.7.1.2 Ethnographic research: case studies

According to Mouton (2001:149) ethnographic research case studies "are usually qualitative in nature and aim to provide an in-depth description of a small number (less than 50) of cases."

1.7.2 Research strategy

The research strategy was presented in the form of a case study method. According to Moody (2012:4), "Case studies tend to produce complex interpretations or explanations in the form of an unfolding plot or narrative story about particular people or specific events."

1.7.3 Research methods

The research methods used deal with the research setting, the entrée and establishment of the researcher's roles, the self as instrument, population, sampling, data collection, the recording and analysis of data, strategies employed to ensure quality data and ethics.

1.7.3.1 Research setting

The participants in the study were observed and studied in their natural setting. This setting comprised the area between Bellair Road (M10), New Dunbar Road, Wiggins Road and Harry Gwala Road within the Cato Manor township.

1.7.3.2 Entrée and establishing the researcher's role

Most participants were approached informally, at their residences in Cato Manor.

1.7.3.3 The self as instrument

The researcher was an instrument of data collection, in other words, data was mediated through the researcher, and not mediated through machines, inventories and questionnaires. To avoid assumptions and biases, and to explicate personal experiences and expectations, the researcher kept a research journal explaining personal reflections and reactions, insights into past and self, and how bracketing occurs (Simon, 2011:1)

1.7.3.4 Population

Salaria (2012:2) states that "a population is any group of individuals who have one or more characteristics in common that are of interest to the researcher. The population may be all the individuals of a particular type or a more restricted part of that group."

1.7.3.5 Sampling procedure

The study used non-probability sampling. Welman, Kruger and Mitchell (2005:67) refer to non-probability sampling as "the probability that any unit of analysis (element) included in a non-probability sample cannot be specified."

1.7.3.6 Data collection methods

The study collected data using different methods and sources, which decreased the risk that conclusions arrived at would reproduce only the limitations or systematic biases of a specific

method or source. This also allowed the researcher to gain a more secure and broader understanding of the issues being examined. This strategy is commonly known as ‘triangulation’ (Maxwell, 2018:13). Triangulation as a logic of inquiry within ethnographic and field-based research is carried out across and within events and times using a variety of collection and analysis methods and procedures (Green and Chian, 2018:3).

1.7.3.7 Data analysis and interpretation

Themes were identified by doing multiple examinations of the collected data. The researcher familiarised herself with the narrative by reading it repetitively (Nishishiba, Jones and Kraner, 2014:8). Coding was used to help the researcher make sense of the data, grow insight, and create a thorough and rigorous foundation for the analysis. Coding can also help to modify and tighten a research question (Terry, Hayfield, Clarke, and Braun, 2017:14).

1.7.3.8 Strategies employed to ensure quality data

The quality and eminence of the case study research was tested using reliability, construct validity and internal validity. Validity is an abstract problem that is evident at the point when indicators are designated. Reliability is, on the other hand, a technical problem associated with the set of steps that guide from the indicator to the data (Gobo and Mauceri, 2014:10). According to Nastasi and Hitchcock (2016:4), internal validity focuses on whether there exists a causal relationship between two variables while construct validity focuses on the inferences regarding a construct that can be produced from observations conducted on a sample (Nastasi and Hitchcock, 2016:4).

1.7.3.9 Ethical considerations

Ethics is the rules of conduct identified in particular, restricted departments of human life and the school of thought or moral system of a specific writer (Stuart, Maynard and Rouncefield, 2015:3).

1.8 CHAPTER LAYOUT OF REMAINDER OF THE STUDY

The layout, by chapter, for the remainder of the study is as follows:

CHAPTER TWO: LITERATURE REVIEW

Chapter two discusses post-modern theory in urban transport planning, followed by a brief discussion of the international literature on NMT. NMT as a feeder service is discussed, followed by the eThekwini IRPTN and the barriers preventing successful NMT implementation in the eThekwini Municipality. The chapter ends with a discussion of the key factors (conditions), as identified in the literature, that need to be in place to enable the integration of NMT into the over-all public transport system. The chapter aims to highlight the enabling factors to integrate NMT as a key element of the IRPTN.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

This chapter discusses the research design and methodology used for the study. For purposes of triangulation, three data sources were used to establish converging lines of evidence. Data was collected using semi-structured interviews, participant observation, and relevant scholarly and government published documents.

CHAPTER FOUR: FINDINGS AND DISCUSSION OF THE STUDY

Chapter four presents the discussion of the data collected from the review of the literature, participant observation and semi-structured interviews. The data was organised into themes and the discussion was based on the literature reviewed, the interviews and the participant observation.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Chapter five presents the conclusions and recommendations of the study. A summary of the study is provided and this is followed by main findings in terms of both the literature and empirical investigation. Conclusions and recommendations in relation to the findings are made. The possible contributions of the study are outlined followed by the limitations of the study and recommendations for future research. The chapter (and study) ends with a conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter two, the literature review, focuses on the literature relating to the research question posed in the previous chapter. Firstly, the different perspectives regarding post-modern theory in urban transport planning are discussed. This is followed by an international overview of NMT and an exploration and discussion of the legislative and policy context. NMT as a feeder service and the enabling factors for integrating NMT with the overall transport system are identified, analysed and discussed. A chapter summary concludes the chapter.

2.2 POST-MODERN THEORY IN URBAN TRANSPORT PLANNING

The study examined Cato Manor, eThekwini Municipality in the light of 'contemporary planning theories', which are the post-modern planning theories.

The post-modern era emerged in the early 1970s, ushering in an era also described as post-Fordist, post-positivist, post-national, global and post-industrial, and which occurred at the same time as the rise of neo-liberalism as a preponderant ideal (Mc Greevy, 2017:4). Cova, Maclaran and Bradshaw (2013:214) mention that post-modern is the appellation for a renaissance moment that unlocked better engagement with insights from various directions. These included critical theory, post-structuralism and critiques and interventions from such subject areas as sociology, cultural studies and feminism.

Healey (2013:1513) argues that a new generation of regional and urban practitioners and scholars emerged at the turn of the twenty-first century, with an intellectually motivated interest in vigorously searching for novel approaches of thought and action in the various

aspects of social theory and philosophy, and in acquiring knowledge through practical research. The author argues that by the end of the 20th century there was already a cultural turn in the field of geography that had foregrounded this change; while in the fields of policy analysis and planning, the change was expressed in interpretive policy analysis, French poststructuralist ideas, communicative planning, actor-network methodologies and some forms of complexity theory (Healey, 2013:1513). Furthermore, Mc Greevy (2017:5) notes that the post-modern city has been delineated as shifting from landscapes of production towards landscapes of consumption. The customary order of the metropolis has intensely changed from the pre-war where it was mixed, coherent, settled and bound to one where it is diffused, fragmented, stretched and unbound.

Newman, Kosonen and Kenworthy (2016: 430) mention that planners worldwide are interested in producing metropolises that are less reliant on vehicles, more livable and better functioning. The authors state that this is achieved by means of a new theory, namely, 'post-modern theory', one that replaces the former, but still prevalent, 'modernist city' (which undermines efforts aimed at renewing the walking, cycling and public transport systems). The WITS School of Governance (2017:3) states that transport planners use post-modern theory applications to plan for people that use NMT such as walking, bicycles and animal-drawn transport. The School further mentions that post-modern urban transport planning consists of more inclusive, compact and mixed frameworks than the modernist framework of building roads to minimise traffic congestion.

Gugger and Kerschbaumer (2013:56) introduced the 'theory of compact city' that supports the compact city model. This model provides a generic spatial explanation of the sustainable city and signifies an umbrella expression for many other associated concepts such as transit-oriented development, new urbanism, European city model, smart growth, and decentralised concentration. Matthey-Doret (2015:9) mentions that "since the 1990s, the compact city model has progressively been adopted within the urban planning strategies of most capitalist societies. The compact city model became a guiding principle for urban development within the European Union's strategies for sustainable urban environment since 1999 with the European Spatial Development Perspective, which advises Member States to pursue the concept of the compact city to ensure a better control over urban sprawl." Leff and Peterson (2015: 4) posit that planning in the global city model accentuates on areas such as livability, environment and cultural interaction, and appraising the ability of cities to attract businesses

and individuals worldwide. Sassen (2016) revealed that global cities are multifaceted. They are well-rounded, function well, and have qualities to factor in logistics, accounting practices, laws, as well as attract investors, organisations and people.

Decision makers and planners have tried several approaches to promote NMT including, for example, 'new urbanism' and 'smart growth' policies, which target changing urban form to include more bicycling and walking (Kim, Park and Hong, 2017:1).

In the next section, new urbanism theory and smart growth theory are discussed.

2.2.1 New urbanism theory

The rise of new urbanism began in the 1960s through to the 1980s. Architects, planners, academics and urban designers brought together ideas for novel development in a retort to sprawled[1] suburbia (Serrins, 2014:6). Anderson (2015:8) states that new urbanism is a planning theory which strives to reform contemporary planning practices so as to re-establish people as the defining component within the built environment. For instance, Cabrera and Najarian (2013:428) indicate that new urbanists employ several approaches to enable diversity in their neighbourhoods. The approaches focus on changes to the physical space planned to attract different populations - where some of the planned designs encompass mixed housing, mixed-use zoning and accessory apartments. New urbanism is described as a formation or movement of principles, actors and practices and is famously known for its principles and design codes – the movement is branded by the renewal of 'traditionalist' design and architecture which strive to promote walkable, mixed-use, compact and reasonably self-sufficient communities (Moore, 2013:2372).

New urbanism challenges traditional transport planning and planning practices espousing a shift from a city of cars to a city of foot-travelers. The subsequent section explains the principles and benefits of new urbanism.

[1] Urban sprawl is the rapid peripheral growth of metropolises; it changes city centers into putrefied areas (Sag and Karaman 2014:2).

2.1.1.1 Principles and benefits of new urbanism theory

There are four eminent urban forms that are facilitative for sustainable urban development, namely, compact city, urban containment, neo-traditional, and eco-city (Kotharkar, Bahadure and Sarda, 2014:2). Respectively, these urban forms offer different elements in making cities sustainable. Nevertheless, theoretically compact cities appear to be more persuasive than other urban forms (Kotharkar et al, 2014:5). Rossiter and Smith (2018:23) posit that the new urbanism emphasises design and signifies an important break from vehicle-oriented landscapes with developments that normally include mixed-use, high density, compact designs together with open spaces, walkable pedestrian-friendly streets and public gathering spaces. MacLeod (2013:2202) argues that new urbanist principles are evident in the renaissance of numerous city centres worldwide – these cities portray diverse communities with a well-integrated transport infrastructure as well as a sensitively constructed street configuration, usually grid-based. Chaskin and Joseph (2015:138) comment that mixed-use developments employ new urbanist planning principles that enable the production of walkable, scalable and transitional civic space that, amongst other things, support social interaction, promote diversity and ensure civic engagement and safety.

Kotharkar, Bahadure and Sarda (2014:2) posit that sustainable urban growth can be achieved by using different methods such as the compact city urban form which comprises a mixture of design concepts or principles, namely, compactness, density, sustainable transport, diversity, mixed land-use, greening and passive solar design. Based on this argument, MacLeod (2013:2198) asserts that new urbanist principles have come to be common in the thinking and practice of design professionals, environmental activists and policy-makers to the point where they are noticeable in numerous developments that are not in fact linked with new urbanist architecture. Accordingly, Scheepers (2014:25) suggests the principles of new urbanism to be: walkability, mixed houses, quality architecture and urban design, traditional neighbourhood structure, sustainability and quality of life. Furthermore, high density, mixed land-use, increased pedestrian traffic, street connectivity and proximity to different types of transport modes such as buses, bicycling, walking, subways and trains should be integrated into existing and new developments (Park, Huang and Newman, 2016:436).

2.2.2 Smart growth theory

The State of Maryland in the USA implemented the smart growth initiative in the 1990s to protect the environment, balance economic development, combat urban sprawl, enhance the quality of life and regenerate central cities. Since then, the term ‘smart growth’ has been popular (Ali 2013:116). Smart growth aims include conserving land, constructing more compact development patterns, increasing transportation equity and options, ensuring greater fiscal savings, constructing more affordable housing and decreasing greenhouse gas emissions (McMillan and Lee, 2017:3502). Relying on notions such as infill development, new urbanism, affordable housing, urban growth boundaries, transit-oriented development (TOD) and historical preservation, the main thrust of the smart growth concept is to encourage additional high-density development in existing urbanised areas. Such development encompasses mixed land-uses compacted together to stimulate more walking, public transit use and biking (Goetz, 2013:2181).

Sag and Karaman (2014:4) suggest that “Smart growth develops a scheme which brings the mixed use in sub-regions to forefront against dispersed functional use (such as recreation, working and living areas) and favors public transportation against privately owned vehicle[s] and existing transportation network.” Likewise, Scott, Li, Barnes, Stavru, Dayan, Jones, Cragle, and Matthews (2016:5) identify the concept ‘smart growth’ as being contrary to motor vehicle-based residential development. The authors state that it “supports choice and opportunity by promoting efficient and sustainable land development, incorporates redevelopment patterns that optimize prior infrastructure investments, and consumes less land that is otherwise available for agriculture, open space, natural systems, and rural lifestyles.”

Smart growth provides principles for regeneration and dense development within urban areas. The principles provide guidance to urban area municipalities in their endeavour to improve development and the quality of life of the community by increasing urban accessibility based on compact and public transport-oriented forms and by stimulating dense transit-oriented urban development.

2.2.2.1 Principles of smart growth theory

Smart growth principles, when applied properly should minimise any imminent tension about transit-oriented development (TOD), open space, and affordable housing (Asuncion, 2014:16). According to Mohammed, Alshuwaikhat and Adenle (2016:4), the principles of smart growth are: walkable communities; a variety of housing opportunities; the preservation of natural environmental beauty; open spaces; the provision of a diversity of transportation options; compact design or development; and mixed-use development. Mixed-use zoning accentuates a combination of land uses (usually entailing residential, office and commercial) in a single integrated development (Hawkins, 2013: 2508).

Dong and Zhu (2015:779) identified six smart growth indices. These were: the total housing units over acres of residential land (units); mixed use (mix of households and jobs, mix of multi-family home, single-family home, open space and commercial use); mixed housing (mix of renter occupied and owner occupied houses, rent diverse housing value mix, housing size diversity); non-auto transportation accessibility (home, work or other services within a half mile of rail transit or a quarter mile of bus, high quality bicycle lanes, street density and street intersection density); socio-economic diversity (income diversity – low, medium-low, medium-high and high); and, finally, racial diversity (mix of four racial groups).

Asuncion (2014:18) argues that the definition of TOD is interwoven with the smart-growth principles related to walkable environments that encourage transit and mixed-use developments. Pojani and Stead (2015a:133) discuss the eight dimensions for TOD design which include a five-minute-walk radius, pedestrian friendly streets with a continuous network of sidewalks and transit in the urban pattern.

Reflecting on the new urbanism and smart growth theories, Yang and Stockard (2013:412) pointed out that smart growth environs are urban forms that display mixed-use and compact physical characteristics. Despite the fact that smart growth is not identical to new urbanism it does, however, align itself closely with new urbanism when employing 'traditional' neighborhood design to attain a mixture of housing types, land uses and street connectivity. Notably, Zupan (2015:42) mentions that "the concept of the compact, mixed-use European city can be understood as part of the profound shift in planning traditions – mostly referred to as the shift from modernist to postmodernist urban planning – starting in the early 1960s."

It stands to be investigated if these ideas could empower the eThekwini Municipality to move towards the City's vision of becoming the most livable and caring city in Africa. The anticipated transformation requires methodical exploration of successful international stories, specifically government policies and implementation plans, and adjusting these policies and implementation plans to the South African context.

2.3 INTERNATIONAL OVERVIEW OF NON-MOTORISED TRANSPORT

There is limited literature and scholarly articles on NMT and IRPTN relating to the eThekwini Municipality. NMT and IRPTN in the eThekwini Municipality are thus not prominent and are not areas that have been sufficiently researched. Literature from the municipality is limited to the eThekwini Municipality Draft NMT Plan (2013) and the Integrated Transport Plan (ITP, 2010). The study, therefore, relied on international studies and international good practice (government administration processes) as benchmarks for South Africa. Information on NMT in the Netherlands, Denmark and Germany is vast, hence the focus on these countries and, more specifically, how NMT is being integrated into public transport.

The change of the Netherlands from a bicycle town to a motor-car town and then back to a more balanced transport metropolis was not an overnight achievement. Like most metropolises around the world, the Netherlands embraced the motor-car after World War Two (Government of Western Australia, 2014:7). In Germany, there is the '50 by 50' campaign which promotes and encourages cycling for citizens. Some communities in Germany have begun to move in the direction of the car free city (Makarova, Khabibullin, Shubenkova and Boyko, 2016:3).

Figure 2.**1** displays the 10 countries with the highest bicycle possession per capita (this is not the actual number of bicycles). It is evident that the Netherlands has the highest bicycle ownership compared to other countries in the world. Following in the steps of the Netherlands are Denmark and Germany.

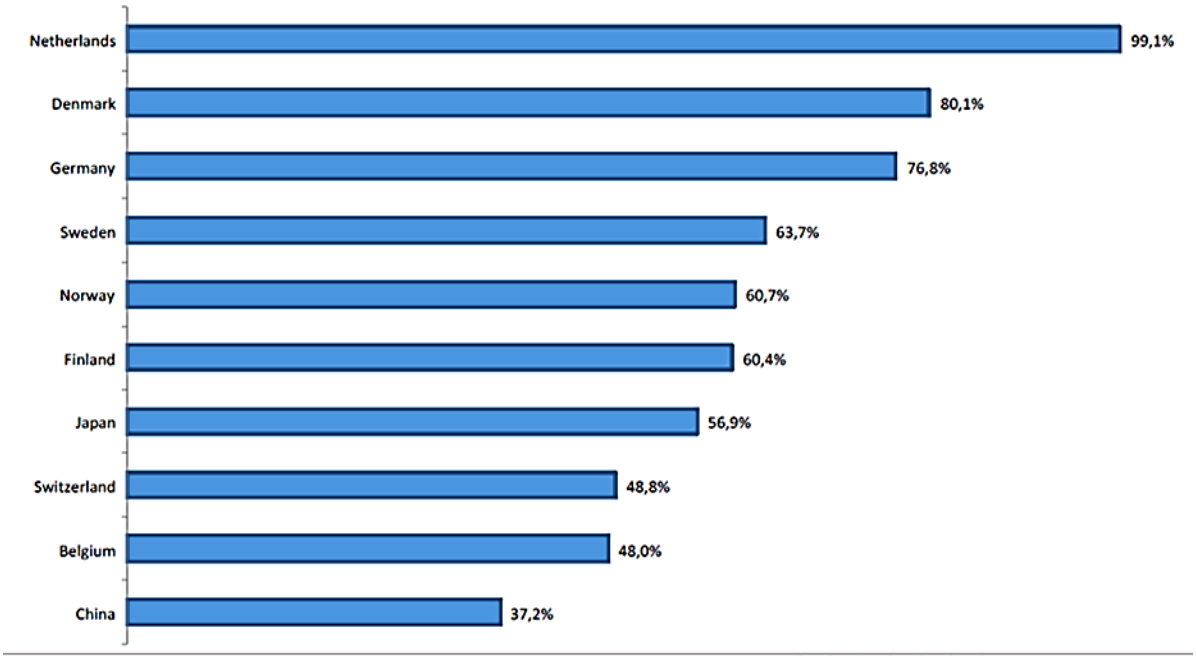

Figure 2.1: Ten countries with highest percentage of bicycle ownership
Source: Randall (2016: 23)

2.3.1 NMT in Netherlands

In Amsterdam, the capital city of the Netherlands, most people use bicycles as a mode of transport. In large cities – with inhabitants above 10 000 – a cyclist will normally reach their journey's end 10% faster than a motor vehicle driver (Plan Amsterdam, 2014:3). People in Amsterdam are well aware that cycling is the most effective mode of transport in their city. Bicycles account for over 60% of trips within the A10 Ring Road – that means 493 000 bicycle trips per day (Plan Amsterdam, 2014:3). Remarkably, while the Netherlands does not have an existing national strategy, cycling in that country is more developed when compared to other European countries (Hellman, 2016:5).

'Masterplan Fiets' was the last national document put together by the Dutch Ministry of Transport covering the period 1990-1997. Interestingly, an integrated framework was selected from the inception of the Masterplan Fiets (Hellman, 2016:5). Another significant aspect of the Masterplan was its decentralised approach. From the time of its enactment, regions have overseen the promotion and development of cycling within their areas. The national government, nevertheless, supports the region, particularly with investments in

projects such as bicycle parking in railway stations and cycle highways. The aim of the Dutch bicycle policy is ensuring joy and safety. The Dutch administration believes that emotions are linked with the different modes of transport. Furthermore, most Dutch metropolises have their own underlying objectives and bicycle policies that they aim to achieve (Hellman 2016:6).

The Netherlands has several planned and current policies emphasised in national reports that support non-motorised and public transport. These policies are accentuated in a novel national policy plan and strategy that has better-quality accessibility of NMT as one of its central goals. Presently, 26% of all the distance journeyed is by bicycle and this is expected to rise to 35% by 2030 (Huizenga, Peet, Major and Cruz, 2016:9). Rotterdam is one of the major ports in the world and the second-largest city in the Netherlands. The metropolis is inhabited by over 600 000 residents comprising more than 170 diverse ethnic groups. The greater urban precinct has approximately 1 400 000 inhabitants. Importantly in terms of NMT, the metropolis is entrenched in the tradition of sustainable urban transport planning and the delineation of policies in air quality. Over the past few years the City of Rotterdam has seen no growth in car use. On the other hand, there has been an increase in bicycle use (Van Ooijen and Jeuring, 2015:14).

2.3.2 NMT in Germany

Germany has seen bicycle ownership numbers remain much the same since the mid-1990s. A survey, Mobility in Germany (MID), counted approximately 70 million operable bicycles in private homes for both 2002 and 2008 with 81% of private households owning at least one bicycle (compared to 75% in 1993) and 25% owning three or more bicycles. The stock of e-bikes and pedelec 25s has been increasing gradually since 2008 and, in 2014, reached more than 2.5 million units. Daily mobility in Germany is quantified by the Mobility in Germany survey (MID). Nearly 20% of those surveyed in 2008 claimed to be cycling daily, while another 20% cycled more times per week. Generally, there is a lower usage of bicycles among older people compared to younger people (Schreck, 2017:45). Cycling's share of the whole number of local trips undertaken by the residents of Berlin in 2008 was 13% (Senate Department for Urban Development and the Environment, Berlin, 2013:3). Each day, roughly 1.5 million trips are travelled using bicycles and the bicycle is the main mode of transport for most people in Berlin (Senate Department for Urban Development and the Environment,

Berlin, 2013:3). The Berlin cycling strategy has set the objective of increasing cycling's share of trips to 18-20% by 2025. In Berlin, the average length of a trip by bicycle is 3.7 km. Only 19% of bicycle trips are longer than 5 km. The cycling strategy is dedicated to the aim of making cycling an attractive mode of transport for longer journeys. Accordingly, it aims to raise the average trip length by bicycle by 25% to 4.6 km by 2025 (Senate Department for Urban Development and the Environment, Berlin, 2013:3).

Many people make multimodal or intermodal journeys. In terms of the former they use dissimilar modes of transport for different trips, for example, on different days of the week. Intermodal journeys, on the other hand, involve the use of different modes of transport for a single trip. In one third of these intermodal and multimodal cases a bicycle is involved (Ministry of Transport, Building and Urban Development, 2013:50). Like the Netherlands, Germany adopted a decentralised approach concerning the promotion and encouragement of cycling. The German Federal Government commonly acts through the Federal Ministry of Transport and has little direct impact on cycling policy. It may influence the provision of funds collaborating directly with municipalities; institute a network among all relevant stakeholders; and promote inter-municipal collaboration and local bicycle schemes and campaigns. Overall, its auxiliary role can be likened to the Dutch national level where the state establishes frameworks, while decentralised authorities implement the policy in extensively worked-out plans (Hellmann, 2016:7).

2.3.3 NMT in Denmark

The City of Copenhagen (2014:2) states that it is one of the most exemplary bicycle-friendly metropolises in the world. Copenhagen's story of success in NMT is notable worldwide and spoken of by urban planners, media, politicians and tourists who visit the city to explore the secret of its success. There are many cities around the world that are eager to follow in the steps of Copenhagen. According to the City of Copenhagen (2014:2), 45% of all trips to places of education or work in the city are done by bicycle – an increase of 25% when compared to two years previously. Bicycle use contributes considerably to reducing traffic congestion, predominantly in the larger municipalities. Each weekday (in Copenhagen) an average of 35 to 40 thousand cyclists cross Knippels Bridge and Dronning Louise's Bridge in. If the same cyclists had taken a car instead, car traffic would have come to a complete halt (Ministry of Transport, 2014:8).

As pointed to above, the modal share of trips made by bicycles to places of education or work has increased by 25% since 2012. Also, the total distance cycled daily has increased and it takes a lesser amount of time to travel from one place to another. In the last decade, the City of Copenhagen has augmented capacity, hence 'passability'. In terms of this, cycle tracks have been broadened, contraflow cycling introduced in several areas, and pedestrian or bicycle bridges opened. Travel time in Copenhagen has been reduced by an average of 7% since 2012. Moreover, the distance cycled daily continues to increase – on a weekday 1.34 million kilometres are cycled (City of Copenhagen, 2014:4).

Development of cycling in Denmark is largely decentralised, it being a local municipality responsibility. As a result, it is critical that the many valuable experiences and initiatives from all over Denmark are collected, systemised and passed on. Danish municipalities receive state funding, via the Trafikpuljen, to encourage cycling initiatives. A precondition for receiving a grant is to communicate experiences and results to other local municipalities (Cycling Embassy of Denmark, 2012:12). McKibbin (2014:2) mentions that the national government launched a new national bicycle strategy to encourage more persons to cycle, to make cycling an option. The national bicycle strategy is founded on three pillars, namely, 'Good, Better, Best' and its purpose is to inspire municipalities to participate in the green transition.

Even though integrating NMT with public transport is perceived as ideal, central transport authorities in developing countries usually tend to neglect this (despite its importance in servicing the poor) as well as failing to include non-motorised intermediate means of transport in public transport planning (Starkey and Hine, 2014:24). According to Ang and Marchel (2013) there must be policies that mobilise and enable a robust investment framework that incorporate principles for efficiently mobilising private investments concerning infrastructure for the transport sector. These would include policy coherence, non-discrimination, transparency and property protection. Furthermore, Ang and Marchel (2013:27) comment that removing administrative and regulatory complications, and ensuring open or free access to transport infrastructure markets, are vital.

Holden (2015: 66) indicated that South Africa also needs to consider that perception and behavioural changes are essential decisive factors, especially for the affluent consumer. The author posits that it is imperative that South Africa understands the context of how other

cities around the world have done such transitions and what has been done to integrate transport systems, before merely shifting ideas to South African metropolises. eThekwini Municipality has set out adequate legislation for NMT development but regulations require skilled (with technical and strategic capacity), motivated, dedicated and ambitious personnel to successfully implement the NMT legislation set out. The lack of capacity is viewed as a serious barrier to implementation.

The legislative (and policy) context relating to NMT in the eThekwini Municipality is further outlined and discussed below.

2.4 LEGISLATIVE AND POLICY CONTEXT DIRECTING NMT PLANNING IN THE ETHEKWINI MUNICIPALITY

2.4.1 Legislative context

This section discusses the legislative context that guides NMT planning in the eThekwini Municipality.

2.4.1.1 White Paper on National Transport Policy

The White Paper on National Transport Policy (1996) sets out numerous pertinent policy principles. The transport system's intention is to minimise the mobility restrictions posed to passengers and goods, maximise speed and services, permit users the choice of transport mode, and integrate the different modes where it is deemed economically and financially feasible to do so (Department of Transport, 2008: 12). The taxi mini-bus is a crucial element in South Africa's public transport system and plays an essential role in urban transport within South Africa. The accessibility of excellent public transport amenities on public transport itineraries to assist the mounting needs of users is vital (Chetty and Phayane, 2013:18). The efficiency and adequacy of transport infrastructure can contribute immensely to either inhibiting or enhancing economic and social development. These effects are discussed in the White Paper on National Transport Policy (1996) that outlines the important role of transport infrastructure on economic and social growth (Chetty and Phayane, 2013:18). EThekwini Municipality (2013: 17) mentions that the "The White Paper refers to NMT as one of the

strategic objectives for land passenger transport, stating: 'To encourage, promote and plan for the use of non-motorised transport where appropriate'".

2.4.1.2 National Land Transport Transition Act (NLTTA, 2000)

The National Land Transport Transition Act, 2000 (2000: 2) was meant "to provide for the restructuring and transformation of the national land transport system of South Africa; and to provide for incidental matters." The intention of the Act NLTTA was to integrate all modes of transport, infrastructure and services through the Integrated Transport Plan.

Chapter 2 of the Act, Matters of National Concern, Part 2, National Land Transport Principles and Policy, states:

"(c) Public transport services facilities and infrastructure must be so provided and developed as to integrate the different modes of land transport.

(h) Effectiveness and efficiency must be promoted in the provision and operation of land transport services and administering land transport matters."

Part 7 of the Act, Transport Planning - Section 26 on Public Transport Plans (2) (b) states:

"(ii) Modal integration and fare systems for public transport, the latter comprising fare structure, level and technology."

Finally, Section 27 states that Integrated Transport Plans (2) should:

"(c) Include all modes and infrastructure."

2.4.1.3 National Land Transport Act 5 of 2009

The National Land Transport Act (NLTA) 5 of 2009 (2009:1) is "to provide further the process of transformation and restructuring the national land transport system initiated by the National Land Transport Transition Act, 2000 (Act No. 22 of 2000); and to provide for matters connected therewith."

The purpose of the NLTA (2009:16) is:

1. to give effect to national policy;
2. to continue the process of restructuring and transportation the national land transport system initiated by the NLTTA;

3. to consolidate land transport functions and locate them in the appropriate sphere of government; and
4. to prescribe requirements, national principles, frameworks, guidelines, and national standards and norms that must be applied consistently in the provinces and other matters envisioned in section 146 (2) of the Constitution.

The NLTA is concerned predominantly with public transport. The Act distinctly defines the functions of the pertinent tiers of government regarding the management of public transport. The NLTA, like the NLTTA, furthers the process for the provision for integrated public transport planning. In the municipal context, in Chapter 2, Institutional Arrangements for Land Transport, the responsibilities of the three spheres of government relating to NMT are outlined. These are:

"(vii) Efficiency of the transport system and minimise travelling costs and time by optimal use of travel modes;

(viii) Applying a strategy to avoid (reduce or minimise) any negating impacts of the land transport system on the environs in its area" (NLTA, 2009:30).

2.4.1.4 National Department of Transport – Draft NMT Policy

The primary purpose of the Draft NMT Policy is to intensify the role of NMT as one of the foremost modes of transport by integrating NMT as an indispensable element of public transport and providing safe NMT infrastructure, including adequate allocation of sustainable funding for NMT development and promotion (Department of Transport, 2008:6). It must be noted that in Section 3.1.2 of the Draft NMT Policy, a suggested policy vis-à-vis animal transportation, is to be incorporated in Integrated Transport Plans (ITPs). According to the policy, all ITPs should provide for the use of animal transportation, regardless of whether local authorities (municipalities) have or have not endorsed the use of animals and animal drawn vehicles within their boundaries. The main NMT objectives in the Draft NMT Policy are as follows:

- Endorsement and facilitation of the use of NMT modes;
- Integration of NMT into the transport system including transport and spatial planning;
- Enhancement of traffic legislation that recognizes NMT as an alternative transport mode;

- Development of infrastructure and maintenance standards that recognise NMT as an essential mode of transport;
- Facilitation of NMT as a feeder system to other modes of transport;
- Empowerment of the marginalized group promotion of SMME through NMT;
- Promotion of NMT as reliable, healthy, affordable, accessible and safe transport mode;
- Allocation of adequate and sustainable funding for promotion and development of NMT;
- Facilitation of research and new initiatives to improve NMT performance; and
- Reduction of the number of traffic fatalities of vulnerable non-motorised road users (eThekwini Municipality, 2013:15).

2.4.1.5 Urban Transport Act 1977

The Urban Transport Act endorses the planning and supply of sufficient urban transport amenities. It provides for the establishment of particular transport funds, municipal transport advisory boards, metropolitan transport areas and the preparation and implementation of urban transport plans. It also provides for additional matters associated with the above. The Act thus plays a role in the execution of NMT in urban spaces (Department of Transport, 2008:12).

2.4.1.6 National Road Traffic Regulations of 1999

The National Road Traffic Regulations, together with municipal by-laws, administer the behaviour of road users and operators by promoting safety. The Regulations manifest a directive that affects and regulates NMT, particularly cyclists and faunae. The Regulations relate to animal-drawn vehicles, animals, cycling and pedestrians on public roads. Finally, the Regulations framework addresses the standards and combinations of some aspects of NMT concerning animal-drawn vehicles, cycling and safety of NMT vehicles (Department of Transport, 2008:12).

2.4.1.7 Municipal by-laws

Numerous municipal by-laws focus on the operation of NMT. For instance, there are restrictions on rickshaw pullers and animal-drawn vehicles in the CBD. Additional by-laws relate to the behaviour or attitudes of pedestrians and cyclists in crossing roads and pedestrian bridges. Furthermore, issues of enforcement and public education as well as the training of enforcement officers are included in the by-laws (eThekwini Municipality, 2013:17).

The legislative context, as outlined above, thus directs the planning of NMT in the eThekwini Municipality by setting a well-founded foundation to establish and integrate NMT with the overall public transport system, in line with the national, provincial and local government transport objectives.

2.4.2 Policy context

The following section discusses the policy context that guides NMT planning in the eThekwini Municipality.

2.4.2.1 Integrated Development Plan

The integrated development plan (IDP) approach was intended for planning and implementing projects though a participatory and consultative process (Sikrweqe, 2013:13). The IDP is a five-year plan and is used by the Municipality as an instrument to plan for imminent development within its region. It directs and appraises all planning, budgeting, management and decision-making associated with the supply of services and development in the municipal precinct. In assembling the IDP, the Municipality deliberates on a range of international, national, provincial and local guiding documents (eThekwini Municipality, 2014:9). The eThekwini Municipality intends to ensure, through the IDP, that the metropolis is more efficient, responsive, accountable and effective. An operational plan supports the city budgets, and monitors as well as evaluates approaches and timeframes for supply or delivery. Moreover, the Municipality has embarked on a strategic initiative to obtain closer alignment between the IDP and long-term development objectives (in line with local, provincial, national and international development policies) (eThekwini Municipality, 2018:15).

2.4.2.2 The 'Imagine Durban' plan

The Imagine Durban plan is viewed as an inspirational plan moulded and shaped by the many hopes and dreams of eThekwini residents as to the future of eThekwini. In order to develop the plan, the Imagine Durban project asked a cross section of citizens within eThekwini questions relating to what they liked and did not like about eThekwini, what their hopes and dreams were for the future of the city, what changes they would like to see, and what they could do to make their dreams a reality (eThekwini Municipality, 2015:30). The motivation of the Imagine Durban project was to establish a visionary strategy that could enthuse people, businesses, non-governmental organisations and government to work together to enhance the key strategies and vision strategies. The reviewed vision statement, as defined in the Imagine Durban Plan and as espoused by the IDP (2010 and beyond), states that the eThekwini Municipality endeavours to be Africa's most liveable and caring city by 2020 (eThekwini Municipality, 2015:30).

Imagine Durban is a visionary plan on integrated long-term planning – to make Durban a more caring and liveable City. The Imagine Durban project intended to capture people's leading aspirations for eThekwini and transform them into planning. The project identified six key themes:

- Creating a safe city
- Creating a prosperous city where all enjoy sustainable livelihoods
- Promoting an accessible city
- Ensuring a more environmentally sustainable city
- Fostering a caring and empowering city
- Celebrating our cultural diversity, arts and heritage (eThekwini Municipality, 2010:2).

It is of note that even though the respective themes are presented individually, their inter-relatedness requires them to be read as complementary. For example, the strategies associated with promoting alternative transport and public transport are addressed in the accessible city theme, are crucial for the sustainable livelihoods theme, and critical for the environmentally sustainable theme. Altogether the six themes are equally indispensable for the long-term sustainability of eThekwini (eThekwini Municipality, 2010:2). The Imagine Durban plan

does not include details on how the municipal transport sector should roll out the suggested actions within the plan. However, it does indirectly indicate that NMT is the future for the eThekwini Municipality and most eThekwini residents. The request by the municipal citizens to promote alternative transport and public transport discussed in the accessible city theme; the significant cost transport is for poor people discussed in the sustainable livelihoods city theme; and the increased use of alternative transport and public transport which lessens emission of gases and air pollution as discussed in the environmentally sustainable city theme are clear indications that NMT will be one of the preferred modes of transport in the future, forming an integral element of the public transport system.

2.4.2.3 Integrated Transport Plan

The eThekwini Transport Authority (ETA) concluded two policy documents, namely, the Integrated Transport Plan (ITP) and Public Transport Plan (PTP) in 2005 to govern the transport sector. The ITP was later revised in 2010. The two policy documents support the eThekwini IDP as well as provincial and national objectives. The PTP is an integral constituent of the ITP. It comprises a long-term strategic plan which offers the framework for short term planning. The PTP is a realistic document being continually reviewed and receptive to the influence of planning decisions in attaining the municipality's vision for transport. Projects included in the short-term planning element of the PTP were transferred into the ITP as a component of the 2005-2010 programmes (eThekwini Municipality, 2005:1.1).

The ETA Integrated Transport Plan (update 2010-2015) and the KwaZulu-Natal (KZN) Department of Transport mission are affiliated to the White Paper on National Transport Policy (1996) and all aim for public transport that is effective, safe, reliable, efficient, affordable, accessible, needs driven and integrated (Chetty and Phayane, 2013:18). As part of the Public Transport Strategy and Action Plan's policies and objectives in relation to integrating public transport systems (as detailed in the White Paper on Transport), the eThekwini Municipality has, through the ITP, implemented an IRPTN incorporating the various modes of transport and technologies and envisioning maximum accessibility in a cost-effective manner. Initially, the first IRPTN to be implemented in the eThekwini Municipal area was the Bus Rapid Transit (BRT) system (Adewumi and Allopi, 2014: 37). The ITP accentuates the importance of effective, efficient, sustainable, secure and safe

transport. It also identifies five key focus areas, namely, public transport, freight, safety, roads, and traffic management and control, which the municipality aims to focus on for the provision of an efficient and effective transport system within the metropolis.

2.4.2.4 EThekwini Municipality Draft NMT Plan

The eThekwini Transport Authority produced various ideas in 2006 for a cycle policy for the municipality, which expressed a strategy addressing specific priority areas such as recreation, commuting, tourism, special events, sports and scholars. Part of the eThekwini Municipality NMT's foundation was further developed in the years leading up to the Soccer World Cup in 2010 with the extensive upgrade of the beachfront (Baxter, 2014:2). The municipality acknowledged through the Draft NMT Plan that NMT serves as an indispensable mode of transport in the ill-serviced regions by offering a human-powered mode of transport to the destitute majority in the form of walking, cycling, and small-wheeled transport (for example, skateboards and roller skates). Furthermore, the eThekwini Municipality acknowledged walking and cycling as the predominant NMT modes in eThekwini and these were planned to be incorporated in the City's current transport modes (eThekwini Municipality, 2013:1).

The existing NMT strategy (in the ITP of 2010) focused on these two NMT modes (cycling and walking) and on integrating the IRPTN with the cycling and walking components of NMT. The strategy focused on the development and implementation of cycle projects and aimed to ensure that NMT was incorporated in the IRPTN. The municipality had set out a mandate to develop a NMT plan for the IRPTN, and to make certain that NMT was assimilated in the planning, design, and effecting of the IRPTN services and infrastructure (eThekwini Municipality, 2010: 10.5). Effective assimilation of NMT with public transport promotes NMT as a feeder service to the IRPTN.

The policy context guides development in the eThekwini Municipality, including transport development. The policies promote sustainable development, integrated transport systems and NMT. Furthermore, the policies are instruments used to shift the city towards the vision of a carbon free city.

2.5 NMT AS A FEEDER SERVICE

According to Barendse (2016: 3), integrated transport can be defined as the procedure through which components of the passenger transport system (including tariffs, network and infrastructure, ticketing, information and marketing) are, across operators and modes, "brought into closer and more efficient interaction, resulting in an overall positive enhancement to the overall state and quality of the services linked to the individual travel components." An integrated transport system is needed in the case when a certain system is composed of numerous elements and parts and the purpose of integration is to improve the work effectiveness of these elements by their compatibility (Poliaková, 2013:83).

The review of the literature by Stopka, Bartuška and Kampf (2015:154) indicates that integrated transport, by definition, goes beyond the borders of public transport systems. It includes wider integration with other transport modes (for example, walking, cycling and private cars) and other non-transport services, such as spatial development, land planning and environment. Integration refers to multimodal planning, that is, it covers both transportation and land use planning that consider varied transportation options, including cycling, walking, automobile and public transit, and take into consideration land use factors that impact accessibility (Litman, 2017a:13).

Campbell, (2016:26) explicitly states that the bicycle usually functions as a feeder mode to serve public transport facilities in the developed world. According to Simões (2014: 43), NMT provides an essential connection between a pedestrian's destination (egress point) and the preferred public transport. The author states that in order to ensure the successful movement of foot-travellers in an urban environment, it requires both motorised and NMT to work efficiently together so as to integrate the transport network.

NMT sustains the public transport system by providing a feeder service to other public transport modes. Despite this, NMT is hardly recognised for its role in public transport (Jain, 2013: 7).

Figure 2.**2** shows how NMT contributes to the seamless integration of public transport if private cars are not used. NMT plays a unique role in public transport by connecting commuters to the overall public transport system.

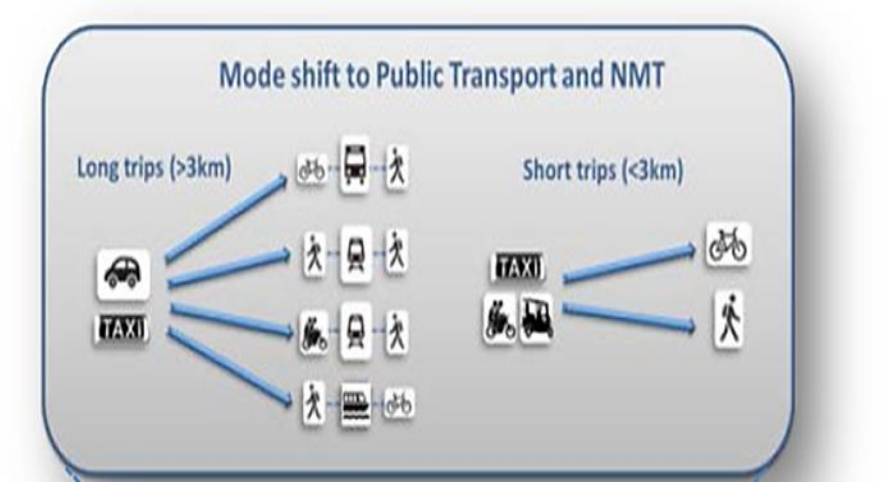

Figure 2.2: Mode shift to NMT and public transport
Source: Kijmanawat and Karoonkornsakul (2016: 7)

It is evident that integration of NMT as a feeder service reduces the number of vehicles on the road and, as a result, reduces demand for road space and carbon dioxide emissions. It allows for integration with other public transport modes like taxis, buses and trains. It is, therefore, important to establish an NMT system that is safe will enhance its role as a feeder service to the comprehensive public transport system.

The integration of NMT with public transport modes contributes to a more environmentally sustainable and efficient transport system. A properly integrated NMT system accelerates public transport usage amongst commuters (Brussel, 2014:7). According to Brussel (2014:16), an IRPTN is "a linking public transport network, entailing a low density of stations and stops, with access to the NMT network connected to the IRPTN as a feeder system, with a taxi and bus density complementing NMT as an access transport mode." Jain (2013:24) points out that establishing added park and ride facilities, stations and introducing single multimodal ticketing would assist in the integration of NMT and bus, taxi and rail and provide seamless multimodal transport. Brand (2015:2) describes an integrated transport system as "a collection of elements that is discernible within the total reality". Brand goes on to say that "the outcome of the system … is the principle that whole entities (groups of elements) display characteristics that are not only meaningful when they are assigned to the whole and cannot be reduced to the individual elements."

Figure 2.**3** presents a generalisation of an integrated transport system (NMT and bus transport). How integration is reached is not shown, but the figure provides an indication of the dissimilar parts of the system that could possibly impact integration.

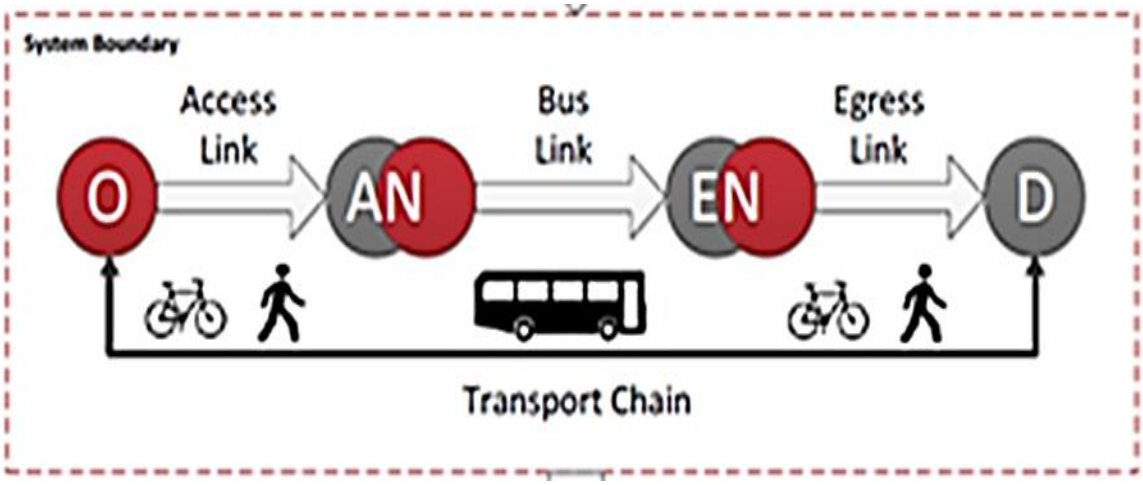

Figure 2.3: Generalisation of an integrated transport system (NMT and bus transport)
Source: Brand (2015:16)

The different modes of transport in the figure must complement each other thereby facilitating a decrease in travel time. Access link (AN-Access Node) and egress link (EN – Egress Node) are the arrival of the bus and end of the trip, each of the elements having their distinct characteristics based on time, reach and distance (Brand, 2015:16). IRPTN encourages integrated feeder services that encompass integration with other distinct public transport modes like NMT, long-distance intercity services, bus, taxi and metered taxi services.

The FIFA World Cup 2010 in South Africa highlighted the need for public transport enhancements. The Public Transport Strategy and Complementary Action Plan fashioned in 2007 impelled the progress of an IRPTN (SACN, 2014: 6). The objective was to construct rapid transit corridors comprising of a mixture of rail and bus, to function as the public transport mainstay. Local level government was to put into effect the IRPTN development as well as the Public Transport Infrastructure and Systems Grant (PTISG) which was founded for developing BRT services that would accompany rail transport (and which certain areas

already had in place). An essential element of the strategy was the densification along corridors and the growth of infrastructure for NMT feeder services (SACN, 2014: 6).

Building on the integrated transport system, eThekwini's IRPTN has begun to implement cycle projects and planned programmes to ensure the new and anticipated networks meet the needs of NMT users considering, in the main, the needs of those who require inexpensive commuting choices such as cycling and walking (Baxter, 2014:2). The South African Cities Network (SACN, 2016:340) points to the fact that, if NMT (walkways and cycling routes) and new railways are included in the eThekwini IRPTN (GO! Durban), they would decrease the number of cars on the road and stations will be precincts of mixed land-use developments (businesses, residential and retail). The latter will be sustained by a NMT system comprising walkways and cycling lanes. The eThekwini IRPTN consists of all transport modes functioning together in establishing an integrated network along best-suited routes (SACN, 2016:340). For example, taxis or buses will offer contracted feeder services from highway to rail stations. The IRPTN integrates numerous different transport modes and innovations, whereas the existing 'People Mover' bus system is one aspect of this having been in effect since 2007 and operating along the beachfront and inner city.

2.5.1 EThekwini Integrated Rapid Public Transport Network (GO! DURBAN IRPTN)

The IRPTN in the eThekwini Municipality aims to provide a cost effective, flexible, safe, accessible, reliable and efficient transport service for the citizens of eThekwini. Thomas (2016:352) suggests that it is fundamental that South Africa provides a more effective, safe, affordable and accessible system of public transportation. Bannister and Esteves (2015) elucidate that BRT systems, like other effective, efficient, cost effective and reliable transport systems can, similarly, transform our metropolises. This phenomenon, now generally recognised as transport-oriented development (TOD), comprises augmented levels of development around transit stations and hubs (Bannister and Esteves, 2015:9).

The municipality conducted an analysis for 15 proposed eThekwini IRPTN stations (along the northern rail corridor). A 'Concept Proposal' was taken from Phase 1 – 'Conceptual Proposals for CBD to Bridge City Public Transport and Integrated Land Use Corridor'. The 'Concept Proposal' outlines the city's pursual of sustainable transport and TOD. Some of the

expected results of the eThekwini IRPTN according to the eThekwini Municipality (2012b:18) will be to:

- Change transport modes from car to public transport, cycle and foot;
- Reduce the length of journeys and number of trips;
- Inspire less polluting and energy efficient modes of transport by enhanced design encouraging public transport;
- Create higher compactness particularly public transport interchanges and stops;
- Create mix uses, specifically have public facilities, shops, workplaces and houses all in the same precinct and promoting medium density residential development;
- Permit no new low-density separate residential units and offer better quality public transport;
- Produce mixed-use neighbourhood nodes and encourage an even mix of ownership and rental.

Figure 2.4 depicts the anticipated eThekwini IRPTN stations and station precincts. The municipality intends to provide state-of-the art, high quality facilities in its envisioned stations and station precincts.

Figure 2.4: Intended eThekwini IRPTN stations and station precincts

Source: EThekwini Municipality (2012a:26)

The comprehensive objective of the eThekwini Municipality is to implement a sustainable, efficient, safe and effective public transport system. Guided by the legislative provisions, the ETA has developed an IRPTN plan for the entire eThekwini Municipal area. The ultimate envisioned 2025 public transport system for the eThekwini Municipality area is defined by the IRPTN 'Wall to Wall' plan. The IRPTN plan is a way to ensure that the gradual implementation of the IRPTN accomplishes the established goals (eThekwini Municipality, 2015:164). The planned IRPTN will link various modes of transport, for example, taxi, rail and bus across the eThekwini Municipality by 2027. The figure illustrating the nine corridors of the eThekwini Municipality IRPTN is contained in Appendix B.

The city's idea was to connect communities and people by providing walkway paths such as the 'Walk all the Way' system, the 'Connect to Rail' and the 'Green Walk Cycle Circuit' and these would be extended to the new IRPTN. Additional investment in infrastructure transpired by COP17 (in 2011) enabled the municipality to develop itineraries that connected pedestrian and cycling lanes along the beachfront promenade (boardwalk) from uShaka Marine World to uMngeni River Bird Park. The bridge at the M4, over the uMngeni River, was widened to provide cycling and pedestrians lanes and these lanes will slowly be stretched to join up to Botanic Gardens, Bulwer Park and Burman Bush. The municipality has also plotted out numerous 'spines' to connect the Botanic Gardens, Wilson's Wharf, the ICC and Durban beachfront (Baxter, 2014:2).

As part of eThekwini's strategic move to becoming a carbon free city there has been a campaign for NMT but at a very low level. The primary methods of NMT found within Durban and the eThekwini Municipality at large are walking and cycling (eThekwini Municipality, 2012:54). Transport that is animal drawn is mainly found in rural regions of the municipality area, and not utilised much inside the urban development line. Cycling, however, is prevalent in many parts of the metropolitan area, where topography allows. NMT is intended to serve as a significant mode of transport in the planned IRPTN (eThekwini Municipality, 2012:54). It is, therefore, crucial that the obligatory facilities and infrastructure for these stated modes are put in place to protect the susceptible road users, and for the eThekwini Municipality to promote NMT as an official transport mode. Planning authorities need to construct, maintain and expand continuous networks for walking and cycling.

Providing dedicated infrastructure will assist in protecting cyclists and walkers from conflict with motorcar users and in reducing road traffic fatalities (eThekwini Municipality, 2012:54). Figure 2.5 shows one of the completed IRPTN stations along the Pinetown to KwaMashu route.

Figure 2.5: The eThekwini Municipality IRPTN (GO! DURBAN) station constructed in Pinetown CBD, at Josiah Gumede Road
Source: Author

Considering the above, the eThekwini Municipality (2013) indicates that existing NMT infrastructure in eThekwini comprises pavements, cycle paths and ancillary structures. The majority of large surfaced roads within the city have a pavement on one side of the road and generally, pavements are provided on both sides of the road. However, according to the Municipality (2013:8) the standard of the provided facilities in terms of universal accessibility, maintenance and design is not always appropriate.

Within the CBD, an NMT network was developed and introduced as the 'Priority Pedestrian Network' during the FIFA World Cup in 2010. The NMT network connects important municipal attractions by corridors and footpaths. These routes were improved in terms of landscaping, lighting, signage, CCTV surveillance and paving. Near the beachfront is the promenade, which links Moses Mabhida Stadium to the Point area, and has demonstrated to be a very popular recreational and tourist link, promoting jogging, cycling and walking along the beachfront (eThekwini Municipality, 2013:8). According to the eThekwini Municipality

(2013), this linkage is presently in the process of being protracted further northwards to the uMngeni River, thus making an uninterrupted NMT corridor alongside the entire Durban beachfront. A comparable promenade has been made along the Umhlanga coastline to the north of Durban, although not as broad (eThekwini Municipality, 2013:8).

There is no doubt that trips done by walking account for the majority of all non-motorised trips within the eThekwini metropolis. The Household Travel Survey (2008) confirmed that the highest demand of NMT trips was the demand for walk trips. The survey confirmed that 32% of all households on any travel day made at least one walk trip; with this percentage increasing to 41% for low income homes. In total, 14% of people made a walk trip on the travel day. This equals approximately half a million walk trips on a normal travel day. Walk trips peak in the morning with an incidence of 14% compared to the evening peak where the incidence is 2%. This is partially a result of many school children walking to school in the morning peak and returning home before the afternoon peak period (eThekwini Municipality, 2013:6).

Figure 2.6 shows the modal split within the eThekwini Municipality. It was observed that walk trips account for approximately 25% of all trips, with cars and taxis contributing about 30%. This modal split shows that the percentage of walk trips, cars and taxis in eThekwini are not much apart, therefore making walk trips an important part of the eThekwini public transport system.

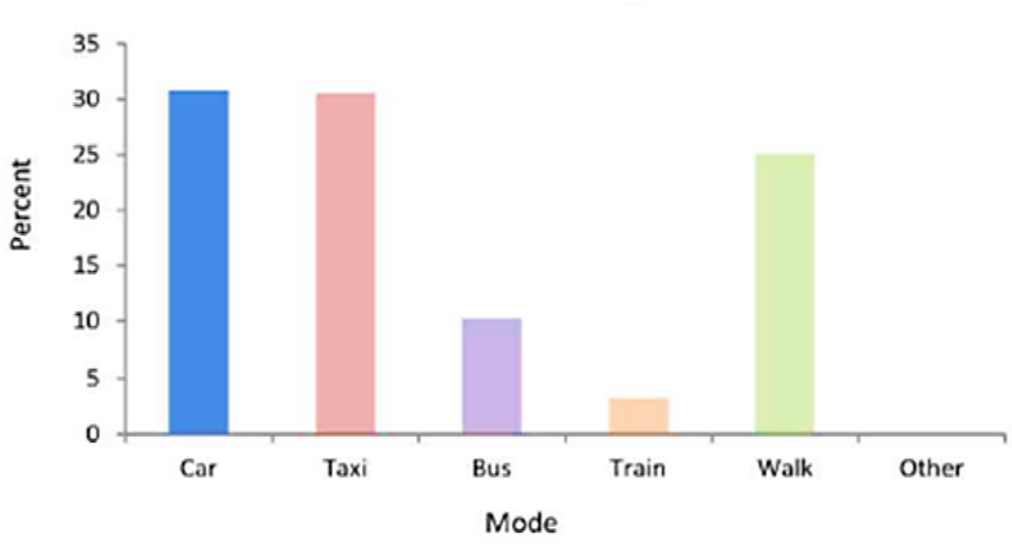

Figure 2.6: Modal split within eThekwini

Source: eThekwini Municipality (2013:6)

NMT provides numerous benefits such as economic, health, environmental and transportation (Angira, 2013:16). Around the world, cities are now eradicating travel lanes and substituting them with dedicated lanes for public transport, pedestrian and bicycle substructures. The provision by cities of necessary infrastructure for NMT means that cities must develop innovative and bold philosophies to overcome the challenges that may transpire (Menon, 2015:82).

The City of eThekwini identified in the Draft Non-motorised Transport Plan (2013) NMT problems that needed exigent consideration. The problems that needed to be addressed related to insufficient standards of the general environment, infrastructure, safety and security and were, in more detail, as follows:

- General environment includes landscaping;
- Infrastructure includes cycle and pedestrian ways and surface condition;
- Safety includes road crossing facilities; and
- Security includes street lighting (eThekwini Municipality, 2013:71).

The eThekwini Municipality's public transport sector lacks structure and is ineffective. Problems that exist in the public transport sector are outlined by Gopaul (2015:54) as follows:

- Lack of control (or enforcement) over transport modes, which gives rise to illegal and poor driving practices and duplicate services;
- Insufficient services and inadequate capital for upgrades;
- Lack of integration of services between modes, resulting in inconvenient and expensive travel;
- Limited ability to provide safety at public pick-up and drop-of zones; and
- Detrimental environmental impact such as air and noise pollution, extreme land reserve required for road lanes.

Although the eThekwini Municipality has existing constraints in providing adequate public transport, and cycle and pedestrian infrastructure, it acknowledges the need to address the NMT problems in order make such transport more attractive and comfortable for current

NMT commuters and to increase NMT usage in the municipality. The city understands the NMT barriers as comprising the following:

- The pattern of land-use development has placed low income residents the furthest away from employment opportunities;
- Climate and terrain restrict NMT facility siting and trip lengths;
- Low levels of demand in rural areas do not support the widespread provision of NMT infrastructure;
- NMT infrastructure is limited mainly to sidewalks which, where provided, are generally of an inadequate standard;
- Disparities in NMT user and motor vehicle speed and mass as well as inadequate NMT infrastructure lead to high casualty rates for cyclists and pedestrians;
- Generally, NMT users must share facilities with motorised traffic in which the latter is usually favoured;
- Personal security is a major concern for pedestrians and cyclists;
- NMT users and motorists display inconsiderate (illegal) behaviour towards each other;
- NMT is a responsibility of over 10 municipal departments or units without formal coordination in place;
- Training arrangements for pedestrians and cyclists are under-resourced;
- Although adequate legislation exists for NMT, the regulations are generally not adhered to or enforced; and
- Extensive planning and design guidelines for NMT are available but they lack uniformity and none are legally required (eThekwini Municipality, 2013:14).

South Africa is experiencing an increase in urban growth (Mudau, Mhangara and Gebreslasie, 2014: 186). This has resulted in the country looking to NMT as a feasible alternative mode of transport. Climate challenges have created an opportunity to develop mitigation strategies such as cultivating a green economy for SA. NMT forms part of the green strategies and stresses the importance of improving accessibility and mobility for the areas that are inhabited by the economically disadvantaged. A clear policy is needed for the municipality – one that highlights the importance of planning to direct and guide the ETA and one which will determine the need for facilities while, at the same time, highlighting the

process to the community (Chetty and Phayane, 2013:18). The municipality requires properly delineated enabling factors that ease the integration of NMT with the over-all public transport system. It is to these enabling factors that the discussion now turns.

2.6 ENABLING FACTORS FOR INTEGRATING NMT WITH THE OVERALL PUBLIC TRANSPORT SYSTEM

Sustainable transport is the supply of infrastructure and services for the movement of goods and people and the advance of social and economic development to benefit present and future generations via a method that is accessible, safe, affordable, resilient and efficient. In addition, this is done while reducing carbon and other environmental impacts and emissions (UN, 2016:10). Sustainable transport provides effectual and safe mobility for the people with minimum ecological impact (Lah, Shrestha and Hüging, 2015:4). Sustainable transport is a multifaceted cross-sectoral issue that connects the requirement for legal compliance with noise standards and air quality with green development, attractiveness, climate strategies, budget constraints and citizens' satisfaction. It includes infrastructure projects, bicycle or car sharing inventiveness, campaigns to encourage the use of bicycles or public transport, and sustainable transport fostering efforts (Schmale, Von Schneidemesser and Dörrie, 2015:1330).

Sustainable transport makes access available to different groups of people in the metropolis in a way that is in line with the environmental carrying aptitude of the metropolis and is inexpensive to both the users and providers of the system. Sustainable transport promotes transit-oriented development, green vehicles, non-motorised modes of transport (for example, cycling and walking) and car sharing. Sustainable transport provides a fuel-efficient transport system and has a low impact on the environment. A sustainable transportation system is important as it is an essential feature of a liveable metropolis, one that provides a high-quality standard of living (UNESCAP, 2012:3).

Sustainable transportation, such as cycling and walking, is affordable, healthy, does not harm the environment with air or noise pollution, enhances the quality of city life and is efficient over short distances (Irlam, 2016:11). Like all modes of transportation, it is important that non-motorised modes are not understood in isolation (Campbell, 2016:25). NMT modes need to be conceptualised according to their interrelationship with other different transport modes

(Campbell, 2016:25). It is important to ensure that NMT is included in the initial planning procedures. Of concern, however, is that it is usually the first component to be cut because of fiscal constraints (Labuschange and Ribbens, 2014:193).

The development of NMT is a key element in effectively promoting inclusive, integrated and sustainable urban transport. Central to pursing this perception is the notion of universal design which, in principle, identifies a society's accessibility and mobility which in turn are mainly determined by the built environment, namely, sidewalks, roads, design of buildings, paths and vehicles. Design practices and standards founded on an 'average' individual have normally been unsuccessful to accommodate a lot of prospective customers. Universal design focuses on the community rather than the individual – it undertakes that the built environment should provide for all users rather than supposing that societies must accommodate the built environment (Gauteng Province, 2013:1). Limited literature is beginning to materialise around the different public transport modes and operations integration. Simple modifications to the operations timetable of the rail service in eThekwini Municipality by the authorities can initiate a more integrated and attractive public transport amenity using present rolling stock and infrastructure. However, because of the insular development of separate modes there is an absence of operational and spatial incorporation of public transport (Bickford, 2013:15).

A public transport system should encompass an increased service that comprises affordability, reliability, transit use incentives (such as lower fares), and transit-oriented development (more compact, walkable, mixed development around corridors and transit stations) (Litman, 2017b:4). Public transport must be safe, reliable, attractive, provide travel information, and be user friendly pertaining to improved service and the improvement of infrastructure, for instance, waiting rooms (Adewumi and Allopi, 2013:1). Cost is an essential aspect that impacts on the demand for public transport. Apart from the financial aspect, it incorporates the time spent waiting for and embarking and disembarking from vehicles, together with the inconveniences and risks involved in those activities (Adewumi and Allopi, 2013:1).

Safety and security are also essential for a transport system as calamities have socio-economic impacts (UNESCAP, 2012:6). The accessibility of a wide range of public transport services is a key factor in developing a sustainable transit system (UNESCAP, 2012: 20).

Transport mobility seems to be an essential constituent of the everyday lives of individuals and transport mobility arrangements are evidently related to the relative setting of activities and urban density. These may possibly be balanced through better and more public transport services. Urban sprawl growth hinders the efficiency and competitiveness of the public transport system thus hindering the supply of resources to finance public transport services (Monzón, Hernández, and Di Ciommo, 2016:1125).

Properly designed and managed interconnections provide benefits for users, including time saving, efficient travelling and less transfer time (Monzon et al, 2016:1126). Generally, non-motorised and public transport modes require mixed uses and high densities in order to be financially and practically viable. Compact urban development is often linked with shorter distances and decreased use of motor-powered transport (Pojani and Stead, 2015b:7799).

EThekwini Municipality has in place a public transport improvement programme. One of the key objectives of the programme is to entrench the architectural revolution, which will revitalise and influence the urban renewal of run-down areas and provide residents with affordable, safe and quality planned public transport; as well as improve opportunities for mixed-use, densification and transit-oriented development to decrease travelling and encourage the emergence of a post-apartheid city (eThekwini Municipality, 2012a:2).

The literature identifies current thinking on urban space, the institutional framework, funding, NMT-friendly urban structure, marketing, and finally, implementation as enabling factors that need to be in place in order that the integration of NMT into the overall public transport system be facilitated (Salleh et al, 2014; Labuschagne and Ribbens, 2014). Each factor will be discussed below.

2.6.1 Current thinking on urban space

Smart growth, characterised by active transportation (active transportation includes walking or cycling into routine travel) network provision and sound land use can raise the physical activity strata of citizens (Wang and Wu, 2015:3). The City of Copenhagen suggests constructing a cohesive city public transport system across the entire city thus allowing people to easily transfer from origin to destination and vice versa. The system comprises diverse measures such as cycle super highways, cycle corridors and bicycle bridges

(Copenhagen, 2014:16). In fact, TOD suggests building mass transit corridors that function as the main transportation axes of metropolises but also constructing high density development near these corridors. TOD proposes adopting mixed land-use that tends to reduce regular distance of trips and enables NMT. TOD also allows for the construction of large regions of housing that are effectively served by public transport services. By raising the financial feasibility of non-motorised and public transport along with refining conditions for their use, TOD accomplishes higher involvement of these less carbon intensive transport modes in overall urban mobility (Aguilar and Glocker, 2015:12).

2.6.2 Institutional framework

Municipalities must decide to what degree public transport will competitively accommodate passenger mobility demand. Many municipalities indirectly make this decision through the distribution of institutional power and related infrastructure prioritisation (McLeod, Scheurer and Curtis, 2017:232). Rathete (2015:8) suggests that the existence of institutional and regulatory systems that encourage and promote non-motorised transport is one of the key pillars that will guarantee and put into effect the inclusion of continual NMT planning progressions. Mokitimi and Vanderschuren (2017:4803) noted that the effect that institutional backing can have on non-motorised transport development in developing nations can be huge. According to Mokitimi and Vanderschuren (2017:4804), institutions have a duty to keep the culture of NMT usage in cities, especially in developing nations through implementing fewer vehicle orientated transport policies and encouraging investment in NMT infrastructure. The authors state that in developing nations the goal institutions must have is to implement NMT in their cities. Institutions must aim to preserve a high usage of NMT. Litman (2017a:16) posits that transport system connectivity, predominantly links between modes, should be given special considerations, such as the quality of cycling and pedestrian access to transit.

2.6.3 Funding

In order to provide a competitive and sustainable public transport network, continuous investments in operation and infrastructure are required and, in most cases, subsidies are needed to maintain affordability and quality (Aguilar and Glocker, 2015:16). Practices world over indicate the foremost source of funding for NMT investment is undeniably the central

government which finances directly to NMT initiatives and programmes or decentralises funds to municipal level. Nevertheless, several other inventive financing instruments used in NMT funding have been defined and these include public private partnerships (PPP), national funds and levies, charges and community funding (Mohapatra, 2015:7). Governments have a significant role and responsibility to play in inducing private investment for sustainable and non-motorised transport infrastructure through national policies, even in fiscal constraints. From the viewpoint of the private sector, a green investment strategy (policy) framework can impact three investment situations: 1) the return on investment, including limiting costs and boosting returns; 2) the risks faced by investors; and 3) the existence of investment opportunities (Ang and Marchal, 2013:18). SACN (2016:244) mentions that in terms of the constitution, "a municipality must structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community and to promote the social and economic development of the community."

2.6.4 NMT-friendly urban structure

Walkability is usually associated with suitability factors such as the number of lanes, street width, crossing improvements, safe speeds, heavy traffic, safety, and the presence of trees (Parizi, 2015:154). Urban mobility is optimised by a compact city form and can decrease the need for motor vehicle travel (UNEP, 2013:10). The primary principle of attaining accessibility in cities is grounded on the physical density of services, people, economic exchange and activities. In this regard, the most important features include workplace and residential densities; the dissemination of functions and degree of mixed use; local level urban design; and the level of centralisation. More dense and compact metropolises (also referred to as smart growth) are distinctive examples of enabling cluster economies through greater proximity. Creating accessibility centred on physical nearness involves a certain attention to designing, planning, constructing and managing the specific local circumstance at a human scale (Rode, Floater, Thomopoulos, Docherty, Schwinger, Mahendra and Fang, 2017:4). There are numerous urban conditions that can enable NMT travel. Decreasing traffic movement can allow bicycles to be integrated into overall traffic and reducing road space from cars can increase space for NMT. Cycling and pedestrian mediations will only be efficacious if they are joined with the compact and attractive use of the city landscape (UNEP, 2013:10).

2.6.5 Marketing

Cities and governments have the responsibility to enact polices to encourage bicycles and walking as alternative transport, consequently increasing NMT mode share (Rissel, Crane, Standen, Wen, Ellison and Greaves, 2018:309). Some of the measures that are intended to promote the use of the NMT modes of travel include enhancement of physical facilities such as bikeways, pavements and setting up of more direct routes (Belwal, 2016:12). Authorities should also have in place the 'Safe System' approach intended to improve cycling and traffic safety – focusing more on cyclists and seldom on the overall traffic system (OECD, 2013:23). Additionally, ensuring clarity and continuity of routing, eradicating built and natural barriers that might prohibit cycling or walking, presenting attractive and interesting activities along walking routes with pleasant views, and minimising vehicular or pedestrian conflicts by providing readily identifiable, convenient cycle tracks or walkways are further measures that can be taken (Belwal, 2016:12). It is important for developing countries to encourage the use of NMT by establishing project champions and leadership support, developing technical capacity and addressing policy barriers (Giduthuri, 2015:264).

2.6.6 Implementation

An important element to ease implementation of NMT is to have in place a strong political will to transform the way that persons travel. Political determination is important for driving strategies, legislation and policy that will facilitate local municipalities and governments to implement the needed changes to make NMT trips more attractive and viable (Baufeldt, 2016:45). The City of Cape Town has progressively created a culture of respect for non-motorised modes within the city through the construction of continuous NMT networks, improved maintenance and provision of NMT facilities, and increased safety and security within the city (Irlam, 2016:18). Also, the city aims to ensure cycling is affordable and accessible for all, and to ensure cycling is incorporated in transport and urban planning initiatives and transport projects. It also aims to ensure that project monitoring and evaluation is an integral part of the project life cycle. Stakeholder collaboration to enable project coordination and cycling infrastructure and systems that serve the needs of cyclists are also needed (City of Cape Town, 2017:12). Furthermore, strategies intended for successful implementation include creating attractive and safe pedestrian and bicycle networks that serve every person, constructing safer NMT environs particularly in sensitive areas that have

a high fraction of vulnerable users, and ensuring that implementation provides for special needs commuters (Baufeldt, 2016:48).

2.7 CHAPTER SUMMARY

The regeneration of a city to a sustainable one necessitates a shift from modern planning applications to post-modern planning principles. New urbanism and smart growth principles challenge traditional planning practices in spatial and transport planning. These principles transform a city from a private vehicle-oriented city to a pedestrian friendly city. New urbanism and smart growth principles facilitate walkable communities. Countries like the Netherlands, Denmark and Germany are good examples in NMT and public transport integration. In these countries, NMT is the preferred mode of transport for most citizens. While South Africa has legislation and policies in place that promote integrated transport development, NMT remains, in general, underdeveloped compared to other public transport modes. The policies in the eThekwini Municipality promote sustainable development, integrated transport systems and NMT. In instances where a city has different public transport modes (as in eThekwini) an integrated public transport system is necessary in order to provide an effective, affordable and seamless transport system. In eThekwini NMT is a key element in public transport and functions as a feeder mode to other public transport modes. Therefore, it is important that NMT problems are addressed to enable the seamless movement of foot travellers and cyclists. The literature review provided the factors that need to be in place in order to enable the efficient and effective integration of NMT with the overall public transport system.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The aim of this chapter is to discuss the methodological elements pertaining to qualitative empirical research. The chapter commences with a presentation of the qualitative research design, followed by a justification for the design. It continues with a discussion of the data collection method, research sample, procedure and theatrical discourse analysis, the latter the selected method of data analysis for the study. The chapter concludes with a section on the trustworthiness of the study, ethical considerations and a chapter summary.

3.2 RESEARCH DESIGN

This section presents the approach, strategy and research method pertaining to the study.

3.2.1 Research approach

Different research design types can be used for different research goals. The research design shapes the problem to be investigated, questions and context. The problem determines the questions which in turn determine the methodology and no part (component) is independent of the others (James and Slater, 2014:26). Qualitative research design can be reshaped and reviewed as the research continues. Several analytical strategies require the researcher to revise questions and sampling as findings (conclusions) are analysed and preferably data collection continues until theoretical saturation is achieved, a point that can be projected but not identified before data collection starts. If the research design is participatory, the aims, research questions, methods, analytic approaches (strategies) and dissemination plans could be challenging to outline accurately prior to discussion with participants (Shaw and Holland, 2014:3).

3.2.1.1 Qualitative research

A qualitative approach was adopted for the study. In a qualitative study, a properly constructed research question will guide the choice of a suitable methodology as well as the development of the research design (Mills and Birks, 2014:9). Qualitative researchers take cases and context seriously for understanding a certain issue under study. The main parts of a qualitative study are centered on text and writing (field notes and transcripts), descriptions and interpretations, and the presentation of the findings of the research (Flick, 2018:5). This type of research is a situated activity that detects (locates) the viewer (observer) in the world. It involves a set of interpretative, material practices that assume the world to be observable. These practices metamorphose the world and together with interviews, field notes, conversations, recordings, memos (to the self) and photographs they make the world into a succession of representations (Guest, Namey and Mitchell, 2013:3).

Qualitative research is mainly used to gain an in-depth understanding of underlying motivations, opinions and reasons. It is similarly used to reveal trends in opinions and thoughts and to 'dig' deeper into a problem by studying a group or an individual, usually using semi-structured or unstructured techniques (Byrne, 2017a:2). The researcher in a qualitative study is engrossed in understanding the meaning the public has created, and how the public make sense of their experiences and their world. Qualitative research consists of an interpretive naturalistic method. People are studied in their natural environment, endeavouring to interpret and to make sense of phenomena based on the meanings persons bring to them (Guest et al, 2013:3). Qualitative research is considered an umbrella term that includes methods, topic, voices, text and discipline. The importance of discipline in determining the ethics of qualitative methodologies should not be underestimated, mostly regarding the choice of topic, substance, text and place of voices (Mills and Birks 2014:8).

3.2.1.2 Descriptive research design type

The descriptive research process is a simple research process that investigates the situation, in the natural environment (as it happens in the current state) (Jann and Hinz, 2016:3). The qualitative descriptive approach allowed the researcher to stay close to the data and the surface of events and words, thus enabling the use of observations, semi-structured interviews and document reviews (Colorafi and Evans, 2017:5-6). Descriptive research was used so as to

have a good understanding of the problem. Descriptive study can be used for numerous research situations and that is why it is the most regularly used type of research (Clow and James, 2014:44). The study was designed to portray the participants in an accurate way by adopting a case study approach in order to enable an in-depth study of the participants by employing participant observation and interviewing (and recording) participants. The study used semi-structured interviews which are in-depth and permit participants the liberty to express their perceptions guided by questions that prompt a conversation.

3.2.2 Research strategy

The case study method was used in this research. Thomas and Myers (2015:2) define a case study as an in-depth inquiry from multiple perspectives of the uniqueness and complexity of a specific system, project, institution, policy or program in a 'real life' context. Case study research is a method of framing a bounded unit (particularity) by providing guiding principles for the research design, process, communication and quality (Hamilton and Corbett-Whittier, 2013:8). A case study involves an understanding of why something might have occurred, or how it might be the case. The case study approach allows one to observe the subject from several and diverse angles allowing one to get closer to the 'how' and 'why' (Thomas and Myers, 2015:4).

Case study research can have a single-case or multiple cases, allowing investigation of concerns, problems and issues confronted by the phenomena under examination and how these concerns, problems and issues may be addressed (Stewart, 2014:2). In this research, the case study approach allowed the researcher to investigate the multifaceted social phenomena of one locality. A single-case study was carried out as it allowed the researcher to do an in-depth investigation into one region, thus providing the reader a more detailed understanding of a phenomenon.

Figure 3.**1** shows a basic version of Yin's multifaceted model which offers a foundation for developing a basis for the case study research design. According to this version, three choices for case study design are available. While it may not be possible to entirely achieve the standards for these designs they do, however, provide guidance on how to develop the rationale (underlying principle) for the single-case design. An embedded case study can consist of more than one unit of analysis but is commonly used within a single organisation.

The multiple-case design allows the researcher to investigate the phenomenon in several dissimilar cases and to contrast and compare cases (Farquhar, 2012:16-17).

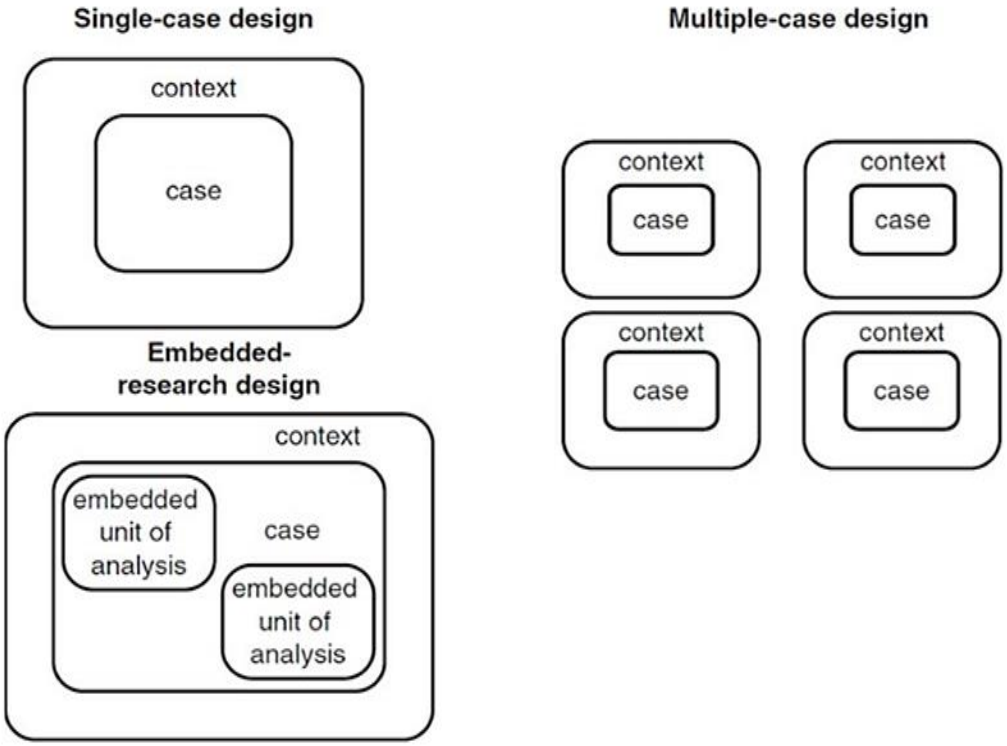

Figure 3.1: Case study designs
Source: Farquhar (2012:16)

Furthermore, the multiple-case study design allows researchers to observe each case uniquely and, at the same time, allows for the clarification of findings across all cases. Additionally, this method inspires researchers to move away from employing only interviews in qualitative inquiry and to expand their data collection to audio and visual recordings, written documents and the like (Brown, 2017:8).

The current study was a single-case design.

3.2.2.1 Single-case study

A single-case study can be employed to focus on an extreme case that can be used to draw attention to unique circumstances. Single-case design can also be employed to emphasise a typical case.

Figure 3.**2** adopted, from Yin (2009:46), indicates a single-case study design. The current study was depicted by a holistic single (or primary) unit of analysis, namely, the community of Cato Manor, eThekwini Municipality. More specifically, the community comprised people above the age of 18 and below the age of 65, who resided in Cato Manor, were either male or female, married or single, used public transport and who usually walked to and from work and the surrounding areas on a regular basis.

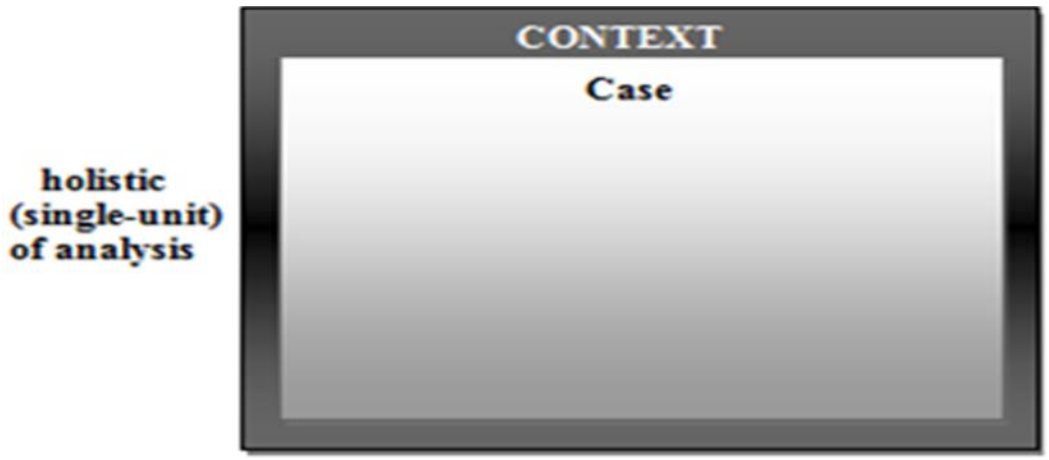

Figure 3.2: Single-case study design

Adopted from: Yin (2009:46)

The single-case study (also referred to as single-subject) involves prolonged, in-depth study of a single-case; the principal concern is not how many persons believe in what they believe in, but 'how' and 'why' they believe what they do (McKeown and Thomas, 2013:4-5). The moniker single-case is used to define this class of study strategy because, reliant on the context, a case may well refer to a social unit (for example, family), a support group, a client, or an organisational or institutional body (for example, a group of employees). It is imperative to note that an absence of generalisability is associated with case study research, particularly if a common approach is not applied within a specific field or subfield. Unlike survey research or experiments, case studies, in terms of their design, centre on gathering in-depth data on a single-case or, at times, a small number of cases (Norander and Brandhorst, 2018:4).

3.3 RESEARCH METHOD

In the following section the research method is discussed as it relates to the research setting, sampling, data collection, recording, data analysis, strategies to ensure trustworthiness of the study and the ethical considerations.

3.3.1 Ethnographic research: case studies

There are different types of research methods that can be employed in qualitative research. According to Bacon-Shone (2015:42-43) the narrative research method is employed for the gathering of people's narratives about their experiences. The author mentions that researchers can also employ the grounded theory research method for the practice of analysing and constructing novel theories from data. Furthermore, the phenomenological research method can be used for observing participants and to gain an understanding of their behaviour. The case study research method is employed to study a small number of cases in-depth in order to gain deeper insight into the processes or behaviours being researched. Ethnographic research is the anthropological method of becoming fully immersed in the natural environment and becoming part of the people and culture being studied in order to gain an in-depth understanding (Bacon-Shone, 2015:44-45). The study employed an ethnographic research case study. The researcher was thus fully immersed into the natural environment in order to gain an in-depth understanding of the transport system in the study area.

Ethnographic research generally includes multiple methods (most usually interviews and participant observation) and data sources such as behaviour, speech, text and interactions (Konstantoni and Kustatscher, 2016:2). Ethnographic researchers use different methods, from simple quantitative approaches, to textual analysis. It is more than the study of culture. The researcher may be required to conduct interviews, to analyse documents, to conduct surveys and even count things (Mills and Morton, 2013:12). According to Bloome and Green (2018:6) "the logic of inquiry in ethnographic studies contributes to the knowledge base in various fields by providing cases and insights. The cases provided may be of particular

cultural patterns within and across various settings, social institutions, groups, activities, and so on, or they may be cases of how ethnographic studies have been conducted and knowledge generated." Ethnographic case studies usually focus on certain groups or institutional cultures, teaching behaviours or methods (Hamilton and Corbett-Whittier, 2013:6).

In the field, an ethnographic researcher can use a range of different methods. Customarily, an ethnographic researcher uses a mixture of observations, interviews and informal conversations (Konstantoni and Kustatscher, 2016:7). Figure 3.3 shows the qualitative method employed for the study, namely, a qualitative ethnographic case study which used a semi-structured interview and participant observation to collect data from the participants' in their natural settings. It was an effort to make sense and interpret the public transport phenomena in the Cato Manor area. The qualitative research method provided a contemplative and more in-depth understanding of the participants' perspectives and behaviour.

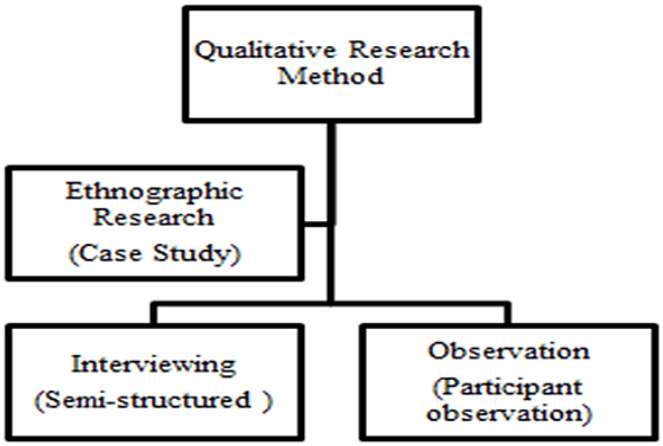

Figure 3.3: Qualitative method employed for the study
Source: Author

Thus Figure 3.3 shows the study as a qualitative ethnographic case study which used semi-structured interviews and participant observation to collect data from the participants' in their natural settings. The approach exposed the researcher to the natural environment in order for her to make sense and interpret the public transport phenomena in the study area.

3.3.2 Research setting

As emphasised above, the participants in the study were observed and studied in their natural setting. The study covered the area between Bellair Road (M10), New Dunbar Road, Wiggins Road and Harry Gwala Road in Cato Manor.

3.3.3 Entreé and establishing researcher roles

The study was not company or organisation specific. Most participants were approached informally, at their residences in Cato Manor. Therefore, it was not necessary to approach government or other entities for authorisation. These entities thus had no impact on the research setting.

3.3.4 Population

A population is a well-defined set of objects, events or individuals (Schumacker, 2015:5). The population is the group from which the sample is drawn. It can, for example, be all of the individuals in a country, all of the individuals in a province, all of the employees in an organisation or all of the individuals in a small learning institution (Clow and James, 2014:3). The population can be described as extensional or intentional. An extensional delineation, also known as the sampling frame, is a list of all units in the population. An intentional delineation, also known as the target population, is a semantic depiction of the population, for example, the population living in South Africa at a particular date (Till and Matei, 2016:2).

There is always a fissure between the sampling frame and the target population. For example, for the population living in South Africa, problems can arise because of residents that are temporarily abroad or illegal residents thus resulting in coding error. The fissure between the sampling frame and target population is called the coverage problem. It is probable that units are in the sampling frame but not in the target population – this is understood as over-coverage. Conversely, under-coverage is known as units not existing in the sampling frame, but existing in the target population (Till and Matei, 2016:2).

For the study, the unit of analysis was the community of Cato Manor in the eThekwini Municipality. The population of the study was, as noted above, defined as people above the

age of 18 and below the age of 65, either married or single, male or female, used public transport and walked to and from work on a regular basis. The study excluded scholars, people below the age of 18 and over the age of 65, the physically disabled, people who were not Cato Manor residents, Cato manor residents who used private transport and, lastly, Cato Manor residents who used motorised public transport only. The population size amounted to 5 996 people. The people in the sample were non-randomly selected and this is discussed below.

3.3.5 Sampling procedure

According to Bacon-Shone (2015: 47) "the different sampling procedures include purposeful sampling which is to select a sample with the intention of collecting a wide range of responses by sampling across all factors likely to influence outcomes. Alternatively, a researcher can employ convenience sampling; that is sampling driven by the feasibility and convenience of the selection process." Alvi (2016:33) explains snowballing sampling as another non-probability sampling procedure "also called chain sampling. In this sampling procedure one element of the population is approached at a time and then is asked to refer the investigator to the other elements of the population." Alvi (2016:34) further mentions that "matched sampling can be used in experimental researches; to take a control group to assess the effects of an intervention".

Purposive sampling was used to select the sample for the study. Schumacker (2015:5) defines a sample as a selection of objects, events or individuals taken from a well-designated population. Sampling is the actual selection of a subset of elements or units from a predetermined population with the intention of extrapolating the results attained on this subset to the whole population (Till and Matei, 2016:2). A sample can be drawn from a population in many ways. A good sample is thought of as one that is representative of the whole population from which the sample is drawn. The sample not only matches the population in relation to observable characteristics, but the results from the data collected from the sample is consistent with the results one would have acquired if one had collected data from the entire population (Fricker, 2017:5).

There are two approaches to sampling, that is, non-probability sampling and probability sampling. Probability sampling is where the entire units in the population have positive and

known probabilities of inclusion. This definition indirectly involves randomisation, a process like lottery drawing, where all units are chosen according to each of their inclusion probabilities. On the other hand, the concept of non-probability sampling means the absence of a probability sampling instrument, nonconformity with probability sampling ideologies and where units are incorporated with unknown probabilities (or some of these probabilities are understood to be zero) (Vehovar, Toepoel and Steinmetz,2016:2).

Below is the biographical profile of the participants in the study.

BIOGRAPHICAL PROFILE		
	Study Includes	**Study Excludes**
1.	Cato Manor residents, above the age of 18 and below the age of 65.	Scholars, disabled persons and people who were not Cato Manor residents.
2.	People (male and female; married and single) who used public transport but who also usually walked to and from work and surrounding areas.	Cato manor residents who used private transport, Cato Manor residents who used motorised public transport only and people below the age of 18 and above the age of 65.

3.3.5.1 Sample types

As noted, the study made use of non-probability sampling, in which the participants in the study were purposively chosen thus making it a non-random sampling method. The units of analysis were selected according to the researcher's experience and judgement. The selection was based on frequent users of NMT modes and distance travelled using such modes. The people who matched the criteria described above and who were selected were considered information rich units. As Emmel (2013:3) points out, the power and logic of purposive sampling rests on the comprehensive study of information rich cases, in order to learn in-depth about the research question and the problems the researcher considers to be of vital importance. Purposive sampling is also known as judgemental sampling – the selection of the sample follows some arbitrary or judgemental ideas of the researcher who is seeking for a sort of 'representative' sample (Vehovar et al, 2016:2).

3.3.5.2 Sample size

Sample representativeness is connected to the concepts of inclusion probability and probabilistic sampling (Till and Matei, 2016:6). According to Guest et al, (2013:20) approximating probabilistic sample sizes is a justly straightforward initiative (they are projected mathematically based on preselected objectives,) while non-probability samples are completely different when it comes to approximating the needed sample sizes. In qualitative research designs, sample sizes are invariably small. The key thoughts in justifying sample size in qualitative enquiry centre on meaningfulness, insights, and validity produced. This has more to do with the information richness of the chosen cases and observational competences of the researcher than with size of the sample selected (Emmel, 2013:6).

In a qualitative study sample size is justified when data saturation is reached. According to Saunders and Townsend (2018:12), only a few authors within business and management provide empirically-based advice about when saturation is likely to be achieved. One of the most commonly cited studies, a study of 30 Ghanaian and Nigerian women with HIV, pointed out that six to 12 interviews should be sufficient to attain data saturation with a comparatively homogenous population (Saunders and Townsend, 2018:12). The number needed to reach saturation is likely to be different depending on whether the participants comprising the target population are heterogeneous or homogenous. Using non-probability sampling, one would consider employing numerous conventions, ad-hoc, non-statistical approaches and ‘rules of thumb’ in determining sample size. According to Daniel (2012:8), typical sample sizes for different types of research designs, are as follows:

- Phenomenological research: 6 to 10 participants
- Case study research: 3 to 5 participants
- Ethnographic research: 35 to 50 participants
- Grounded theory research: 15 to 30 participants
- Experimental research: 15 to 30 participants per group
- Focus group research: 3 to 12 focus groups depending upon type of participants, 6 to 12 participants per group.

The sample size of the study was 20 participants (Sample (S) = 20 adults). As noted, qualitative studies involve a smaller sample size determined by the researchers' judgement and understanding. The sample size was deemed justified given that participants met the laid-down criteria (importantly used public transport and regularly experienced walking to and from work and surrounding areas) and were considered information-rich. The participants all resided in the area between Bellair Road (M10), Dunbar Road, Wiggins Road and Harry Gwala Road in Cato Manor. This area comprised mixed land-use, increased pedestrian activity and high public transport activity.

3.3.6 Data collection method

Triangulation was used in the collection of data. Triangulation is when a research question is approached by employing more than one method, for example, observation, interview and questionnaire (Skott and Ward, 2013:2). The study thus used multiple sources of evidence to collect data – data was collected from three different sources, namely, the literature review, semi-structured interviews and participant observation all of which contributed to confirming the validity of the data.

3.3.6.1 Triangulation

Triangulation is when more than one method is used to investigate a particular phenomenon (Stuart, Maynard and Rouncefield, 2015:3). Different perspectives and different forms of data collection were used to improve the quality of this work. Triangulation as a logic of inquiry within ethnographic and field-based research, is conducted across and within events and times through different collection and analysis methods and procedures. These could include, amongst others, participant observation and informal and formal interviewing (Green and Chian, 2018:3). According to Morris (2018:2), "triangulation is seen to add discipline to both qualitative and quantitative research. A primary reason for the use of triangulation is the recognition that bias can be introduced if only one way of obtaining or interpreting data is used. The use of triangulation requires researchers to regard their data critically, identify methodological weaknesses, and employ alternative ways of testing outcomes and inferences. In particular, it is used in qualitative research as a protocol or procedure to seek stronger accuracy, employ cross-referencing, or demonstrate verification of data."

For purposes of triangulation, the study, as noted, used the literature review, semi-structured interviews and participant observation. This is depicted in

Figure 3. below.

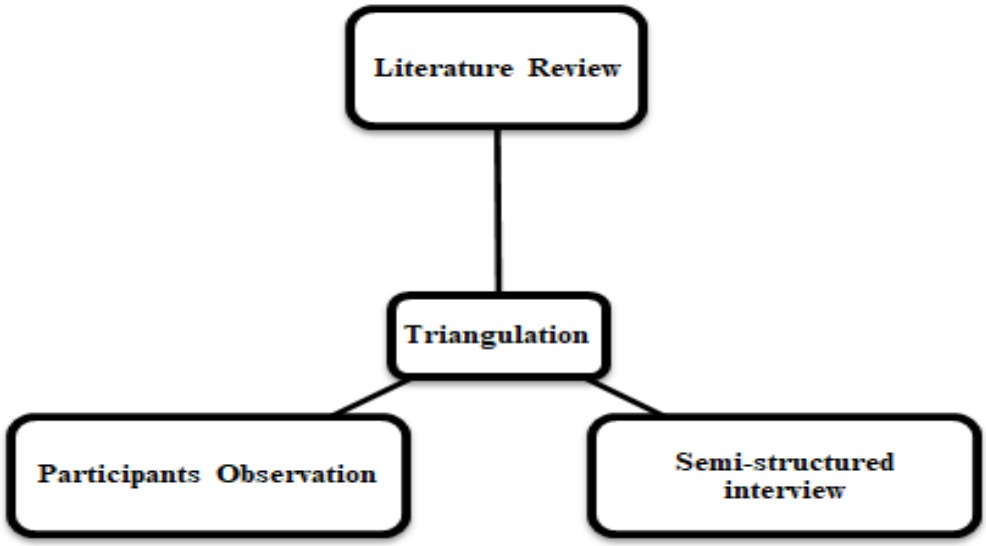

Figure 3.4: Triangulation used for the study to approach the research question
Source: Author

Employing several methods of data collection allowed the researcher to cross-check and compare findings. The documents used in the literature review were obtained electronically via the internet. Participant observation allowed behaviour to be viewed and recorded. The participants were observed in their natural environment and conclusions were drawn from the observation. In conjunction with the literature review and observation, semi-structured interviews were conducted with participants in order to collect their views on current public transport services and infrastructure. Also determined, were their perceptions, needs, preferences, and experiences with regards to public transport and NMT in Cato Manor.

Interviews were conducted with 20 particpants in Cato Manor. The same participants were also observed at certain times. Interviews were usually conducted in the afternoon after work at a day and time agreed upon by the participants and the interviewer. For precautionary

reasons, the interviews were done in a public place, namely, on the street near the participant's residence or outside in their yard. Observations were done early in the morning or after work depending on the participants' preferences. Throughout the interview the researcher ensured to ask conversational questions in an unbiased manner, and ones which followed the initial line of inquiry.

Semi-structured interviewing was one of the data collection methods for triangulation, the other two being participant observation and the literature review. Data was collected to assist the researcher in examining the enabling factors (social and political), specifically, postmodern theory in urban transport planning and policy, and NMT as a feeder service to integrate NMT as a key element of the IRPTN. Data was also collected to suggest the key factors, that is, current thinking, institutional framework, funding, NMT-friendly urban structure, marketing and implementation that need to be in place to enable the integration of NMT into the overall public transport system.

Interviews were conducted in isiZulu and were recorded using a voice recorder. The designated participants were Zulu-speaking from an impoverished community characterised by issues associated with illiteracy. The participants had a limited English vocabulary hence the use of isiZulu in the data collection process. Once the interviews were completed (and the observation taken place) they were immediatley transcribed word-for-word into English which assisted in ensuring the integrity of the translation process. One participant was interviewed and observed per day and the interview recording was translated and transcribed on the same day. The translation of the data was imperative since the information (in English) was essential in the consolidation of the dissertation. The length of the interviews conducted varied between 40 minutes to an hour per participant. The researcher collected data over a period of 20 days, that is, from the 4th to the 24th January 2018.

3.3.7 Pilot study

Once the questions were developed and the semi-structured interview compiled, it was tested in a pilot study in which five participants were interviewed. The participants were 'independent' in that they not part of the final sample. The reason for the pilot study was to determine whether participants understood the questions and if there were any complications and/or confusion with the questions. The pilot interviews were to strengthen the quality of

the questions posed and to identify participants' verbal and non-verbal discomfort in responding to a particular question thus helping to ensure the validity of the data collection instrument. The length of time taken to conduct the interviews was also monitored to ensure that they took no longer than an hour. Once the pilot was completed, questions which did not lead to meaningful answers were removed from the questionnaire and incongruities in the insrument were identified and excluded. The questionnaire was refined accordingly and deemed 'ready' for use.

3.3.8 Data analysis and reporting

The qualitative data was organised, analysed, interpreted and reported (for the latter see the following chapter). Analysis began with efforts to condense the data collected by sorting and selecting. In the first stage numerous concepts were explored and emerging themes were documented, as well as followed-up, through the data set (Brooks, te Riele and Maguire, 2014:11). Qualitative analysis is an iterative and systematic practice of analysing written data inductively, and creating recurring themes or conceptual categories to explain or describe phenomena. Quantitative analysis, however, makes use of statistical methods that include numeric data to create measures of statistical association and significance between variables (Curry and Nunez-Smith, 2015:3).

In quantitative data analysis the procedure of analysis is as much a statistical one as it is a logical enterprise. Even though a small number of social scientists would argue this point, present-day research often highlights statistical modus operandi at the expense of logical dialogue (Aneshensel, 2013:2). To organise data for analysis, the researcher aligned the theoretical assumptions concerning interviewing with the type of research design and interview approaches employed to generate data. In the study, data was transcribed (to include words articulated) as the topic of the conservation, or substantive content, and was the focus of analysis (Roulston, 2014:4). Also, the participant observations were reviewed and analysed, building on the observer–observed relationships. As a researcher, my main focus was how observations were reformed, from loosely linked records of encounters between the 'other' and the researcher herself, into documented analysis (Marvasti, 2014:9).

Generally, for qualitative data analysis, practical theories obviously have crucial inferences, as do the coding categories that were constructed and the classification of sections of data to

which analytic processes will be applied (Maxwell and Chmiel, 2014:2).Coding data can be done in relation to dissimilar code categories (Layder, 2013:4). In qualitative studies, researchers frequently begin with an initial, flexible coding structure, which gets developed and expanded as the coding procedure advances. The coding structure changes as categories are reaaranged, merged, redefined or added (Sun, 2018:5). The clustering of themes by means of categorisation and coding is perhaps the most used analytic method applied by qualitative researchers using interviews (Roulston, 2014:13). Good coding is inclusive and open, locating and labelling all sections of significance and interest within the dataset, in addition to everything that is of significance within those sections. There are no 'wrong' or 'right' codes; codes produced should be meaningful to the researcher, "capturing *their* interpretations of the data, in relation to their research question" (Terry, Hayfield, Clarke and Braun, 2017:12).

Collected data was roughly coded according to main categories which had resulted from the general guidelines employed in data collection. The number of created categories in this first stage is fairly small and controllable; it typically consists of between 10 to 20 major categories. The following stage is where categories are further differentiated and developed based on the data (Kuckartz, 2014:6). In an exploratory manner, concepts are closely linked to explanatory aims – they are the key units or 'components' through which explanations and arguments are articulated. In this way, concepts are almost entirely explanatory or should at least symbolise the balancing opposite of description. Further categories such as 'emotions', 'themes' or 'conversations' can be either analytic or descriptive depending on how the researcher uses them. In a descriptive logic, a 'theme' might denote an encounter as a 'sad occasion' or an 'unhappy meeting'. Such descriptive themes are categorised by their connections to particular places, people and times (Layder, 2013:4-5).

3.3.8.1 Thematic analysis

To analyse and interpret the data, the practice of thematic analysis was followed. Thematic analysis is, overall, a valid method for analysing qualitative data such as interview transcripts or meeting minutes. The researcher first seeks to find key themes as well as related sub-themes by complete immersion in the research data. Once these themes and sub-themes have been identified, codes for each of the themes and sub-themes are generated, and the codes are applied to the text under analysis in order to mark the manifestation of particular

themes in the different places within the data set, such as in different interview transcriptions (Rowley, 2014:4). The whole data set is coded and analysed according to the categories, as well as arranged for the research report. The more intricate category structure offers a rudimentary structure for the research report. By contrasting and comparing sub-groups of interest, category-based analysis draws explanatory power, complexity, and sophistication. In principle, this practice permits the thematic analysis of problem-centred, guideline-oriented and focused interviews plus numerous other types of data, such as other forms of interviews, including narrative or episodic interviews and focus groups (Kuckartz, 2014:6). Usually, thematic analysis is piloted by initially identifying themes in a text, interview transcript (document) or case from one participant. From there, similar and additional themes are located in the following documents studied. During the course of theme development, information that supports the theme is pulled out directly from the data being analysed (Hawkins, 2018:2).

In the study the collected data was coded by theme, sub-theme, participant and interview question number. For instance, code T1.1/P3/Q1 is theme 1.sub-theme1/participant3/question1 and code T1.2/P6/Q10 is theme 1.sub-theme2/participant6/question10.

3.3.9 Discussion

In the discussion (See Chapter four) the researcher described how the study results contributed to the research objectives (Nishishiba, Jones and Kraner, 2014:13). When writing up the results of the research, the researcher made logical and clear arguments that readers could easily follow, starting with general concepts and continuing to more precise ideas. Sub-headings assist in organising the section by concepts or themes (Omori,2018:2). Thus the researcher used key themes and sub-themes employed in the data analysis to structure the discussion. The objective was to assimilate perspectives from diverse data sets and sources and to simultaneously reference those sources. Hence, for each sub-heading there was a general description of the pertinent information that was found as well as evidence of the sources for this information (Rowley, 2014:7). The researcher employed, in the main, a third-person qualitative reporting style to report on the findings of the study.

3.3.10 Strategies employed to ensure the quality of the study

3.3.10.1 Credibility

The researcher assessed the credibility of the study from the planned research purpose. The researcher made credible research decisions, that were consistant and in line with the research purpose (Moon, Brewer, Januchowski-Hartley, Adams and Blackman, 2016:2). Korstjens and Moser (2018:121) state that "credibility is the equivalent of internal validity in quantitative research and is concerned with the aspect of truth-value. Strategies used by the researcher to ensure credibility were prolonged engagement, persistent observation, triangulation and member check."

3.3.10.2 Dependability

According to Anney (2014:278), "dependability refers to the stability of findings of the study over time, and involved participants evaluating the findings and the interpretation and recommendations of the study to make sure that they were all supported by the data received from the informants of the study." Findings are to be consistent and stable across conditions and over time, and whether the same methods used in data collection yield similar or same results (Billups, 2014:3).

3.3.10.3 Transferability

Transferability, is also referred to as external validity, as well as confirmability, which is mostly a matter of presentation (Gunawan, 2015:4). The researcher improved transferability by providing what is often described as 'thick description' (nameley, providing enough detail so the person reading can decide if the findings are transferable to their own settings) (Brown, 2015:26).

3.3.10.4 Conformability

Noble and Smith (2015:34) posit that confirmability is realised when applicability, truth value and consistency have been addressed. The researcher focused on recognising the complexity of lengthy engagement with participants. In addition, the approaches assumed

and the findings were inherently connected to the researcher's philosophical perspectives, experiences and positions. These were differentiated and accounted for from participants' explanations. Therefore, confirmability intended to prove that the findings were taken from the research data and not imagined or misconstrued by the researcher (Tong, Palmer, Craig and Strippoli 2014:901).

3.3.10.5 Trustworthiness

According to Gunawan (2015:4), "trustworthiness becomes a matter of persuasion whereby the researcher was viewed as having made those practices visible and therefore auditable." Elo, Kääriäinen, Kanste, Pölkki, Utriainen and Kyngäs, 2014:3) mention that the strategy to make sure trustworthiness is maintained in content analysis begins by selecting the best data collection technique to respond to the research questions of interest.

In the study trustworthiness was ensured by employing strategies to ensure quality of the study. These strategies used were dependability, credibility, transferability and conformability, which were used to support the trustworthiness by reporting the procedure of content analysis correctly.

3.3.11 Ethical considerations

3.3.11.1 Informed consent

Informed consent is a generally accepted regulatory, ethical and legal requirement for most research (Grady,2015:855). An informed consent comprises a full disclosure of the study purpose, benefits, risks, and the like (Allen, 2017:3).

3.3.11.2 Voluntary participation

The consent form normally requests individuals to confirm that they have read through and understood the information sheet. In the study, the participants were given the opportunity to

ask questions, and agree to take part voluntarily with the understanding that they could withdraw at any time (Parsons, 2018:3).

3.3.11.3 Harm and risk

Sieber and Tolich (2013:10) state that "risk is a probabilistic statement about a possible harm that may occur. Statements about risk have two parts: H (the degree of harm that might occur) and P (the probability that it will occur). Thus, a very harmful event that occurs with an extremely low probability is no riskier than a very minor harm or inconvenience that occurs with an extremely high probability."

3.3.11.4 Honesty and trust

Honesty involves approaching the data even-handedly and openly, not in a spirit of advocacy but of enquiry, organising a theoretical framework that is justified and laid out, providing only such judgements with supporting evidence and not ignoring evidence when it suits the researcher (Hollway and Jefferson, 2013:18). According to Kuckartz (2014:12), trust in the researcher and the findings of their research is improved when particular standards are adhered to.

3.3.11.5 Confidentiality and anonymity

Konstantoni and Kustatscher (2016:12) state that ethical considerations in ethnographic research include concerns around informed consent, confidentiality and anonymity. Common processes to guarantee confidentiality comprise excluding all identifying materials in presentations and publications about the research, storing data securely and anonymised. In the same note, confidentiality protection forces the researcher to consider the magnitude, nature and probability of harms and risks that would be likely result from an unlawful release of the gathered data (Allen, 2017:3).

In the study ethicality was ensured by informed consent, participants were given a consent form to sign and confirm that they had read and understood the information sheet. The study allowed for voluntary participation, confidentiality and anonymity, no risk or harm, and honesty and trust.

3.4 CHAPTER SUMMARY

A qualitative approach was adopted for the study. The study used a descriptive research process that enabled the researcher to be fully immersed in the natural environment. The study was a single ethnographic case study which allowed for an in-depth inquiry in a real-life context. The researcher used different methods for data collection, known as triangulation. For this case study, the unit of analysis was the community of Cato Manor in the eThekwini Municipality. Data was collected from participants living between Bellair Road (M10), Dunbar Road, Wiggins Road and Harry Gwala Road in Cato Manor. Most participants were approached informally, at their residences in Cato Manor. The study used non-probability sampling, a type of sampling in which the researcher purposively chooses participants for the study. The population of the study was defined as people above the age of 18 and below the age of 65 living in Cato Manor, either married or single, male or female, that used public transport and walked to and from work on a regular basis. The sample size of the study was 20 participants (Sample (S) =20 adults). The collected qualitative data was arranged, analysed, construed and reported on. To analyse and interpret the data, the practice of coding and thematic analysis was followed. The study employed strategies to ensure the quality of the study and the researcher abided by the various ethical considerations.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

In this chapter the empirical findings of the study are discussed. The study used thematic analysis to analyse empirical data. The researcher reports on the themes and sub-themes, derived from the data analysis. The findings are interpreted from a pattern-matching logic supported by evidence from participants in the form of 'detailed descriptions' and with reference to the relevant transport and NMT literature. Included in the discussion are the enabling factors needed to integrate NMT with public transport as identified by the participants in the study. A chapter summary concludes the chapter.

4.2 THEMES

This section is divided into five parts that will unpack the empirical findings based on the themes and sub-themes. The themes and sub-themes either emanated from the researcher's interpretation of the data or from those as identified by the participants.

Theme 1: Public transport cost

Sub-theme 1: *Public transport affordability*
Sub-theme 2: S*uitability of public transport cost.*

Theme 2: Multimodal transport

Sub-theme 1: NMT as a mode of choice
Sub-theme 2: Increased transport mode choice.

Theme 3: Public transport service

Sub-theme 1: Poor public transport service

Sub-theme 2: Inadequate service for NMT users

Sub-theme 3: Public transport infrastructure.

Theme 4: Non-motorised transport

Sub-theme 1: NMT as a successful mode of transport

Sub-theme 2: Integrating NMT with public transport

Sub-theme 3: Promote the use of NMT.

Theme 5: Barriers preventing successful NMT implementation in eThekwini

Sub-theme 1: NMT environment

Sub-theme 2: Infrastructure

Sub-theme 3: Safety and security.

4.2.1 Public transport cost

4.2.1.1 Public transport affordability

An obvious characteristic of public transport is the 'paying fee' aspect. Public transport operators require users to pay for their service and this characteristic creates a problem for most urban poor people. One participant alluded to the variability of funds for public transport costs. This opinion was shared as follows by a 28-year-old male participant:

> *"…. you see, sometimes when I have enough money, I take the taxi but if it happens that there is not enough money I walk to work"* (T1.1/P3/ Q1).

This challenge of the availability of funds to finance trips using public transport becomes a limiting factor for most public transport users. At the same time, it intensifies the need for non-motorised alternative public transport. This would improve the efficiency of the transport system by minimising travelling costs and time by using, in the best way, the available transport modes (National Land Transport Act, 2009). The need for non-motorised alternative public transport is further supported by the eThekwini Draft NMT Policy, which encourages

and intensifies the envisioned role of NMT as one of the preferred modes of transport to service the people of eThekwini. This would be done in a manner that integrates NMT as an indispensable element of the public transport system (Department of Transport, 2008). A 30-year-old male participant articulated their opinion on public transport and NMT, by saying:

> *"I look at what it will cost me to use a taxi, when I have money, I use it. However, if I do not have, I walk to work. Well, most of the time I walk to work, even when I am going to Chesterville, Pavilion centre and these other areas. Walking is cheaper for me, so I use it as often as I can because I do not have money, most of the time I know I will walk, and I do not have a problem with that, it helps me and many others. Why would people use a taxi when it is expensive? Most people here walk, and you should see in the mornings and afternoon, the road is crowded full of people. We walk because we do not have money to pay in a taxi…."* (T1.1/P20/ Q2).

With regard to NMT, walking forms an integral part of the public transport system in Cato Manor, even though NMT infrastructure and services are neglected. Existing legislation and policies for the transformation and restructuring of the land transport system in South Africa suggest that the different modes of transport (including walking) be integrated. So too the integration of the different transport infrastructures and services where, for example, public transport infrastructure and services are developed and provided in an interconnected approach (National Land Transport Transition Act, 2000). However, in practice, the intended integration of NMT with public transport appears to be a far-fetched possibility, especially in township areas such as Cato Manor. This is in contrast to developed countries where it is common to have NMT, specifically, cycling and walking as the backbone of the public transport system, and where it complements other public transport modes by being a feeder mode. Overall, in most developed countries like Germany, many people use different modes of transport in one trip. A person, for example, would walk to the bus stop, access a bus and egress, then access a train and egress, disembark and walk to the final destination. NMT modes, especially walking, play an important role in the public transport systems in the eThekwini Municipality and these modes could be used to ensure affordable and sustainable transport systems in the city (ETA, 2010).

A 24-year-old male participant outlines the possible expenses (and difficulties) involved in getting to work:

> *"…. sometimes I work at Stanger and I cannot walk to Stanger, it is too far and impossible to walk to that area. So, I walk from here to town, you see, when I work far which is not always, I wake up very early because I will take a train at Durban station. I do not use a taxi to Stanger because it is very expensive. So, I walk and save, early in the morning but at most times I am late, and I use a taxi from here, I pay 9 rand. I have no choice but to pay and I drop off in town and I take another taxi for 6 rand to drop me off at Durban station. The train cost me 22 rand for one trip to Stanger, so I pay 44 rand. It is expensive but better than a taxi…"* (T1.1/P19/ Q3).

Though there are plenty of minibus taxis in the Cato Manor area, participants expressed their dissatisfaction with the current public transport system and trip fees. It is evident from the above that the availability of money to pay for a public transport service is a decisive factor for individuals who use public transport.

4.2.1.2 Suitability of public transport cost

Participants discussed the minibus taxi industry operating in the study area, labelling it 'an overcharged service'. They expressed much frustration with the nine rand per single trip fee to the CBD and mentioned that, in their opinion, the distance travelled to the CBD is short and one should be charged less. One 24-year-old female participant, who sometimes uses a taxi when going to the CBD, echoed this view:

> *"…. the price is too expensive from here Cato Manor to town, it is too close by. It cannot be 9 rand for a taxi…9 rand is too expensive…."* (T1.2/P 6/ Q10).

Another 20-year-old female participant verbalised her experience of having to walk to her destination for the first time:

> *"…. we also did not have money to pay in the taxi, so we walked, and I was young and I am still young, still fresh and I can walk anywhere. Walking to town, Musgrave, Botanic is not a problem because it is not far; when I walk it*

takes me 30 minutes to get to town, so it is not a problem for me…" (T1.2/P14/Q4).

In terms of administration, strategies to minimise transport costs for the consumer exist in policies that project modal integration for public transport and fare systems. For instance, the eThekwini IRPTN (GO! Durban) initiative is an integrated rapid public transport system that intends to provide users with integrated transport services and integrated bus and train ticketing systems. The fare systems will comprise an advanced fare structure and technology that will benefit the consumer (National Land Transport Transition Act, 2000). The different modes of transport in the eThekwini IRPTN (namely, NMT, bus, taxi, meter taxi and rail transport) are intended to balance each other and ensure each trip is completed at the lowest cost and least amount of time possible (Brand, 2015). One 24-year-old female participant strongly believes that:

"The fee is expensive because it is nearby, maybe it should be 5 Rand from Cato Manor. Prices have to be different from place to place…" (T1.2/P9/Q10).

Participants also expressed dissatisfaction with having a high supply of public transport in the form of minibus taxis that do not meet their financial needs. They suggested that transport fees should differ for users who egress during the trip and those users who egress at the destination of the minibus taxi. Additionally, participants shared their opinion on the proximity of Cato Manor to surrounding areas and the annual increase of transport fees:
A 29-year-old female commented on the annual fee increase:

"…well, the expense, every year they add 1 rand, they add 1 rand. You see, right now it is 9 rand, right now as the year begins, they will add 1 rand. Every year it is 1 rand, 1 rand, 1 rand. It does not go up by 50 cents..." (T1.2/P13/Q9).

It is a common practice in the minibus taxi industry to increase transport prices annually which, in turn, negatively affects poor commuters. The eThekwini IRPTN (GO! Durban) will thus benefit many people especially those residing in areas located near the CBD such as Cato Manor (which is situated at 7 km from the CBD) (Mncwabe, 2013). The IRPTN is

planned to connect different public transport networks, including NMT networks. The NMT networks are intended to service people for short distance trips and people who cannot afford to use motorised public transport regularly (Brussel, 2014). A 30-year-old male participant pointed to the many people having to walk, stating that:

> *"There are a lot of people who walk, a lot of people walk, it is bad and the rand is seen no more. You see if you come in the afternoon you will see crowds and crowds of people in a line coming down, at about 16:00 pm to 17:00 pm, the road gets full"* (T1.2/P12/Q7).

The Department of Transport's Draft NMT Policy is a clear indication that the government aspires to integrate NMT with the overall public transport system (Department of Transport, 2008). The existing NMT legislation is based on the White Paper on National Transport Policy (1996) and recognises the necessity of integrating the different travel modes (Department of Transport, 2008). With this legislative foundation, the Department of Transport facilitated IRPTN projects with the core purpose of making way for the initiation of the bus rapid transit systems in order to instil novel public transport system initiatives in municipalities. It can be concluded that the IRPTN is a method employed by government to ensure an effective and sustainable public transport system, where NMT provides a feeder service to the IRPTN.

4.2.2 Multimodal transport

Post-modern planning theories brought a transformation in the traditional principles of urban and transport planning. Architects, planners, designers, academics and philosophers introduced approaches that promoted NMT, which saw the rise of philosophies such as new urbanism and smart growth (Serrins, 2014). The core focus was to provide compact environments with increased transport mode choice which included more cycling and walking (Kim et al, 2017). Gugger and Kerschbaumer (2013) suggest that the traditional urban form be changed to a denser and more sustainable city that reflects the European city model and transit-oriented development. Such a change will support the compact city model and increased mode choice of travel (Gugger and Kerschbaumer, 2013).

In this section, theme two, multimodal transport, is discussed in relation to NMT as a mode of choice (sub-theme 1) and increased transport mode choice (sub-theme 2).

4.2.2.1 NMT as a mode of choice

NMT can be walking, jogging, cycling, animal-drawn transport, wheelchair travel and other small-wheeled transport (such as scooters and skateboards). In eThekwini the primary NMT mode is walking, followed by cycling with the latter mostly used for recreational purposes (eThekwini Municipality, 2012). Walking has become a preferred method of transportation for many people in Cato Mano. This could be the consequence of high levels of unemployment and poverty within the area and NMT would thus be an important component of a public transport system in Cato Manor (Gopaul, 2015). On this note, participants were asked whether they had preferences when choosing a public transport mode. The reflection below was offered by a 38-year-old female participant:

> *"….my money informs me what I can use or not use. I depend on my pocket and most times my pocket tells me to walk. I walk, what can I do? Because it is not like I can use a train because we do not have one. Look at Umlazi and KwaMashu, people there are lucky to have taxis, buses and a train. Here you will never see that, you will see people walking. We walk not because we enjoy it but because we cannot afford taxis all the time. Listen; there are people here who never use taxis. Never! They use it when they are going back home to the rural areas because it is far, and they cannot walk...it is bad"* (T2.1/P15/Q6).

A 37-year-old male participant responded to the question by saying:

> *"We have no bus here; we do not have a choice but to use the taxi. If the taxi is too much for me, if I do not have money, then I walk and go to town. There is nothing else, no train and no buses. Buses end at Bellaire road…. there is no choice"* (T2.1/P11/Q6).

NMT and sustainable transport systems, as planning concepts, provide people with access to services, public offices, centres of employment, recreational places and the like at an affordable standard (for both users and providers) and within the environmental carrying

capability of the metropolis (UNESCAP, 2012). This includes the use of bicycles, public transport and walking (Schmale et al, 2015). According to the eThekwini Municipality, walking and cycling are the primary NMT modes and are expected to be vigorously employed within the city centre so as to ensure that the city provides people with sustainable, carbon-free transportation.

Participants expressed their dissatisfaction with the existing public transport system in Cato Manor. They were asked whether they viewed the existing public transport system of Cato Manor as efficient and effective. Participants' dissatisfaction with the system was evident in the responses. One 27-year-old female participant said the following:

> *"No, the public transport system is not working for me, no it is not…."* (T2.1/P1/ Q10).

A 30-year-old female participant expressed her narrative on what made walking an only option:

> *"....I was forced to walk to work, I had no choice. The taxis were on strike and I was forced to walk to work. That is the reason, and taxis cost 9 rand, they are expensive, they are expensive because even if you are going to drop off halfway, they will charge you 9 rand, it does not matter whether it is halfway or not, they will not say 5 rand, no, they will want 9 rand. They are expensive, just that we do not have a choice…."* (T2.1/P2/Q5).

A 48-year-old female participant had this thought:

> *"…… transport is expensive, very expensive, so if you use a bicycle....it does not need water or petrol…. you would not pay for transport…."* (T2.1/P7/Q13).

The main objective of the city of eThekwini's Draft NMT Policy is to ensure that NMT forms an integral part of the public transport system in the city, with the aim of providing a reliable, affordable, accessible and safe transport service (eThekwini Municipality, 2013). This is supported by the eThekwini IDP which, while it does not specifically mention NMT it does,

however, encourage integrated development in the transport sector of the city which in turn influences NMT planning and implementation. Also, an integrated development mode in transport rejects industry monopoly, which is a major concern of the road public transport sector of eThekwini. The following reflection was offered by a 32-year-old male participant:

> *"……there are so many bad things going on here…. you can see that there are only taxis in this place. That is why these drivers are so rude to us; they know that we do not have a choice but to use their taxis. You should see how they protest without informing us. That alone indicates they do not care because they know we have no choice but to use them. They know we do not have another option; we will use them whether we like it or not because not everybody can go to the bus, and it is not there all the time. So, you use them or walk…."* (T2.1/P17/Q9).

The above responses suggest that it is time the eThekwini Municipality moves towards its vision of becoming the most liveable and caring city in Africa. This can be done by understanding how cities in developed countries, such as the city of Copenhagen, have emerged as exemplary NMT-friendly metropolises in the world. Copenhagen has urban planners, media, politicians and tourists from all over the world visiting the city to explore the secret of its success with regard to NMT (City of Copenhagen, 2015). It is important that the eThekwini Municipality understands how cities in developed countries have integrated NMT into their transport systems and apply what is learnt in line with the South African setting.

4.2.2.2 Increased transport mode choice

A 35-year-old male participant mentioned how they preferred the bus service. They believed that the bus was a cheaper transport service compared to minibus taxis. Equally, he mentioned how he was unable to access the bus service, as he would have liked to, because of the location of the access point. In contrast, the eThekwini Municipality states in the Imagine Durban policy that one of the city's strategies and key areas is to make eThekwini a more caring and liveable city; to create a more accessible city for all its citizens by providing alternative public transport modes (eThekwini Municipality, 2010). Alternative transport modes include NMT modes such as walking and cycling, to increase the catchment area of

minibus taxis and buses. Clearly, the bus service if it is to be in line with the policy, needs to accommodate the residents of Cato Manor. The above-mentioned 35-year-old male participant articulated his situation as follows:

> *"I look at how much money I will pay if I use transport, as for now the bus is better because there is a bus ticket which is cheap, also I walk a lot because walking is free. The problem with the bus is that the bus stop is far, and the bus is not always there. I must walk from her to down there. It is far, and it is worse if I must walk up because you can see we are on a hill…. I end up not using the bus...."* (T2.2/P18/Q6).

As mentioned above, the White Paper on National Transport Policy (1996) requests for the integration of different transport modes. The policy suggests that a transport system should allow users the choice of transport mode (Department of Transport, 2008). Notably, a public transport system that includes different modes of travel (including walking and cycling) improves accessibility to services and centres of employment, especially for the urban poor population. A 28-year-old male participant expressed his thoughts on the current public transport system in Cato Manor:

> *"…. bring buses closer....in other townships they have trains, buses and taxis and it depends on what the user wants to use. What the person sees as safe they will use….in that way I say government…find a way that we can choose in transport, what we want to use. IT lacks, it lacks"* (T2.2/P3/Q9).

A 30-year-old female participant highlighted the following predicament (also underscoring the need for a bus service):

> *"……the fees are expensive, I am not sure whether they are so expensive because they know that they are the only option, there are no buses, there is no choice, probably"* (T2.2/P4/Q4).

An increased choice in the mode of transport is also provided by principles of transit-oriented development (TOD). These principles are connected to the smart growth principles (Asuncion, 2014), and they encourage walkable and dense communities, with transits that

promote public transport use (Panaji and Stead, 2015a). The TOD planning concept provides for mixed land-use communities that enable NMT use whilst allowing motorised public transport to service the public (Aguilar and Glocker, 2015). It is common for carbon-free transport modes such as walking and cycling to be the preferred modes for short distance trips in TOD. The person in this approach uses more than one mode of transport in one journey or dissimilar modes of transport in one week. This phenomenon is referred to as multimodal or intermodal trips, where walking or cycling is usually involved as a feeder mode to other public transport modes (Ministry of Transport, Building and Urban Development, 2013). In other words, TOD creates high density developments with mass transit corridors and a variety of public transit options that include NMT modes as complementary to the public transportation system. A 37-year-old male participant commented on the importance of having a 'choice' in public transport, based on his experience with public transport in Cato Manor:

> *"My feelings are that, I see us as commuters without a choice. It is not nice to us because we have no option. Even if you had enough money for maybe a bus, you cannot. Or maybe if we had a train, at least we could use it or the bus but now we are forced to use the taxi. Either you have money; if you do not then you must walk. It would be better if there were different, many transports, because the bus sometimes costs less than the taxi"* (T2.2/P11/Q8).

Another male participant (40 years old) pointed out the main reason that made walking an only option was:

> *"...I had no money; I did not have money"* (T2.2/P8/Q5).

Personal reflection: This statement reminds the researcher of her own experiences in the study area during field work. Participant observation required the researcher to behave and think like the participants and, in doing so, the researcher had to become a person who could not afford to use public transport. Usually, the researcher walked for periods between 45 minutes and one hour to get to her destination. On very hot days walking would, understandably, become unbearable. While walking, the researcher experienced and came across a lot of unfavourable walking conditions, which included the already-mentioned hot weather, steep gradients and an unpleasant environment. In terms of the latter, the researcher

had personally never come across an area, specifically a township, which was as populated and as dirty as Cato Manor. There was a huge amount of discarded waste littering the area. Furthermore, and for the first time, the researcher was in an area with portable latrines along main roads and pit latrines further in the precinct. The smell in the air was beyond the pale and during the entire field-work period, the researcher kept thinking "This area is situated only seven kilometers from eThekwini CBD". The researcher walked pass portable latrines that had been knocked over spewing their contents on the pavements. Others were falling apart and left open. Sometimes whilst walking, the researcher came across gigantic rats coming from the numerous unkempt areas and going to the low-income houses and informal settlements.

Figure 4.**1** gives an idea of the existing road environment challenges such as discarded waste, portable latrines and unkempt areas on New Dunbar road, which is the main road in Ward 29. The figure shows discarded waste on the main road, portable latrines on the side of the main road (with one having fallen onto the pavement), as well as an unkempt area, with a self-made pit latrine.

Figure 4.1: Existing road environment challenges on New Dunbar road, Cato Manor, eThekwini

Whilst walking, the researcher would find herself appreciating motorised transport. The time spent in the study area allowed the researcher to experience the environment and observe the transport infrastructure. The experience and observation confirmed to the researcher that there is still a long way to go before communities become pedestrian-friendly, liveable spaces that provide comfortable walking environments (Scheepers, 2014).

To many it would seem impossible to imagine the mainstream public transport system in eThekwini incorporating sustainable transport modes in order to improve transport efficiency and decrease vehicle dependency (Scott et al, 2016). However, it should be emphasised that countries like the Netherlands and Germany were once countries that embraced the motor-vehicle. Despite this, the Netherlands has become a leading bicycle-friendly country in the world, with more bicycles than people (Government of Western Australia, 2014). As revealed in the reflection above, limited financial resources could cause a person to embark on their journey using NMT (such as walking) although they would prefer not to employ this method of mobility. Because of financial constraints other public transport alternatives, assuming that they are available (for example, buses in Cato Manor) become difficult to access

4.2.3 Public transport service

Enhanced service quality in public transport is one way to amplify the standard of a public transport service as well as attract new users, that is, private vehicle users and affluent customers. In multimodal transport systems the user usually chooses a public transportation mode based on costs and the standard of service quality provided by the different modes. Even so, multimodal and monopolised public transportation systems have a responsibility to provide users with affordable, effective, accessible, convenient, comfortable, safe and reliable transport (Thomas, 2016). However, public transport operators often neglect the service quality component.

In this section, theme three, namely, public transport service is discussed under the following sub-themes: poor public transport service, inadequate service for NMT users, and public transport infrastructure.

4.2.3.1 Poor public transport service

A public transport service is many-sided and measured by aspects such as customer service, comfort, communication, prices and infrastructure. The service provided by public transport operators is the ‘life line’ of a public transport system. Some responses made by participants related to driver behaviour and attitude, which participants believed influenced the quality of service provided to them. There is undeniably an intense concern about how the majority of

public transport drivers behave on the roads and towards users. The attitude displayed by most public transport drivers was expressed by participants as an emotionally taxing one and one which, to some extent, influenced them to choose to walk to work and surrounding areas. In this regard, a 27-year-old female participant expressed the following opinion:

> *"…. they have no respect for elders, or anybody, you see, they just talk rudely, not caring whether you are young or old or whatever. So that is why I prefer walking most times, it prevents me from having a bad day, my day is not ruined….so I rather walk than have someone shout at me, I am free from that chaos and noise. So that is why I like walking……. walking also makes me happy, in a taxi there is no respect between commuters and the driver, so I am happy walking"* (T3.1/P1/Q4).

There is concern about illegal and reckless driving practices on the roads (Gopaul, 2015). One 30-year-old female participant mentioned that:

> *"My own experience, I would say it is very bad, besides the fees and stuff, which go up when petrol prices go up, it is bad……. also, some of the taxi drivers are very rude towards the passengers"* (T3.1/P4/Q8).

A 40-year-old male participant was, however, more positive stating that:

> *"……. with a taxi, you can jump off by simply asking the driver. You can jump off at traffic lights, if you know that you will be fast at jumping off you can drop off where you want. Even when there is traffic, the taxi can manoeuvre and avoid traffic by driving in between traffic and make you arrive quickly where you are going because they know that they too need to get customers……with a taxi you can at least tell and beg the driver that you are late, and the driver can make means. The driver would say "I will help you my boss" and he would go in between traffic, until they get out of traffic. They can drive on the yellow lane, which is usually used by traffic cops and break-down vehicles. The taxi driver would drive on this lane to rush me to work because they know they work with the public"* (T3.1/P8/Q6).

However, the type of driver behaviour and attitude described above is likely to result in unlawful vehicle speed which could lead to high casualty rates for motorists, passengers, cyclists and pedestrians. Without a doubt, the majority of public transport drivers display inconsiderate (illegal) behaviour on the road and towards users. Although adequate legislation exists for drivers, the regulations are generally not adhered to (eThekwini Municipality, 2013). A 30-year-old female participant said:

> *"…. drivers do not have time; they are always in a rush. Taxis are always in a rush….and taxis are very expensive, very expensive. Maybe if they could do something to reduce prices or count prices according to the distance a person travelled it would be much better. Even when you are going to a nearby area, taxis are expensive; we do not know what to do"* (T3.1/P2/Q8).

Lack of empathy and poor conduct by drivers towards passengers also results in users labelling a transport service as a bad service. The poor driving conduct demonstrated by the taxi driver as described above by the 40-year-old male participant (T3.1/P8/Q6), is anything but the law-abiding, permissible behaviour and attitude that is needed to demonstrate a high level of competency and customer service including continuous efforts being made to improve the efficiency of the service provided. A clear policy is needed for public transport operators – one which highlights the procedures of planning and customer service, in order to direct, guide and improve the road passenger transportation service. The policy should encourage community participation and engagement in the decision-making processes (Chetty and Phayane, 2013). The unswerving narrative has been that public transport users were not engaged with regarding public transport issues that affect them and decisions were made without them being part of the decision-making process.

4.2.3.2 Inadequate service for NMT users

One of the many challenges that faced NMT users in Cato Manor was the risk of crime. Personal safety was a major concern for participants' including safety from injury (eThekwini Municipality, 2013). It is essential for NMT users to feel safe and secure when using NMT modes. The municipality has the responsibility to provide safe walking and cycling environments. A 30-year-old male participant voiced:

> *"I just walk, I take it slowly, but it gets difficult. You walk at the same time looking around to see if there are criminals. It is bad…."* (T3.2/P12/Q12).

Cato Manor is popularly known for its high crime rate. One 29-year-old female participant gave a narrative on their experience with this problem:

> *"…. there is a lot of crime here, there is a lot crime. I was ambushed on my way back from Sherwood, from work. I was working on a Saturday and on Saturday's vehicles are very scarce as people are scarce too. I saw this man walking; he was on the opposite side of the road. I was walking by the bridge at Sherwood; I heard a person say 'hello, give me your bag'. I just let go and he went with it. Luckily, he took my bag without my phone, as it was in my brassiere. There is no safety…."* (T3.2/ P13/Q13).

A 48-year-old male participant emphasised the importance of safety and put forward a solution:

> *"For people who are walking, it would be better if where they are walking have policemen patrol regularly, so people can feel safe. That is all; they could walk 24 hours, by foot, if there are safety measures where they will be walking. Safety that is all"* (T3.2/P10/Q16).

The participants indicated that NMT users in Cato Manor are at risk of infringement and other criminal happenings. On the same note, a 25-year-old male participant mentioned the importance of safety from injury and also proffered a solution:

> *"……there has to be more pavements, even for those who walk, it will be easier for them to walk as it will be safe, this will enable them to walk without worrying about being hit by taxis or having to avoid taxis behind or in front of them. They will walk and be safe…"* (T3.2/P5/Q11).

Safety consists of different facets including personal safety from being robbed as well as safety from vehicles and fatalities.

Personal reflection: One Saturday afternoon while the researcher was conducting participant observation, she stood at the traffic lights at the T-junction of Bellair Road and Wiggins Road waiting to cross. The participant whom she was observing had already crossed the road. Whilst waiting, the researcher heard a person call out, in isiZulu for their attention. At the time, the researcher was more focused on the participant and the noticeably dreadful condition of the environment. Again, the person called out for the attention of the researcher, prompting the researcher to turn around. Seated next to a concrete pathway and an informal settlement was a group of females, who cautioned the researcher to avoid carrying her back-pack carelessly. They emphasised that she must not walk around Cato Manor without being cautious and aware of her surroundings. Also, the researcher should leave personal belongings at home or the researcher would be at risk of being robbed. The researcher was aware that Cato Manor was an area characterised by high levels of crime but these well-intentioned warnings troubled her. As a consequence, in subsequent observations the researcher was constantly thinking about her personal safety.

4.2.3.3 Public transport infrastructure

A crucial consideration concerning public transport infrastructure is that there must be policies in place that support and enable mobilisation of investment. These policies must include principles and approaches that efficiently mobilise government and private investors to finance public transport infrastructure (Ang and Marchel, 2013). The eThekwini Transport Authority acknowledges that a public transport system is one that provides an effective, safe, reliable, efficient, affordable, accessible, needs driven and integrated service (Chetty and Phayane, 2013). To achieve this, public transport infrastructure plays a key role.

Participants expressed how they perceived the existing public transport infrastructure. One 32-year-old female said:

> *"Oh no, you can see for yourself, the roads are very narrow, there is no space. The roads are not in good condition, they are like one-way streets without sidewalks. When we walk, we walk on the roads because there are no pavements; you cannot call these things we have here as pavements. They are too linear, and cars would be on these very same narrow roads…. cars would be speeding because we do not have traffic lights and speed humps. This area*

of ours has a lot of people being hit by cars. I really do not think we can say everything is in order when we see that even the roads are not in good condition" (T3.3/P16/ Q11).

A 24-year-old female also pointed to the roads and lack of safety facilities:

"The roads are narrow, vehicles congest on the road, it is a problem….traffic lights and road signs are not present, they are not there…. if there could be traffic lights and zebra crossing facilities, maybe it could be better…. have shelters, you see bus shelters, there are none…." (T3.3/P6/Q11).

A 28-year-old male was of the opinion that:

"Infrastructure is alright but mainly near the main road…. I can say that Infrastructure is not enough though government is trying it is still not enough and not working…" (T3.3. /P3/Q11).

A 30-year-old male participant pointed to a number of issues:

"……when I am walking, I must walk on the road because sometimes there are no pavements, and in some areas the pavements are not wide enough. The cars would drive on the roads and I would be walking on the road, you cannot walk on the sides and even the areas with pavements I cannot walk on them because there are all kinds of waste. So now I would be fighting over road space with the car…. what can I say? If I am going to town and it is hot, I would wait for the taxi under a tree because we do not have stops and shelters…" (T3.3/P20/Q11).

The above responses pose a significant challenge for the eThekwini Municipality's comprehensive objective of implementing a sustainable, efficient, safe and effective public transport system (eThekwini Municipality, 2015). Participants clearly believed that more could be done to improve the state of public transport infrastructure in the study area.

One 24-year-old female participant commented:

> *"We can develop our roads because they are not in a good condition, we can improve our traffic lights because most times they are faulty.....as people we need help from our Councillor, a lot of things need to be developed, bus stops, there has to be signs showing that there is a taxi stop…with shelters for when it rains….There must be something that encourages us to use taxis and buses…"* (T3.3/P9/Q15).

A24-year-old male provided a wistful comment:

> *"In my opinion I would like to see the roads being fixed and have in place other things such as beautiful taxi ranks, with shelters and stops. To just have nice things that you find in the suburban areas…"* (T3.3/P19/Q15).

Participants identified sufficient road space, pavements, traffic lights, bus stops and bus shelters as critical requisites to providing an acceptable standard of public transport infrastructure.

4.2.4 Non-motorised transport

EThekwini Municipality has stated that the city aspires to create mixed use neighbourhoods, with medium density and better-quality public transport (eThekwini Municipality, 2012b). The mixed-use compact communities prioritise pedestrians and the provision of a well-integrated transport infrastructure and discourage private vehicle (MacLeod, 2013).

In this section, theme four is discussed in relation to NMT as a successful mode of transport, integrating NMT with public transport and promoting the use of NMT.

4.2.4.1 NMT as a successful mode of transport

In 2006 the eThekwini Municipality, through the eThekwini Transport Authority, produced strategies and ideas for a cycle policy. In this way, the city started NMT's foundation and this was intensified in the years leading up to the Soccer World Cup in 2010 (Baxter, 2014). World cup 2010 provided eThekwini with the motivation to transform its public transport

sector in line with existing transport legislation and policies. Progress was made with the IRPTN and the infrastructure for NMT feeder services (SACN, 2014). It is the eThekwini Municipality's aspiration to encourage its citizens to change from private cars to public transport and to NMT modes, namely, cycling and walking (eThekwini Municipality, 2012b).

Participants were asked if they perceived NMT as a successful mode of public transport. A 30-year-old female participant responded by saying:

> *" I think it would succeed , especially for children….maybe build a way where they can walk on the side….even those who work close by can end up not paying for transport like a person going to town, whereas they will be dropping off halfway through the trip"* (T4.1/P4/Q13).

One 24-year-old male participant commented on both cycling and walking:

> *"…. I do not really think bicycles would work but I am sure walking will be successful. Already a lot of people walk every morning and afternoon; people will still walk even if it is not developed…. I have a problem with bicycles because older people will not be able to ride a bicycle, even woman. I do not see woman riding a bicycle...."* (T4.1/P19/Q13).

In eThekwini, walking is the most used mode in NMT trips. The municipality showed that 32% of all households made at least one walking trip each day, with a lot of people walking in the morning and afternoon peak periods (eThekwini Municipality, 2013).

A 48-year-old female participant commented on cycling:

> *"It could be successful in South Africa is it were planned properly; it needs proper planning. I think that there are people that can use bicycles. It might not be everybody because some people are old, and we are not the same ages but there are people who can use them, I think it can be a lot of help to other people…."* (T4.1/P7/Q13).

Although NMT is seldom integrated with the overall public transport system and hardly recognised for its role in public transport, NMT modes (such as walking and cycling) are key feeder services used to complement and sustain a comprehensive public transport system (Jain, 2013).

A 32-year-old female participant observed:

> *"…. already people are walking but I have never seen a person cycle to work but many people walk. The only problem could be safety but not during peak hours because there are crowds of people and nobody can rob you. So, it can succeed…"* (T4.1/P16/Q13).

Even when NMT is successfully integrated with public transport, the eThekwini Municipality will be challenged with convincing private vehicle users and affluent potential users to change from using their cars to using public transport and to cycling and walking. For instance, NMT, especially walking, is largely associated with the poor and that it is the prime mode of choice for the deprived. However, it is essential that all society, irrespective of people's social status, uses NMT as it provides cities with numerous economic, health, environmental and transportation benefits (Angira, 2013). Many cities around the world have built separate lanes for pedestrians, bicycles and public transport with the aim of reducing private vehicle dependency and the concomitant traffic congestion and transport-related pollution (Menon, 2015).

A 28-year-old male participant mentioned his hopes for NMT in Cato Manor:

> *"…. if safety could be prioritised it would be so perfect, so good. People can even use their bicycles and walk and so on. Some people fear walking because of criminals. You end up not being safe in situations like that. There should be safety. Maybe it could be better. If there is safety, it would be better"* (T4.1/P3/Q16).

Safety and security were identified by the eThekwini Municipality in the Draft NMT Plan (2013) as NMT problems that needed urgent attention, together with insufficient standards of general environment and infrastructure (eThekwini Municipality, 2013). It is important that

these challenges be addressed so that NMT can contribute to the seamless integration of public transport particularly if private vehicle usage is decreased (Jain, 2013).

4.2.4.2 Integrating NMT with public transport

Integrated transport comprises the integration of infrastructure, networks, ticketing, tariffs, and so on, across different operators and transportation modes. The transport system is made more efficient by bringing everything closer thus enhancing interaction and the quality of services provided (Barendse, 2016). The delineation of an integrated transport system is more than assimilating public transport systems and includes the integration of other modes (for instance walking, cycling and private car usage). Moreover, the definition of integrated transport also encompasses other non-transport services such as spatial development and land use planning (Stopka et al, 2015). The White Paper on transport legislation outlines strategies to integrate public transport systems, and in terms of this, the eThekwini Transport Authority (ETA) implemented an IRPTN guided by the Integrated Transport Plan (ITP). According to the ITP, the aim of the IRPTN is to maximise accessibility in an affordable manner by incorporating the various modes of transport and technologies (Adewumi and Allopi, 2014).

Participants commented on integrating NMT with public transport. A 25-year-old male participant said the following:

> *"Yes, we can use bicycles, yeah and trains. They must include a train, which is a must. Trains are very important; they have to include trains…. that would be a good idea that trains be used as well as bicycles…. they can work together."* (T4.2/P5/Q14).

A 48-year-old female participant raised the issue of portable bicycles:

> *"The portable bicycles would be a great idea. When you go to the taxi, just fold your bicycle and get inside. It would be a great idea. It would be a very good idea"* (T4.2/P7/Q14).

Integrated transport provides different transportation options including walking and cycling (Litman, 2017a). NMT modes function as feeder modes to service other public transport

modes and serve facilities such as station hubs (Campbell, 2016). It is important that NMT and motorised public transport work together to successfully integrate the transport network (Simões, 2014) and improve the work efficiency of the different modes of transport according to compatibility (Poliaková, 2013).

A 48-year-old male participant expressed the following:

> *"…. I do see it succeeding but have to construct separate lanes for people who are walking….* (T4.2/P10/Q14).

The same participant further stated:

> *"Firstly, we must renovate the pickup areas including taxi ranks, stations and bus stop. Have bus shelters and a place with toilets…. have street lights so it can shine bright, so we can see each other at night…"* (T4.2/P10/Q15).

NMT contributes to a more efficient and environmentally friendly transport system that provides a cheap, fast, accessible, convenient and safe service (Brussel, 2014). Cycle projects have begun to be implemented in some areas of eThekwini in line with the city's IRPTN initiative. It is important to ensure that the anticipated NMT networks meet the needs of users, especially the needs of those who need inexpensive travelling options, such as walking and cycling (Baxter, 2014).

4.2.4.3 Promote the use of NMT

Measures to promote NMT include constructing pavements and cycle ways, and providing separate lanes for cyclists and pedestrians. Linking NMT networks with employment and commercial centres and the provision of continuous routes with signals and safety barriers are further measures that can be taken. Having interesting and attractive environments which encourage people to walk more compared to polluted and tainted environments are important considerations. Also, route information, enhanced pedestrian safety, crosswalks and signals to control pedestrian movement promote the use of NMT modes. As emphasised, connecting NMT networks to other public transport modes, so NMT can serve as a feeder mode is a further important consideration (Belwal, 2016).

Linking in with the above, a 27-year-old participant commented:

> *"Government must tell people to walk, anyways, they would be exercising without realising it….it would help to encourage people to walk by improving and fixing pavements…after government has fixed things, they can then encourage people to walk"* (T4.3/P1/Q16).

A 30-year-old female participant suggested that:

> *"NMT can be encouraged to the people; they must tell people and build lanes to encourage people…."* (T4.3/P2/Q16).

Participants voiced the importance of having the municipality encourage the use of NMT. Giduthuri (2015) pointed to the importance of establishing NMT champions and leadership support to ensure that NMT is successfully incorporated with public transport. A 25-year-old male participant commented on integration:

> *"I wish to see bicycles being integrated; having bicycles integrated will benefit a lot of people…"* (T4.3/P5/Q16).

A 30-year-old male mentioned:

> *"My hope is to see government take NMT seriously and educate people about walking especially us who are near the city centre…integrating the transports you mentioned will only be successful if people are told about them…people need to be encouraged… I have been walking for a long time, but I did not know about any NMT…."* (T4.3/P20/Q16).

The municipality has the responsibility to ensure successful implementation of walking and cycle paths, ensure the safety of NMT users on the road and the provision of appropriate facilities. In this way, the sharing of NMT modes is increased (City of Cape Town, 2017).

Finally, establishing guiding principles related to non-motorised alternative transport and ones that encourage integration of public transport modes, including NMT, must be a priority.

4.2.5 Barriers preventing successful NMT implementation in eThekwini Municipality

Existing road and environmental barriers in eThekwini are the cause of the slow take-off in integrating NMT with public transport. These barriers are NMT challenges faced by participants and relate to insufficient standards concerning the general environment, infrastructure, safety and security (eThekwini Municipality, 2013). The public transport system in eThekwini lacks structure and is perceived by many people to be ineffective. Gopaul (2015) identifies insufficient capital for upgrades, inadequate services, lack of law enforcement visibility, the risk of crime, illegal and reckless driving practices, lack of integration of services between modes and the inability to provide a safe transport environment, as the main public transport problems that need urgent consideration (Gopaul, 2015).

In this section, theme five, challenges faced by participants on the road are discussed in relation to road environment, infrastructure and safety.

4.2.5.1 NMT environment

The NMT environment should provide an atmosphere that brings joy to NMT users. It should have a lot of open spaces (Dong and Zhu, 2015), be walkable (Asuncion, 2014), provide public seating, colourful vegetation and buildings (Pojani and Stead, 2015), and have parks that have recreational activities and colourful flora. In contrast to the above, the road environment in Cato Manor is a tainted and unattractive one. Figure 4.2 shows the existing road environment challenges in Cato Manor. The study area has a lot of discarded waste and pit and portable latrines. In general, the NMT environment is both unpleasant and unattractive.

Figure 4.2: Existing road environment challenges in Cato Manor, eThekwini.

A 32-year-old male participant had this to say:

> *"…. I have never seen a place as dirty as this area. I come from the rural areas and I have never thought that a city can have a place that is dirty like this place…. there is nothing clean about Cato Manor; there are roads that you will never walk on, in this place. Borough road and the other roads inside this area, when you walk there your body begin to itch. I end up having an allergy if I walk in those roads, I do not go anywhere near them…."* (T5.1/P17/Q11).

A 37-year-old male participant expressed similar sentiments:

> *"Oh no, the environment here is very bad. No, no! It is too bad, very, very bad. It is very bad here in Cato Manor, worse ever, there is no other township that looks like Cato Manor, Mayville, everywhere worse ever, worse ever. On the road you come across water, it is smelly everywhere, there are potholes, their roads have no lanes…everything in totality is very bad, very bad…. Cato Manor, worse ever* (T5.1/P11/Q11).

Participant observation allowed the researcher to be fully immersed in the natural environment in which the study took place and, as a result, was able to conclude from her experience that the NMT environment in Cato Manor was polluted and unpleasant.

4.2.5.2 Infrastructure

As part of the eThekwini IRPTN initiative, the city stated its intention to connect different communities by providing cycle and walkway paths. At present the municipality has developed the beachfront promenade with cycle and pedestrian lanes as well as the bridge over the uMngeni River on the M4. In the future it is anticipated that these lanes will be extended to connect to areas such as Botanic Gardens and Burman Bush (Baxter, 2014). Generally, where topography allows, a lot of people cycle especially in the CBD and suburban areas close to the CBD. The promenade has proven to be a very popular recreational and tourist link, encouraging people to jog, cycle and walk along the beachfront (eThekwini Municipality, 2013). The city intends for NMT modes to be indispensable modes of travel as well as serve the planned IRPTN as complementary modes. It is therefore important that the necessary NMT facilities and infrastructure are put in place to enable seamless movement of NMT users by providing dedicated NMT infrastructure. In doing so, cyclists and walkers will be protected from conflict with motorcar users over road space thus reducing road traffic fatalities (eThekwini Municipality, 2012).
Participants expressed their opinion on the existing public transport infrastructure. One 29-year-old female participant said:

> *"…. the road is too narrow, there are no pavements, on some roads there are no pavements…. the problem is the narrow roads and pavements. If you walk, sometimes it is not safe, drivers speed a lot…. they forget that they are using roads with public. They do not follow road rules and a lot of people get injured here on the roads" (*T5.2/P13/Q11).

A 24-year-old female participant had the following to say:

> *"….in some places there are no road signs…. taxis are also speeding…. they must put in place speed humps here…. the roads do not satisfy me because there are places that have no roads. In some parts the road is not properly tarred…. give us proper roads"* (T5.2/P9/Q11).

The existing NMT infrastructure in eThekwini comprises pavements and most of the city's large surfaced roads have a pavement on one side. When considering the design, accessibility and maintenance of the existing infrastructure it can be said that the standard of the provided infrastructure is not always adequate (eThekwini Municipality, 2013). Figure 4.3 below displays the current condition of existing pavements in Cato Manor. As with the majority of areas in the eThekwini Municipality, some roads in Cato Manor have pavements on one side but most roads do not have pavements at all.

Figure 4.3: Existing infrastructure in Cato Manor, eThekwini

A 38 year old female participant stated the following regarding pavements:

> *"……It is all chaos, everything here is a disorder, we are provided with insufficient pavements. Some pavements do not have enough space for two pedestrians to walk on side by side. The pavements are unsatisfactory, most of the pavements are not in good condition and some have running water…"* (T5.2/P15/Q11).

Despite the challenges, the eThekwini Municipality is eager to make NMT an integral part of the IRPTN. The city has acknowledged the existing NMT challenges and recognised that planned NMT networks linked to the IRPTN will service people in the CBD and areas close to the CBD. However, township areas remain marginalised and although Cato Manor is located close to the CBD, the planned transport developments exclude this area.

4.2.5.3 Safety and security

Deliberate disregard of the law by drivers and bad behaviour of drivers towards passengers has been emphasised. Participants mentioned their concerns regarding safety when using public transport and when walking.

Participants commented on what could be done to improve public transport in Cato Manor and one 30-year-old female participant said:

> *"I think they can begin with the taxi association. They have to work together with the police and the community since at times taxi operators and drivers assassinate each other over routes and roads. There must be in place effective methods that enable communication, to prevent fighting and assassinating of taxi operators, drivers and also commuters…….I think it is better that the association, police and community sit down and communiacte properly about issues. Operators and drivers need to be educated and be disciplined. If the association educates taxi operators, they will in turn educate drivers on how to conduct themselves; especially on how to service passengers. You sometimes come across very rude drivers, who address passengers offensively. I am not sure if I am right, but customers need "* (T5.3/P4/Q15).

When employing NMT modes there is always a fear of personal violation and injury. Walkability is usually connected to factors such as safe speeds, personal safety, safety from vehicles, suitable street sizes, crossing improvements, traffic control measures and the number of lanes (Parizi, 2015).

One 24 year old female participant mentioned:

> *"Government or the Councillor, one of the two, must build for us pavements; fix roads so they can be wider, so when taxis cross each other are able to pass each other without affecting us pedestrians. Also build pedestrian bridges at freeway; we cannot share the road or freeway with vehicles……Government must build pedestrian bridges, get us pedestrian bridges. Also, get us those vests that light up at night…"* (T5.3/P6/Q15).

A 40 year old male participant stressed the importance of street lighting:

> *"……..but mostly if there could be street lights, very, very bright light because early in morning, in winter, you will go out to find the whoonga boys. Most of these boys who use drugs are criminals and without proper street lighting we are at risk of infringement. Street lighting has to be very bright, to enable pedestrians to see other commuters. Pedestrians have to feel safe; a lot can be done to enhance safety. Going to the bus stop is emotionally taxing because you do not know what will happen at the bus stop……..pedestrians must be reassured that the people they are walking with are people going to work too. There has to be street lights, with very, very, very bright lighting, bright like day light, inside the Township…..this enables you to avoid certain situations…"* (T5.3/P8/Q16).

There are numerous conditions that can enable NMT travel including appropriate infrastructure, facilities, safety measures, and improved driver behaviour and attitude. Also, reducing road space for cars can increase space for NMT. Cycling and pedestrian mediations will only be efficacious if they are joined with the compact and attractive use of the city landscape (UNEP, 2013).

What follows is a discussion of NMT enabling factors as identified by the participants themselves.

4.3 NMT ENABLING FACTORS IDENTIFIED BY PARTICIPANTS

The primary aim of the study was to explore the enabling factors (social and political) to integrate NMT as a key element of an IRPTN in the context of postmodern theory in urban transport planning and policy making, with specific reference to Cato Manor. In addition, to suggest the key factors, that is, current thinking, institutional framework, funding, NMT friendly urban structure, marketing and implementation, that need to be in place in order to enable the integration of NMT into the overall public transport system.

Factors identified by the particpants during the interviews and by the researcher while undertaking participant observation that would enable the integration of NMT with the overall public transport system in Cato Manor were identified as:

(1) Promotion of NMT

(2) Infrastructure

(3) NMT environment

(4) Safety and security.

To further demonstrate the findings and to serve as a foundation for further discussion, the model illustrated in

Figure 4.**4** is proposed.

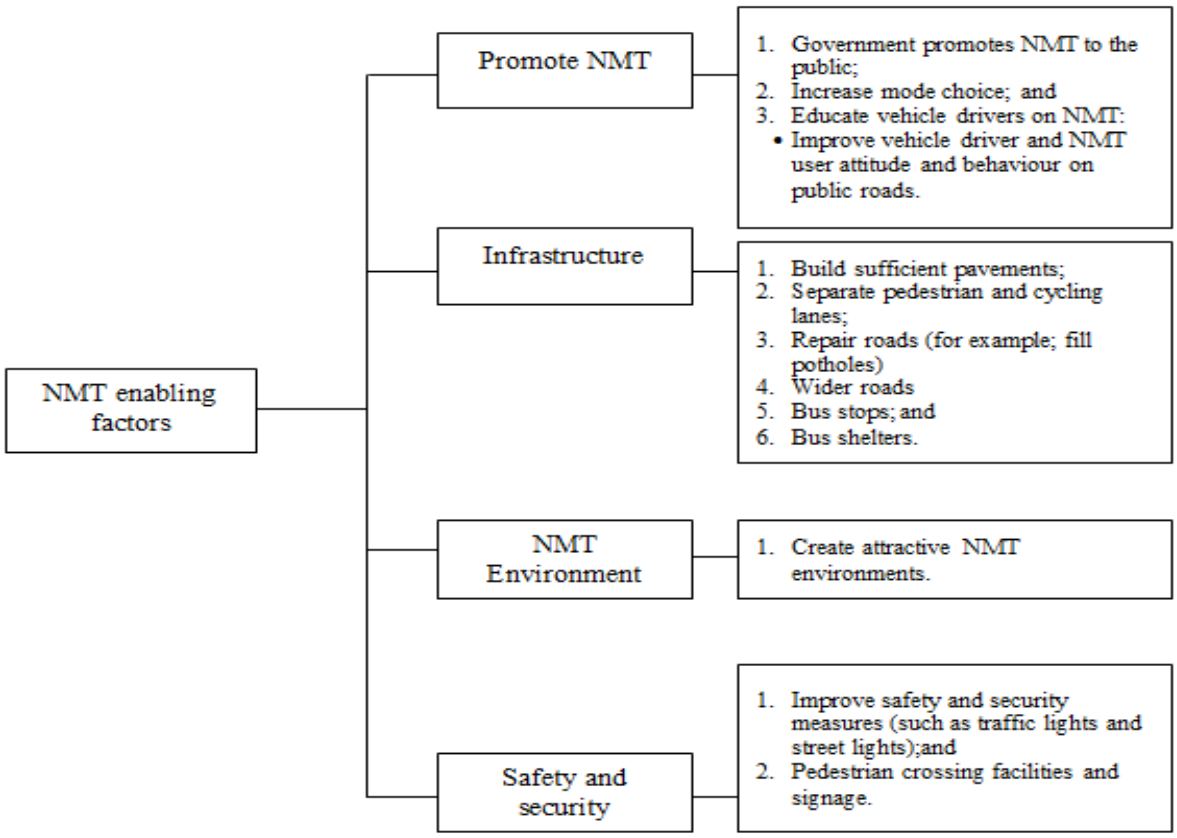

Figure 4.4: Proposed model to integrate NMT with public transport

The model depicts the enabling factors identified during the interviews and participant observation. These enabling factors are put forward to assist in the integration of NMT with the overall public transport system in Cato Manor. Primarily, it is understood that government involvement is required for the promotion of NMT to the public. Successful promotion of NMT can be facilitated by a specialised unit within the municipality, with

personnel that understand relevant policies and have experience in NMT development and implementation. Establishing official NMT champions responsible for marketing NMT as an alternative and complementary transport mode is also suggested. Furthermore, conducting NMT workshops on a regular basis and providing bicycle training facilities with adequate resources are also recommended. Notably, investing in NMT development provides commuters with an option to choose from different transport modes. Therefore, it is important to invest in NMT infrastructure and also prioritise NMT educational programmes for users and vehicle drivers in order to improve the attitude and behaviour of drivers and NMT users on roads. In this way, awareness of NMT is created, thus encouraging commuters to use existing infrastructure such as pavements (where they are available).

Once interest is created among people it is probable that the NMT mode share will increase over time. A noticeable increase in the number of people using NMT on a day-to-day basis increases the possibility of infrastructure renewal and development. When cyclist and pedestrian numbers increase on the road, vocal demand by the public will increase, which in turn should attract the attention of relevant government departments who, in turn, will be pressed to address existing NMT deficits. The public can begin by using existing infrastructure, thereafter roads can be repaired and sidewalks/pavements constructed, widened or repaired. Where applicable, separate pedestrian and cycling lanes can be demarcated, with sufficient provision of bus stops and bus shelters. Undeniably, NMT is usually apportioned a minimal fiscal budget and in many instances no budget is allocated. Consequently, for these changes to take place (and an adequate monetary allocation to be provided) there has to be an increased demand both in terms of usage of NMT and in terms of 'voice' on the part of the public.

Attractive NMT environments are mandatory if the envisioned outcome is to increase NMT mode share. Poor people too want to be exposed to a pleasant and clean environment, with beautiful and colourful flora along NMT networks, tidy open spaces and clean parks, with attractive vegeation and recreational activities. Bright and colourful buildings produce attractive environments to walk in. Having clean walkways or cycle lanes with unpolluted surrounding areas, colourful waste bins and bright coloured NMT signs or signals along NMT routes will all assist in increasing NMT mode share.

Safety and security is a major concern in Cato Manor. Traffic and streets lights should be in good working condition. Traffic lights should have pedestrian signals and street lights should be bright enough to enable pedestrians to observe the surrounding environment.Painted pedestrian crossing lines and road barriers to separate NMT users from vehicles should be provided. Additionally, drivers should be educated on NMT to create awareness and improve their behaviour on roads. Clear NMT signage that indicates high pedestrian traffic area as well as signage that provides information to NMT users should be put in place. The visibility of law enforcement officers needs to be increased and more credence given to the community policing forum. Finally, people need to be encouraged to walk or cycle in groups.

For the participants, NMT was recognised as a solution to the transport problems they were experiencing in Cato Manor and it should be viewed as a key component in the public transport system of the study area. For these reasons it is vital to address NMT short-comings in order to improve NMT services for NMT commuters and potential NMT users.

The enabling factors identified by the participants could, arguably, reflect the overall opinion of the people living in the study area.

4.4 TABLE SUMMARISING EACH THEME

THEME 1: Public transport cost	
Sub-theme 1: Public transport affordability	NMT improves the efficiency of the transport system by minimizing travelling costs and time by using, in the best way, the available transport modes (National Land Transport Act, 2009). NMT modes could be used to ensure affordable and sustainable transport systems in a city (ETA, 2010).
Sub-theme 2: Suitability of public transport cost	The different modes of transport in the eThekwini IRPTN (namely, NMT, bus, taxi, meter taxi and rail transport) are intended to balance each other and ensure each trip is completed at the lowest cost and lowest time

	possible (Brand, 2015).
THEME 2: Multimodal transport	
Sub-theme 1: NMT as a mode of choice	In eThekwini the primary NMT mode is walking (eThekwini Municipality, 2012. The city of eThekwini has, in its Draft NMT Policy, stated that its main objective is to ensure NMT forms an integral part of the public transport system in the city, with the added objectives of providing a reliable, affordable, accessible and safe transport service (eThekwini Municipality, 2013).
Sub-theme 2: Increased transport mode choice	TOD provides an increased choice of mode in public transport (Asuncion, 2014), and promotes walkable and dense communities, with transits that include public transport use (Pojani and Stead, 2015a). TOD provides for mixed land-use communities that enable NMT use, whilst allowing motorised public transport to service the public (Aguilar and Glocker, 2015).
THEME 3: Public transport service	
Sub-theme 1: Poor public transport service	Majority of public transport drivers display inconsiderate (illegal) behaviour on the road and towards users. Although adequate legislation exists for drivers, the regulations are generally not adhered to by drivers (eThekwini Municipality, 2013).
Sub-theme 2: Inadequate service for NMT users	One of the many challenges that face NMT users is the risk of crime. Personal safety is a major concern for NMT users in the eThekwini Municipality; including safety from injury (eThekwini Municipality, 2013).
Sub-theme 3: Public transport infrastructure	One of the crucial considerations of public

	transport infrastructure is that there must be policies that support and enable mobilisation of investment. Policies must include principles and approaches that efficiently mobilise government and private investors to finance public transport infrastructure (Ang and Marchel, 2013).
THEME 4: Non-motorised transport	
Sub-theme 1: NMT as a successful mode of transport	It is the eThekwini Municipality's aspiration to encourage its citizens to change from private cars to public transport and to NMT modes, namely, cycling and walking (eThekwini Municipality,2012b).
Sub-theme 2: Integrating NMT with public transport	An integrated transport is the integration of infrastructure, networks, ticketing, tariffs, etc. across different operators and transportation modes (Barendse, 2016). Integrated transport is more than assimilating public transport systems but includes integration of other modes (for instance walking, cycling and private car use) (Stopka et al, 2015).
Sub-theme 3: Promote the use of NMT	Measures to promote NMT include constructing pavements and providing separate lanes for cyclists and pedestrians. Link NMT networks with employment and commercial centres and provide continuous routes with signals and safety barriers. Also, provide attractive environments (Belwal, 2016).
THEME 5: Barriers preventing successful NMT implementation in the eThekwini Municipality	
Sub-theme 1: NMT environment	The road environment should provide an

	atmosphere that brings joy to NMT users. It should have a lot of open spaces (Dong and Zhu, 2015), be walkable (Asuncion, 2014) and provide public seating, colourful vegetation and colourful buildings (Pojani and Stead, 2015)
Sub-theme 2: Infrastructure	The existing NMT infrastructure in eThekwini is pavements and most of the city's large surfaced roads have a pavement on one side. When considering the design, accessibility and maintenance of the existing infrastructure it can be said that the standard of the provided infrastructure is not always adequate (eThekwini Municipality, 2013),
Sub-theme 3: Safety and security	Some areas within eThekwini CBD have insufficient lighting, paving and signage (eThekwini Municipality, 2013). There are numerous conditions that can enable NMT travel including safety measures, improved driver behaviour and attitude. Also, reducing road space for cars can increase space for NMT (UNEP, 2013).

4.5 CHAPTER SUMMARY

Findings revealed the public transport service in Cato Manor to be expensive despite the area being located close to the CBD. Walking was the most-used method of transportation for many people in Cato Manor. Despite this, there was a lack of public transport integration. Likewise, the infrastructure was unsatisfactory – while some existing surfaced roads had a pavement on one side, the standard of the provided infrastructure was not always adequate (as the figures above illustrate). Some parts of the study area had insufficient lighting, paving and signage. The quality of NMT service was disappointing and ineffective. Furthermore, lack of empathy and good conduct by drivers towards NMT users' increased risk of injury.

One of the many challenges that faced NMT users in the study area was the risk of crime with personal safety being a major concern including safety from fatality. Moreover, the NMT environment was unpleasant and polluted.

The research objectives addressed by the study were to explore enabling factors to integrate NMT as a key element of an IRPTN from the perspective of participants to the study, to propose a theoretical model for integrating NMT with public transport, and to provide recommendations for successful NMT and public transport integration. The results of the study can be used alongside the current NMT planning and design guidelines in the eThekwini Municipality. The results can be used as a basis for further research within the wider public transport population in eThekwini as well as other NMT and public transport systems.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATONS

5.1 INTRODUCTION

Chapter one discussed the background and motivation for the study. The research problem was provided and research objectives of the study were also presented. Chapter two focused on the literature review and suggested some answers to specific literature aims of the study. NMT as a feeder service and enabling factors for integrating NMT with the overall public transport system were identified, analysed and discussed. In Chapter three, the methodological issues pertaining to qualitative empirical research were discussed. The chapter commenced with a presentation of the qualitative research design used, followed by a justification for the design. The data collection method, research sample and procedure were discussed. Theatrical discourse analysis was the method of data analysis used for the study. The chapter concluded with a section on the trustworthiness of the study and ethical considerations. Chapter four presented and discussed the empirical findings of the study. The researcher reported on the themes and sub-themes, derived from the data analysis. The findings were interpreted by a pattern-matching logic supported by evidence from participants in the form of 'detailed descriptions' with reference to the relevant transport and NMT literature. The identified enabling factors to integrate NMT with public transport were discussed.

In this final chapter, conclusions and recommendations are put forward and the chapter ends with some concluding remarks. To begin with, a summary of the findings from the literature is provided.

5.2 SUMMARY OF FINDINGS FROM THE LITERATURE

Post-modern theory in urban transport planning is employed by planners interested in creating metropolises that are less reliant on vehicles, more livable and better functioning. This is achieved by replacing modern planning uses with post-modern planning principles

which produce walkable communities (Newman, Kosonen and Kenworthy, 2016). The WITS School of Governance (2017) states that transport planners use post-modern theory applications to plan for people that use NMT such as walking, bicycles and animal-drawn transport.

Gugger and Kerschbaumer (2013) mention that walkable communities are founded on the compact city model, established as the sustainable city, which signifies the canopy expression for many other associated concepts such as new urbanism and smart growth. New urbanism challenges traditional transport planning and practices advocating a shift from a city of cars to a city of foot-travelers. New urbanism is the renewal of 'traditionalist' design and architecture which strive to promote walkable, mixed-use, compact and reasonably self-sufficient communities (Moore, 2013). Smart growth provides principles for regeneration and dense development within urban areas. The principles of smart growth promote walkable communities, the provision of a diversity of transportation options, compact design or development and mixed-use development (Mohammed, Alshuwaikhat and Adenle, 2016).

Countries like the Netherlands, Denmark and Germany campaign for and promote NMT modes. For example, in Germany there is the '50 by 50' campaign which promotes and encourages cycling for citizens (Makarova, Khabibullin, Shubenkova & Boyko, 2016). In Amsterdam, the capital city of the Netherlands, most people use bicycles as a mode of transport (Plan Amsterdam, 2014). In Denmark, the City of Copenhagen is one of the most exemplary bicycle-friendly metropolises in the world. Copenhagen's story of success in NMT is known worldwide and spoken of by urban planners, media, politicians and tourists who visit the city to explore the secret of its success. It is thus unsurprising that there are many cities around the world that are eager to follow in the steps of Copenhagen (City of Copenhagen, 2014). In Germany, many people make multimodal or intermodal journeys and with most of these journeys, a bicycle is involved (Ministry of Transport, Building and Urban Development, 2013). People in the Netherlands, Denmark and Germany are well aware that cycling is the most effective mode of transport in their countries.

The White Paper on National Transport Policy (1996) sets out numerous pertinent policy principles to guide transport development in SA. The White Paper indicates that the intention of the transport system is to minimise the mobility restrictions posed on passengers, permitting users the choice of transport mode or integrating different modes where it is

deemed economically and financially feasible to do so (Department of Transport, 2008). The taxi mini-bus is a crucial element in the public transport system and plays an essential role in urban transport (Chetty and Phayane, 2013). The National Land Transport Transition Act (NLLTA, 2000) was intended for the integration of all modes of transport, infrastructure and services through the ITP. The Department of Transport's Draft NMT Policy was to intensify the role of NMT as one of the foremost modes of transport by integrating it as an indispensable element of public transport and providing safe NMT infrastructure, including adequate allocation of sustainable funding for NMT's development and promotion (Department of Transport, 2008).

The eThekwini Municipality ITP (update 2010-2015) and the KwaZulu-Natal (KZN) DoT mission are affiliated to the White Paper on National Transport Policy (1996) and all aim for public transport that is effective, safe, reliable, efficient, affordable, accessible, needs driven and integrated (Chetty and Phayane, 2013). Furthermore, the eThekwini Municipality Draft NMT Plan acknowledges that NMT serves as an indispensable mode of transport in the poorly serviced regions by offering a human powered mode of transport to the destitute majority in the form of walking, cycling, and small-wheeled transport (for example, skateboards and roller skates) (eThekwini Municipality, 2013).

The review of the literature by Stopka et al (2015) indicates that integrated transport, by definition, goes beyond the borders of public transport systems. It includes wider integration with other transport modes (for example, walking, cycling and private cars). NMT compliments and sustains the public transport structure as a key feeder service though it is seldom integrated with the public transport system (Jain, 2013). An IRPTN is a linking public transport network, with access to a NMT network which is connected to the IRPTN as a feeder system, with taxis and buses complementing NMT as an access transport mode (Brussel, 2014).

The eThekwini IRPTN consists of all transport modes functioning together to establish an integrated network along best-suited routes (SACN, 2016). The IRPTN in the eThekwini Municipality aims to provide a cost effective, flexible, safe, accessible, reliable and efficient transport service for the citizens of eThekwini. The comprehensive objective of the municipality is to implement a sustainable, efficient, safe and effective public transport system (eThekwini Municipality, 2015). Existing NMT infrastructure in eThekwini

comprises pavements, cycle paths and ancillary components. Within the CBD, an NMT network has been developed, encouraging people to jog, cycle and walk along the beachfront (eThekwini Municipality, 2013). However, the eThekwini Municipality is challenged by existing NMT problems as identified in the Draft Non-motorised Transport Plan (2013). These problems pertain to insufficient standards for the general environment, infrastructure, safety and security (eThekwini Municipality, 2013). While the municipality has existing constraints in providing adequate public transport, cycle and pedestrian infrastructure, it acknowledges the need to address the NMT problems in order make it more attractive and comfortable for current NMT commuters and to increase NMT usage in the municipality (eThekwini Municipality, 2013).

The literature review identified the enabling factors that need to be in place in order to facilitate the integration of NMT into the overall public transport system (Salleh, Rahmat and Ismail, 2014; Labuschagne and Ribbens, 2014). The review outlines current thinking on urban space – the employment of new urbanism and smart growth practices to produce walkable communities, and the provision of mixed land-use and grid street networks (Wang and Wu, 2015). Additionally, TOD proposes adopting mixed land-use that would tend to reduce the regular distance of trips and enable NMT (Aguilar and Glocker, 2015). Municipalities must decide to what degree public transport will competitively accommodate passenger mobility demand (McLeod et al, 2017). Rathete (2015) suggests that the existence of institutional and regulatory systems that encourage and promote NMT are the key pillars that will guarantee and put into effect the inclusion of continual NMT planning progressions.

Moreover, the literature review suggests that in order to provide a competitive and sustainable public transport network, continuous investments in operation and infrastructure are required and, in most cases, subsidies are needed to maintain affordability and quality (Aguilar and Glocker, 2015). Governments have a significant role and responsibility to play in inducing private investment for sustainable NMT infrastructure through national policies, even in time of fiscal constraints (Ang and Marchal, 2013). NMT creates walkable cities, optimised by a compact city form and can decrease the need for motor vehicle travel (UNEP, 2013). It also creates accessibility centred on physical nearness (Rode, Floater, Thomopoulos, Docherty, Schwinger, Mahendra and Fang, 2017).

Cities and governments have the responsibility to enact polices to encourage bicycles and walking as alternative transport and by doing increase NMT mode share (Rissel et al, 2018). An important element to ease implementation is to have, in place, strong political willpower to transform the way that persons travel. Political determination is important for driving strategies, legislation and policy that will facilitate local municipalities and governments to implement the needed changes to make NMT trips more attractive and viable (Baufeldt, 2016).

5.3 CONFIRMATION, CONCLUSIONS AND RECOMMENDATIONS

The confirmation, conclusions and recommendations are based on the findings of the study and discussed in line with the objectives of the study, namely, to explore the factors that need to be in place to enable integration of NMT with the overall public transport system; to determine the enabling factors to integrate NMT as a key element of an IRPTN from the perspective of participants of the study; to propose the theoretical model for integrating NMT with public transport; and to provide recommendations for successful NMT and public transport integration.

5.3.1 Confirmation

The City of eThekwini does not have specific guidelines to promote NMT as a key element of an IRPTN. Existing guidelines focus on spatial development to influence urban landscape development designs, to accommodate the use of NMT and the construction of NMT networks. The current guidelines are intended for the planning and design of NMT infrastructure and facilities in projected and current developments. NMT is wide-ranging and beyond the mere construction of NMT infrastructure and facilities. It includes other factors such as the promotion of NMT, the provision of adaquate safety measures, the enhancement of the NMT environment and the provision of suitable NMT infrastructure (Figure 5.1). Figure 5.1 illustrates guidelines that enable the integration of NMT with the overall public transport system. The guidelines are enabling factors that promote NMT as a key element of an IRPTN. The proposed guidelines are not meant to replace existing guidelines but add to the existing body of knowledge and be applied in conjunction with current guiding principles.

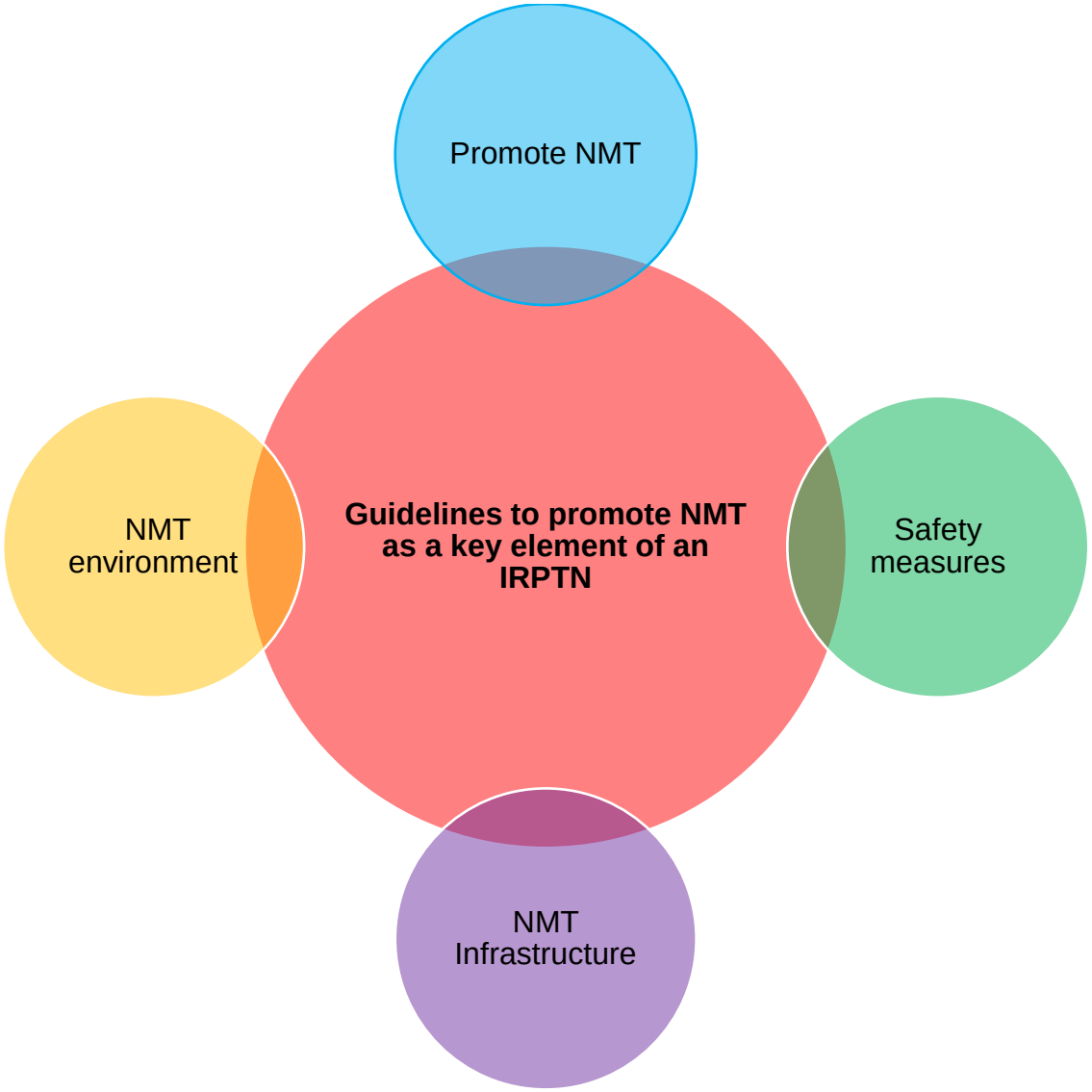

Figure 5.1: Guidelines to integrate NMT as a key element of an IRPTN

The proposed guidelines to integrate NMT as a key element of an IRPTN are:

(1) Promote NMT
(2) Safety measures
(3) NMT Infrastructure
(4) NMT environment.

Each is discussed below.

5.3.1.1 Promote NMT

Providing the right infrastructure to service pedestrians is one method of marketing NMT modes such as cycling and walking. Infrastructure that is intended to promote integrated transport networks, including walking and cycling and encourage people to use NMT modes of travel need to be in place. Wide sidewalks, cycle ways, interconnected streets and pedestrian-friendly cities with continuous routes are other methods to promote NMT (Belwal, 2016). Signage that indicates pedestrian or cyclist movements, traffic lights that have pedestrian signals and painted pedestrian crossing lines must also be considred. The provision of sidewalks without dustbins, trees, sign poles, and street lights placed in the middle of the sidewalks allows for an easy and comfortable journey, which in turn encourages more human powered trips and less dependence on vehicles. Similarly, the establishment of NMT champions and advocates who are skilled in, and enthused about, NMT needs to be ensured. Furthermore, NMT educational programmes for road users, alongside NMT workshops, campaigns and cycle projects need to be made available. Finally, the programmes and campaigns offered need to be consistent (Giduthuri ,2015).

5.3.1.2 Safety measures

Secure and safe NMT environments that are suitable for cyclists and pedestrians to use need to be provided. A safe and secure environment encourages the use of implemented NMT networks (Irlam, 2016). Stern institutional and regulatory systems that prioritise pedestrian traffic, accompanied with road regulations and correct enforcement that regulate NMT user behaviour, needs to be ensured (Baufeldt, 2016). Safety measures, such as barriers and speed humps need to be in place. It should be noted that road barriers and speed humps are an important road feature, particularly on roads with a high volume of motorists and sharp curves. The barriers are intended to separate vehicles from pedestrians in order to enhance pedestrian safety (Baufeldt, 2016). Traffic control lights with pedestrian signals to accommodate NMT users as well as painted pedestrian crossing lines are required to control the movement of vehicles and pedestrians. Also needed are speed limit signs and signs that indicate pedestrian and cyclists' movements. Finally, bright street lights along roads to improve pedestrians' sight on the road need to be put in place

5.3.1.3 NMT environment

An environment that promotes walkable, compact communities that encourage walking and use of bicycles for short commutes needs to be created (Wang and Wu, 2015). The compact form of community allows interconnected streets, with better connectivity and ease of walking (UNEP, 2013). Such communities are planned to allow a person to walk from home to work, retail stores, public offices etc., within 10 minutes. Natural environments and public spaces that have trees, recreational activities and an attractive setting for cycling and walking need to be made available. Colourful buildings and open spaces between buildings and public space with, for example, public gardens with colourful flora, need to be provided. Generally, the environment should be attractive with unique architecture and a lot of open spaces, that provide for healthy and safe communities and permit social interactions and physical activity. A traditional neighbourhood structure to enable a better quality of life, and allow for more open spaces and natural environments should be striven for (Aguilar and Glocker, 2015).

5.3.1.4 NMT infrastructure

In terms of NMT infrastructure, a more walkable and livable community in which streets are more pedestrian friendly with wider sidewalks and interconnected in a grid system design to ease walking and cycling should be provided (Parizi, 2015). Also needed are continuous routes of sidewalks that have bright street lighting. The street should be designed to enable control of vehicle traffic and vehicle speed whilst encouraging societal interaction for human traffic. Cycle and walkways along pleasing environments need to be provided. The provision of mixed land-uses will allow people to walk to work and access services with ease. Work and services will be in close proximity to home and access to public transport such as bus and rail should be within a walkable distances of 500 meters (Rode et al, 2017). Communities should be designed in a dense, compact style, with everything in shorter, walkable commutes (UNEP, 2013).

5.3.2 Conclusions

Investing in human capital, that is, people skilled in promoting NMT to the public, accelerates the integration of NMT with public transport. Skilled people in policy development, marketing, communication, engineering, architecture, design, and any other

field relevant to NMT are catalysts in integrating NMT with the public transport system. Policy developers that create transport policies that recognise and encourage NMT development and NMT use, create a tradition where NMT is acknowledged and distinguished in a similar manner as other public transport modes. Moreover, when the different public transport mode operators are enlightened on NMT as well as the feeder service NMT provides to public transport modes (such as train, bus, taxis and meter taxis) integration of NMT with the overall public transport system is enabled. Furthermore, the community which NMT is intended for has to be aware of the presented NMT services. Educational workshops and bicycle training facilities assist in engraving the culture of walking and cycling in people.

Properly designed NMT systems that provide networks that are continuous and allow for the smooth movement of foot-travellers without any disturbance (such as a pavement coming to an end) will encourage people to walk or cycle more. The proper design and inclusion of NMT networks with other public transport networks (where NMT provides a feeder service to other public transport modes) will contribute to the successful integration of NMT with the overall public transport system. In cases where NMT is a complementary mode, bus stops with bus shelters create a NMT friendly environment encouraging people to walk distances of 500 metres to access either a bus or train. In the context of Cato Manor, people walk approximately 2.5 kilometres to access the bus service and should adequate NMT infrastructure and facilities be provided (for instance, satisfactory public lavatories at designated taxi and bus ranks) more people would be encouraged to walk to access the bus and other services.

It is important to provide a NMT environment of an acceptable standard. People are less likely to walk in an area that is polluted and where roads are swamped with drain water. A clean precinct with well-kept open spaces and beautiful flora situated among attractively painted buildings with intriguing architecture and structures along NMT routes, creates a liveable and sociable environment. In an attractive environment people are encouraged to walk and cycle more. Instead of using private vehicles people will begin to transform their preferences and use public transport. A beautiful and relaxing NMT environment brings joy to many people. In such an environment people will walk or cycle to bus stops to access bus or taxi services as well as walk or cycle short distances to access amenities such as public services, schools, shopping malls and work.

Furthermore, suitable safety and security measures to enhance NMT user safety along NMT routes reassure users potential users of their safety whilst using NMT modes. It cannot be emphasised enough that the majority of people will not use NMT (irrespective of the type) if they feel unsafe. While infrastructure can be constructed, NMT promoted and NMT environments renewed, if proper safety and security measures are lacking a majority of people will not use the provided NMT infrastructure and services, especially the more affluent users. The greatest concern is the risk of crime. NMT users want to feel safe when walking or cycling. There has to be a significant presence of law enforcement officers along NMT routes with CCTV cameras placed along the routes. In addition, there needs to be cooperation between law enforcers and the community policing forum. Finally, road barriers, traffic lights, bright street lights, painted crossing lines, signage indicating high risk areas (crime areas) and well- kept open spaces, especially around bus stops, need to be put in place.

In the ever-evolving business environment, new technologies emerge which transform traditional systems and processes. In the eThekwini Municipality public transport is experiencing an evolution in systems and processes, with the current innovative IRPTN initiative aimed at addressing urban mobility underway. However, it is imperative that the IRPTN accommodates the poor population within the city, that is, people who cannot afford public transport services regularly. EThekwini could adopt a city model that supports compact city development and which will enable a city to plan for pedestrian traffic. Township areas such as Cato Manor could be prioritised areas for NMT projects and developments centered on a vigorous mandate to service the urban poor in these areas. There is a need to maintain the dignity of poor people who cannot afford to use public transport regularly.

Figure 5.2 illustrates the enabling factors needed to integrate NMT in Cato Manor with the overall public transport system. The enabling factors were identified by eThekwini participants and are catalysts to accelerate public transport integration.

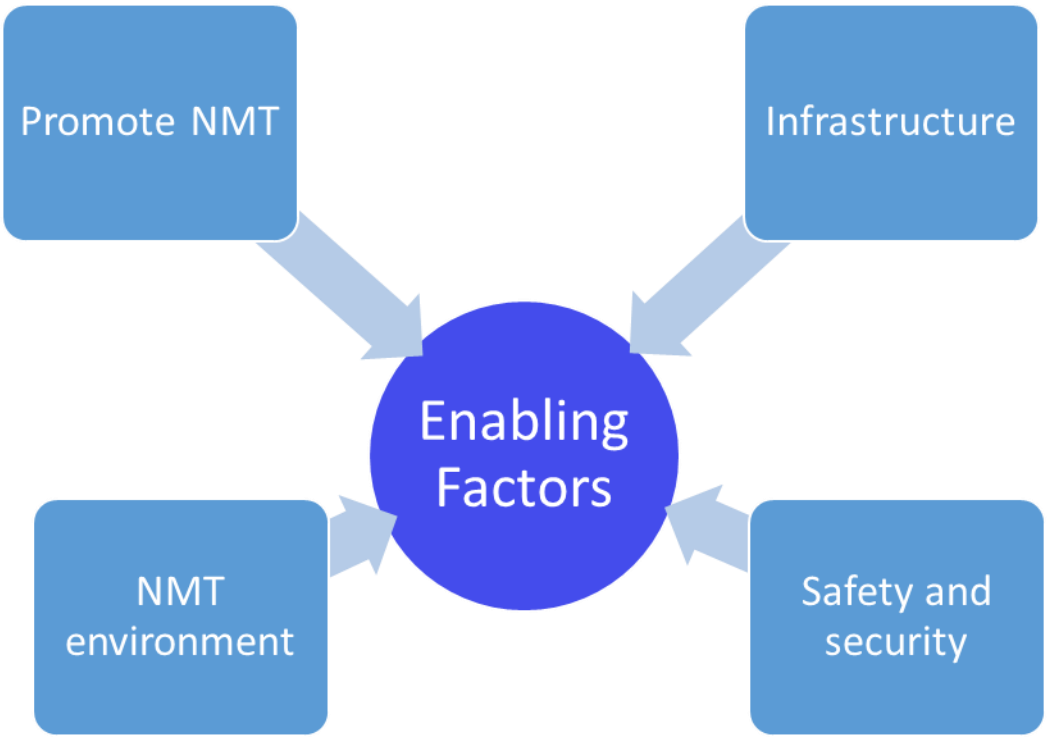

Figure 5.2: Enabling factors as identified by the participants

Thus the enabling factors identified by the participants are the promotion of NMT, infrastructure, the NMT environment and safety and security. In order to enable integration of NMT in Cato Manor with the overall public transport system, the identified enabling factors must be branded as key factors for public transport system integration.

Based on the findings of the study, the recommendations below are put forward.

5.3.3 Recommendations

It is recommended that NMT development in Cato Manor be accelerated by, firstly, establishing committed NMT champions and leadership in government spheres, including urban practitioners, planners, architects and scholars, with the necessary skills to design, plan, construct and manage NMT. Simultaneously, establish NMT advocates that encourage the use of existing rolling stock such as pavements (in areas that have pavements), in order to

promote NMT to the public. Parallel to that, conduct campaigns, educational workshops and programmes in urban and peripheral areas (for example, townships), with cycle events and cycling training facilities for ordinary citizens. According to Salleh et al (2014:292) measures to promote NMT among both users and non-users include encouraging special programmes linked to NMT, such as workplace travel plans, safer routes to school programmes, cycle to work programmes, health campaigns, travel awareness campaigns, and travel smart programmes. Educational workshops, programmes, cycling events and campaigns need to be consistent and included in yearly budgets. Thus, public interest in NMT is created and ultimately, the modes of choice for the commuter increased. Educational workshops for road users (specifically motorists and pedestrians) are intended to educate motorists on NMT and create public awareness of NMT. It is important to emphasise the importance of good conduct on public roads by both motorists and NMT users and that their attitudes and behaviour on public roads are improved.

The provision of adequate and continuous NMT infrastructure enables seamless movement of pedestrians from origin to destination. Communities with suitable pavements and street connectivity in a grid system design on a continuous and simplified network will enable pedestrians to move about easily (walkability) and goes hand-in-hand with the promotion of the mode. NMT infrastructure provision is thus intertwined and interlinked with promotion (Labuschagne and Ribbens, 2014:203). The provision of wide roads minimises conflict over road space between motorist and pedestrian and, as a result, reduces accidents and fatalities. Vehicles and pedestrians need to be provided with separate lanes that are in good condition and distinct from one another. Equally, suitably designed features such as bus stops and bus shelters should be made available.

Salleh et al (2014:294) mention strategies to provide safe pedestrian pathways so as to ease the conflict points between human-powered transport and other transport modes and to ensure that the walking environs are safe, comfortable and accessible for all ages and abilities. Similarly, traffic control lights with pedestrian signals to accommodate NMT users as well as painted pedestrian crossing lines ease conflict between pedestrians and vehicles. Painted pedestrian lines and traffic control lights with pedestrian signals are necessary to control the movement of vehicles and pedestrians. Speed limit signs and signage that indicate pedestrian and cyclists' movements enhance NMT user safety. Likewise, bright street lights along roads improve the visibility of pedestrians thereby enabling pedestrians to observe oncoming traffic

including other pedestrians. The continuous patrol of law enforcement officers in Cato Manor is necessary as the area is characterised by high levels of crime.

The general environment ought to be high or medium density and of a compact form that includes buildings (industrial, offices, retail etc.) and residential houses (different housing types and home incomes) with a lot of well-kept and beautiful open spaces in-between. Equally, colourful buildings, flora and parks (or gardens) that provide interesting recreational activities for people need to be inlcuded. The NMT environment should present pleasing and attractive walking routes, with beautiful views that bring joy and relaxation. Labuschagne and Ribbens (2014:203) posit that factors influencing walkability consist of: land use mix, the presence of vegetation and trees, residential density, a variety of buildings and the amount of glass in doors and windows.

Base on my understanding as a researcher, I would suggest that the enabling factors identified by the participants would contribute to a successful integration of NMT in Cato Manor with the overall public transport system. It is proposed that a seamless, inclusive, affordable, effective, reliable, efficient, sustainable and varied public transport system should be provided in eThekwini. Once these enabling factors are in place, the public transport system would be in line with national, provincial and local visions on integrated public transport networks. The identified enabling factors to integrate NMT with public transport in Cato Manor could be further researched within the wider public transport population in eThekwini as well as other NMT and public transport systems. The emphasis of this further research should be on determining whether the broader public transport population responds in the same way in terms of having NMT and public transport being integrated in relation to servicing the poor, whether they find the same enabling factors significant, and whether these factors contribute to the enhancement of public transport and mobility of the poor.

5.4 POSSIBLE CONTRIBUTIONS OF THE STUDY

The potential contributions of the study include recognition of the need to promote NMT as a key element of the IRPTN and to facilitate the integration of NMT with the overall public transport network. This would be done with the aim of providing affordable and seamless public transport to the residents of Cato Manor. It is also anticipated that the study will contribute to creating awareness of the importance of human powered transport (NMT) and

recognising the benefits of planning for, and using, such transport, especially in developing cities. The benefits gained from using NMT would include, amongst other socio-economic advantages, improvement in health, the environment and traffic flow. The proposed enabling factors and guidelines are to be applied in accordance with existing guiding principles.

Finally, it is anticipated that the study's findings will contribute to the existing body of knowledge on NMT in a developmental context.

5.5 LIMITATIONS OF THE STUDY

1. Information on NMT in the eThekwini Municipality was either limited or unavailable and no research on the issue could be identified. Literature from the municipality was limited to the eThekwini Municipality NMT Plan (2013) and Integrated Transport Plan (2010). The study relied on international studies and international good practice (government administration processes) to benchmark the study for South Africa.

2. The small sample size (20 participants) affected the generalisability of the study's findings. The study did not include all citizens and age groups in Cato Manor. It only included people above the age of 18 and below the age of 65, either married or single, male or female, who used public transport and who also walked to and from work on a regular basis. No other groups with differing characteristics were interviewed, making it impossible to have discussed similarities and differences in preferences, views and perceptions between people of various age groups and physical abilities. The study could have been expanded to include scholars, the elderly and disabled people to provide a broader picture of public transport and NMT in Cato Manor. The pilot study indicated that the local residents of Cato Manor had a limited English vocabulary and displayed difficulty in comprehending terminology, concepts and contexts used by the researcher. These included NMT, public transport, public transport systems, public transport services and public transport infrastructure.

3. In the light of the last point above, the reseacher had to set aside 10 to 15 minutes before commencing the main 45 to 60 minute interview with each participant, to explain the interview questions (which had been translated into isiZulu). Data saturation was reached after all 20 participants had similarly responded to the

interview questions. The chosen study area had extremely high levels of crime which consequently affected the time when observations could be done and the duration of the observations. In addition, the time available to conduct the study was not sufficient to increase the sample size and by doing so increase the generalisabilyt of the findings to the entire Cato Manor community. Nonetheless, the findings may be transferable to other similar contexts.

Given the above, future research is needed and recommendations in this regard follow.

5.6 RECOMMENDATIONS FOR FUTURE RESEARCH

- Future research should continue to explore the factors that may facilitate the integration of public transport and NMT. The emphasis of this research should be on determining whether the broader public transport population in the eThekwini Municipality responds in the same way to NMT and public transport being integrated in relation to servicing the poor. The research should further determine whether the broader population finds the same enabling factors significant and whether these factors contribute to the enhancement of public transport and mobility of the poor.

- The identified enabling factors to integrate NMT with public transport in Cato Manor could be further researched within other NMT and public transport systems in other contexts/municipalities. As with the first recommendation above, the emphasis of this research should be on determining whether the broader public transport population responds in the same way in terms of NMT and public transport being integrated in relation to providing a service to the poor. Furthermore, whether they find the same enabling factors significant and whether these factors contribute to the enhancement of public transport and mobility for the poor.

5.7 CONCLUDING REMARKS

Public transport in South Africa has traditionally been planned and designed for the motor vehicle. The needs of motorists have generally been prioritised in policy development and decision-making processes when compared to the needs of cyclists and pedestrians. The

result of this is largely evident in disadvantaged communities where cyclists and pedestrians are provided with minimal infrastructure and services. For instance, in Cato Manor the problems faced by pedestrians on a daily basis relate to infrastructure, the general environment, safety and security. A redress of these problems could ease the integration of NMT with the public transport system in Cato Manor and, at the same time, bring postmodernism planning to the centre of transport planning. This will herald a shift from motor vehicle to human powered transport (such as cycling and walking) in the city. Equally, the shift will reflect a change in transport planning towards sustaining an environmentally friendly transport system with NMT as part of the solution. The NMT enabling factors identified in the study will play a significant role in harmonising the integration of NMT with the overall public transport system. South Africa has demonstrated a remarkable transformation within its public transport sector compared to other African countries. The projected transport transformation in the public transport sector of eThekwini is evident from the city's IRPTN and intended implementation of compact form principles around station hubs. The eThekwini IRPTN (GO! Durban IRPTN) aims to provide a comprehensive, universal access public transport system. The City's vision emphasises a low carbon city that includes NMT as a feeder mode to other public transport modes. Equally, the ETA highlights sustainable, safe, effective, affordable, accessible, operationally effective and reliable transport as the future of the transport system in eThekwini. It is evident that NMT has an important role to play in this regard.

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APPENDICES

APPENDIX A: ETHEKWINI MUNICIPALITY IRPTN TRUNK CORRIDORS

C1 – Bridge City to Durban Central Business District (CBD)

C2 – North-South Rail Line

C3 – Bridge City to Pinetown and New Germany via MR577

C4 – M25 to South Durban Basin along the N2 with a spur along the M7 to Rossburgh

C5 – Chatsworth Town Centre to CBD along Higginson Highway and South Coast Road

C6 – Mpumalanga to CBD along the N3 with a spur along the M13

C7 – Extension of C5 to Hillcrest

C8 – Tongaat to the CBD via Umhlanga along Dube West Arterial and Umhlanga Rocks Drive

C9 – Bridge City to Umhlanga via Cornubia along Phoenix highway and Cornubia Boulevard

eThekwini Municipality (2014:146)

APPENDIX B: PARTICIPANT INFORMATION SHEET

Dear Prospective Participant

My name is Nomfundo Cele and I am doing research with Jeremy Mitonga-Monga, a Doctor in the Department of Entrepreneurship, Supply Chain, Transport Economics, Logistics and Tourism towards a Mcom at the University of South Africa. We have funding from National Student Financial Aid Scheme for Mcom Transport Economics degree. We are inviting you to participate in a study entitled Integrating Non-Motorised Transport with public transport in Cato Manor for an Integrated Rapid Public Transport Network.

WHAT IS THE PURPOSE OF THE STUDY?

This study is expected to collect important information that could provide enabling factors to integrate/ promote non-motorised transport as a key element of the IRPTN; to suggest key factors (conditions) that need to be in place in order to enable the integration of NMT into the over-all public transport system to enhance the urban mobility within the Cato Manor area of eThekwini Municipality, South Africa.

WHY AM I BEING INVITED TO PARTICIPATE?

You have been identified as information rich, source of data collection because you use public transport and non-motorised transport regularly. By participating in the interviews, you are making a valuable contribution to non-motorised transport and public transport research in South Africa. You were purposely chosen for this research; the selection is based on frequent users of non-motorised transport and public transport. The sample found is representative of the population in question (S=20 local resident participants).

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves audio taping semi-structured interviews, which will take approximately 20 minutes of your time and participant observation in your natural environment.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Please note, participation is voluntary, and your response will be kept strictly confidential and anonymous. There is no penalty or loss of benefit for non-participation. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do

decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason. The researcher will have access to the computer-based records stored on a password-protected computer. Records will be kept for a period of five years; thereafter they will be permanently disposed of.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Probable enhancement of urban mobility within the Cato Manor area of eThekwini Municipality, South Africa by integrating NMT with the overall public transport system which could provide affordable and seamless public transport to the residents of Cato Manor. Additionally, create awareness on the importance of human powered transport (NMT) and understanding the health, environmental, traffic and socio-economic advantages gained from using human powered transport.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There is no potential level of inconvenience and/or discomfort to the participant. There are no possible or reasonably foreseeable risks of harm or side-effects to the potential participants. There is no risk that may come from others identifying the person's participation in the research.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher will know about your involvement in this research. Your answers will be given a code number, or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at eThekwini Municipality, KwaDabeka for future research or

academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded, and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There is no payment or reward offered, financial or otherwise. There are no costs incurred by the participant when participating in the study.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the Research Ethics Committee of the College of Economic and Management Sciences at Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Nomfundo Cele on 060 484 5880. The findings are accessible for 5 years.

Should you have concerns about the way in which the research has been conducted, you may contact Dr Mitonga-Monga, mitonmj@unisa.ac.za, (012) 429 2344. Alternatively, contact the research ethics chairperson of the Department of Entrepreneurship, Supply Chain, Transport, Tourism and Logistics Management Research Ethics Review Committee (ESTTL RERC), Ms Carmen (Leodolff) Poole, 012 433 4668, esttl-rerc@unisa.ac.za.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Signature

Nomfundo Cele

APPENDIX C: PARTICIPANT INFORMATION SHEET (isiZulu version)

Shidi lwazi kuya kumhlanganyeli

12 Mandulo 2017

Isihloko: Ukuhlanganisa Ukuthutha Okungekho Emotweni Nezokuthutha Zomphakathi ku-Cato Manor ye- Integrated Rapid Public Transport Network

UMHLANGANYELI OTHANDEKAYO

Igama lami nguNomfundo Cele futhi ngenza ucwaningo kanye kanye no Jeremy Mitonga-Monga, uDokotela eMnyangweni osomabhizinisi, ukuthengiswa kwezinto, ezokuthutha ezomnotho, UkuThuthukiswa KwezokuThutha nokuThuthukisa nezokuvakasha ukuya kwiziqu ze Mcom eNyuvesi yaseNingizimu Afrika. Sinezimali ezivela kwiSikimu sikaZwelonke sezeziMali zoMnyango wezeMnotho wezokuThutha (kusuka ku-National Student Financial Aid). Sikumema ukuthi uhlanganyele ocwaningweni oluhlanganisa isihloko sokuhlanganiswa kwezokuThutha okungenaMoto kanye nokuthutha umphakathi ku-Cato Manor ngenethiwekhi ehlanganisiwe yokuthutha umphakathi.

YINI INJONGO YOKUFUNDWA?

Lolu cwaningo kulindeleke ukuthi luqoqe ulwazi olubalulekile olungahlinzeka ngezici ezivumela ukuhlanganisa/ukugqugquzela ukuthutha okungenawo amandla njengento eyinhloko ye-IRPTN; ukuphakamisa izici ezibalulekile (izimo) ezidingekayo ukuze zikwazi ukuhlanganiswa kwe-NMT ohlelweni lokuthutha umphakathi jikelele ukuze kuthuthukiswe ukuhamba kwedolobha ngaphakathi kweCato Manor endaweni kaMasipala waseThekwini, eNingizimu Afrika.

KUNGANI NGIQINISWA UKUTHI NIKHANDLE?

Ukhonjiswe njengolwazi olucebile, umthombo wokuqoqwa kwedatha ngenxa yokuthi usebenzisa izithuthi zomphakathi kanye nokuthutha okungenawo amandla njalo. Ngokubamba iqhaza kulezi zincwadi, wenza umnikelo obalulekile ekuthuthweni okungenawo amandla nokucwaninga kwezokuthutha komphakathi eNingizimu Afrika. Ukhethiwe ngokuzithandela kulolu cwaningo, ukukhethwa kusekelwe kubasebenzisi

abangejwayelekile bokuthutha okungenawo amandla nokuthutha komphakathi. Isampula etholakalayo ibamele abantu ababuzwayo (S = abahlanganyeli bendawo abangu-20).

YINI ISIHLOKO SOKUPHATHISWA KWAMI KULE KUFUNDWA?

Ucwaningo luhilela izingxoxo zokulalelwayo ezihleliwe, okuzothatha cishe imizuzu engama-20 yesikhathi sakho kanye nokubonwa komhlanganyeli endaweni yakho yemvelo.

NGINGA HOXISA KULO KUFUNDWA NGAPHAMBILI NGEMVA NGOKUVUMELWA UKUTHI NIKHANDLE?

Sicela uqaphele, ukubamba iqhaza kungokuzithandela futhi impendulo yakho izogcinwa ngokuyimfihlo futhi engaziwa. Ayikho inhlawulo noma ukulahlekelwa kwenzuzo ngokungabambe iqhaza. Ukuhlanganyela kulolu cwaningo kungukuzithandela futhi awukho ngaphansi kwesibopho sokuvuma ukubamba iqhaza. Uma ukhetha ukuthatha ingxenye, uzonikezwa leli shici lwazi ukuze ugcine futhi uceliwe ukuthi usayine ifomu lokuvuma elibhalwe phansi. Ukhululekile ukuhoxisa nganoma yisiphi isikhathi futhi ngaphandle kokunikeza isizathu. Umcwaningi uzokwazi ukufinyelela kumarekhodi asekelwe kwikhompyutha agcinwe kwikhompyutha evikelwe ngephasiwedi. Amarekhodi azogcinwa isikhathi esiyiminyaka emihlanu; emva kwalokho bazobe behlulwa unomphela.

YINI IZIPHUMA ZOKUPHAKHA KWENQAKU KULO KUFUNDWA?

Ukuthuthukiswa okungahle kwenzeke emadolobheni e-Cato Manor eMasipala waseThekwini, eNingizimu Afrika ngokuhlanganisa i-NMT ohlelweni lukawonkewonke lwezokuthutha olungahle lunikeze izithuthi zomphakathi ezingathengi futhi ezingenasisekelo kubantu abahlala eCato Manor. Ukwengeza, yenza ukuqwashisa ngokubaluleka kokuthuthwa kwabantu okusetshenziselwa amandla (NMT) nokuqonda impilo, imvelo, ithrafikhi kanye nezinzuzo zomphakathi nezomnotho ezitholakala ngokusebenzisa ukuthuthwa kwabantu okusetshenziselwa amandla.

INGABE ZINYE IZINTO EZINYE EZIKHONA NGAYO UKUBA NGINGIQINISELELA ESIKHWENI SESIFUNDO?

Ayikho izinga elingahle lokuphazamiseka kanye / noma ukunganaki komhlanganyeli. Azikho izingozi ezingenzeka noma ezibonakalayo ezibangelwa ukulimala noma imiphumela emibi kubantu ababambe iqhaza. Ayikho ingozi engase ivele kwabanye okukhomba ukuthi iqhaza lomuntu kulolu cwaningo.

INGABE LOLWAZI LOKUPHILA KUNYE NOMFUNKULU NOKUBA KWAMAZI KANYE KUNGABENZEKA?

Unelungelo lokugcizelela ukuthi igama lakho ngeke lilotshwe kuphi nokuthi akukho muntu, ngaphandle komcwaningi ozokwazi ngokubandakanyeka kwakho kulolu cwaningo. Izimpendulo zakho zizonikezwa inombolo yenombolo noma igama eliyimfihlo futhi uzothunyelwa ngale ndlela kudatha, noma yiziphi izincwadi, noma ezinye izindlela zokubika zocwaningo ezifana nezinqubo zenkomfa.

Idatha yakho engaziwa ingasetshenziselwa ezinye izinjongo, njengokubika kocwaningo, izihloko zezincwadi kanye / noma izinqubo zenkomfa. Umbiko wesifundo ungathunyelwa ukushicilelwa, kepha abahlanganyeli ngabanye ngeke babonakale kulowo mbiko.

UMFUNYEZI (S) UZIKHUBEKA UKUVIKELWA KWEZINDAWO?

Amakhophi anamandla ezimpendulo zakho azogcinwa ngumcwaningi iminyaka emihlanu ekhabhinini elikhiyiwe / ikhabhinethi yokufaka isicelo kuMasipala waseThekwini, KwaDabeka ngokucwaninga esikhathini esizayo noma ngezinhloso zemfundo; Ulwazi lwe-elekthroniki luzogcinwa kwi-computer evikelwe iphasiwedi. Ukusetshenziswa esikhathini esizayo kwedatha egcinwe kuzobe sekuhambisana nokubuyekezwa kokuHlola koKuCwaningo nokuvunywa uma kusebenza. Amakhophi aqinile azokhishwa futhi / noma amakhophi e-elektroniki azosuswa unomphela kwi-hard drive yekhompyutha ngokusebenzisa uhlelo lwe-software olufanele.

INGABE NGZOKWAMUKELA UKUKHOKHELWA NOMA OKUNYE OKUFAKELWE UKUFAKA INGXENYE KULESI SIFUNDO?

Ayikho inkokhelo noma umvuzo ohlinzekwa, wezezimali noma okunye. Azikho izindleko ezithathwe ngumhlanganyeli lapho ehlanganyela esifundweni.

INGABE LOLOCWANINGO LIYITHOLILE IMVUMO KWIKOMIDI ELAWULA UKUZIPHATHA NESIMILO?

Lesi sifundo sithole imvume ebhaliwe kusuka eKomidini Lokubuyekeza Lokuziphatha Lokucwaninga leKomidi Lokuziphatha Lokucwaninga leKholeji lezoMnotho nezoPhathwa kwezeMpilo e-Unisa. Ikhophi yencwadi yokuvuma ingatholakala kumcwaningi uma ufisa kanjalo.

NGIZOKWAZI KANJANI UKUTHOLA IZIMPENDULO/ IMIPHUMELO YALOLUCWANINGO?

Uma ungathanda ukwaziswa ngemiphumela yokugcina yocwaningo, sicela uxhumane noNomfundo Cele ku-060 484 5880. Okutholakele kufinyeleleka eminyakeni emihlanu.

Uma kufanele ube nokukhathazeka ngendlela okuqhutshwa ngayo ucwaningo, ungathintana noProfesa Nkoana Simon Radipere, Radipns@unisa.ac.za, (012) 429 4332. Ngaphandle kwalokho, thintana nosihlalo wezokuziphatha wezocwaningo eMnyangweni Wezokuhweba, Ikomidi lokuHlola Lokuziphatha LokuThintana NezokuThutha (ESTTL RERC), uNkk Carmen (Leodolff) Poole, 012 433 4668, esttl-rerc@unisa.ac.za.

Siyabonga ngokuthatha isikhathi sokufunda leli shici lwazi kanye nokuhlanganyela kulolu cwaningo.

Ngiyabonga.

Isiginesha

Nomfundo Cele

APPENDIX D: CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had enough opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the semi-structured interview and participant observation.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……. Date……

Researcher's Name & Surname…… (please print)

Researcher's signature…….. Date……

APPENDIX E: CONSENT TO PARTICIPATE IN THIS STUDY (isiZulu version)

UKUSEBENZA KUNYE NOKWENZA KANYE KULO KUFUNDWA

Mina, _____ (igama lomhlanganyeli), ngiyaqinisekisa ukuthi umuntu ocela imvume yami ukuba ahlanganyele kulolu cwaningo ungitshele ngemvelo, inqubo, izinzuzo ezingenzeka kanye nokukhathazeka okulindelekile kokubamba iqhaza.

Ngiyifunde (noma ngabe ngiyichazile) futhi ngiyiqonda isifundo njengoba kuchaziwe kushidi lwazi.

Nginethuba elanele lokubuza imibuzo futhi ngilungele ukuhlanganyela kulolu cwaningo.

Ngiyaqonda ukuthi ukubamba iqhaza kwami kungukuzithandela nokuthi ngikhululekile ukuhoxisa nganoma yisiphi isikhathi ngaphandle kwesijeziso (uma kusebenza).

Ngiyaqaphela ukuthi okutholakele kwalolu cwaningo kuzosetshenziselwa umbiko wokucwaninga, izincwadi zezincwadi kanye / noma izinqubo zenkomfa, kodwa ukuthi ukubamba iqhaza kwami kuzogcinwa kuyimfihlo ngaphandle uma kuchaziwe ngenye indlela.

Ngiyavuma ukurekhodwa kwengxoxo ehleliwe kanye nokubonwa komhlanganyeli.

Ngithole ikhophi esayiniwe yesivumelwano semvume esaziwayo.

Igama lomhlanganyeli nesibongo..... (sicela uphrinte)

Isignesha esihlanganyele ....Usuku .....

Igama lomcwaningi negama nesibongo ..... (sicela ushicilele)

Isignesha yomcwaningi ....Usuku ….....

APPENDIX F: INTERVIEW QUESTIONS

Primary unit of analysis (local residents of Cato Manor):

Opening questions

1. What do you do on a normal day to work?
2. Are there certain practices you do or do not do when you are going to use public transport?
3. What primary mode of transport do you usually use?
4. Can you tell me about the first time you had to walk to work?
5. What is the main reason that made walking to work an option?
6. Are there preferences you have when choosing a public transport mode?
7. Are there other people who use the same mode of public transport as you?

Main questions

8. What is your experience with public transport in Cato Manor?
9. What do you think about the current public transport system of Cato Manor?
10. Do you view the public transport of Cato Manor as efficient and effective?
11. How do you perceive the existing public transport infrastructure?
12. Have you experienced non-motorised transport as a mode of transport?
13. Do you perceive non-motorised transport as a successful mode of public transport?
14. What is your opinion on integrating non-motorised transport with public transport?

Closing questions

15. What do you think can be done to improve public transport in Cato Manor?
16. What are your hopes for non-motorised transport in the future for Cato Manor?

APPENDIX G: IMIBUZO YOKUQONDISA IMIBUZO (isiZULU version)

Umuvo wokuhlaziywa (izakhamuzi zendawo zaseCato Manor):

Imibuzo yokuvula

1. Yini oqale uyenze ekuseni uma uvukela ukuya emsebenzini?
2. Zikhona izinto ozenzayo noma ongazenzi uma uzosebenzisa ezokuthutha umphakathi?
3. Eyiphi inqola/imoto ethutha umphakathi ojwayele ukuyisebenzisa?
4. Ungangitshena ngosuku lakho lokuqala uhhamba ngezinyaywo uya emsebenzini?
5. Yini eyakwenza ukhethe ukuhhamba ngenzinyawo?
6. Zikhona izinto ozibhekayo noma okhetha ngazo uma uyogibela ezokuthutha umphakathi?
7. Bakhona yini abanye abantu abasebenzisa imodi efanayo yokuthutha komphakathi njengawe?

Imibuzo esemqoka

8. Ongitshene umbono/ imizwa yakho mayelana nesikhathi usebenzisa ezokuthutha umphakathi la eCato Manor?
9. Ucabangani ngesistimu yezokuthutha yomphakathi ka-Cato Manor yamanje?
10. Ingabe ubheka ukuthuthwa komphakathi kweCato Manor njengendlela ephumelelayo nephumelelayo/ Ngabe uzibona zikusebenzela ezokuthutha umphakathi zala eCato Manor; ngabe konke kuhle, kuyakujulisa?
11. Ubona kanjani ingqalasizinda yezokuthutha zomphakathi ekhona/ Ziyakujulisa izakhiwo ezikhona manje ezokuthutha umphakathi la eCato Manor, ziyakusebenzela ngakho khonke na?
12. Ingabe uke wabhekana nokuthutha okungekho emotweni njengendlela yokuthutha/ Ngabe wake wayisebebzisa ezokuthutha umphakathi ezingahhambi ngenjini yemoto kodwa kusebenzisa amandla omuntu ukuthi azithuthe okwaziwa nge non-motorised transport, okungaba izinyawo, ibisikili, ihhushi nokunye?
13. Uyabona yini ukuthutha okungekho emotweni njengemodi ephumelelayo yokuthutha umphakathi/ Ngabe uyibona lendlela yokuthutha (non-motorised transport-izinyawo, hhashi, bisikili nokunye okungahhambi ngenjini yemoto) iphumelelela ekutheni ibe inqola yokuthutha umphakathi?
14. Uyini umbono wakho ngokuhlanganisa izithuthi ezingekho emotweni nezithuthi zomphakathi/ Uthini owakho umbono ngokuhlanganisa iNMT (non-motorised transport) nezokuthutha umphakathi?

Imibuzo esivala ngayo

15. Ucabanga ukuthi kungenziwa kanjani ukuthuthukisa izithuthi zomphakathi eCato Manor/ Yini ocabanga ukuthi ingenziwa ekutheni kuthukuthiswe ezokuthutha umphakathi la eCato Manor?

16. Zithini ezakho izifiso nge NMT esikhathini esizayo mayelana ne Cato manor/Ufisani ngezokuthutha okungenawo amandla esikhathini esizayo seCato Manor?

APPENDIX H: PERMISSION LETTER

ETHEKWINI MUNICIPALITY

PERMISSION LETTER

Request for permission to conduct research at Cato Manor Area

"Integrating Non-Motorised Transport with public transport in Cato Manor for an Integrated Rapid Public Transport Network"

Date: 20/07/2017

Contact person's name: Mr Councillor Mveli Mthembu

Contact person's building no. or room no: Wiggins Community Hall No 3 (room)

Insert contact person's Department: Local government

Insert contact person's telephone number and email address: 031-261 1453 / 0832710120 Email: mvelimthembu @ gmail.com

Dear Mr Mveli Mthembu,

I, Nomfundo Gugulethu Precious Cele am doing research with Simon M. Radipere, a Professor in the Department of Entrepreneurship, Supply Chain, Transport Economics, Logistics and Tourism towards a Mcom at the University of South Africa. We have funding from National Student Financial Aid Scheme for Mcom degree in Transport Economics. We are inviting you to participate in a study entitled integrating Non-Motorised Transport with public transport in Cato Manor for an Integrated Rapid Public Transport network.

The aim of the study is to provide enabling factors to integrate/promote NMT as a key element of an Integrated Rapid Public Transport Network.

Your company has been selected because it represents the study area.

The study will entail semi-structured interviews and participant observation with 20 respondents- local residents that regularly use non-motorised transport (NMT) and public transport to go to work and surrounding areas.

The benefits of this study are : to promote NMT as a key element of the IRPTN and how to facilitate the integration of NMT into the over-all public transport network and which could possibly provide affordable and seamless public transport to the residents of Cato Manor. As well as, to create awareness on the importance of human powered transport (NMT) and recognising the benefits of planning for NMT especially in developing cities and understanding the health, environmental, traffic and socio-economic advantages gained from using human powered transport.

Potential risks are none besides the usual day to day life risks.

Feedback procedure will entail oral presentation and a summary report.

Yours sincerely

Signature : [signature]

Nomfundo Cele

Mcom Student (Transport Economics)

Councillor Mveli Mthembu
Ward No. 29
COMMISSIONER OF OATHS
ETHEKWINI MUNICIPALITY
EX OFFICIO DISTRICT OF DURBAN IN TERMS OF SECTION 6 OF ACT 16 OF 1963 (AS AMENDED) CITY HALL SECRETARIAT
Dr Pixley Ka Seme Street, Durban, 4001

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APPENDIX I: ETHICS APPROVAL

UNISA DESTTL ETHICS REVIEW COMMITTEE

Date: 15/12/2017

Reference number : 2017_CEMS_ESTTL_012
Name: Nomfundo Gugulethu Precious Cele
Student number: 35472928
Staff number:

Dear Ms N Cele

Decision: Ethics Approval from 12/2017 to 12/2020

Researcher(s): Nomfundo Gugulethu Precious Cele
35472928@mylife.unisa.ac.za
060 484 5880

Supervisor (s): Dr Jeremy Mitonga-Monga
mitonmj@unisa.ac.za
012 429 2344

Working title of research:

Integrating Non-Motorised Transport with public transport in Cato Manor for an Integrated Rapid Public Transport Network

Qualification: MCom: Business Management (Transport Economics)

Thank you for the application for research ethics clearance by the Unisa DESTTL Ethics Review Committee for the above mentioned research. Ethics approval is granted for three years.

*The **low risk application** was **reviewed** by the DESTTL Ethics Review Committee in December in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision was approved on the 15 December 2017.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the DESTTL Committee.

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3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No field work activities may continue after the expiry date (12/2020). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **2017_CEMS_ESTTL_012** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature

Chair of DESTTL-RERC

E-mail: loodoc@unisa.ac.za

Tel: (012) 433-4668

Signature

Executive Dean: CEMS

E-mail: mogalmt@unisa.ac.za

Tel: (012) 429-4419

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