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Factors Influencing the Prioritization of Non-Motorized Transport Infrastructure in Nairobi

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Summary

In Nairobi 40% - 60% of all trips are by foot and 1% - 3% of trips are by bicycle (Nairobi City County Government 2015; Mitullah and Opiyo 2012). Despite the high percentage of trips by non-motorized modes, there is little investment in walking and cycling infrastructure. Pedestrian fatality and injury rates are high and much of the existing infrastructure is inaccessible to people with limited mobility. Prioritization of non-motorized transport (NMT) is low compared to motorized modes of transport and NMT infrastructure is often insufficient for the needs of the users.

This thesis explores the factors that influence the priority of NMT infrastructure in Nairobi, focusing specifically on walking and cycling infrastructure. Furthermore, the thesis attempts to explain how various factors influence the priority of NMT infrastructure.

A case study approach was used for this research. Qualitative data for the research was collected through key informant interviews with respondents that were involved in the NMT sector in Nairobi. In total 12 respondents were interviewed from a variety of backgrounds. The respondents were grouped into four different categories based on their professional backgrounds: 1) Academia; 2) Civil society; 3) Donors; and 4) Private consultant. The data collected from the respondents was used primarily to gain a better understanding of the factors that influence the priority of NMT infrastructure in Nairobi.

The research methodology also included document analysis to collect data on the level of priority of NMT infrastructure. Priority was determined by the type of planning for NMT infrastructure found in policy documents and the financial allocation given to these projects in budgeting at the municipal and national level. Some of this data was supplemented by qualitative data from respondents as it related to NMT prioritization.

The findings suggested that there were six factors that influenced the prioritization of NMT infrastructure in Nairobi: 1) Appraisal mechanisms; 2) Cultural attitudes towards NMT users; 3) Inter-agency coordination in transportation planning; 4) Politics and governance; 5) Social advocacy; and 6) Training of technical staff at implementing agencies.

In the conclusion the thesis offers some recommendations, based on the findings, for increasing the priority of NMT infrastructure in Nairobi.

For increasing the prioritization of NMT infrastructure some of the key recommendations were: 1) Improve data collection techniques for NMT infrastructure and NMT users to better understand the economic, environmental, and social costs and benefits of NMT; 2) Improve the awareness of the general population on the benefits of NMT; 3) Use reliable data to show decision-makers the quantifiable costs and benefits of investing in NMT infrastructure; 4) Unify advocacy groups around specific and detailed NMT goals and objectives; 5) Better coordination of NMT design guidelines and NMT policy between implementation agencies; and 6) More training for personnel in implementing agencies on NMT user preferences and inclusive NMT design.

Keywords

- Non-motorized transport
- Nairobi
- Sub-Saharan Africa
- Transportation infrastructure
- Sustainable urban transport

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Abbreviations

CBA	Cost Benefit Analysis
EIA	Environmental Impact Assessment
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KURA	Kenya Urban Roads Authority
IHS	Institute for Housing and Urban Development
INGO	International Non-Governmental Organization
NMT	Non-Motorized Transportation
SUT	Sustainable Urban Transportation

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Chapter 1: Introduction

1.1 Background

Nairobi is one of the fastest growing major cities in Sub-Saharan Africa. Not only is the population growing quickly but the economy is growing quickly as well (Central Intelligence Agency 2018). As a result, there is increased pressure on services and infrastructure. One of the most significant challenges in the city is the growth in traffic. The growth in traffic, both motorized and non-motorized, has led to congestion. The growth in travel has also led to an increase in injuries and fatalities from collisions. In 2016, officially, there were over 400 traffic fatalities in Nairobi, the majority of which were pedestrian fatalities (Cummings and Obwocha 2018). Due to the methodology used to collect fatality data, it is likely that the traffic fatality rate is actually significantly higher (ibid.). For example, the World Health Organization estimates that the traffic fatality rate in Kenya could be four times higher than the official rate given by Kenyan police (ibid.).

Non-motorized transport (NMT) constitutes a significant share of transport in Nairobi. NMT is defined as all forms of transport which are not motorized; this includes walking, cycling, pedicabs, rickshaws, handcarts and any type of animal powered transportation (Setty Pendakur 2011). This thesis will focus primarily on the walking and cycling aspects of NMT. 40% - 60% of all trips in Nairobi are by foot and 1% - 3% of trips are by bicycle meaning that around half of all trips are NMT (Nairobi City County Government 2015; Mitullah and Opiyo 2012). However, in many developing countries such as Kenya, NMT is often unsafe, inefficient, and inaccessible for many people due to the lack of good quality infrastructure, poor enforcement of road traffic laws designed to protect NMT users, and poor integration of NMT with other modes of transportation (Pirie 2013).

Although Nairobi has a high percentage of citizens using NMT versus motorized modes of transportation, this is primarily a result of many citizens having low incomes and not being able to afford motorized transport. As the economy has grown and incomes have increased in Nairobi, so has the rate of motorized transportation. The majority of residents in low-income informal settlements walk for the majority of their trips, while residents in middle-income and upper-income estates rely more on matatus, taxis, and privately owned automobiles for their daily transportation needs (Klopp 2012). Vehicle congestion and gridlock have become increasingly common in Nairobi, not just during typical peak hour commute times but even in off-peak hours (Gachanja 2015).

As the economy grows and residents become wealthier there will likely be an increase in motorized traffic and this will put greater strain on an already congested road network and contribute to the worsening of Nairobi's air quality.

This pattern of development and change in transportation patterns is not unique to Nairobi. Cities throughout the world have experienced the same transportation challenges as their populations and economies have grown. However, some cities have been able to manage their congestion more successfully than others. Typically, these cities place a higher priority on NMT and public transportation versus private motorized travel. Examples of such cities include Hong Kong and Amsterdam (Haghshenas and Vaziri 2012). They prioritize NMT in their transportation policies and invest significantly in walking, cycling, and public transportation infrastructure.

Other cities and countries around the world are also prioritizing NMT infrastructure to address issues like those found in Nairobi such as: greenhouse gas emissions, pollution, congestion, travel savings, and transportation accessibility (Litman 2016).

Investment in NMT infrastructure such as sidewalks, protected cycling lanes, protected road crossings, and street lighting generally incentivize more trips by walking and cycling even among middle-income and upper-income residents (Cao et al. 2006). However, NMT infrastructure needs to be prioritized in transportation planning and budget allocations in order for such investments to occur.

This thesis attempts to better understand the factors that influence the priority of NMT infrastructure within the context of Nairobi.

1.2 Problem Statement

The challenges of NMT in Nairobi, as noted in the previous section, are well documented. Several studies have identified the gaps in NMT infrastructure, described the inaccessible nature of the NMT network, discussed the lack of integration with other modes of transport, and highlighted the issues of enforcement of laws designed to protect pedestrians and cyclists (Mitullah and Makajuma 2009; Mitullah and Opiyo 2012; Ogendi et al. 2013).

One study, from 2015, mapped 18 major road corridors throughout Nairobi to determine the adequateness of the NMT infrastructure (Mitullah and Opiyo 2017b). The main findings of the study found that of the 18 corridors, only four were considered to be in good condition and the remaining 14 were in fair condition; only two of the 18 corridors had bicycle paths (ibid.). The study also found that the infrastructure was not uniform and did not fully conform to NMT design principles of safety, coherence, attractiveness, and comfort (ibid.). Many of the facilities were discontinuous and were not properly segregated from motorized modes of transport (ibid.).

The government, at both the county and national level, have recognized the problems with NMT in Nairobi and have created plans to improve it. For example, the Nairobi City County Government passed an NMT policy in 2017 with several planned short-term and long-term actions for improving NMT (Nairobi City County Government 2015). The plan calls for expanding footpaths and cycle paths; building NMT facilities at major matatu stages; developing a streets and roads manual that includes guidelines for NMT; expanding and improving NMT crossings; and improving and expanding the street lighting to make NMT safer at night (ibid.).

Despite ambitious goals for improving NMT in Nairobi, the prioritization of these goals remains unclear. Prior to the 2015 NMT policy, Winnie Mitullah, one of the leading academics researching NMT in Nairobi and Kenya, suggested that several factors had contributed to the low priority of NMT: 1) Lack of clarity around which actor was responsible for various aspects of NMT; 2) Poor coordination of actors involved in implementing NMT; 3) No comprehensive national standard design guidelines for NMT infrastructure; and 4) A bias towards motorized transportation on behalf of decision-makers (Mitullah and Opiyo 2012).

It should also be noted that many transportation projects are funded by development agencies of foreign countries and multilateral organizations and they also have some influence on NMT planning in the projects that they fund.

Although there has been significant investment in projects for motorized transport in Nairobi such as road widening, building of ring roads, and road tarmacking, relatively little has been invested in NMT. Additionally, little is known about the project appraisal process and how this influences the transport projects that are prioritized.

The lack of clarity around how NMT infrastructure is prioritized and the factors that influence this priority is the primary problem that this thesis seeks to understand.

1.3 Research Objectives

The main objective of this research is to better understand the factors that influence prioritization of NMT infrastructure in Nairobi. The research also aims to understand how these factors influence prioritization of NMT.

1.4 Research Question

The main research question is:

"What factors influence the prioritization of NMT infrastructure in Nairobi?"

There are two sub-questions related to the main research question:

1) How do factors (as identified in the main research question) influence the prioritization of NMT infrastructure in Nairobi?
2) What is the level of priority for NMT infrastructure in Nairobi?

1.5 Significance of the study

The lack of NMT infrastructure and the poor quality of infrastructure in Nairobi and its impacts on users is well documented (Mitullah and Opiyo 2017b; Ogendi et al. 2013; Cummings and Obwocha 2018; Salon and Gulyani 2010; Safe Way Right Way and Kenya National Transport and Safety Authority 2017). Research has shown that poor NMT infrastructure is a factor in high road fatality and injury rates, low accessibility, low mobility, high cost of transportation, poor air quality, and social exclusion (Litman 2010). However, despite the fact that these issues are well researched and documented, much of the transportation planning in Nairobi is focused on road construction for motorized vehicles and other motor vehicle infrastructure to the exclusion of NMT (Mitullah and Opiyo 2017a). Transportation funding is disproportionately allocated to motorized transportation even though a majority of citizens in Nairobi use NMT.

Therefore, this study attempts to understand why NMT infrastructure is not given a high priority in the transportation planning hierarchy in Nairobi. Are appraisal mechanisms the main factor that explain why transport projects are chosen that prioritize private motorized travel over NMT? If appraisal mechanisms are not a significant factor, can other factors like cultural, political, financial, and technical factors explain this disconnect? Are there are other factors that are significant that are currently unknown? Some research has touched on some of these factors, but little research to date has comprehensively examined factors that influence prioritization of NMT infrastructure in Nairobi. This research attempts to explore these factors more completely.

Understanding these factors may better inform policymakers, planning practitioners, and advocates in Nairobi and Kenya in their effort to improve sustainable urban transportation and walking and cycling specifically. Having a more complete picture of the NMT context in Nairobi, from the perspective of prioritization, may also prove useful in comparing and contrasting the case to other cities in East Africa and Sub-Saharan Africa more generally. Many of these cities also face similar challenges in trying to manage and incorporate NMT infrastructure into their transportation systems in fast growing urban metropolitan regions.

1.6 Scope and limitations

This study is a case study of Nairobi. As such, the study was limited to Nairobi County. Cities or municipalities outside of the administrative area of Nairobi County were not included in this study. The two primary methods of data collection were analysis of secondary data from the Nairobi City County Government and other government agencies and key informant semi-

structured interviews with a variety of informants from respondents in government, civil society, academia, and the private sector.

Given that the data collection phase of this research was relatively short (4 weeks), the selection of key informants and scheduling of interviews was limited. It was not possible to interview every stakeholder involved in the NMT sector in Nairobi. Notably, no elected officials were interviewed in this study. This was not an intentional omission; the limited timeline and logistical challenges of setting up an interview with a politician simply did not allow for this. However, this research is not designed to capture every perspective from all individuals working in the NMT sector in Nairobi; the key informant interviews were designed to give a better general understanding of the factors that influence prioritization of NMT infrastructure in Nairobi.

Similarly, collecting and analysing documents in Nairobi was constrained by the timeline of the field work. Additionally, gaining access to this data was dependent on bureaucratic processes that did not allow for full unhindered access to the documents being sought. For example, comprehensive spatial data related to NMT infrastructure was extremely difficult to find in any of the government agencies contacted. Despite several efforts, this type of data, if it exists, was not made accessible. Therefore, other documents from non-profits in the sector, INGOs, trade journals, press releases, newspapers, and multilateral agencies were used to attempt to find the necessary data.

The purpose of this research is to offer greater insight and understanding into the factors that influence the prioritization of NMT infrastructure in Nairobi. The research will hopefully act as a building block to further research in this area but due to the nature of the limitations and scope of research, it is not exhaustive and should be viewed as a starting point for more investigation into the topic. Additionally, because it is a single case study, the external validity to other contexts will be limited although it may serve as a guide for similar research in other cities.

Chapter 2: Literature Review / Theory and Conceptual Framework

2.1 Literature Review

This literature review consists of three sections. The first section reviews the literature on Sustainable Urban Transportation (SUT) approaches to transportation planning in cities and how NMT fits within these approaches. Literature on SUT was chosen because NMT is a significant aspect of SUT and is often viewed as a complementary component to other sustainable transport modes such as public transport.

The second section discusses literature about factors that influence the prioritization of NMT. Much of this literature is about project appraisal with a specific emphasis on how economic, environmental, and social criteria are used in project appraisal mechanisms. Other factors discussed in this section include cultural factors, policy coordination between different levels of government and implementing agencies, political/governance factors, social advocacy, and technical capacity.

The third and final section reviews literature about the priority of NMT as it relates to other modes of travel.

2.1.1 Sustainable Urban Transportation and the role of NMT

The concept of Sustainable Urban Transportation (SUT) has grown out of the broader theory of sustainable urban planning and the even broader concept of sustainable development. Sustainable development has been defined in many ways by many different academics, institutions, and organizations. The concept was popularized in 1987 with the publication of the Brundtland Report (World Commission on Environment and Development 1987). It defined sustainable development as, "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (ibid.). This definition has since been debated, refined, and applied to many different sectors including the urban planning and transport sector. For example, a commonly accepted concept of sustainable urban planning uses three core pillars of sustainability: 1) Economic sustainability; 2) Environmental sustainability; and 3) Social sustainability (Campbell 1996). Campbell (1996) theorizes that these three pillars form a type of triangle with each pillar at the vertices and the urban planner at the middle of this triangle trying to balance these sometimes complimentary and sometimes conflicting goals.

The three pillars of economic, environmental, and social sustainability are widely used in the study of SUT (Litman 2016; Bakker et al. 2014; Buehler and Pucher 2009). There is disagreement on the relative importance of each of these pillars and authors such as Campbell (1996) argue that a perfectly balanced equilibrium between the three pillars is impossible to achieve in urban planning. However, the majority of authors studying SUT generally use the trio, or some derivation thereof, of economic, environmental, and social sustainability as the basis of their theoretical approach to the subject.

The agreement on the three pillars of sustainability has led to a popularization of approaches to SUT that attempt to balance economic growth with the protection and improvement of the natural environment while also being socially inclusive (Litman 2016).

These sustainability approaches have contributed to the mainstreaming of concepts in transport planning such as compact urban growth, mixed-use urban development, transit-oriented development, multi-modal transportation systems, non-motorized transportation, and transport demand management (Litman 2017; Wright 2012)

2.1.1.1 Economic Sustainability

In relation to economic sustainability, a sustainable transportation system is one that: "…is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy" (The Centre for Sustainable Transportation 2005). The European Union also uses a very similar definition for economic sustainability of transportation systems (ibid.).

Given the emphasis on affordability, efficiency, choice, and support of economic vibrancy, research on this topic generally examines how sustainable modes of transport such as public transport, walking, and cycling supports these goals. For example, research at the household level has shown that families save substantially on transportation costs when they live in locations with high levels of public transportation service versus locations with little or no public transportation service (Cervero and Arrington 2008).

Research related to the economic sustainability of SUT has typically focused on the economic benefits of public transportation networks by studying factors like travel time, direct monetary costs, operating costs per unit of travel, capital costs, and linkages between nodes of housing settlements and nodes of employment (Miller et al. 2016).

Research on NMT with respect to economic sustainability is less well developed but there is a growing body of research examining the economic benefits of walking and cycling, particularly when trips by walking and cycling replace trips by private motorized vehicles (Litman 2010). There is also increasingly more research on the health benefits of walking and cycling relating to healthier populations and improvements in air quality, both of which have economic benefits as they reduce healthcare costs (Rojas-Rueda et al. 2012).

2.1.1.2 Environmental Sustainability

Much of the research on environmental sustainability in the urban transportation sector is focused on the environmental impacts of the growth of private vehicle motorization and the environmental solutions to these problems offered by other transportation modes such as public transportation, walking, and cycling (Ernst 2011; Pirie 2013; Wright 2012).

The findings in academic literature on the environmental sustainability of urban transportation generally suggest that non-motorized modes of transportation have fewer negative effects on the environment than motorized modes. This is primarily due to the fact that walking and cycling produce few or no carbon emissions and other harmful air pollutants and also require relatively less energy input compared to motorized modes of travel. More energy intensive modes of transport such as buses, trains, and private automobiles produce more carbon emissions and air pollutants; non-renewable extractive resources are also required for the manufacture of fossil fuelled and electric transport vehicles (Woodcock et al. 2007). The varying energy requirements and other environmental impacts of different urban transport modes has led to a ranking of transport modes based on criteria such as: 1) Per capita energy consumption; and 2) GHG emissions per person (Litman 2016). The types of energy used to produce electricity to power electric vehicles such as trains, trams, and battery electric vehicles are also taken into consideration when determining the environmental sustainability of transport modes. The use of such indicators usually results in NMT ranking highly for environmental sustainability. Public transport ranks lower than NMT but higher than private automobiles and single occupant motorized vehicles tend to rank poorly due to their high energy use per person.

The environmental problems associated with the rapid growth of private vehicle motorization, particularly in the developing world in rapidly urbanizing countries, impact both the natural and built environment (Ernst 2011). In the natural environment, these impacts include auto-

centric low density suburban development that leads to loss of natural habitat such as wetlands and forests; increases in air pollution from tailpipe emissions; increases in atmospheric CO_2 emissions from fossil fuel combustion that contributes to climate change; increases in impervious surfaces to accommodate motor vehicles such as paved roads and parking lots that change natural watersheds and exacerbates flooding; and consumption of natural resources, both renewable and non-renewable, to produce motor vehicles and to fuel their movement (Ernst 2011; Wright 2012; Bakker et al. 2014).

With respect to the built environment, research has shown that vehicle motorization has contributed to: an increase in noise and vibration; high concentrations of particulate matter that is harmful to human health; human injury and death from collisions; and increases in urban temperature due to an increase of paved impermeable surfaces (Ernst 2011; Wright 2012).

Various solutions have been offered to these problems. In SUT theory, the Avoid-Shift-Improve model is one of the most popular approaches offered to address these problems. The core tenets of the Avoid-Shift-Improve model are:

- Avoid – Reduce demand for motor vehicle trips;
- Shift – Shift modes of travel from private motor vehicle trips to public transit and/or NMT; and
- Improve – Improve infrastructure and vehicle efficiency standards to make motor vehicle travel more efficient (Wright 2012; Bongardt et al. 2011).

The Shift aspect of the Avoid-Shift-Improve model is the most specific to NMT. To achieve this shift to NMT, Wright (2012) recommends that cities: 1) Repair and improve pedestrian/non-motor vehicle infrastructure by repairing or building sidewalks and cycle paths; 2) Make road crossings safer for pedestrians and cyclists; 3) Light sidewalks and cycle paths; 4) Improve landscaping; and 5) Make walking and cycling routes more direct.

2.1.1.3 Social Sustainability

The study of social sustainability as it relates to SUT generally focuses on the impact of transportation infrastructure and policies on those who benefit and those who bear the cost (Pirie 2013; Godard 2011). More specifically, the research is focused on the impacts of transportation on typically marginalized groups of people such as the elderly, children, women, people with disabilities, minority groups, and the poor (ibid.).

Compared to economic and environmental sustainability, social sustainability, as it relates to SUT, has historically received less attention and study (Grieco 2015). However, there is a growing interest in the topic. Much of the research in this area focuses on urban mobility and accessibility for marginalized groups.

Xavier Godard defines urban mobility as "…the action of moving in order to carry out activities located in urban space" (2011: 238). Researchers studying mobility and social sustainability often study *who* is served by transportation networks, how much it costs, and the level of service offered to different groups of people (ibid.).

Accessibility refers to the spatial distribution of amenities and services in a given geographical area (Grieco 2015). The literature shows that poor accessibility to employment, amenities, schools, shopping and other services is a likely contributor to social exclusion (Boschmann and Kwan 2008).

Many authors view improvements in NMT as a significant factor in making urban transportation more socially sustainable. They argue that improvements in NMT improve mobility and accessibility (Litman 2010). Literature shows that NMT networks can improve

connections with public transit making multi-modal trips easier and faster (ibid.). Studies also show that NMT is cheaper than other modes of transportation especially compared with owning and operating a private vehicle (ibid.).

Although social sustainability is distinct from economic and environmental sustainability, there is still some overlap between the sustainability pillars. For example, in the case of social sustainability, improvements in connecting marginalized groups of people to employment clusters and amenities means that they will likely have more employment opportunities. This directly impacts their economic sustainability. Additionally, less of their income will be spent on transportation if lower cost forms of transport such as public transport and NMT are made safer and more efficient and replace trips by private motorized transportation which tends to be more expensive. Improving NMT and public transportation in marginalized communities can also lead to a reduction in motor vehicle emissions and result in better air quality. This contributes to a more sustainable environment.

2.1.2 Factors Influencing the Priority of NMT Infrastructure

Several factors play a role in determining the prioritization of urban transport infrastructure relating to NMT. This section specifically reviews literature on six factors that influence the priority of NMT in sustainable urban transport: 1) Appraisal mechanisms; 2) Cultural attitudes towards NMT; 3) Co-ordination of planning and implementing agencies involved in NMT infrastructure; 4) Politics and governance; 5) Social advocacy; and 6) Technical capacity. These six factors were chosen based on a literature search on factors influencing priority of NMT. All of the factors that came up in the search were written down and grouped into broader themes. The six factors listed are based on these themes.

2.1.2.1 Role and Importance of Project Appraisal in Prioritizing Sustainable Urban Transportation Projects

This section reviews literature relating to project appraisal in SUT. Literature on economic, environmental, and social sustainability, as it relates to project appraisal in the urban transportation sector, is reviewed with a specific emphasis on NMT.

2.1.2.1.1 Economic Sustainability Criteria and Project Appraisal in Urban Transportation Projects

Economic appraisal is one of the most well-developed aspects of project appraisal in urban transportation projects. Economic appraisal can take the form of appraisal of a specific transportation project and it can be analysed at a microeconomic level; economic appraisal can also analyse a project at a macroeconomic level (Hook 2011).

Perhaps the most known tool used in this field is cost-benefit analysis (CBA) (Awasthi and Chauhan 2011). However, there are many ways to conduct a CBA and there is much disagreement on the best method for appraising transportation projects and policies. “Standard economic project appraisal in the urban transport sector generally compares the cost of a transport sector investment, usually a road, to a stream of benefits resulting from the investment” (Hook, 2011: p. 361). The anticipated benefits usually include factors like travel time savings for motorists, fuel savings, and reductions in motor vehicle operation (ibid.). These savings are then multiplied across the anticipated number of users for the proposed project (ibid.).

The traditional type of CBA is widespread in practice throughout the world in transportation project appraisal but it has been criticized for a variety of reasons. For example, Hook (2011) argues that CBAs of urban transport projects rarely offer comparisons to alternative projects

like a proposed road project versus an investment in mass transit. Therefore, decision makers lack a good understanding of the costs and benefits of alternative projects. Hook (2011) also criticizes CBAs for drawing macroeconomic conclusions from microeconomic analysis. Another criticism of using a CBA in economic project appraisal is that the body or people tasked with appraising a project may also have a bias in promoting a specific project (Mackie and Preston 1998). This can result in a CBA that is biased to a predisposed outcome instead of a CBA that appraises a project objectively. Mackie and Preston (1998) suggest that to reduce bias, appraisal bodies should be separate from the project; projects should be open to public scrutiny; and projects should be evaluated ex-post to see how closely they match the projections in the CBA.

Despite the criticisms of CBAs, literature suggests that it is still a useful tool for project appraisal in relation to NMT (Borjesson et al. 2014). Conducting CBAs for NMT projects is relatively new in the field of urban transport appraisal but there is a growing body of literature dedicated to this type of research. For example, recent research, using CBA, has attempted to quantify the value that cyclists place on travel time savings; the findings suggest that cyclists place a very high value on travel time savings and will cycle more when their cycling trip time is reduced as a result of better cycling infrastructure (Börjesson and Eliasson 2012).

At a macroeconomic level, Buehler & Pucher (2009) used the case study of Freiburg, Germany to show that increases in public transport and cycling, as a share of total trips, had a positive correlation to strong economic growth in Freiburg and a significant increase in per-capita income from the early 1980s to the mid-2000s (ibid.). Investments in mass transit and cycling infrastructure, in this time period, resulted in a lower percentage of trips taken by private motor vehicle compared to transit and cycling. Private motor vehicle trips dropped from 38% to 32% of total trips, cycling trips increased from 15% to 27% of total trips, and public transport increased from 11% to 18% of total trips (ibid.).

Another study in Jefferson, County, Alabama, USA analysed over 5000 property transactions from 2004 to 2008 and found a strong positive correlation between locations with high walkability scores using Walk Score™[1] and high property values (Rauterkus and Miller 2011). Conversely, locations with a low Walk Score™ had lower property values (ibid.).

CBA has also been used to compare the costs and benefits of cycling versus driving in Copenhagen (Gössling and Choi 2015). This study showed that when CBA is used to assess the cost of accidents, climate change, health, and travel time between cycling and driving, the cost to society is Euro 0.50/km for driving and Euro 0.08/km for cycling (ibid.).

Due to the relatively recent application of CBA to NMT, the methodology is not as refined as it is for other transport modes and there is a lack of standardized assessment methodology. However, as research continues to grow in this field, these gaps are starting to be addressed (Van Wee and Börjesson 2015).

2.1.2.1.2 Environmental Sustainability Criteria and Project Appraisal in Urban Transportation Projects

The most known and used tool for appraising the environmental sustainability of urban transport projects is an Environmental Impact Assessment (EIA). The purpose of an EIA is to evaluate the environmental effects or consequences of a proposed project and to propose

[1] Walk Score is a company that ranks the walkability of a location based on the time it takes to walk to amenities from that location. A location with a high walk score means that an individual can walk to most or all amenities within five minutes. Low walk scores mean that most amenities are more than 30 minutes by walking. (https://www.walkscore.com/methodology.shtml)

measures or alternative solutions to mitigate these effects (Replogle 2011). There are several different kinds of EIAs used in different contexts but the United Nations Environmental Program recommends several key elements that should be included in all EIAs: 1) Political support and commitment; 2) Legal basis with regulations and guidelines; 3) Provision for public involvement; 4) Consideration of actions likely to have significant environmental effects; 5) Mechanisms for reviewing the quality of an EIA report; 6) Measures to ensure quality and compliance by authorities and decision-making bodies; 7) Role for environmental agency in EIA process administration and decision-making; and 8) Technical capacity to conduct an EIA (Abaza et al. 2004).

Although the use of EIAs for urban transport projects has been growing throughout the world, many researchers have been critical of their use. Data from a study in Spain, using a survey of practitioners involved in transport planning, showed that many practitioners felt that public participation was lacking in the EIA process and that EIAs were not specific enough to transport planning issues (Soria-Lara et al. 2015). Other research suggests that EIAs often do not consider the full life-cycle energy inputs and greenhouse gas (GHG) and pollution emissions in the transportation sector for vehicles, infrastructure, fuel production, and supply chains (Chester and Horvath 2009). Additionally, many EIAs do not consider the costs and benefits of other potential projects in comparison to the project being evaluated such as building or expanding a roadway versus building or improving a public transport link (Replogle 2011).

Litman (2016) suggests that a number of indicators need to be included when evaluating sustainable transportation to address the critiques of environmental assessment discussed above. Some of the indicators recommended are: 1) Per capita GHG emissions; 2) Per capita emissions of other air pollutants; 3) Portion of populations exposed to high levels of traffic noise; 4) Per capita land devoted to transportation facilities; 5) Amount of land preserved as high-quality wildlife habitat; 6) Average size of roadless wildlife preserves; and 7) Non-renewable resource consumption in the production and use of vehicles and transport facilities (ibid.).

Much of the academic research on environmental impact, as it relates to NMT, has focused on the environmental impacts of shifting transport modes from private motorized vehicles to walking and cycling modes. For example, a study of the metropolitan region of Barcelona showed that a shift of 40% of trips from private automobile to cycling would result in a significant decrease in $PM_{2.5}$[2] resulting in an improvement in local air quality (Rojas-Rueda et al. 2012). A more recent study examining the impacts of polluted air exposure on pedestrians and cyclists found that the health benefits of increased physical activity among this group significantly outweighed the risks of higher exposure to polluted air; the study also found that health benefits would be even higher if there was a mode shift from automobile travel to physically active modes of travel due to reduced air pollution (Tainio et al. 2015).

Although there is an increasing amount of academic literature showing the environmental benefits of shifting transport modes from automobile travel to NMT (Ernst 2011; Miller et al. 2016; Joumard and Gudmundsson 2010; Dalkmann and Brannigan 2007), it is not clear from the literature to what extent municipalities are currently engaging in this type of analysis when

[2] $PM_{2.5}$ refers to fine particulate matter that is 2.5 microns in diameter or less. Particulate matter generally refers to the mixture of matter (solid or liquid) suspended in the air. $PM_{2.5}$ in urban areas often consists of aerosols, dust, smoke, and ash. These particles can easily enter the human respiratory system through breathing and contribute to and worsen respiratory illnesses such as asthma and lung disease (Government of Ontario 2018).

conducting EIAs for NMT or other urban transport projects. This gap in the literature suggests that there is an opportunity for further study on the topic.

2.1.2.1.3 Social Sustainability Criteria and Project Appraisal in Urban Transportation Projects

Appraising the social sustainability aspects of urban transport projects is relatively new compared to economic and environmental appraisals. However, research on the social aspects of urban transportation (Boschmann and Kwan 2008; Grieco 2015) has led to more serious consideration of social sustainability in urban transport projects. A traditional CBA generally focuses on the aggregate financial or economic benefits of a particular project (see section 2.1.6) but a social assessment focuses more on *who* receives the benefits and how these benefits are distributed amongst different groups of people (Vasconcellos 2011). Authors such as Litman (2016) and Vasconcelles (2011) argue that equity should be a key consideration when evaluating the social sustainability of a transport project.

There is a growing body of academic literature devoted to developing indicators to measure social sustainability. Litman (2016) suggests a number of possible social sustainability indicators for use in sustainable transportation: 1) User satisfaction rating of transport system by disadvantaged users; 2) Per capita injuries and fatalities resulting from transport collisions; 3) Portion of population walking and cycling 15 minutes or more per day; 4) Degree to which cultural or historic values are reflected and preserved in transport planning decisions; 5) Quality of transport services and access for non-drivers; 6) Portion of budgets spent on transport by lower income households; 7) Quality of transport facilities and services for disabled individuals; 8) Quality of walking and cycling conditions; 9) Portion of travel to school and other local destinations by walking and cycling; and 10) Amount of planning involvement by disadvantaged and vulnerable groups.

Recent research has focused on developing sustainable transportation indicators (economic, environment, and social) that can be used to compare cities to each other so that they can be ranked globally on their sustainable transportation performance (Haghshenas and Vaziri 2012). Research by Haghshenas and Vaziri (2012) used a meta-analysis of 17 studies on sustainable transportation indicators to develop 3 indicators each for comparing the economic, environmental, and social sustainability of transport across cities. The social sustainability indicators focused on the safety of the transportation system, the accessibility of the system, and the variety of transportation modes available per person (ibid.).

The literature suggests that there are no universally agreed upon indicators for social sustainability in urban transport. However, many researchers in this field agree on the need for municipalities to: 1) Include social indicators when evaluating urban transportation to measure aspects such as safety, affordability, and accessibility; and 2) Use consistent indicators over time so that progress on social sustainability can be measured and trends can be accurately identified (Chakhtoura and Pojani 2016).

With respect to NMT, the research shows that cities with good quality walking and cycling infrastructure and high walking and cycling modal share generally perform well with respect to social sustainability indicators. For example, Haghshenas and Vaziri (2012), in their comparative analysis of sustainable transportation in 100 cities worldwide, found that the top performing cities scored highly on social sustainability and had modal share of NMT above 30%.

2.1.2.2 Cultural Attitudes About NMT

Cultural attitudes of residents in a city or region can play a significant role in the prioritization of NMT infrastructure in a city. The specific link between cultural attitudes towards NMT and its prioritization in terms of infrastructure development is not as clear as the other factors in the literature. This may be due to the fact that less research has been done in this area. However, attitudes about NMT especially among decision makers or those with political and cultural influence can impact the kind of transport infrastructure that is prioritized and eventually built. When people value specific modes of transportation, these modes typically receive a higher priority than others.

In a paper reviewing the literature on the determinants for commuting by bicycle, the authors found that attitudes, social norms and habits played a role in determining whether people chose to commute by bicycle (Heinen et al. 2010). Generally, people's attitudes are more positive about private automobile use than cycling (ibid.). However, perhaps unsurprisingly, research shows that those who cycle to work and those considering cycling to work have a more positive attitude towards cycling as a mode of commuting (ibid.) Personal perceptions of positive health benefits as a result of cycling can also impact the likelihood of someone choosing cycling as a commuting option (ibid.).

Heinen et al. (2010) also found that social norms were also an important influence on the choice to use a bicycle for commuting. For example, if people's co-workers rode their bicycle to work, they were more likely to ride their bicycle to work (ibid.)

In developing countries, and especially in Africa, there is an association of cycling as a mode of travel for poor people. Results of a household travel survey in Bamako, Mali and Ouagadougou, Burkina Faso found that people viewed cycling as a mode for poor rural people and they feared being seen as poor if they were seen riding a bicycle (Pochet and Cusset 1999). People in developing countries also often see cycling as a sign of a backward economy when compared to developed countries with high rates of motorized travel. For example, the Chinese government actively discouraged bicycle use as its economy began to grow and more priority was given to motorized transport (Oldenziel 2017).

In developed countries, there is also a divide in attitude about cycling. A study on bicycle use of Asian and African immigrants in Australia showed that they associated cycling as a means of transport for the poor because those were the people that cycled in their country of origin; but they also viewed cycling in Australia as elitist because many cyclists in Australia rode expensive bikes and wore expensive cycling gear when they cycled (Law and Karnilowicz 2015). A study on transport modes in Montreal and Vancouver also found that walking and cycling was more prevalent in gentrified inner-city neighbourhoods and that this preference among upper-middle income residents resulted in more investment in NMT infrastructure in those neighbourhoods (Danyluk and Ley 2007).

The cultural attitude of motorization being a sign of progress is one factor that leads to the prioritization of motorized transport over non-motorized modes. However, from the literature it appears that once a certain level of socioeconomic development is reached, there is a shift in citizens attitudes towards NMT due to the environmental and health benefits of these modes and NMT is reprioritized as a result. However, the developed country cities that achieve higher NMT use only do so when they invest in infrastructure that is accessible, comfortable and overall of high quality (Poudenx 2008).

2.1.2.3 Coordination Within and Between Implementing Agencies

Coordination of policy is a significant factor that influences the priority of NMT infrastructure projects according to the literature. Not only does transport policy influence the priority of projects, but land-use policy in coordination with transport policy also influences the degree to which people will choose to use NMT. Policy coordination between implementing agencies within a city or metropolitan region is also a factor that can influence the priority of NMT.

Few studies analyse NMT policy specifically; usually it is grouped within a broader sustainable transportation policy. This is partly because NMT users also use other modes of transport and sometimes multiple modes in the same trip. For example, one might be a pedestrian while walking to a transit stop and then continue their trip using transit. Similarly, a cyclist might cycle to a suburban commuter rail station, park their bicycle, and then continue their trip by train.

Nonetheless, the studies on SUT policy offer useful insights into how these policies also shape the priority given to NMT infrastructure. For example, a comparative analysis of SUT policies in Seattle, USA; Montreal, Canada; and Curitiba, Brazil found that a mix of land-use policies, greenhouse gas reduction policies, active transportation policies, and transit master plans led to relatively high usage of public transport and NMT modes (Mercier et al. 2016).

A study in Singapore found that regulations on private automobile use such as high taxation and congestion charging in central areas coupled with extensive and affordable transit led to high usage of public transit and NMT (Diao 2018). Land-use policy allowing for dense nodes of commercial and residential areas around public transport hubs also contributed to high rates of public transit and NMT modes (ibid.). Singapore also used revenue from congestion charges to fund implementation of SUT projects (ibid.).

Both Mercier et al. (2016) and Diao (2018) suggest that some level of centralization of transport planning and implementation is necessary to achieve significant mode shifts from private motorized modes of transport to SUT. In Kenya there are several implementing agencies that have a role in planning and constructing NMT infrastructure but there is not one central planning agency overseeing all of the urban transportation projects in Nairobi (Mitullah and Opiyo 2012). This lack of policy coordination between agencies relates to the governance structure of a municipality and higher levels of government and will be discussed more fully in the next section.

It should be noted that the transportation context in Sub-Saharan African cities is much different than developed countries because many African cities already have high percentages of NMT users. However, as these cities have grown in population and wealth, growth in private motorization has grown significantly and the trend may continue, as happened in many cities in developed countries, without coordinated policies that encourage SUT and discourage private motorization.

2.1.2.4 Politics and Governance

According to the literature, governance is a crucial factor that influences local government priority of NMT (Pirie 2013; Mitullah and Opiyo 2012; Sagaris 2010; Klopp 2012). Governance at local, regional, and national levels all play a role in influencing investment in NMT. However, governance functions differently in different contexts, and therefore the level of influence of various levels of government differs depending on the governance structure of a given municipality; governance structures also change over time.

In this section, two aspects of governance will be discussed based on existing literature: 1) The effect that different systems of governance have on local government investment in NMT;

specifically, the interplay of local, regional, and national government actors, with respect to NMT, will be examined; and 2) The influence of the political process on local government priority for NMT.

In many developing countries, the delineation of responsibilities for urban transport governance is often unclear. In the Kenyan context, Mitullah and Opiyo (2012) discuss this issue in depth and note that, "The lack of coordination, overlap of functions and responsibilities, the lack of an Integrated Transport Policy, as well as bias towards motorised transport, continue to affect the efficient governance of the sector". Additionally, many cities in Sub-Saharan Africa do not have a central transportation agency, at the municipal level, that governs all aspects of transport like those found in large cities in developed countries. For example, Transport for London (TfL) governs almost all sectors of urban transportation in London including the subway, buses, cycle lanes, sidewalks, and transportation demand management policies (Transport for London 2018).

Gordon Pirie (2013) notes that large cities in East Africa such as Kampala and Nairobi have fragmented transport governance systems. One of the major challenges, according to Pirie, is the private control in the paratransit (*matatu*) sector which makes it difficult for those cities to implement a comprehensive and integrated approach to sustainable urban mobility (Pirie 2013). Jacqueline Klopp (2012) suggests that the fragmented governance of transport also serves the interests of patronage networks that are connected to various government ministries and agencies involved in Nairobi's transportation system that are resistant to change and benefit from the status quo. The lack of a centralized transportation agency and lack of clear jurisdictions allows for a governance system with little transparency and makes it difficult for the public to meaningfully engage on major transportation infrastructure plans and projects (ibid.). Lake Sagaris (2010) also argues that strong democratic governance is an important factor in building NMT infrastructure. This is because it is usually the poor and middle class, whom have little political influence, that are the most dependent on walking and cycling for their primary mode of transport in developing countries (ibid.).

The influence of political leaders, particularly at the municipal level can also have an important impact on prioritizing NMT infrastructure. A popular mayor with a strong mandate and a supportive administration can significantly influence the priority and implementation of NMT projects. For example, former mayor of Bogota, Colombia, Enrique Penalosa, made significant progress in prioritizing NMT infrastructure and implementing large NMT projects during his time as mayor; he campaigned on a platform of prioritizing public transport and NMT and showed strong political will to follow through on his vision despite vocal opposition (United Nations Environment Program 2017). Similarly, former mayor of New York City, Michael Bloomberg, had a strong vision for prioritizing NMT during his time in office from 2002-2013 (Sadik-Khan 2016). It was part of a larger strategic plan called PlaNYC and the prioritization of walking and cycling infrastructure was a result of the Bloomberg administration believing that encouraging more NMT trips would provide more mobility options in a growing and gridlocked city (ibid.). The emphasis on prioritizing NMT, especially cycling infrastructure, was initially met with a lot of resistance because many drivers did not want to lose road space to cycling lanes. However, Bloomberg remained committed to the plan, infrastructure was built and there was a sharp increase in NMT mode share as a result (ibid.).

The literature shows that both the system of governance and political decision makers influence the priority of NMT infrastructure.

2.1.2.5 Social Advocacy

Social advocacy is another significant influence on the prioritization of NMT in urban transportation. The literature suggests that strong citizen led efforts to improve NMT are usually a prerequisite for a change in policy that emphasizes the role of NMT in urban transportation (Gwilliam 2002; Sagaris et al. 2017; Sorensen and Sagaris 2010)

Sherry Arnstein (1969) theorized, in her seminal work on citizen engagement, that there was a ladder of citizen participation. At the lowest rung of the ladder, citizens are manipulated and 'educated' about what is best for them by those in power (ibid.). The higher rungs of the ladder involve more meaningful participation whereby citizens actually influence the decision-making process through different forms of engagement (ibid.). Arnstein argued that at that time in the United States poor people and minority groups were participating at the lower rungs of the ladder (ibid.). She used examples of urban renewal efforts in major US cities to support this theory. Minorities and the poor were either not participating or participation was akin to tokenism where feedback was solicited by decision-makers but it did not actually influence the decision of an outcome (ibid.).

Arnstein's ladder of participation is still influential as a theory when examining the types of participation that occur in urban planning and urban transportation planning in cities throughout the world.

Lake Sagaris (2010) discusses how the transportation planning policies of Santiago, Chile changed to focus more on NMT, and specifically cycling, as a result of a well-organized civil society organization (CSO) that partnered with international funding organizations and advocated for more sustainable transport. However, Sagaris suggested that much of the success of the CSO was due to the funding, technical expertise and other resources provided by the external funding organizations (ibid.). Sagaris also argued that the relatively new democratic structures in Chile were not as participatory as they were in more mature democracies and that the partnership with international funding and advocacy organizations helped the local organizations be more united, articulate and influential in their advocacy for better NMT infrastructure (ibid.).

Kenya, like Chile, also has relatively new democratic institutions and a relatively new constitution enacted in 2010 which entrenched more democratic citizen rights compared to the previous constitution (Republic of Kenya 2010; Klopp 2012). Klopp (2012) argues that this growth in democratic institutions and citizen rights in Kenya could make the transportation planning process more participatory and democratic and allow more space for advocacy groups to push for more sustainable and equitable forms of transportation. Klopp suggests that historically, transportation planning in Nairobi was not very participatory and inclusive of lower-income citizens (ibid.). During colonial times, transportation planning served the needs of the colonial administration and in the post-colonial era it was biased towards the upper classes and rarely considered the needs of the lower classes living in Nairobi's informal settlements (ibid.).

In a developed country context, research shows that community led advocacy is no less important in changing transportation policies to focus more on NMT (Clifton et al. 2014). In a study of 4 low-income and traditionally underserved communities in different parts of the United States (Michigan, Georgia, Tennessee, and Oregon), Clifton et al. (2014) found that public involvement and engagement was critical in the visioning and planning process for improving NMT on streets in these communities. In discussing the importance of community support, Clifton et al. state,

> This [community support] is particularly important when soliciting ideas and input from communities such as the disabled, low income families, and communities of colour. Although Individuals within public agencies were able to take a leadership role, this was often heavily influenced and complemented by strong public support (2014).

Another example of community advocacy leading to prioritization of NMT infrastructure is in Davis, California. Davis, regarded as one of the most bicycle friendly cities in the USA, invested in significant cycling infrastructure in the 1960s after a citizen led effort to prioritize cycling infrastructure in the city's transportation policy (Buehler and Handy 2008). In the early stages of advocacy, the citizen group started a petition calling for better bike infrastructure and campaigned for pro-cycling candidates in the municipal election; the petition garnered over 2000 signatures in a city with fewer than 20,000 residents (ibid.). The group was well organized and had broad support in the city; they were specific in their demands and made arguments for investing in bike infrastructure based on the health and economic benefits of cycling (ibid.). After a number of pro-bicycle candidates won seats in the municipal election, the group took on a more consultative role with the city to give feedback on proposed plans and designs for cycling infrastructure (ibid.).

The literature shows that in both developing and developed country contexts that public involvement in influencing policy and decision making is essential for prioritizing NMT in transportation planning and investment.

2.1.2.6 Technical Capacity

The literature suggests that technical factors also influence the level of local government priority of NMT. The main technical factors are: 1) Interest by engineers and technicians in NMT (Gwilliam 2002); 2) Experience and proficiency of technical staff in NMT planning and design (Mitullah and Opiyo 2017a; Gwilliam 2002); 3) Presence of planning department specializing in NMT (Gwilliam 2002); 4) Reliable data and relevant benchmarking tools (Clifton et al. 2014; Balsas 2017); and 5) Existence of NMT design standards that are understood and applied by technical staff (Balsas 2017).

Mitullah & Opiyo (2017) state that part of the reason African cities prioritize their transport systems towards motorized vehicles is that urban transport planners received training that exclusively emphasised planning for motorized transport. This is beginning to change as some planners are starting to recognize the importance of NMT but many transport planning departments throughout Africa are still dominated by auto-oriented planning (ibid.).

The concept that urban transportation is much broader than just moving motorized vehicles has not been mainstreamed in urban transportation planning in Sub-Saharan Africa (Sietchiping et al. 2012). Sietchiping et al. (2012) argue that the social, economic, physical, and environmental dimensions of urban transportation are all important considerations in planning for urban mobility in Sub-Saharan African cities. Keeping the demographic, safety, and social aspects in front of mind during transportation planning and design would lead to a greater priority for pedestrians and cyclists (ibid.).

2.1.3 Prioritizing NMT

This section reviews literature on the prioritization of NMT infrastructure in two specific areas: 1) Policy; and 2) Financial investment. There are other factors that influence the priority of NMT and its corresponding infrastructure. However, generally, there needs to be a specific NMT policy with a corresponding implementation plan that determines the level of priority given to NMT with relation to other modes of transport. Secondly, sufficient funding needs to be in place to realize the goals set out in the policy and corresponding plans. The level of

funding allocated for different modes of transport in government budgets is generally a good indication of which modes have been prioritized.

2.1.3.1 Policy

A study comparing municipal policies between cities in the Netherlands and their impact on cycling rates found that municipal policies have a clear and significant impact on individuals' modal choice over short distances (Rietveld and Daniel 2004). Specific policy variables that were significant, amongst others, were: 1) Improving attractiveness of cycling as a mode; 2) Making competing modes more expensive; 3) Improving the safety level of cyclists and their satisfaction with cycling; and 4) Provision of direct routes and reducing numbers of stops for cyclists (ibid.). This shows that there needs to be an emphasis on providing infrastructure that improves safety and makes cycling more direct and efficient if people are to choose it as a viable transportation mode.

Another significant policy tool that is important in prioritizing NMT infrastructure is land-use policy. Typically urban development that is compact and mixed-use (mixing residential and commercial uses) coupled with high quality walking and cycling infrastructure achieves a higher modal share of walking and cycling (Litman and Steele 2018). This requires streets within and connected to mixed-use developments to accommodate multiple modes of travel by including sidewalks, cycling lanes and intersections that are safe for all users (ibid.).

A comparison of sustainable transportation policies from Latin America showed that some policies were more effective than others in prioritizing NMT infrastructure and sustainable transport more generally (Hidalgo and Huizenga 2013). Countries were grouped into three policy categories: 1) Basic; 2) Initial; and 3) Intermediate (ibid.). Countries with basic policies were just considering proposals and plans for sustainable transport; countries at the initial level gave national level support to sustainable transport actions like mass transit systems and fuel standards; and at the intermediate level countries allocated national funding for a range of sustainable transport options like mass transit and cycling infrastructure (ibid.). Countries at the intermediate level also had significant coordination between transport, environment, health and urban development agencies in terms of sustainable transport policy (ibid.). The authors of the study argued that only countries that embraced *Avoid-Shift-Improve* policies, as discussed in section 2.1.1.2, for sustainable transport would realize higher modal share of NMT and public transport (ibid.).

Having a policy that supports sustainable urban transportation and NMT is necessary for improving NMT infrastructure. However, implementing a policy that prioritizes NMT needs to be accompanied by the appropriate implementation tools and authority to realize the policy goals. A case study of five local transport authorities in England showed that despite national transport policies aimed specifically at reducing the growth in motorized transportation, the local authorities were often constrained from implementing the policies due to: 1) Other public policies that worked at cross-purposes to sustainable urban transport policy; and 2) Lack of autonomy and funding to implement policies (Hull 2008).

2.1.3.2 Finance

Several authors have identified finance as a significant influence on government implementation of NMT projects (Mitullah and Opiyo 2017a; Gwilliam 2002; Balsas 2017). Usually the priority of a specific service or type of infrastructure can be determined in part by the amount of funding it is allocated vis-à-vis other expenditures. In a developing country context, such as Kenya, funding for services and infrastructure is influenced by the government sector, private sector, and aid sector.

The government sector, as it relates to financing, encompasses local, regional, and national governments. Cities have different financing structures for government funded NMT infrastructure depending on the governance system in their local context. Often, local governments rely on transfers from higher orders of government to fund local NMT infrastructure and many facilities are co-funded by two or more levels of government. For example, in the United States federal funding is often available specifically for NMT projects such as the implementation of NMT pilot programs (Balsas 2017). This cooperation can work well when local, regional, and national governments have aligned interests for NMT but it can be problematic when interests are in conflict with each other. In the Kenyan context, there is often not a clear mechanism in place for national government funding of municipal NMT projects (Mitullah and Opiyo 2012).

Private sector investment in NMT specific projects is rare because it is difficult to directly charge users for using infrastructure like sidewalks and bicycle lanes (Gwilliam 2002). Generally, NMT infrastructure is non-rivalrous and non-excludable unlike a toll road or public transit system, so it serves as a public good (Buchanan 1965). As a result, the private sector has little incentive to invest directly in this kind of infrastructure.

In some contexts, the private sector may in fact be opposed to investment in NMT, believing that it would harm their financial interests. For example, in Nairobi, and many other Sub-Saharan African cities, much of the public transit system is owned and operated by the private sector in the form of paratransit; typically these are 14 seat minibuses called *matatus* (Mitullah and Opiyo 2017a). The *matatu* operators believe that more allocation of road space to pedestrians and cyclists would come at the expense of road space used by *matatus*, increasing motor traffic congestion and therefore limiting their revenue earning potential (ibid.). Furthermore, making walking and cycling more attractive may encourage existing *matatu* customers to choose active modes of transportation instead of patronizing *matatus* (ibid.).

The aid sector also plays a significant role in influencing financial investment in NMT both directly and indirectly:

> The [development] agencies have committed financial and technical resources in commissioning studies and funding several projects in Kenya and Tanzania. A number of these studies, especially those by JICA, World Bank, SIDA and the African Development Bank, have contributed significantly to the visibility of NMT infrastructure in many urban road projects and to the development of policy and the National Road Safety Action Plan, 2006/2010 for Kenya (Mitullah and Opiyo 2017a).

Many of the urban transportation infrastructure projects in Sub-Saharan Africa such as roads, railways, and airports are often funded by multilateral institutions such as the World Bank and AfDB as well as foreign government development agencies and increasingly consortiums of Chinese companies backed by the Chinese government (Zafar 2007). However, the specific influence of foreign funding agencies and governments on NMT in Nairobi and other Sub-Saharan African cities is an area that is relatively underexplored in the existing literature when compared to other sectors such as resource extraction and other hard infrastructure investments. This is an area of research that could be investigated further to more fully understand the nexus between multilateral/foreign government influence on local government investment in NMT infrastructure.

2.1.4 Literature Review Conclusion

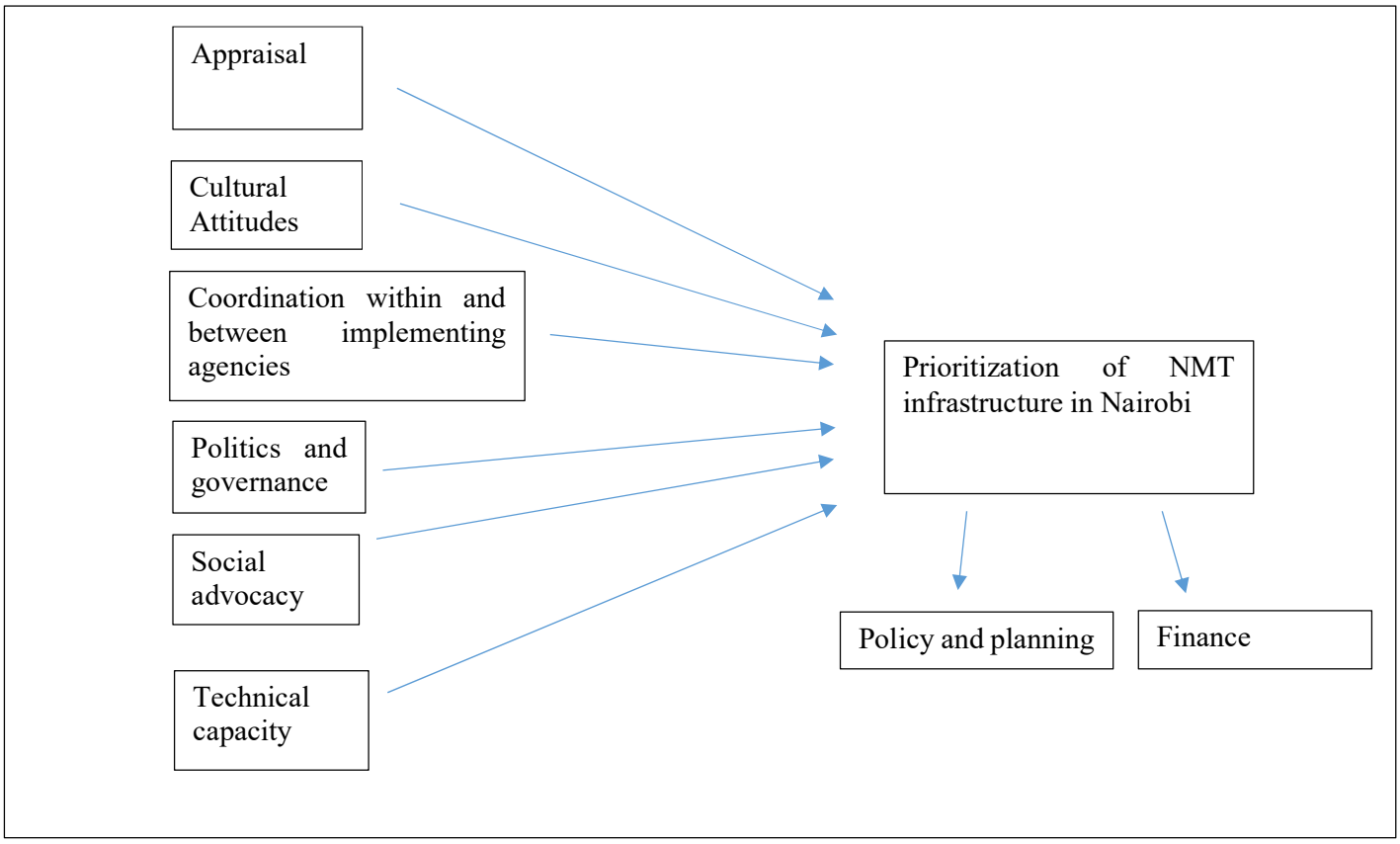
The literature has shown how NMT fits within the broader context of SUT. There is a growing body of research suggesting that NMT provides economic, environmental, and social benefits as part of a sustainable urban transportation system.

The literature also showed that approaches to evaluating transport project appraisal are evolving, as they relate to evaluating economic, environmental, and social aspects. These new approaches are attempting to more accurately capture and quantify the benefits and costs of NMT.

The literature review discussed other factors that influence the prioritization of NMT infrastructure such as cultural attitudes, policy coordination, politics and governance, social advocacy, and technical capacity.

Finally, the literature review examined the priority of NMT by reviewing how it is incorporated into policies in various cities and countries throughout the world and how it is financed.

2.2 Conceptual Framework



Chapter 3: Research Design and Methods

3.1.1 Research Question

The main research question is:

"What factors influence the prioritization of NMT infrastructure in Nairobi?"

There are two sub-questions related to the main research question:

1) How is the prioritization of NMT infrastructure in Nairobi influenced by the factors found in the main research question?
2) To what extent is NMT infrastructure prioritized in Nairobi according to policies, plans and financial commitment?

3.1.2 Operationalization: Variables and Indicators

Variables	Sub-variable	Indicator	Data
Factors influencing priority of NMT infrastructure in Nairobi	Economic assessment mechanism	• Existence of economic assessment mechanism • Type of economic assessment mechanism	Key informant interviews
	Environmental assessment mechanism	• Existence of environmental assessment mechanism • Type of environmental assessment mechanism	Key informant interviews
	Social assessment mechanism	• Existence of social assessment mechanism • Type of social assessment mechanism	Key informant interviews
	Cultural attitudes	Attitudes towards NMT by decision-makers	• Key informant interviews
	Coordination within and between implementing agencies	• Level of coordination within agencies • Level of coordination between agencies	• Key informant interviews • Policy documents

	Politics and governance	Priority given to NMT infrastructure by decision-makers and implementing agencies	• Political platforms • Key informant interviews
	Social advocacy	• Presence of NMT advocacy groups • Level of cohesion between advocacy groups	• Key informant interviews
	Technical capacity	Technical capacity to implement NMT infrastructure	Key informant interviews
Prioritization of NMT infrastructure in Nairobi	NMT policy and planning	• Policies with goals and targets for NMT • Plans linked to NMT policies	Secondary data
	Funding committed to NMT infrastructure	• Level of budget allocation to NMT infrastructure by local and national government • Funding allocated to NMT infrastructure by external governments/donors	Secondary data

Table 1: Operationalization table

3.1.3 Research Strategy

This research will be a case study. A case study is a useful methodology when little is known about a specific topic because it allows a researcher to study a situation in great detail with an emphasis on depth rather than breadth. Furthermore, a case study approach allows for a mix of inductive and deductive research (Van Thiel 2014). Some of the factors that influence prioritization and implementation of NMT infrastructure in Nairobi have been studied to some degree while others have been explored less. Therefore, a mix of inductive and deductive methods will be used for the research.

3.1.4 Data Collection Methods

Two data collection methods will be employed in this research; one method is inductive and the other method is deductive. The inductive method will consist of semi-structured key informant interviews and the deductive method will be collection of documents.

The decision to use semi-structured key informant interviews as a data collection method was chosen because it can capture qualitative data that may not be available from document collection. The aim of interviewing key informants was to understand what factors influence

the priority of NMT infrastructure in Nairobi. A key person from an International Non-Governmental Organization (INGO) specializing in NMT research assisted in the selection of suitable key informants. The snowball approach, whereby key informants recommend other key informants, was also used. Key informants from government implementing agencies, civil society, academia and the private sector were chosen. Key informants were chosen based on their professional role and relevant experience with respect to the NMT sector in Nairobi.

The decision to choose these informants was informed by the literature review. The literature identified key factors that influence the priority of NMT infrastructure such as inter-agency coordination, advocacy, appraisal mechanisms, and technical capacity. As a result, respondents from government implementing agencies were chosen to get a better understanding of policy, plans, appraisal mechanisms used, and technical capacity. Informants from civil society were chosen to better understand the role of advocacy in NMT infrastructure prioritization. Academics were able to speak to a broad range of factors due to their role in researching the NMT sector in Nairobi and Kenya more broadly. The private sector consultant also had a lot of experience working with various aspects of NMT planning, research, and evaluation in Nairobi. Although each of the respondents had different areas of expertise professionally, they also offered insights into other aspects of NMT in Nairobi based on other experiences in Kenya outside of their professional role. These insights allowed for a richer and more complete picture of the factors examined in this case study. In total 11 interviews with 12 respondents were conducted. See section 4.2 for a breakdown of the respondents by respondent group.

The interview question guide was developed based on the literature review. The general guide for questions went as follows:

1) Can you please explain your role and professional background?
2) What role do you and/or your organization play in road infrastructure and NMT infrastructure specifically in Nairobi?
3) What kind of appraisal mechanisms are in place when doing urban road projects?
4) What kind of economic evaluation mechanisms are in place?
5) What kind of environmental evaluation mechanisms are in place?
6) What kind of social evaluation mechanisms are in place?
7) What kind of implementation has happened for the NMT goals and objectives set out in the 2015 Nairobi City County NMT Policy?
8) What are the main factors that influence the implementation of the Nairobi City County NMT Policy?
9) Can you describe the influence of advocacy groups on decision-makers in terms of advocating for NMT infrastructure?
10) Can you describe the political will for investing in NMT infrastructure?
11) Can you describe the financial capacity for investing in NMT infrastructure?
12) Can you describe the technical capacity with respect to NMT infrastructure projects?
13) Are there factors, besides the ones that we have talked about, that influence the prioritization of NMT infrastructure in Nairobi?

The above guide was not used verbatim when asking questions, it was only a guide. In many circumstances, follow-up questions were asked based on the response given by a respondent to get more information about a specific factor or situation.

Time constraint was a factor when interviewing respondents. That meant that not all questions could be asked from the guide in all interviews so some questions had to be prioritized over others. This prioritization was based on the specific expertise of the respondents. For example, a respondent from a government implementing agency would likely have more expertise on the implementation process of infrastructure than someone from civil society or academia.

The decision to collect secondary quantitative data from a variety of sources was chosen to better understand the current policies and plans with respect to NMT infrastructure in Nairobi. Secondary data was also used to determine what level of financial allocation was being committed to NMT infrastructure by various government implementing agencies. Examples of documents collected were annual budgets, annual reports, political manifestos, and transportation policies. Sources for these documents included the Kenya Ministry of Transport, government implementing agencies, and academic studies.

3.1.5 Data Analysis Methods

The data from the key informant interviews was recorded, transcribed, and coded using ATLAS Ti. This software is specifically designed to analyse qualitative data. The interviews were coded using a code list with indicators from the operationalization table. Once the interviews were coded, they were analysed to determine what factors had an influence on the prioritization of NMT infrastructure in Nairobi. The analysis also sought to determine how these factors influenced the prioritization of NMT infrastructure in Nairobi.

Document analysis consisted of finding data as it related to the prioritization of NMT infrastructure in Nairobi. Specifically, data on NMT policy and planning was analysed along with funding levels for NMT projects allocated in government budgets.

Given that this study is primarily qualitative in nature, efforts have been made to ensure that that the quality of the research is trustworthy. The concept of using trustworthiness in qualitative research was popularized in the 1980s (Spiers et al. 2002). Validity and reliability, popularly used in ascertaining the quality of quantitative research, is less relevant to qualitative research because qualitative research rests on the premise that there is not one single reality upon which inquiry can converge (Guba 1981). Rather, naturalistic inquiry assumes that there are multiple realities (ibid.). Therefore, the concept of trustworthiness is better suited for assessing the quality or rigour of qualitative research. The concept of trustworthiness as defined by Guba (1981) consists of four aspects: 1) Credibility; 2) Transferability; 3) Dependability; and 4) Confirmability.

This study attempted to maintain credibility by interviewing informants that were involved professionally in the subject in question, checking interviewee responses with other documents for triangulation, and identifying common responses and themes that emerged from multiple respondents. It should be noted that not every claim or response from interviewees was able to be triangulated with documentation. Therefore, there was more reliance on common responses or themes emerging between interviewees. As a result, some claims or responses may be less credible than others.

The study attempted transferability by developing thick descriptions for each factor being studied and relating the findings back to the literature discussed in the literature review. Interviewees from many different backgrounds were also chosen so that multiple points of view were considered.

The use of document analysis to complement the responses from interviewees strengthens the dependability of the study. Additionally, all interviews were recorded and transcribed. Copies of each transcription have been kept by the author should any of the interviewees, or others, wish to verify the responses. Dates and locations were also recorded for all interviews. Respondents were also given a copy of the final report.

Finally, confirmability was attempted by basing many of the questions on the literature review. This shows that the assumptions in the questions were based on findings from other research

and studies. It should be noted that as the interviewer completed several interviews, common themes began to emerge even before the analysis occurred and this likely influenced how and with what emphasis questions were asked in later interviews. This is a common characteristic with qualitative research because the researcher is embedded in the process. This does not mean that the responses from interviewees are any less valid. Rather, it is a recognition that the researcher, as a human, is constantly shaping their assumptions based on their environment and interactions with others. In some instances, this can help the researcher focus on certain themes emerging from respondents and gain greater insight into these themes. However, it also means that the researcher may develop some blind spots because they may begin to harden some assumptions that may be challenged by other information that is overlooked or under-investigated. In this study, the researcher attempted to balance this by using the interview question guide in all interviews even though themes were emerging in later interviews.

Chapter 4: Research Findings

This chapter is organized in three parts:

1. Description of the case studied;
2. Description of the study sample; and
3. Presentation and analysis of data with respect to the main research question and sub-questions.

4.1 Description of Case Study

The case study examined the factors the influenced the priority of non-motorized transportation (NMT) infrastructure in Nairobi. The study also examined the level of priority of NMT infrastructure in Nairobi by analysing policies, plans, and financial allocation to NMT infrastructure projects.

4.2 Description of Sample

The primary method of data collection was a series of semi-structured interviews with key informants. These key informants were grouped into five distinct groups: 1) Academics; 2) Civil society; 3) Donor agencies; 4) Government ministries and implementing agencies; and 5) Independent consultant.

Typically, one interview was conducted for each respondent, however there was one interview with two respondents from a civil society group. In total 11 interviews were completed with 12 total respondents.

Informant Group	Number of Interviewees	Respondent Number
Academics	2	5, 6
Civil Society	3	2, 3, 7, 12
Donor agencies	2	8,9
Government ministries and implementing agencies	3	4, 10, 11
Independent consultant	1	1

After the interviews were transcribed, they were coded using variables based on the literature review. These variables made up the code groups for the coding strategy with sub-codes representing sub-factors within the code groups.

Overall, six main factors were identified as having influence on the priority of NMT infrastructure in Nairobi: 1) Appraisal mechanisms; 2) Cultural attitudes; 3) Coordination within and between implementing agencies; 4) Politics and governance; 5) Social advocacy; and 6) Technical capacity.

Some of the responses touched on more than one factor and some responses also had multiple factors intertwined with each other. Therefore, multiple codes were used to code some responses.

Document analysis was also used in the data collection process primarily to determine the level of priority of NMT infrastructure. These documents consisted of policies, plans, and financial information relating to NMT infrastructure such as government budgets.

4.3 Presentation and Analysis of Findings

This section will first present the findings from the analysis of the independent variables and then the analysis of the dependent variable. Finally, there will be an analysis of how the independent variables influence the dependent variable.

The presentation of the independent variables will consist of interview quotes from the respondents for each variable. The quotes are used to show the role that each factor plays in influencing the priority of NMT infrastructure in Nairobi. There will also be some discussion for each factor about how the responses relate to the existing literature, as discussed in the literature review, to show how respondent data supports or diverges from existing theory about the subject. Each section begins with a quote to give the reader a sense of the direction that each section will go. This acts as a sort of teaser quote or 'cold open' to pique the readers interest and hopefully draw them further into the text.

The dependent variable (priority of NMT infrastructure) is presented through policies, plans, and financial allocations to NMT. The decision to use these documents was based on the literature review which shows that policy, planning, and finance are important indicators in determining the priority of NMT infrastructure.

4.3.1 Independent Variables

The independent variables consist of the factors that influence the priority of NMT. These factors are analogous to the factors discussed in the literature review.

4.3.1.1 Appraisal

> *"…historically NMT has not really featured in the standard financial appraisal of a project…" (Respondent 2)*

Generally, the respondents from agencies responsible for implementing projects (government and donor agencies) stated that there are appraisal mechanisms in place for evaluating urban transportation projects. However, there are no current mechanisms in place that evaluate NMT infrastructure projects specifically. They are usually evaluated as part of a larger road project that includes NMT infrastructure.

Respondent 4 (government group) stated that lack of data was a significant impediment to evaluating NMT projects specifically:

> *"…our problem is data. We are not very good at collecting data so while you ask me for this sort of data now and not even we have it. We don't collect the data when we are doing our projects and most likely when we finish we don't. So most of the time we don't really have an appraisal process that we do."*

Respondents from the civil society and academic groups believed that appraisals took place but the access to economic, environmental, and social appraisal reports for transportation projects were very difficult to access. Respondent 5 (academic) stated: *"I think this appraisal thing is a good thing and I'm sure it's being done and done well. But it's just not so open…"*

With respect to openness of appraisal processes, respondent 6 (academic) said:

> *"What I know is that they do environmental analysis...there is an organization called NEMA. It's the environmental impact. They should also do social impact. I rarely see that.*

I really do a lot of reading on these things. I look for these reports; they should be made public. I rarely see them."

Speaking about appraisals conducted by donor agencies, respondent 5 (academic group) said:

"Appraisal tend to be done by this quote on quote 'development partners' who are into infrastructure and it tends to be usually...it's not well disseminated. Even when you want to get appraisal is like digging a grave. I don't know how easy you have been able to get. It's very difficult for them to give appraisal. They do appraisal, they keep them, they are internal documents."

Some respondents, particularly those from civil society, were more sceptical about the reasons why appraisals were difficult to access. For example, respondent 7 (civil society) said:

"Unfortunately, those things are really hidden. Even today we are still looking for...we are trying to look or get hold of the designs for certain roads in the city. So, it's something that the road authority will hold close to their hearts or their chest. Even the City County doesn't have it unfortunately. So, there is a bit of mistrust amongst the agencies. They never share those designs. So, that's where the anomalies start. And, of course, that becomes a barrier to public participation. You can not participate in anything that you don't even see. Otherwise it would be really easy to even influence a design."

Respondent 2 (civil society) also noted that the public engagement process for urban transportation projects at the appraisal stage was not very transparent:

"...despite the fact that stakeholder engagement is one of the key things that need to take place in a project, there is not much transparency in terms of what the design is, how it will actually impact you, those kinds of conversations don't really take place.

…they either don't want to share with you because it's not sufficiently detailed and they're afraid that if you scrutinize it, you might be able to note all those things and really stall the project. And in other cases it's the stakeholder engagement is more or less something that you are ticking off the box."

The above responses from the interviewees show that there are two major issues with project appraisals for urban transport projects in Nairobi: 1) Access to reliable data; and 2) Openness of the appraisal process to the public.

The literature on appraisals did not discuss data reliability to the same degree as other issues. This could be due to the fact that much of the literature focused on cities in developed countries where data collection and access to data is more reliable.

However, the literature did discuss the importance of appraisals being open to public scrutiny (Mackie and Preston 1998). Mackie and Preston (1998) suggest that this is one of the most important aspects of reducing bias in appraising transportation projects. The lack of transparency in the appraisal process in Nairobi, as noted by the interviewees, suggests that the likelihood of bias in the process will be much higher according to the literature.

Economic Appraisals

For larger road projects that include NMT, the NMT is not economically evaluated separately from the road project according to respondent 4 (government):

"...the biggest problem as I told you was the NMT is seriously underfunded. So, unless you are doing a big project and most of the big projects are road projects...and then the road projects will include the NMT as part of it. So, once they do the economic evaluation,

they'll do the economic evaluation for the road but not economic evaluation for the NMT."

Some of the criteria used for economic appraisal of road projects include estimating the economic value of a proposed road by determining the number of people that will use it according to respondent 10 (government):

"...if it's urban then it is which settlement is it [proposed road] serving? Or which particular industrial area is it serving? And what value is it? And to be able to come up with such an information then there is what we call traffic count that is done and then the traffic count will inform the estimated number of users at that particular time and then that is projected for a longer period given the growth rate of motorization in the country. And therefore, we use that to project the usage and also, the economic activities around...economic and settlement activities around the area where we want to place the road."

However, the same respondent also stated that traffic counts typically emphasise the role of private automobile users:

Interviewer: *Do these traffic counts also capture the number of pedestrians, the number of cyclists, number of matatu users?*

Respondent: *Yeah, it does although in most cases the main target is the motor vehicles.*

Respondent 11 (government) stated that feasibility studies for road projects never recommend against constructing a road:

"I'm yet to see any feasibility study that point out that a road that the government wants to do is not necessary. It seems to me like they are always done to justify what was already decided."

Respondent 11 (government) also mentioned that traffic studies, conducted as part of feasibility studies, typically emphasize the movement of private automobiles:

"...the provision of the infrastructure is normally guided by the traffic studies. And traffic studies is normally based on the number of cars they have managed to count. So, they decide on the type of pavement, they decide on the type of alignment they want to provide based on the number of cars they have been able to study or the number of people from point A to point B. They don't actually count the number of people moving from point A to point B. They count the number of cars moving from point A to point B. So, the decision is based on the number of cars and not the number of people or where people are going from to but where cars are going from to.

...all the criteria used for analysis and decision-making regard to the type of pavement and the type of alignment provide geometrically. It's based on the car population not the people population. So there has been that gap even during the study.

If for example you are doing an origin-destination survey for a person walking it would be quite different for origin-destination survey for a car. So, I think they need to improve and design specific analysis criteria different for the car. And even for the car the focus has always been on the private car. We've not found models on integrating analysis or separating the analysis for the public service vehicle and the private car."

The issue of focusing primarily on private motorized vehicles for economic appraisal of urban transport projects is one of the main criticisms mentioned in the academic literature (Hook 2011). Only recently have researchers begun to quantify the economic costs and benefits associated with NMT infrastructure projects (Borjesson et al. 2014; Van Wee and Börjesson

2015; Buehler and Pucher 2009; Rauterkus and Miller 2011; Gössling and Choi 2015). Almost all of this newer research has been conducted in Northern European and North American cities. The lack of economic appraisal for NMT in Nairobi is consistent with the literature that showed this was primarily being used in developed country cities and even then, only recently and not very widespread.

Respondent 4 from the government group stated that not doing NMT specific economic evaluations for past NMT focused projects was a lost opportunity to quantify the economic benefits of this type of infrastructure:

> *"...where we could have done that [economic appraisal] and it was really a success is and actually it should have been done and it was a very good project. There is a road here...but it's called Mama Ngina Street. You see how it is...we have Java. After we did it, one of the issues was the property values went up. Right now, you can not even get a shop there. Everybody wants to put a shop there because it is...it became safer, there is no congestion and there is a lot of space. So, once it was done it became a hit for businesspeople and now everybody wants it to be done…"*

The project the respondent is referring to is a pedestrianization project of a road in Nairobi's CBD. Much of the road was pedestrianized reducing the vehicle travel lanes to a single one-way travel lane and the rest of the space was given over to walking and enhanced landscaping (Mitullah and Opiyo 2012).

This response shows that the absence of an economic appraisal for an NMT project meant that there was no formal quantification of the economic benefits accruing from the street retrofit to make it more pedestrian friendly.

However, the increase in land values after the road was pedestrianized is consistent with the findings in the literature showing a significant correlation between improved walkability and higher land values (Rauterkus and Miller 2011).

Quantifying and understanding the economic benefits and costs of a project is an important aspect of prioritizing a project. The lack of such quantification of economic costs and benefits for NMT projects in Nairobi means that decision makers are working with incomplete information when deciding which urban transport projects to prioritize.

Environmental Appraisal

Environmental appraisals are also performed for road projects in Nairobi but not the NMT component of these projects specifically. Environmental impact assessments (EIA) for road projects evaluated the construction impacts such as noise and dust during construction, but when asked if EIAs capture aspects such as changes in air quality once the facility is completed, respondent 10 (government) stated: "*At the moment, no. We know that increased motorization in a particular area due to road construction, once a road has been completed we need to monitor air quality because of pollution."*

Respondent 11 from the government group also mentioned that many of the major road corridors in Nairobi have been designated for several years so many EIAs do not consider alternative route selections:

> *"But in terms of routes, route identification and all that, the corridors already exist. So, they've already been a study to tell whether...even the economic evaluation was already done. So, we just deal with the resettlement action plans and the environmental studies and then we now mitigate the social factors and the environmental factors and then we move in."*

Similarly, respondent 1 (private consultant) stated that EIAs typically evaluate issues that arise during construction as opposed to the long-term impacts of the proposed facility:

> *"EIAs are done…they tend to look at its influence on the people in the surrounding area. They tend to be very how do I put it...not really deeply detailed per se from the little I have got to hear. There is a look at existing land use and relocation of especially informal settlement areas. There is also a bit of look into how aspects such as dust will affect the people in the area during the construction phase."*

None of the respondents provided an example of an EIA on an urban transport project that evaluated aspects such as long-term changes in air quality or carbon emissions. That does not mean that this kind of analysis never occurs in an EIA process in Nairobi. However, throughout the course of this study, such an EIA was never found through desk research nor were the respondents able to produce such an appraisal document.

The literature suggested that EIAs, within the sustainable urban transport paradigm, need to consider factors such as GHG emissions, other air pollutants, noise, and consumption of non-renewable resources (Litman 2016; Chester and Horvath 2009). The responses from interviewees suggest that this kind of detailed analysis does not occur when EIAs are conducted for urban transport projects. Such analysis would likely lead to a higher prioritization of NMT projects given its lower negative environmental impacts compared to motorized transport infrastructure as discussed in the literature.

Social Appraisal

Social appraisals, like economic and environmental appraisals did not evaluate NMT facilities specifically. However, social appraisals were used for urban road projects that sometimes included NMT infrastructure. In some cases, social appraisals are combined with environmental appraisals and are known as Environmental and Social Impact Assessments (ESIA). The emphasis of social appraisals was generally on resettlement of citizens that needed to have their homes moved for the construction of a road facility. Respondent 3 (civil society) stated:

> *"…once they do the Social Impact Assessment, that's when they know if, let's say a road requires people to be moved from that place to a different place so they check and see if this is actually a viable project or is it going to be too expensive for the government…"*

Respondent 10 (government) stated the importance of Social Impact Assessments (SIA) for resettling affected citizens: *"…issues of resettlement are considered. Although we may have one or two [SIAs] that may not have purely followed that but generally that one is done. And where resettlement need to be done it is done. So, we are doing it."*

Apart from resettlement of citizens, none of the respondents provided specific examples of other criteria that was included in SIAs. Respondent 1 (independent consultant) suggested that this was a critical oversight because it neglected to evaluate aspects such as use of facilities by vulnerable road users:

> *"…their view of transport projects tends to be not one of moving people but moving vehicles. And therefore, you end up ignoring things such as land use, you end up ignoring things such as influence on different vulnerable groups in society. Good examples include Thika Road, Thika Superhighway Development and the Outer Ring Road that has now brought a lot of problems around insecurity, around safety for women and children and such areas."*

The emphasis on resettlement of citizens in SIAs in Nairobi appears to be the primary focus according to the respondents. The literature suggests that best practice for SIAs should be much broader in scope. The scope should include aspects like the safety of transport systems,

accessibility of the system specifically for vulnerable and marginalized populations, and transportation modes available per person (Haghshenas et al. 2015; Litman 2016). Considering that most residents of Nairobi do not own or have access to a motorized vehicle, broadening the scope of SIAs to include the travel needs and preferences of lower-income and socially vulnerable populations would likely lead to a higher priority of NMT infrastructure given that this is the mode of travel most often used by these groups.

4.3.1.2 Cultural Attitudes

> *"People still think that for instance if they see you cycling it's because you're broke, you can't afford any other means of transport. Or if they see you walking, it's because you can't afford anything better." (Respondent 12)*

Cultural factors were mentioned by many respondents across groups as a significant factor that influenced the priority of NMT facilities in Nairobi. Four sub-factors were used to categorize the responses that related to culture: 1) Awareness of benefits of NMT; 2) Classism; 3) Perceived success of travel mode; and 4) Societal views of NMT.

Awareness of benefits of NMT

Several respondents mentioned that decision-makers in Nairobi did not have a good understanding of the economic, environmental, and social benefits of NMT and this resulted in NMT being a low priority in transportation projects in the city. This appears to be consistent with the findings on the appraisal mechanisms used to evaluate urban transportation projects in Nairobi as discussed in the previous section. One of the key findings from that section was that the benefits and costs of NMT are not sufficiently analysed and as a result poorly understood.

With respect to decision-makers, respondent 5 (academic) said increased awareness of NMT would help them prioritize NMT projects when they negotiate infrastructure partnerships with donors:

> *"...it's also this sensitization and awareness and people who are in charge of policy and negotiation being what you would call advocates of these things that we are talking about. They need to be aware first and then become advocates, then they are able to question in the negotiations with development partners."*

Government respondents also mentioned that greater awareness of the benefits of NMT by decision-makers would have an effect on the prioritization of NMT. Respondent 4 (government) stated:

> *"...we need to convince them of what benefits we would accrue by doing NMT projects as opposed to a car-oriented project and it should be presented in such a way that it is understandable. So, I think how we present the benefits is really important because the issue here is just funding."*

This lack of awareness by decision-makers on the benefits of NMT can likely be explained, at least in part, by the shortcomings in the appraisal processes discussed in the previous section. The economic, environmental, and social costs and benefits of NMT infrastructure are not sufficiently quantified and disseminated to decision-makers and the general public.

Classism and Perceptions of Success by Travel Mode

Several respondents mentioned that NMT is generally perceived as a travel mode for poor citizens. This societal perception, according to the respondents, is a factor in limiting the prioritization of NMT because wealthier citizens, whom typically have more societal influence, are more likely to advocate for infrastructure that serves private motor vehicles. Respondent 6

(academic) suggested that most high-income individuals would rarely choose to walk versus drive if given the choice:

> "*…it has also to do with the class. Class in terms of status. Most normal people, ordinary people would walk. They walk but there is a certain class of people that may not be very willing to walk. Probably citing either security issues or such like things…*
>
> *…But the issues of social status come in from a sociological point of view. We all want to drive a vehicle and stuff like that. But ok maybe the middle class will always walk. The rich maybe not, actually not."*

Similarly, respondent 7 (civil society) said:

> *"…the culture towards cycling that when people cycle they would be seen as low-income or poor. And that is something that has been a barrier towards encouraging more people to adopt cycling or people who walk to work."*

The responses about NMT being viewed as a mode of travel for the poor are consistent with the literature which suggests that NMT, especially in developing countries in Sub-Saharan Africa, is viewed as a travel mode for the poor (Pochet and Cusset 1999).

Respondent 9 (donor) suggested that the priorities of poor people are rarely considered by government because they don't contribute as much tax revenue:

> *"…the projects, the prioritization of projects [audio incoherent] written by the poor people because they don't add in to the bigger national basket, never receive funding. That's the problem."*

Respondent 1 (consultant) also suggested that Nairobi's planning priorities had historically served the middle and upper classes:

> *"…the planning of the city has always tended towards being middle and upper classes, very little emphasis to the lower classes. So, even when there is talk of NMT as I said earlier, it is simply looked upon as an afterthought…so there is, I would say a knowledge gap there for those authorities, even from the users."*

The suggestion that Nairobi's planning priorities are biased towards middle and upper classes is an issue that was touched on in the literature review. Research showed that NMT infrastructure became a higher priority in neighbourhoods in gentrifying Canadian cities only after younger and wealthier residents moved to those neighbourhoods and started advocating for better walking and cycling infrastructure (Danyluk and Ley 2007).

However, respondent 11 suggested that some of the class-based attitudes with respect to NMT were beginning to change:

> *"…the general public is now appreciating the need for provision of NMT. Every forum you go to is no longer a case of class…NMT is now being viewed as a key requirement not only for moving from point A to point B faster and convenient but also for purpose of recreation and health."*

Although this aspect of newly changing attitudes towards NMT was not explored in great depth in this study, it is an interesting finding and deserves further exploration. The literature suggested that once a city or society reaches a certain level of affluence, there is a shift in thinking towards NMT as citizens become more cognizant of environmental and health issues (Oldenziel 2017; Law and Karnilowicz 2015; Poudenx 2008). No literature was found in the literature review that explored this phenomenon in African cities. This suggests that there is some nuance needed when discussing the theory that residents always aspire for motorized

means of transport as their incomes increase. Given Nairobi's recent economic growth it is possible that some of the younger and more affluent citizens are shifting their views on NMT as they start thinking more about the recreational, environmental and health benefits of different travel modes. Further research on citizens' views of NMT, according to demographics, could elucidate the significance of this alleged change in views and the reasons for this recent shift in attitudes.

Societal Views of NMT

The societal views of NMT were also mentioned as a factor in the prioritization of NMT projects. Specifically, the historical societal views of NMT from the late colonial and early post-colonial era had an influence on how NMT was prioritized in Nairobi.

Respondent 7 (civil society) said that:

> *"…the master plan team of 1948 said that Nairobi was actually a mess. They cited cycling particularly as a problem, that there were too much bikes in the city.*
>
> *… the 1948 Master Plan site analysis specifically used the word 'cycling was a nuisance in Nairobi'. So, it indicates the special role of government, I mean if you connect it to the bylaws that banned cycling, the special role of governments and legal structures in killing some of the things that would actually be seen as sustainable today."*

The literature showed that a similar pattern occurred in China as the country began to industrialize (Oldenziel 2017). Cycling was deprioritized and more emphasis was placed on motorized travel. Motorization of travel was viewed as a sign of industrialization and progress (ibid.).

However, the same respondent noted that more recently the attitudes towards cycling and walking have started to change from an attitude of restricting cycling and walking to an attitude of encouraging these travel modes:

> *"…this change happened after 2000 in the new millennium era and we've seen an improvement in terms of allowing people to walk and bike in the city and allowing to go and encouraging people to linger in the city. Those kinds of things have been slow but have been surely are taking root."*

This is significant because the change in attitudes towards walking and cycling after 2000 coincides with a more free and fair democratic process in Kenyan politics. The role of colonialism, post-colonial politics, and democratization is not something that was explored in the literature review with respect to the prioritization of NMT infrastructure. However, it is a factor that deserves further exploration to determine what influence democratization has on urban transportation infrastructure.

4.3.1.3 Coordination Within and Between Implementing Agencies

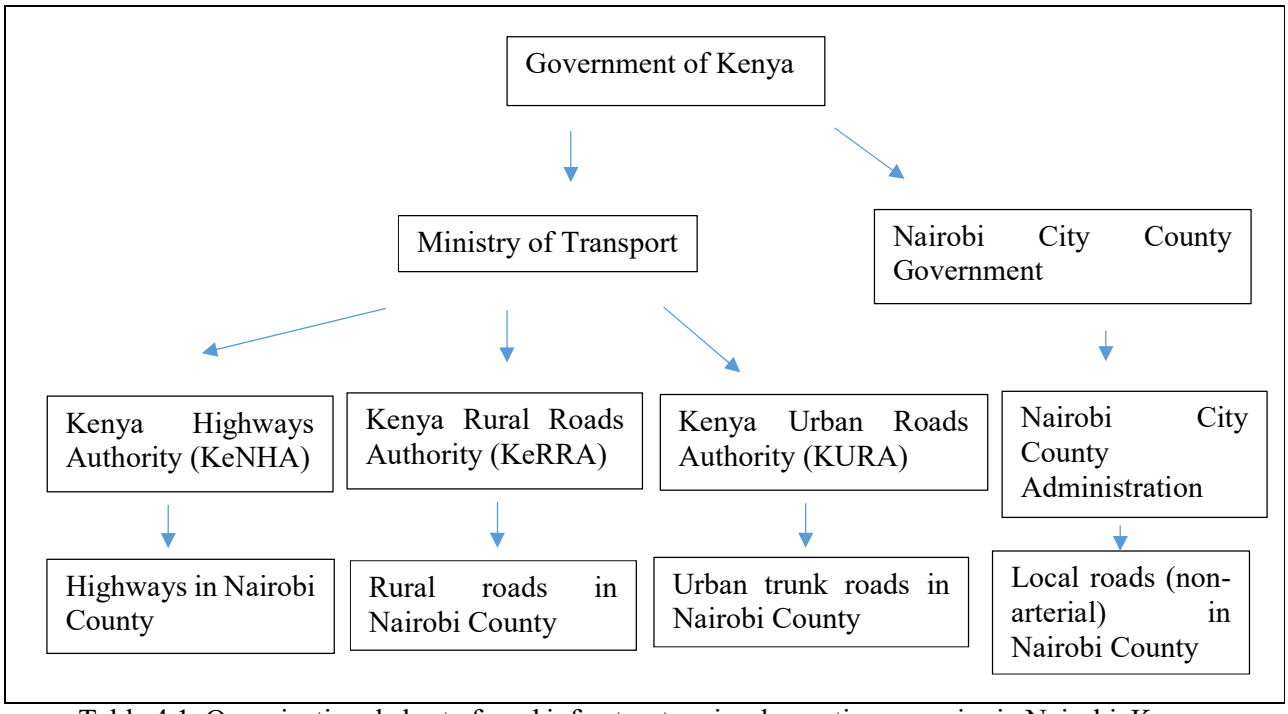


Table 4.1: Organizational chart of road infrastructure implementing agencies in Nairobi, Kenya

Table 4.1 shows that there are four different implementing agencies for road infrastructure in Nairobi. Three of the agencies are under the Government of Kenya's Ministry of Transport and one agency is under the Nairobi City County Government. The Government of Kenya, through the Ministry of Transport, fully funds KeNHA, KeRRA, and KURA. The Nairobi City County Government receives some funding from the Government of Kenya but also has its own revenue collection mechanisms such as property tax and other user fees.

Land use and transport planning

One of the central pillars of sustainable urban transport that was discussed in the literature review was the importance of land-use planning to encourage and make it easier for people to use more sustainable modes of transport such as public transit and NMT. This requires significant coordination within and between government agencies involved in transport planning and implementation of projects.

Several respondents mentioned that there was a disconnect between land-use planning and transport planning, specifically in the area of NMT. Respondent 11 (government) mentioned that connecting land use and transport planning should be an easy task:

> *"...connecting land use to mobility and access is not quite hard, it's very easy to study Nairobi and know where people live and where they work, how their pattern of movement is and identifying priority corridors which can be pedestrianized or cycle paths provided and deliberate contracts or deliberate interventions provided without having to look at the major public transport or car movement."*

However, other respondents suggested that there was a disconnect between land use and transport planning because priority for transport planning was given to higher-income areas of the city. Respondent 8 (donor) said:

"Roads are built in an area where maybe the rich or the one who can afford may live. You are not really building or bringing in a transport plan that would support road building or NMT for those who are living in a very bad or outskirts or slums in cities. So, there is a mismatch."

Respondent 9 (donor) suggested that planners were not sufficiently guiding the development of land use and this contributed to the disconnect between land use and transport:

"One is that silo mentality. The planners are busy working on their own. The developers are doing their own and actually the private sector is ahead of the public sector. Sometimes I wonder who is in charge. Who is supposed to be in charge?"

Another issue mentioned was that land use planning for Nairobi was the responsibility of Nairobi City County, but national government agencies were responsible for much of the implementation of infrastructure within the city. Respondent 7 (civil society) said:

"…land use planning is led by city hall but infrastructure, provision of basic infrastructure especially transport or mobility infrastructure is national government. That is where the disconnect starts."

The disconnect between land-use planning and transportation planning in Nairobi, as discussed by the respondents, and the resulting de-prioritization of NMT infrastructure aligns with the SUT theory which suggests that land-use and transportation planning need to be integrated to promote NMT. Additionally, having the municipal government responsible for land-use planning, but having national government agencies responsible for implementing transport infrastructure is considered poor practice by SUT theorists whom suggest that one level of government or metropolitan agency should be responsible for both land-use planning and transportation infrastructure delivery (Diao 2018; Mercier et al. 2016). The disconnect between various implementing agencies is discussed in more detail in the following section.

Intergovernmental coordination

Intergovernmental and inter-agency coordination was a factor in the prioritization of NMT in Nairobi. This factor was mentioned predominantly by the respondents from civil society and government.

Respondents stated that the lack of intergovernmental coordination with respect to NMT policy prevented NMT from being prioritized in a consistent manner. Respondent 7 (civil society) stated that because Nairobi's NMT policy was a Nairobi City County policy, it had little influence on other national government road agencies that implemented transportation infrastructure in Nairobi:

"Kenya Urban Roads Authority does provide road infrastructure in urban areas so it's not really the City County despite the fact that the City County is a custodian of the Non-Motorized Transport policy. So, you see a bit of piecemeal intervention but also disconnected interventions where the national government is providing infrastructure where the county government should be providing the infrastructure. So, the policy is not really, I would say is not home in national government that is domesticated at the county government."

Another issue that was mentioned was the fragmentation of agencies and the ambiguity of their roles and responsibilities with respect to implementing projects in Nairobi. However, one government respondent argued that the roles and responsibilities were very clear in terms of which agency was responsible for different types of road infrastructure. Respondent 10 (government) said:

"The roles are very clear in that there is what we call classification of roads. So, roads that fall under certain classification are addressed by KURA. And then roads that fall under certain classification are addressed by the County Government. So, it's clear on which type of road within your County you are going to address and they are listed and they are named and KURA knows that this road is under us, this other one is under County government. So, each party knows its place."

However, another respondent from government (respondent 11) stated that there is confusion about which agency is responsible for different roads in Nairobi:

"It's currently not possible to get a clear jurisdiction. We are kindly doing a lot of roads that are generally meant to be done by the County. The other way around is very...is always not possible. The County deems roads that are meant to be done by us. It's always the other way around. We are always doing roads that are meant to be done by the County."

The same respondent added that this jurisdictional confusion was a barrier to implementing NMT infrastructure:

"...because of that confusion and uncertainty with regard to what network belongs to what, especially in the City of Nairobi, it becomes very difficult to have a concrete five-year plan and also to intervene with regard to our vision of increasing the overall network and quality of the NMT facilities that we intend to provide."

Respondents from civil society also mentioned that the ambiguity of responsibility between agencies influenced the priority of NMT infrastructure in Nairobi. Respondent 12 (civil society) said:

"...one of the contributing factors to the reason why we don't have proper facilities for NMT and roads in general is because all these many institutions are not working together. They're I don't know how to put it...they are disjointed, they are not coordinated and the end result is that you have some kind of confused activities and development that maybe at the end of the day doesn't serve any serious interest."

Respondent 7 (civil society) stated that the confusion between agencies also made it difficult for citizens to hold the government to account because they may attribute implementation of infrastructure to Nairobi City County when another agency was responsible for it:

"...you have a highway authority that's focused on building the highways who is in charge of the strategic network. So, getting them to also understand that they need to be building their roads with NMT as well in the as part of their scope has been a challenge. The same thing we have another authority called Urban Roads and they do not really have the capacity because it's not an area that they used to have focus on before despite being the agency in charge of roads. And then you have this third element where you have the City County. So, they are the ones with the sort of political responsibility for providing this quality infrastructure and they're the ones who will be held to account by citizens when they see quality of infrastructure not meeting their aspirations. But they do not have the part to influence these other road agencies who are building within their own sort of area despite it being their jurisdiction."

The confusion about which agency is responsible for different classifications of roads with the general public and implementing agencies themselves is a significant barrier to the prioritization of NMT infrastructure. Despite several attempts, none of the government agencies contacted during the field research were able to produce a map detailing the hierarchy of roads in Nairobi with a clear jurisdiction for which agency was responsible for each one. This lack of clarity

over jurisdiction for Nairobi's roads hinders the process for a comprehensive and consistent NMT infrastructure plan across all implementing agencies.

4.3.1.4 Politics and Governance

Increased prioritization of NMT by politicians

"…every policy you have to have political backing…" (Respondent 3)

Several respondents said that politics had a significant influence on the priority of NMT in Nairobi. Some respondents stated that NMT was becoming a bigger priority for governments. However, respondents also said that there were some factors preventing NMT from becoming a higher priority in the political decision-making process. Respondents discussed the following factors that were challenges for politically prioritizing NMT: 1) Lack of significant advocacy and political pressure from citizens to invest in NMT; 2) Poor understanding of the benefits of NMT by politicians; and 3) Conflict of interest by politicians due to their involvement in sectors of the economy that benefited from motorized transportation.

Respondents suggested that in the last few years, politicians had started to prioritize NMT more. Respondent 5 (academic) stated that the inclusion of NMT in the campaign of the current Governor of Nairobi was a change from previous political campaigns and that it was a sign of a higher priority for NMT:

"…there is the manifesto for the current government and that manifesto is very good on NMT. In fact, it talks about revolutionizing or what, he has a very strong concept for NMT, for walking, for paths. It will focus on that so it's a good thing when a governor's manifesto which made him win elections mentions NMT. So, to that extent I think things are good in terms of the leadership committing at least in writing if not practical."

Respondent 7 (civil society) also commented on the fact that the current Nairobi County Government administration campaigned on a platform of higher priority for NMT but that implementation of NMT projects had not matched the promises in the campaign:

"When the new county administration came in they were big on investing in people. They want to invest in people, they want to invest in walkability, want to invest in...and if we look at their manifesto, they particularly talked about paving revolution. Basically, provide more walking opportunities and invest in the 60% who walk to work every day. And I think that was really big and we took that seriously. But if you look at now the practicality of that or the reality on the ground, then you don't see much."

As discussed in the literature, political leadership can have a significant influence on the priority of NMT at a municipal level. Indeed, the current Governor of Nairobi County ran on a platform of increased prioritization of NMT infrastructure in Nairobi (Sonko 2017). However, the previous section showed that the governance system for transportation infrastructure in Nairobi is highly fragmented. Nairobi City County does not have jurisdiction over many roads in Nairobi including the major arterial roads and highways. Even some of the roads that should be within the jurisdiction of Nairobi City County are not clearly mapped and identified. This means that it is hard to compare Nairobi with cities that have a more centralized system of transport governance like London or New York City as identified in the literature review. Political leadership can only prioritize NMT or other transport infrastructure in as much as he or she has jurisdiction to implement such facilities.

Political pressure to invest in NMT

Respondents stated that one of the factors preventing NMT infrastructure from becoming a higher political priority was the lack of pressure from citizens and advocacy groups.

Respondents suggested that if politicians could gain votes by prioritizing NMT, then they would do so. However, so far, it was easier to curry favour with voters by prioritizing projects for motorized transport.

Respondent 6 (academic) stated that it may be more politically popular to prioritize motorized transport because Kenyans see car travel as an aspirational goal that signifies progress:

> *"They may understand but it may not be first priority, it's not a priority issue because most of the time like now in this contemporary Kenya we think of more of...when we think of you progressing and doing better in life we are thinking of being in a car. It's what everybody wants to acquire like, 'I have a high university education, I need a car'."*

Respondent 12 (civil society) also suggested that the public had not raised their expectations to demand better NMT facilities and therefore politicians had not prioritized it:

> *"...NMT still doesn't find space in what is priority for politicians. I think it's because even the public themselves have not been made to understand that they can actually have proper provisions for NMT facilities and they can actually go about their business without having to scramble for road space with cars. And so, it has not been made a political issue and then that means that the politicians still don't consider it as something important..."*

Respondent 9 (donor) stated that the low priority of NMT amongst politicians was a result of them responding to the pressure from wealthier citizens, whom relied on motorized transport, rather than poorer citizens that relied more on NMT:

> *"This is not a very democratic sector. I normally joke about it because if you have 60% people walking we should be expected for many projects on walking, walkways isn't it? Why don't we have that? The answer is simple. The people that walk are not paying. So why should we invest in that? That goes into a democracy. It's actually really raising the real foundation of democratic processes in this country."*

The respondents' assertions that NMT was not prioritized because it was a mode of travel primarily for lower income citizens aligns with the theory of Lake Sagaris (2010), as discussed in the literature, whom suggested that strong democratic governance was a necessary precondition for prioritizing and building NMT infrastructure. Considering that Kenya did not have relatively free and fair elections until the early 2000s, this would support the theory that there is a correlation between democratic governance and the types of transportation infrastructure prioritized by the government. However, it should also be noted that the current Governor of Nairobi County, Mike Sonko, ran on a populist platform that he described as a *manifesto* and was widely supported by lower income citizens living in predominantly informal settlements (Sonko 2017). This *manifesto* included promises to improve walking and cycling infrastructure throughout the city. Given the relatively recent change in leadership in Nairobi County, it is too early to determine if the same transportation priorities are still in place. Another barrier to the implementation of these promises for NMT infrastructure is the polycentric transport governance system as previously described.

Recognition of benefits of NMT

Several respondents mentioned that one of the reasons politicians give low priority to NMT is that they do not have a good understanding of the benefits of investing in NMT. Respondents suggested that bureaucrats had a good understanding of the benefits of NMT but had not done a good enough job explaining these benefits to politicians.

Respondent 5 (academic) stated that although politicians were becoming more aware of NMT, that bureaucrats were ahead of politicians in their understanding of the importance of prioritizing NMT infrastructure:

> *"…now non-motorized transport is still there, they know it if you talk about it, they listen. A number of them will not know what you mean by NMT probably but quite a few already getting converted. And the bureaucrats are quite there because the bureaucrats tend to be more engaged with these things. If you get to Ministry of Transport, these things are in their hands. Probably what they are lacking is the ability to make them happen but they know that that should be a desired thing."*

Respondent 4 (government) said that politicians would prioritize NMT if technocrats did a better job selling the benefits of NMT to them:

> *"The gap is always not on the technical capacity. Maybe not on the politicians. I think the gap is how the technical people sell their idea to the politicians."*

Respondent 7 (civil society) also spoke about the need to more clearly quantify the benefits of NMT so that it would receive a higher investment priority:

> *How do you make an economic case? A business case? Economic case means livelihoods based. A business case means more of a commercial case and also a sustainability case. Also making a health case. And we are making a climate case. So, with these cases we hope to be able to encourage the city or provide an incentive for more investment.*

Respondent 1 (consultant) also suggested that the reason NMT was not prioritized was that politicians lacked knowledge about NMT and also did not recognize the potential political support that they could gain from supporting NMT:

> *"We've not seen specific NMT projects being done or being approved. We've not seen any really or NMT oriented development. And again, as I said this is more due to a knowledge gap than anything because there is huge potential for cheap but well done NMT projects say in the informal settlements which could also have bigger political mileage for those in office. But again, due to that knowledge gap...we probably haven't...it probably hasn't been taken up and when it's raised it's still not looked at upon with the priority that it should get."*

The idea that politicians need to better understand the economic, environmental, and social cases to prioritize NMT infrastructure is consistent with the literature on this topic. Mayor Bloomberg in New York City was convinced early in his administration that prioritizing NMT infrastructure was a solution to increase mobility in the city based on the space and travel efficiency of walking and cycling (Sadik-Khan 2016). Based on the interviews with respondents, it appears that some politicians in Nairobi are beginning to understand the societal benefits of NMT infrastructure but that there is still a need for technical experts to more clearly identify and explain the benefits to a broader group of politicians. However, this is partly reliant on getting better and more reliable data with respect to transportation infrastructure as discussed in the appraisal section of this chapter (4.3.1.1).

It should also be noted that it is only relatively recently that analytical tools have been developed to quantify the economic, social, and environmental benefits and costs of NMT and most of this analysis has taken place in developed country cities as discussed in section 4.3.1.1. Developing such tools in the context of Nairobi will be necessary before technical experts are able to more accurately describe the benefits and costs of prioritizing NMT infrastructure to politicians.

Political conflict of interest

Respondent 11 (government) said that in some cases politicians had a personal interest in prioritizing motorized modes of travel over NMT due to their personal business connections to segments of the economy tied to motorized transport:

> *"Most politicians are in business and they are in the business of transportation. They're in the business of energy. So, any policy that increases the use of fuel or encourages the use of the car is good for a politician because that's his business. Any business that will reduce the number of money or revenue they collect from parking is not good for them. They would rather get revenue from parking. You know NMT will discourage the use of private car. In a way it will discourage the revenue or reduce the revenue they get from the parkings."*

The same respondent added:

> *"We would rather have all the traffic but consume all the fuel because somebody is in that business. Or make sure that you are only able to travel by car and park so that you fund the County Government through parking revenue or make sure you use some public transport...matatu owned by the politician or the policeman. So, when that decision comes to the table and the only thing they see is that you are trying to reduce that car population, there are a lot of people doing car importing to this country. And they manage the policy. Any policy that will reduce the need for them to import as many cars as possible is not good for them. So, there is that conflict of interest."*

It is beyond the scope of this research to verify the veracity of the claim that politicians have business interests in the transportation industry and as a result actively discourage more priority for NMT infrastructure. However, it was mentioned in the literature by Jacqueline Klopp (2012). She suggested that there were several Kenyan government ministries connected to the transportation industry through patronage networks (ibid.). This is an area that requires more in-depth research to determine the details of this network and its influence on transportation policy in Nairobi and Kenya.

4.3.1.5 Social Advocacy

> *"...it's been slow but it's growing and we, the advocacy thing that we always say is that we want to convert people to start adopting...having a mind-shift so that they can see that pedestrians and cyclists are equal road users." (Respondent 3)*

Respondents from all respondent groups mentioned social advocacy as a factor that influenced the priority of NMT in Nairobi. Respondents said that advocacy had influenced the priority of NMT specifically in relation to Nairobi County's NMT policy. However, respondents also mentioned that advocacy groups were fragmented and that they did not have a clear united goal in their advocacy. Respondents suggested that this lack of cohesion and the vagueness of their goals was preventing advocacy groups from exerting more influence on decision-makers with respect to NMT. Respondents also said that the number of NMT advocates were few with respect to other advocacy groups in Kenya like those focused on human rights, gender, and road safety. Finally, respondents said that public engagement for NMT projects focused more on implementing agencies giving information as opposed to a dialogue with meaningful changes made based on citizen feedback.

Influence of advocacy on prioritization of NMT in Nairobi

One of the most significant ways that advocacy groups influenced the priority of NMT in Nairobi was through their role in the creation of Nairobi's NMT policy. Specifically, the Kenya Area Residents Association (KARA), a civil society group, played a major role in shaping the

policy. Respondent 7 (civil society) mentioned KARA specifically as an influential group in the development of the policy:

> *"…there have been major successes in terms of advocacy...even the group are advocacy groups so we have like KARA: Kenya Alliance of Residents Association so they're the ones who steer the whole NMT policy development. They were heavily involved in drafting it as well as promoting it within government and getting it adopted formally as a policy and that's basically an advocacy group because it's looking at residents' welfare and interests."*

Respondent 1 (consultant) stated that advocacy groups were growing and becoming more active in advocating for more NMT in Nairobi:

> *"…through organizations like Naipolitans, Safer Nairobi Initiative, Nairobi Placemaking Week, we've had now a lot more voice and a lot more stakeholder engagement towards non-motorized transit, public space, stakeholder participation in urban development and that is slowly growing…"*

Respondent 5 (academic) also said that NMT advocacy groups were growing and becoming more active:

> *"They are not as many as human rights but of late they are increasing. We are increasing and we have a good database on them and they always attend our functions. They are increasing and this is really really making a difference. They are dedicating on different sectors, some dedicate on biking, walking ones are very few, there is a lot on biking, a lot of biking advocacy. But walking not much, but now there is also the bigger names that are trying to look at making streets better and all that looking at designs and that pool of research and advocacy together is coming up quite well."*

Respondent 1 (consultant) also noted that the media was beginning to take more interest in NMT:

> *"Even the media are slowly getting involved...slowly getting involved, inviting us to talk, to speak about these things and educate others, we are having bloggers writing a lot about this so there is the last I would say five years or so...you know 2013 or so we've had much more engagement."*

The influence of citizen-led advocacy on prioritization of NMT in government policy is consistent with the theory in the literature that suggests that it is often grassroots advocacy that pushes decision-makers to formalize NMT and make it a greater priority in the transportation system (Gwilliam 2002; Sagaris 2010; Buehler and Handy 2008).

Although respondents said that there was growth in advocacy, this advocacy was not widespread throughout the city.

Respondent 1 (consultant) stated that many of the advocates in these groups tended to be young in age:

> *"…there is a lot more involvement from I would say those people between say age 40 going downwards so 40 going down…40 being the upper limit."*

Respondent 2 (government) also said that many of the advocacy groups were found in wealthier areas of the city:

> *"…most of them [NMT advocacy groups] are in the upmarket areas. The low-income areas it is not there. Most of the time you will not find them on transport issues. You will find them on health, you will find them on housing...not mostly on transport."*

Social advocacy around NMT, despite its recent growth, had not broken into the mainstream the same way that other social issues had according to respondents. Respondent 6 (academic) stated:

> *"...they [NMT advocacy groups] are not very conspicuous, they can not really be seen."*

Respondent 3 (civil society) also commented on the failure of NMT advocacy groups to break into the mainstream:

> *"As much as there is a good movement...a vibrant movement. I think it is not...the mass is not big enough. We are trying to build that critical mass of people that think about mobility as a way to move around. We've not reached there yet. We're just a group of people: 50, 100 people. But we need the wider public to be able to say, 'guys we're investing. These things is our investment, it is public funded, it's public money, so let's do this'."*

The inability of NMT advocacy groups to break into the mainstream parallels two themes that emerged from the literature review. First of all, the respondents' comments that the advocacy was refined to younger and wealthier populations mirrors some of the experiences of NMT advocacy in developed country cities whereby younger and wealthier residents in gentrifying neighbourhoods were advocating for more NMT infrastructure due to health and environmental reasons (Danyluk and Ley 2007). This was also touched on in the section about cultural attitudes towards NMT (4.3.1.2). This seems logical as changing cultural attitudes are reflected in the types of advocacy that citizens get involved in.

Secondly, the case of Davis, California, as discussed in the literature review, showed that the successful advocacy efforts for better cycling infrastructure enjoyed support from a broad section of the city's population (Buehler and Handy 2008). The responses suggest that NMT advocacy groups in Nairobi are relatively small compared to the population and other advocacy groups. According to the theory, this means that these groups will be less able to exert significant political pressure to prioritize NMT infrastructure until they can broaden their support base.

Advocacy challenges

Despite the growing influence of NMT advocacy groups on the prioritization of NMT, respondents mentioned that there were still significant challenges. One of the major challenges was that advocacy groups were fragmented in their advocacy.

Respondent 3 (civil society) commented on this fragmentation:

> *"...there are a number of advocacy groups but again it's been almost like an individual push but not like one big block of people advocating for NMT."*

Respondent 12 (civil society) also mentioned a lack of coordination as a barrier to NMT advocacy:

> *"...there is still not that strong social voice that can mobilize people around demand for NMT facilities. That of course is our fault as civil society because we have not been able to get properly coordinated and organized to an extent that we can put a strong case or a strong demand for NMT. So that also is a weakness in that regard."*

Respondent 11 (government) suggested that the lack of organization amongst NMT civil society was a factor in their inability to put pressure on government to prioritize and invest in NMT facilities:

"I find some very disorganized noisemaking from the civil society which if could be channelled through very well by organizing people to make these demands directly to the institution that have been given the mandate to provide these facilities then it can be given…"

One respondent suggested that the low budgetary allocation to NMT compared to what was needed to implement the NMT policy goals was due to a lack of significant pressure from civil society to monitor the budget and pressure the government to allocate resources to NMT. Respondent 9 (donor) said:

"…in the absence of a very active NGO or active non-state actors, civil societies in this sector, that gap is felt in the way they monitor the budgeting. Because then you have all the document talking about it, but when it comes to the budget, that's a budget you steal."

The fragmentation of advocacy groups in Nairobi will be less effective than a coordinated effort according to theory. Experiences of other cities, as discussed in the literature review, showed that united advocacy was necessary to have a significant effect on prioritizing NMT infrastructure. The case of Santiago, Chile, as described by Lake Sagaris (2010) showed that it was only with the support of international organizations that advocacy groups became more united and organized. He also theorized that newer democracies like Chile did not have as high a level of participatory democracy as more mature democracies and this made a united grassroots advocacy movement more necessary to push the government to prioritize NMT. Given that Kenya is also a relatively new democracy, according to Sagaris' theory, advocacy groups will also need to unite in their efforts and may also need the assistance of international organizations to be more effective. It should be noted that there are already several international organizations active in Nairobi promoting sustainable urban transportation including the World Bank, various UN agencies, and the Institute for Transportation and Development Policy (ITDP) amongst others.

Another challenge mentioned by respondents was the lack of specific objectives and goals about what advocacy groups wanted. Respondent 11 (government) said:

"The civil society needs to make sure that the government has a proper policy guideline and specific guidelines on the provision of a street design for an urban area that is focused on the pedestrian and the provision of NMT. What we have now are disorganized...civil society which just mentions their concerns in the different social media platforms but it does not come up as a proper organized memorandum with specific recommendations which can be taken up by government for purpose of implementation."

The experiences of NMT advocacy groups in Davis, California and Santiago, Chile, as discussed in the literature, showed that clear and specific policy objectives were an integral part of advocacy efforts to change the government's priorities to focus more on NMT infrastructure (Buehler and Handy 2008; Sagaris 2010). The lack of specific objectives by advocacy groups in Nairobi, as described by the respondent, suggests that the government will be less responsive to change their transportation priorities compared to a more detailed and specific advocacy plan if the lessons of Davis and Santiago are translatable to the Nairobi context.

Respondent 11 (government) also mentioned that one of the reasons why advocates were not able to articulate their goals to government was that there was confusion about which governmental implementing agency was responsible for implementation of NMT projects in Nairobi:

"…they are also not aware who is responsible. Sometimes they present their case to maybe the wrong people. But I think the two major institutions that need to be approached

for this purpose is the Kenya Urban Roads Authority and the County governments. For Nairobi it is the County Government of Nairobi especially which requires this urgently."

This relates directly to the factor about coordination within and between government agencies (4.3.1.3) and the section about politics and governance (4.3.1.4) showing that many of the independent variables in this case study are related to each other. The confusion about jurisdictional authority over transportation networks not only makes it difficult for implementing agencies to coordinate NMT policy, it also makes it difficult for citizens and advocacy groups to know who they should be advocating to and which person and decision-making authority actually has the power to change policy.

Respondent 3 (civil society) suggested that one of the reasons why advocates were unable to clearly articulate their NMT objectives to decision-makers was that they were not familiar with what best practice NMT infrastructure should look like:

"...nobody understands at least from the advocacy groups, nobody really understands what a good street should look like. So, even when they're fighting for NMT facilities they don't know exactly what that good NMT facility should look like. So even the level of engagement would be limited because to get sometimes to get the government or these road agencies to give you an ear you have to also know what you're asking for. So most of the groups are again they're growing they're still learning and understanding the best practices."

The experience of Santiago, Chile showed, like in the case of Nairobi, that local advocacy organizations lacked the technical expertise on NMT infrastructure (Sagaris 2010). Local groups leaned heavily on international organizations to acquire more knowledge and understanding of different NMT facilities so they could more clearly articulate their objectives to government (ibid.).

There is some evidence of knowledge sharing between international organizations and local organizations happening in Nairobi with events like Nairobi Placemaking Week. This is an annual event that helps citizens and advocacy groups in Nairobi re-imagine public spaces through different interactive activities and temporary street re-designs that enhance the pedestrian realm. The event is run in partnership with several international and Dutch organizations (Placemakers 2018).

Public engagement

Respondents said that lack of meaningful public engagement was a factor influencing the prioritization of NMT projects in Nairobi. Public engagement activities, according to respondents, were largely confined to informational sessions and awareness about public engagement activities was low. Engagement typically happened at a point where detailed design of projects had already been completed or detailed designs were not available for public viewing during public engagement. This meant that it was difficult for citizens to advocate for how or where they would want NMT facilities to be prioritized in urban transportation projects.

Respondent 9 (donor) said that public engagement happened for projects but public feedback did not result in changes to the design:

"Everybody can say what they want and they put it down. But they just don't implement it. It's as simple as that."

Respondent 1 (consultant) also spoke about the lack of transparency during public engagement activities and the use of a top-down approach to engagement:

There is tends to be a cultural of secrecy at times towards some of these things and also because what has happened in many of the transport projects which tend to be mainly road development projects, there is a very top-bottom approach and a poor understanding of participation. So, when you are called into a participation meeting, it is simply that of rubber stamping so it is very difficult to know what process it was that was followed. So, I have not been able to get that information.

Apart from the lack of meaningful dialogue at public engagement sessions, respondent 6 (academic) said that public engagement activities were also difficult to find:

"I don't remember any public meetings that were called even to be asked anything. There is no input. Like I've never been in any. And if they are there, then I don't know how they call people. How do the select?

...before such projects are implemented, the general public should give their input. I rarely see that happen."

Respondent 7 (civil society) stated that public engagement for infrastructure projects does not happen:

"Unfortunately, infrastructure projects have not had public engagement processes. Or they don't really look at public engagement. So, it's something that, I mean I would take you back to my discussion on who is leading this: it is the engineers. And engineers unfortunately are very rigid. Even the idea of civic participation or public participation to them is still foreign. It would be about ticking a box. We didn't see the designs of Ngong Road before it was implemented. We just see a billboard. So, simply put there is no participation in infrastructure projects. And this extends to NMT."

Respondent 2 (civil society) said that public engagement activities took place but that detailed designs of projects often were not available for viewing by the public:

"...despite the fact that stakeholder engagement is one of the key things that need to take place in a project, there is not much transparency in terms of what the design is, how it will actually impact you, those kinds of conversations don't really take place."

Respondent 3 (civil society) said that the process for selecting stakeholders for engagement was not a clear process:

"...sometimes that stakeholder engagement that they say they have done would only be a few people that they have pre-selected to be the stakeholders. So, it's not really the general public that get to be engaged in the decision-making process. It could be like a few selected people. It's not as clear as we would have hoped."

Respondent 3 (civil society) also noted that getting changes made to designs to accommodate better NMT facilities was difficult because engagement happened after final detailed design and not at the conceptual phase of a project:

"...for the advocacy groups, the challenge is even when let's say the agencies agree that there are mistakes that have been made, contractual agreements forbid...prohibit them from making any changes...So for example, let's say this road Waiyaki Way going to KURA and asking you know we want bike lanes, we have people who want to ride bicycles but then they would say the design has already been done, there is nothing we can do about it and now if there is any change that has to be done, that has to be a completely different budget."

The respondent data, with relation to public engagement and participatory planning, suggests that the transportation planning process is still, for the most part, top-down. The kind of

participation described by respondents would fall somewhere between informing and consultation on Arnstein's ladder of citizen participation meaning that engagement is largely tokenism as discussed in the literature (Arnstein 1969). In some cases, citizens are solicited for feedback but the feedback is not actually used to make changes to transportation infrastructure designs. This type of participation does not offer the public any sort of citizen power. According to respondents, the ink has already dried on the designs and key decisions have already been made before citizens are consulted.

The responses, relating to engagement, support the theory in the literature which suggests that countries with young democratic institutions, like Kenya, do not have robust and meaningful deliberative processes for participatory planning (Klopp 2012; Sagaris 2010). This is a significant factor in explaining why NMT is not prioritized through citizen advocacy and engagement.

4.3.1.6 Technical Capacity

> *"…we are not short of technical capacity. What we are lacking is that will, the political will and the drive by the people who are involved in this process to be able to do what needs to be done." (Respondent 12)*

Technical aspects of implementation had a significant influence on the prioritization of NMT infrastructure in Nairobi according to respondents. Generally, respondents stated that there was sufficient technical capacity in Kenya in terms of engineering and design skills for implementing urban transport projects. However, respondents suggested that there were a number of factors that prevented the prioritization of high quality, safe, and efficient NMT infrastructure in Nairobi: 1) Dominance of engineers in implementing agencies untrained in non-motorized transportation planning; 2) Lack of inclusive transportation design guidelines focused on NMT; and 3) Absence of personnel with soft skill planning skills in decision-making positions.

These findings are consistent with the literature which suggested that lack of experience and training in NMT, lack of consistent design guidelines for NMT, and absence of planning departments specializing in NMT led to lower priority for NMT projects (Balsas 2017; Gwilliam 2002; Mitullah and Opiyo 2017a).

Engineering and planning NMT infrastructure

Respondents said that transportation planning and implementation in Nairobi was dominated by engineers trained in motorized transport and that this posed a problem for planning NMT projects which required a different set of skills.

Respondent 5 (academic) suggested that the deficit in NMT planning skills was a result of engineers not being trained in world best practices on engineering for NMT:

> *"…typical training so that you produce engineers that are able to plan with the current times, that's what we are struggling with now even as universities...trying to fuse in some of those world practices that exist globally."*

Respondent 3 (civil society) also said that the lack of training on NMT planning at an academic level led to poor prioritization of NMT facilities professionally for technical experts:

> *"…what has been a contributing factor to engineers and planners not being well equipped is much of the syllabus does not have NMT in it. So, they have roads but not really anything on non-motorized transport. So, we hope sometime in future to start engaging universities as well because they are the ones who train engineers and the planners but*

that knowledge is not in the universities as much as it should be there. So that affects the kind of engineers that we will have in the governments…"

Respondent 7 (civil society) stated that many road implementing agencies in Nairobi, and Kenya more broadly, were dominated by engineers to the exclusion of urban planners and this led to roads with little prioritization and subsequent investment in NMT infrastructure:

"…in terms of infrastructure there are things that come into play as well, that it is led largely by engineers. You know the old-time engineers who think that roads should be for vehicles, for cars. So that has been a struggle between urban planners and engineers and at the end of it all if you look at the implementing agencies. Implementing agencies and planning agencies are different. So, implementing agencies are largely led by engineers; they are the ones who have the resources. That's why there has been no investment in NMT infrastructure as it should be. The Kenya Urban Roads, Kenya Highways, Kenya National Highways Authority are led by engineers and they are the ones that get budgetary allocation to actually effect change that would be, that would go a long way in changing how mobility system in Nairobi works."

The same respondent elaborated on the difference between planners and engineers:

"…planners have a different approach to NMT and engineers have a different approach. So, while planners can plan, they don't have the ability or the authority to implement. The authority would implement...it's in another domain: engineers who would not necessarily think about...and they say, 'we are not trained to think about how people move.' But they are thinking about speed…"

Respondent 2 (civil society) also said that engineers typically focused on designing roads to prioritize maximum flow and efficiency of motor vehicles without considering the needs of other road users:

"We have still some ways to go, yeah, in terms of changing even the engineer's perspective on what it means to build a road. Yeah, right now it's still quite limited to highway, yeah just carriageway, auto, like car way and that development where they are just trying to get fast speeds and as much as space as possible for cars so that you can have free flowing traffic but not realizing that they're all these other users who need to be considered when they are designing particularly in an urban environment."

Respondent 4 (government) stated that the lack of consideration for how users would be affected by a project was a problem that led to implementation of projects that did not work well for NMT users:

"The social aspect is not really drilled into the engineer which is...if you don't understand the user, you can do a massive project but unless you understand the user, you cannot provide what works. Because you don't provide what people want. To me I think that is the case now when you design and you are doing appraisals...evaluation, economic and social impact that the user must be at the centre of this."

The dominance of motor vehicle infrastructure planning over NMT also relates to the way that projects are evaluated as illustrated in the above quote from respondent 4. This supports the theory in the literature that suggested that benchmarking tools and data about NMT users and preferences were necessary for technical personnel to properly assess the needs and to develop designs to safely accommodate NMT users (Clifton et al. 2014; Balsas 2017). This also relates directly to the way that projects are appraised as discussed in section 4.3.1.1 of this chapter.

Effect of guidelines for designing and implementing NMT

This section discusses how the lack of NMT design guidelines influences the work of engineers when they implement road projects.

Several respondents mentioned that lack of guidelines and standards for NMT meant that a lot of NMT facilities were implemented at the discretion of technical personnel as opposed to being a minimum requirement and higher priority if national design guidelines were in force.

Respondent 7 (civil society) stated that many of the current standards in use are from the colonial era and do not account for road users like pedestrians and cyclists:

> *"...the standards that we are working with at the moment are old colonial standards that did not encourage...they actually prohibit cycling. So, you see starting from there that is the checklist that actually they are the ones that have checklists that guide the engineers. So, there is no place for cycling and walking."*

Respondent 11 (government) suggested that the lack of design guidelines for NMT resulted in a higher priority for motorized transportation at the expense of NMT especially on narrow road corridors:

> *"The technical capacity I would say is sufficient but because of that lack of a proper guideline it's always been subjective to individual engineer managing or designing the project. It's not well consultative. It's very dependent on the corridor size and is given almost the last priority. Where the corridor is not sufficient, they will first provide the road and if space remains then they provide NMT. That has always been the direction and it's the wrong direction of course but it's been the practice for quite a long time."*

The literature suggests that design guidelines for NMT are necessary to ensure that NMT is prioritized and that NMT infrastructure is continuous and consistent. Lack of a national or even regional guideline for NMT in Kenya and Nairobi has resulted in NMT facilities that are insufficient for the needs of users as described by the respondents.

Soft skill planning

Soft skill planning was mentioned by a number of respondents as a factor that influenced the priority of NMT in Nairobi. Respondents stated that the absence of personnel with specialized skills in understanding walking and cycling behaviour led to poor NMT facilities.

Respondent 9 (donor) said that there was a need for more non-engineers in road projects and that transportation was more than just engineering:

> *"...people don't actually appreciate and know that transportation is not engineering. You need engineer, well that is true, road construction and all this. But you need the person, in fact, you need many non-engineers to run a road project."*

Respondent 8 (donor) discussed the lack of skills in understanding the soft side of user interaction with infrastructure:

> *"When it comes to infrastructure building it is there. When it comes to analyzing the soft aspects of usage, there is no good understanding on that one. So, lack of knowledge on understanding the impact and awareness is minimal. When it comes to building or infrastructure aspect, there seems to be adequate capacity."*

Respondent 9 (donor) also suggested that more importance was placed on metrics like the length of road infrastructure as opposed to the inclusivity of the design for all users including NMT users:

> *"People are more concerned about the length and not how inclusive that design is."*

Respondent 4 (government) stated that transportation planning should be a multi-disciplinary field to better understand how people use the infrastructure:

> *"We need to stop looking at transport as an engineering occupation. It should be multi-disciplinary and we should be getting planners, social experts, engineers and need to sit together...and as much as an engineer would want to do something, it would take the social expert to tell him ok if you want people to use this road, maybe...or to use this NMT maybe you should be able to give them something inclusive."*

The same respondent gave a specific example of how roads are prioritized for motor vehicles by designing footbridges to cross roads when people would usually prefer to cross at grade. The respondent suggested that this was an example of not understanding user behaviour when designing projects and the result being an increase in pedestrian collisions:

> *"...an engineer would always go for a footbridge over a road. When you get to the user part, the user would want the car up and the user at grade. So that...if you don't understand the user and you go right with what you think is the engineering you get there is a disconnect and you are doing infrastructure that is not self-enforcing or self-sustainable. So, you will always find people are afraid of up a bridge, go down, go over, but for a vehicle but if you take a vehicle up and let people cross at grade, the vehicle has no option. It has to go up. People when they have the option of like here or the other option of running across a road, they run and a lot of accidents happen."*

Respondent 1 (consultant) also suggested that the transportation sector needed a multi-stakeholder approach to better incorporate designs that were more inclusive of different user groups:

> *"...there ought to be a bit of a paradigm shift in the way we are looking at our transportation. It's still a bit desktop, office based oriented planning and not really understanding it from a user perspective and the vulnerable groups perspective.*
>
> *...there has to be that paradigm shift also from them and also maybe a review of getting multi-stakeholder involvement in some of these projects where sociologists, planners, environmentalists can also play a bigger role in the development of urban transportation projects."*

The assertion, by respondents, that planning and designing transportation facilities is a broader exercise than simply engineering a road for motor vehicles supports the theory discussed on this topic in the literature (Sietchiping et al. 2012). Many cities in Sub-Saharan Africa and other parts of the world still view urban transportation planning as a purely technical exercise in moving as many motor vehicles as possible (ibid.). The responses from interviewees suggest that the transport planning and road engineering field in Nairobi has not broadened their approach to view urban transportation as an exercise in human mobility. As a result, NMT infrastructure is de-prioritized at the expense of motorized transportation.

4.3.2 Dependent Variable – Priority of NMT Infrastructure in Nairobi

The dependent variable, as shown in the conceptual framework is the priority of NMT infrastructure in Nairobi. Two indicators were used to determine priority: 1) Policy and planning with respect to NMT infrastructure in Nairobi; and 2) Financial resources allocated to NMT infrastructure in Nairobi.

4.3.2.1 Policy

Overall there is evidence to suggest that NMT has become a higher priority for decision makers primarily at the county level in Nairobi. Much of this evidence is found in the Nairobi City

County 2015 NMT Policy. At the national level there is some priority for NMT in the integrated transport policy but there is no stand-alone policy for NMT at the national level.

Despite the priority given to NMT in the Nairobi City County policy, there is little funding priority for NMT specific projects in the County or national budgets. The funding will be discussed in more detail in the next section.

In the most recent 2017 campaign for the governorship of Nairobi City County, the winning candidate, Mike Sonko, explicitly ran on a campaign to create more footpaths and dedicated bicycle lanes (Sonko 2017). This campaign, according to respondents, was the first time that a Nairobi mayor or governor campaigned on a platform of explicitly improving NMT infrastructure. The campaign aligned with the 2015 Nairobi City County NMT Policy.

The NCC NMT Policy has specific goals and targets for NMT infrastructure and this is evidence that there is some level of priority for NMT at the county level. Nairobi's NMT policy: *Non-Motorized Transport Policy: "Towards NMT as the Mode of Choice"* (Nairobi City County Government 2015) is a policy that was developed by Nairobi City County. It is not a Government of Kenya policy. The following table, reproduced from the policy document, shows the specific outputs and outcomes expected for improving NMT in Nairobi:

Objective	**Output**	**Outcome**
Increase mobility and accessibility	Safe and cohesive pedestrian facilities (footpaths, etc) from 500km to 1,500km by 2020	Increase modal share of walking from 47% to 50% for trips up to 5km by 2025
	Cohesive cycle network of lanes, tracks and destination facilities from 50km to 1,000km by 2020	Increased modal share of cyclists from 2% to 10% for trips up to 15km by 2025
	NMT facilities along and at major paratransit routes and terminals from 500km to 1,500km by 2020	Increased modal share of public transport from 32% to 35% for all trips by 2025
	Nairobi Streets and Roads Design Manual (NSRDM) is developed by 2017	All roads within the County shall fully comply with the specifications of the NSRDM by 2025
Improve transport safety and security	Safe NMT crossings: • Increase pedestrians signals from 185 to 500 by 2020; • Increase footbridges and underpasses from 27 to 50; • Increase marked and visible crossings from 150 to 500 by 2020;	• Reduced pedestrian fatalities from 500 to 50 or less by 2025 • Reduced cyclist fatalities from 20 to 5 by 2025

	• Increase working streetlights from 30,000 to 65,000 by 2020	
Improve amenities for NMT	Increase number of benches, repair shops, and stores.	Level of Service rating of streets improves from D to B by 2025.
Increase recognition and image of NMT in Nairobi	Percentage of road users considering NMT as a mode of for the poor reduced by 40% by 2020	Diverse income groups using NMT as a mode of choice.

Table 4.2: Outputs and Outcomes of Nairobi City County NMT Policy (Nairobi City County Government 2015).

Despite the NMT policy at the county level, there is no overarching NMT stand-alone policy at the national level. This is important because many of the agencies responsible for implementing transportation infrastructure in Nairobi are national agencies (see Table 4.1). However, there is an *Integrated National Transport Policy*. The policy has a section on NMT and it states that all road agencies shall make provision for NMT facilities (Kenya Ministry Of Transport 2009). However, there are no specific time bound goals and targets for the implementation of NMT infrastructure like there is in the Nairobi City County NMT policy (ibid.).

The literature review showed that only countries with national level support for sustainable urban transportation policies such as coordinated policies between transport, environment, and urban development agencies were successful in having higher modal share for sustainable transport (Hidalgo and Huizenga 2013). The lack of a national level NMT policy that is complementary to the Nairobi County policy is evidence that priority for NMT infrastructure is not a high priority at all levels of government.

However, respondents still viewed the NCC 2015 NMT policy as a positive step towards prioritizing NMT.

> *"...we have a proper policy for Nairobi county on non-motorized transport. And for us that is a milestone because now we've eliminated that aspect of somebody saying that there is no policy framework for non-motorized transport. Now we have the framework." (Respondent 12)*

Despite this policy, there were two sub-factors of policy that respondents suggested needed to be improved in order for NMT infrastructure to be given a higher priority: 1) Design standards; and 3) Policy clarity.

Design standards

Currently there is no national design standard or guideline for NMT that guides the implementation of NMT projects in Kenya. This lack of a design standard results in infrastructure that is not uniform. The resulting variability in design leads to unpredictability for users and contributes to gaps in the NMT network in Nairobi according to respondents.

Respondent 7 (civil society) explained how the lack of guidelines contributed to a footpath that, in the opinion of the respondent, was too narrow for pedestrians:

> *"...if you have a road as big as Ngong Road, having mere 1.5 metres sidewalk? And also not integrating such things as street trees, then you know there is a problem. But then the*

problem comes in because NMT is normally an afterthought. It is never an initial idea in the design so it normally comes in as an afterthought. So, again this goes to the fact that there are no guidelines."

Respondent 3 (civil society) also suggested that the lack of a clear design guideline was a factor in the lack of implementation of Nairobi's NMT policy:

"...we have this beautiful policy but having...making it more implementable was a problem because the city itself did not have a design guideline. They had a policy but they did not know how to implement the policy and that is why now we are back to now just coming up with street design standards so that those standards can help them implement the NMT policy."

Respondent 4 (government) suggested that the absence of a design standard contributed to pedestrian fatalities due to inadequate facilities being designed and implemented for NMT users:

"KENHA is used to doing express roads so it will be even when the road passes through a number of settlements we try and do an express road but if we had the design, standard design manual for all of us, whether it was KENHA, KURA, the County, you would find the roads are meeting some standards, acceptable standards. Like now KENHA will do a road, the next day people start getting killed by accidents and they come to look at what is the problem because they only know how to do express. So, having agencies designing roads without one guiding design document is also a challenge."

The lack of design standard also meant that different donor agencies use their own individual design standards for different projects instead of conforming to one unified Kenyan standard. Respondent 5 (academic) spoke about this issue stating:

"Standards has been an issue. It's been an endless many years of review which is not unique to standards. Even our policies take very long in drafts. Some take as long as 15, 20 years of policies in draft going back and forth, back and forth. Same as with standards. I would think critically that this could also be because of the way we are being supported in terms of infrastructure development. You have different agencies supporting us and each agency negotiates its own platform."

Respondent 11 (government) also commented on donor agencies using their own design guidelines for NMT that were not consistent with each other:

"...if a road is funded or done by the Chinese government, they'll do according to their best practice. If a road is funded maybe by the Japanese through JICA, they'll provide according to their best practice. There is no custom Kenyan standard for provision of NMT."

The lack of design standards, as described by the respondents, showed that this led to infrastructure that was not uniform and not continuous. It also meant that there was no clear standard of expectation for NMT infrastructure for donor funded project.

Policy clarity

Although Nairobi City County has an NMT policy, respondents suggested that NMT was not sufficiently embedded in other planning documents and policies. Respondent 7 (civil society) suggested that lack of an NMT master plan was a barrier to implementing the NMT policy:

"...one of the key things is the lack of an NMT Master Plan. That is where, I mean looking at policy, the next thing should be a master plan. We are going into a design guideline but that should be a level lower than the master plan."

However, respondents also stated that the creation of an NMT policy was an important part of prioritizing NMT. Respondent 2 (civil society) mentioned that the policy was important in changing the conversation about the role of NMT in transportation:

> *"...at least one good thing the policy is that it really brought to the fore for the...NMT. And it's got the conversation moving in the right direction that our priorities can not just be about building highways and flyovers as they're not really...they're not really a sustainable solution."*

Respondent 12 (civil society) also stated that having an NMT policy was important in prioritization of NMT because it provides a guide to investment and coordination of NMT:

> *"...about four years back we started a process of addressing this issue and when we engaged the government, especially the Nairobi County Government, the excuse or the reason then was that they can't do that because there is no proper policy framework and there is no design manual to facilitate those kind of facilities. So, we began a process of developing a non-motorized transport policy for Nairobi to guide investment and to guide coordination of NMT in our roads. So, the process has been going on and sometime last year we got the policy adopted at the County Assembly which is part of the County Government and now as we speak we have a proper policy for Nairobi county on non-motorized transport. And for us that is a milestone because now we've eliminated that aspect of somebody saying that there is no policy framework for non-motorized transport."*

Despite a policy at the county level, the lack of an NMT policy at the national level also had some influence in prioritizing NMT in Nairobi due to the institutional framework of implementing agencies. Many implementing agencies such as KURA, KenHA, and KeRRA are outside of the jurisdiction of Nairobi City County (see 4.3.1.3 for more detail).

Respondents mentioned that the lack of a national NMT policy was a factor in the level of prioritization for NMT infrastructure. Respondent 11 (government) stated that the lack of an NMT policy at the national level was a factor in the quality of NMT infrastructure for national level implementing agencies:

> *"...the provision of surfacing is sometimes based on the budget. You decide whether there is money to provide a proper surface. Sometimes even the width provided is too narrow because of space.*
>
> *So, there are a lot of factors that have led to this but I think the biggest one is that lack of a guideline, lack of a proper policy to guide the provision of NMT...to guide actually the provision of an inclusive NMT. Right now there is an attempt to do provision but it is not inclusive."*

Respondent 8 (donor) stated that the lack of a national NMT policy was a factor in the low prioritization of NMT in donor funded projects:

> *"...in the first place the starting point would be the government interest or the government national plan that need to influence the type of project finances that has to come from all donors including World Bank. That is where the missing element is. Do we have in the planning of government that telling out the right interests or in the planning well captured this policy so that it will influence the flow finance? I don't think it is there."*

Respondent 8 (donor) also mentioned that the lack of cohesiveness between local government policy and national government policy, with respect to NMT, can also result in prioritization of donor funded projects that are not priorities for local government:

"...we are also facing a challenge because for some of the financiers, maybe they come up with their mandate, with their mindset of catching the money to one specific project maybe. It's attached to railway development or BRT development. Whereas in that city, that may not be a priority or a something that comes first. They have a mindset and they cannot change it."

The assertion that donors have different priorities than local governments in terms of transportation is not something that was discussed in the literature review. In the field of development studies there is a lot of research and theory about the interests and influence of donor countries in the developing world but little about how this influences aspects such as NMT in urban transportation projects. This is an area that deserves further exploration but falls outside of the scope of this paper. However, the fact that Kenya lacks a national level policy for NMT and associated plans means that there is more room for donor countries to prioritize their own interests that may or may not be in the interests of local governments with respect to transportation infrastructure. It should also be noted that many of the new major roads being built in Nairobi County are donor funded.

4.3.2.2 Financing NMT Infrastructure

"You can have many plans, beautiful, you can have design guidelines but without that financial mechanism then it will never be done." (Respondent 7)

The Nairobi City County NMT Policy states that the Nairobi City County Government will allocate at least 20% of its transportation budget to NMT and public transport (Nairobi City County Government 2015). To date, no such funding allocation has been given to NMT and public transport. The NCC 2017/18 budget does not have a specific budget line for NMT so it is impossible to determine what percentage of the transportation budget is allocated for NMT (Nairobi City County Government 2017). Previous Nairobi City County budgets also did not have this allocation.

At the national level, funding allocations for NMT are typically included in broader road projects. The Kenya Roads Board (KRB) is the overarching board that oversees KeNHA, KeRRA, and KURA, all of which implement road projects in Nairobi (Kenya Roads Board 2018). KRB is responsible for collecting the fuel levy in Kenya and it distributes money from this fuel levy to the various implementing agencies (ibid.). However, the budget given by KRB to the implementing agencies gives funding based on the road construction and maintenance projects. There is no further disaggregation of funding to motorized and non-motorized aspects of the road projects (ibid.). This makes it difficult to quantify how much of the budget from the national government road agencies is spent on NMT infrastructure.

Respondent 7 (civil society) commented on this discrepancy between the policy objective for resource allocation to NMT and the actual budgetary allocation:

"NMT interventions get less than 5% budget allocation despite the fact that there is an NMT policy. And if let's say there was an NMT intervention it would be largely donor funded. So, there is no...as of now as we speak, there is no sufficient budgetary allocation, public funded support for NMT."

Respondents also noted that specific road projects that included and prioritized NMT in the design phase often had NMT facilities cut to make up for cost overruns in the implementation phase. Speaking of donor funded projects, respondent 9 said (donor):

"...you find you've been given 400 million or 1 billion. Initially you said you would do 30 kilometres, then you discover, I can only do...If you went by that, I can only do 20. What do you compromise? You still do 30, you compromise on drainage, you compromise on

NMT. All of them. Basically, that's what's happening. It's not that they don't know that. If you go to the original designs that has done for all consultants it is reduced them believe me. But you'll never see it."

Respondent 10 (government) also said that NMT facilities are often cut so that road projects stay on budget:

"…sometimes there could be changes in terms of the amount of money that was estimated at the beginning and by the time you finish this particular road surface, then there isn't much again to proceed and finalize the footbridges which were already in the design."

Cutting NMT facilities on a project to stay within the original budgetary allocation shows that NMT infrastructure is a lower priority than infrastructure for motorized traffic.

Chapter 5: Conclusions and recommendations

5.1 Suitability, Validity, and Importance of Study

The purpose of this study was to better understand what factors influence the priority of NMT infrastructure in Nairobi and also to understand how these factors influence the prioritization of NMT infrastructure. The priority of NMT infrastructure was determined by policies and plans relating to NMT and the financial allocation committed to NMT infrastructure in Nairobi.

The existing literature on this topic suggested that there were a number of factors that influenced the priority of NMT infrastructure in cities. These factors were appraisal mechanisms, cultural attitudes, coordination within and between implementing agencies, politics and governance, social advocacy, and technical capacity.

Respondents discussed all of these factors and stated that they were significant in terms of influencing the prioritization of NMT infrastructure in Nairobi. This suggests that the conceptual framework based on the literature review for the research was suitable and valid.

Although the literature review was suitable and valid for the study, there were gaps that should be mentioned. Much of the literature on NMT and sustainable urban transport more generally was based on cities in the developed world specifically in relation to appraisal mechanisms. Little of the literature was based on developing country cities and even less was found for cities in Sub-Saharan Africa. This gap became apparent in the field research because respondents said that they did not have data to do the kind of appraisal that was found in the literature.

Another gap that emerged related to transport governance. Again, much of the literature found on transport governance related to cities in developed countries but little was found for developing countries and African cities specifically. This made it difficult to compare the transport governance system in Nairobi with theory used for cities with a much different historic, socio-economic, and political context. Therefore, only broad general comparisons could be made between the findings and the literature.

Getting access to data, beyond the interviewee data was extremely challenging. For example, comprehensive spatial data for NMT infrastructure in Nairobi was not found despite several efforts. Additionally, data in annual government reports was insufficiently detailed to determine where and what kind of NMT infrastructure was built and/or maintained on a yearly basis. It was also difficult to find budget allocations specifically for NMT infrastructure.

Finally, due to the brief timeline for fieldwork, it was not possible to interview a politician at the local or national level. As a result, the section on politics and governance is not as rich as it could have been had there been an added perspective from an elected official involved in transportation decision making.

Despite these difficulties, the research still sheds light on some of the factors that influence the prioritization of NMT infrastructure in Nairobi and how these factors relate to each other.

To date, some research has been conducted in Nairobi on aspects of NMT such as travel preferences, condition of NMT facilities, and collision and injury rates for pedestrians (Salon and Aligula 2012; Mitullah and Opiyo 2017b; Ogendi et al. 2013).

However, there has been significantly less research on the factors that influence the prioritization of NMT infrastructure in Nairobi. Therefore, the findings of this thesis are important to understand the factors that lead to the current prioritization of NMT infrastructure in the city.

5.2 Conclusions

The main research question asked: "What factors influence the prioritization of NMT infrastructure in Nairobi?" The findings of the research showed that there were six factors influencing the prioritization of NMT infrastructure in Nairobi: 1) Appraisal mechanisms; 2) Cultural attitudes towards NMT; 3) Coordination within and between implementing agencies; 4) Politics and governance; 5) Social advocacy; and 6) Technical capacity.

5.2.1 Factors Influencing Prioritization of NMT Infrastructure

The first sub-question asked: "How do the factors (as answered in the main research question) influence the prioritization of NMT infrastructure in Nairobi?" A summary of these findings is described below.

Influence of appraisal mechanisms on priority of NMT infrastructure

There were few NMT specific economic, environmental, or social appraisal mechanisms. This meant that the economic, environmental, and social costs and benefits of NMT infrastructure were poorly understood by the general public and decision-makers because the costs and benefits were not well quantified. This made it more difficult for decision-makers and implementation agencies to prioritize NMT projects over others due to the lack of understanding of the costs and benefits.

Influence of cultural attitudes on priority of NMT infrastructure

Culturally, people in Nairobi viewed NMT as a mode of transport for the poor. This meant that NMT infrastructure was rarely prioritized by wealthier citizens and those in decision-making positions because it was more culturally aspirational to move by motorized transport.

Influence of coordination within and between implementing agencies on priority of NMT infrastructure

The findings showed that there was a disconnect between land use planning and transportation planning within implementation agencies such as Nairobi City County meaning that motorized transportation was prioritized over NMT because of the failure to plan land use favouring shorter trips that were more amenable to walking and cycling.

There was also a lack of coordination between the various agencies responsible for planning and building transportation infrastructure in Nairobi. There was also a lack of clear jurisdiction between agencies with respect to responsibility for roads. This fragmentation and confusion meant that there was no coordinated plan between agencies for prioritizing and building NMT infrastructure in Nairobi nor was there comprehensive data on where existing NMT infrastructure was located and what kind of condition it was in.

Influence of politics and governance on priority of NMT infrastructure

Politically, politicians prioritized motorized means of travel over non-motorized means because it was a more politically popular approach. Respondents suggested that politicians stood to gain more popular support for promoting and funding automobile-centric infrastructure rather than infrastructure built for walking and cycling. Priority for NMT was becoming more central in political campaigns such as the recent campaign for governor in Nairobi County. However, Nairobi City County only has jurisdiction, albeit uncertain jurisdiction, over smaller collector roads. The transport governance system in place in Nairobi means that many of the roads are under jurisdiction of national government agencies so Nairobi City County has limited capacity to prioritize NMT infrastructure throughout the city.

Influence of social advocacy on priority of NMT infrastructure

The data from respondents suggested that social advocacy for NMT in Nairobi was weak compared to other social causes. It was also disjointed and lacked clear and concise goals. As a result, social advocacy groups were not able to put significant amounts of pressure on decision-makers to prioritize NMT infrastructure. However, the Kenya Area Residents Association (KARA) played a significant role in shaping Nairobi's current NMT policy which outlined specific goals and targets for NMT infrastructure. Despite these goals and targets, sustained funding to implement the infrastructure had not been committed by government.

Influence of technical capacity on priority of NMT infrastructure

The technical personnel involved in transportation planning in Nairobi, according to the data, were trained primarily in planning and designing transportation systems for motorized vehicles. There was little training on NMT planning and infrastructure. Lack of consistent design guidelines for NMT infrastructure was another aspect that prevented a higher prioritization of NMT infrastructure. Lastly, there were few people in decision-making positions that approached transport infrastructure from a sociological or human mobility perspective. Most of these positions were dominated by traffic engineers trained in motorized transport infrastructure.

5.2.2 Measuring the Priority of NMT Infrastructure

The second research question asked: To what extent is NMT infrastructure prioritized in Nairobi according to policies, plans and financial commitment?

Policies and plans

The research found that there was some priority given to NMT infrastructure in policy primarily through Nairobi City County's 2015 NMT policy. This policy set specific targets and goals for NMT infrastructure in the city. The Governor of Nairobi, Mike Sonko, also ran on a campaign of building more walking and cycling infrastructure. Despite the evidence of priority through policy and political campaign materials, there were no associated funded and publicly available implementation plans laying out how the targets and goals would be met. Additionally, there were no explicit NMT policies at the national level for implementing agencies such as KeNHA, KeRRA, and KURA, all of which build and maintain transport infrastructure in Nairobi County. This meant that there was a mismatch between the Nairobi City County priority for NMT infrastructure, as laid out in their NMT policy, and the national transportation implementing agencies.

Financial commitment

Despite Nairobi City County's promise of allocating 20% of the transport budget to NMT in their NMT policy, this had not yet happened in any of the years since the policy was enacted. The budget also did not provide a specific line item for NMT infrastructure in the budget making it difficult to determine exactly how much was being spent for walking and cycling facilities.

The budgets given to KeNHA, KeRRA, and KURA by the Kenya Roads Board also did not include any specific breakdown for NMT infrastructure. The lack of a budget line item for NMT infrastructure in addition to the lack of a policy with clear targets and goals for NMT infrastructure for these agencies suggests that NMT is not as high of a priority as motorized transport infrastructure.

Finally, respondents stated that NMT facilities are often cut or downgraded on road infrastructure projects to keep projects on budget. This further provides evidence that NMT infrastructure is de-prioritized with respect to motorized transportation infrastructure.

5.3 Recommendations and Areas for Further Study

Recommendations

There are several recommendations, based on the findings, that may lead to higher prioritization of NMT infrastructure in Nairobi. The table below provides recommendations based on each of the factors discussed in the research.

Table 5.1 Recommendations for improving priority and implementation of NMT in Nairobi

Factors Influencing Prioritization	Issue(s)	Recommendation(s)
Appraisal mechanisms	• Weak or non-existent NMT specific appraisal mechanisms.	• Create appraisal mechanisms that better quantify the economic, environmental, and social costs of NMT infrastructure.
Cultural attitudes about NMT	• NMT viewed as mode of transport for low-income people.	• Improved education on personal and societal benefits of NMT.
Coordination within and between implementing agencies	• Poor coordination between implementing agencies. • Jurisdiction of transportation infrastructure unclear.	• Creation and alignment of NMT policies for all implementing agencies. • Settling of jurisdictional boundaries between agencies.
Politics and governance	• Poor understanding of benefits and costs of NMT infrastructure by politicians. • Fragmented transport governance.	• Better quantification of benefits and costs of NMT infrastructure explained to politicians. • Consideration of a more centralized transport governance system.
Social advocacy	• Disjointed advocacy between groups. • Lack of clear and specific advocacy goals.	• Unification of NMT advocacy groups with clear specific, and detailed advocacy goals.
Technical capacity	• Lack of training in NMT infrastructure planning. • Decision making positions in implementing agencies dominated by motorized transport experts.	• More NMT planning training for technical personnel. • Inclusion of broader range of experts in decision making with knowledge of sociological aspects of transportation.

There may be other recommendations that may improve the prioritization of NMT infrastructure in Nairobi. However, these recommendations are only based on the findings from this research. This list of recommendations is not intended to be exhaustive nor necessarily prescriptive for policymakers. Additionally, many of the recommendations are likely already being pursued at some level by members of civil society, government, academia and others.

Suggestions for further research

There is much further study that could and should take place on this topic that were outside the scope of this research. For example, because this research was a single case study, the external validity to other cities in Kenya and Sub-Saharan Africa is limited. Other case studies in the region would provide an interesting opportunity for comparing and contrasting factors influencing the priority of NMT infrastructure in other contexts.

The brief timeline for field research, as described in the scope and limitations section (section 1.6), meant that there were limits to the number of respondents that could be interviewed. Additional research with more respondents from a variety of backgrounds, notably politicians, could provide a richer picture of the factors discussed in the findings.

Finally, the paucity of data, particularly spatial data on infrastructure and data related to cost-benefit analysis and other appraisals is an opportunity for researchers to attempt to address this gap. Gathering primary data for spatial analysis of NMT infrastructure in relation to activity nodes in Nairobi would provide a clearer picture of where infrastructure exists, where it should be built, and/or where it should be modified. Additional research on quantifying the economic, environmental, and social benefits and costs of NMT infrastructure in Nairobi would provide greater insights into the societal benefits and costs of prioritizing NMT infrastructure.

5.4 Concluding Remarks

It is the hope of the author that this research provided a better understanding of the factors that influence the prioritization of NMT infrastructure in Nairobi. If current growth trends in Nairobi continue, in relation to population and the economy, it is likely that demand for urban transportation will increase. Deciding what kind of transportation options will best serve the needs of the city's residents in an economically, environmentally, and socially sustainable way will be a complex task. Literature on the topic of sustainable urban transportation suggests that NMT can play a significant role in addressing this challenge. If decision makers in Nairobi's and Kenya's urban transportation system choose to place greater priority on NMT to make it safer, more efficient, and accessible, the findings in this research may offer some insights that prove useful.

Although considerable effort was made to conduct the research and present the findings in an accurate and rigorous manner, any errors in this study are the sole responsibility of the author.

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