

Rethinking Sustainable Mobility

Understanding the use of *boda-boda* motorcycle taxis in Kampala,
Uganda

Ch'ng Sin Yi

Supervisors

Professor James Evans

Associate Professor Kes McCormick

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Abstract

Cities in Sub-Saharan Africa are characterised by informal transportation services compensating for the lack of institutionalised transportation system. In Kampala, Uganda, the vast army of *boda-boda* (*boda*) motorcycle taxis have proliferated through the city, with passengers and/or cargo goods straddled behind the *boda* drivers as they navigate through the city's congested and dilapidated roads. Despite the strong presence of informal transport in developing cities, local governments often regulate against them as they do not fit the desired modern image. Against this backdrop, the dynamics of the system, perception and needs of the users themselves are neglected and unknown. Therefore, this study aims to identify the role of informal mobility in the sustainable urban landscape by investigating the *boda* sector in Kampala from the users' (i.e. passengers and cargo) lens. Qualitative Geographical Information System (GIS) as a mixed-methods approach was adopted for the research, explicitly: GIS analysis, questionnaire surveys, interviews, and unstructured observations. The study develops understanding of the *boda* demand – travel patterns, trip purposes, profiles, perceptions, and aspirations of the *boda* users. Visual representations and findings are discussed *vis-à-vis* the sustainable mobility dimensions. The study finds that the *boda* physical attributes influence the types of market served including service areas and users. More importantly, the *boda* market morphs according to the city's prevailing activities throughout the day, signifying how *bodas* are woven into the urbanites' life and the city itself. This is more distinctive for lower income groups, working population, and areas with high formal and informal economic activities. Nonetheless, the high social costs resulting from unprofessional driving and high accident rates should justify intervention by formal and informal institutions. Overall, this study identifies the complementary role of the *boda* system and advocate for its integration into the public transport system through three transition pathways, namely improvement, complementary planning, and institutional reform. This analysis suggests that the informal mobility system and users should be engaged in changing the negative narratives of the sector and working towards sustainable urban mobility and development.

Keywords: sustainable mobility, informal transport, *boda-boda*, Kampala, qualitative visualisation.

Executive Summary

Informal transport is characteristic in Global South cities where urban transport infrastructure does not necessarily keep pace with rapid urbanisation. Mobility becomes a significant challenge in these cities due to the lack of public transport system and the endemic traffic congestion. Kampala, Uganda is no exception. Without a solution to urban mobility, informal transport such as the *boda-boda* motorcycle taxis and *matatus* shared taxis have organically grown to fulfil the void. What renders the transport mode like the *bodas* informal is their uncontrolled flexibility: fare, schedule and route (Cervero & Golub, 2007). Despite providing social benefits and mobility to locals, they and the externalities associated with them do not conform to the modern image, or the externalities associated (e.g. safety and accidents, air pollution). This leads to the dilemma many urban planners and authorities face: to shift or to retain the system? The pressure to streamline and organise the mobility system almost always neglect the needs of the end-users themselves. While it is important not to idealise the informal sector, considering the *boda* system as an existing infrastructure so embedded within the city and citizens' lives could shed new light on informal transport and sustainable mobility.

The purpose of this thesis is to study the role of informal mobility in the sustainable urban mobility discourse. To do so, the *boda* system in Kampala is investigated from the users' (i.e. passengers and cargo users) perspective. With this, three research questions (RQ) are asked:

- RQ 1: How do people use *bodas* in Kampala?
- RQ 2: What is the significance of *bodas* to the local populace of Kampala?
- RQ 3: How can the *boda* industry be governed?

This thesis employs the qualitative geographical information system (GIS) method to investigate the *boda* system. As a mixed-method approach, spatial data is able to explore patterns and relationships while specific qualitative data synthesise the reasons behind these visualisations, enabling the triangulation of findings to provide richer insights. Firstly, *GIS analysis* is performed to examine the travel patterns of *boda* users within the city by analysing 149,244 Global Positioning System (GPS) points from 110 *bodas*. This thesis appears to be the pioneer in adopting GIS to analyse informal mobility. Secondly, 46 *questionnaire surveys* are self-administered to understand the demographics and users' perceptions towards *bodas*. *Interviews* are conducted with 31 *boda* users and four stakeholders related to the *boda* industry to gain in-depth perspectives on the role of *bodas* to the society, and future aspirations for the *boda* industry. *Unstructured observation* is employed to document descriptive information, reflexive field notes, and visual evidence to better embed the study. All findings have been analysed using the sustainable mobility dimensions: social, economy, physical environment, and institution, a framework proposed by the UN-Habitat (2013).

RQ1: The *Boda* Demand Market

Boda predominantly provides three types of short-distance services (average about three kilometers): (1) within the urban areas with competition with *matatus* taxis or public buses; (2) as feeder to inaccessible or poor road conditions; and (3) as feeder to main roads especially traffic-laden roads to complement conventional public transport services. These services include both passengers and cargo goods transport.

There are two main competitive advantages possessed by the *bodas* – their speed and agility. The speed of the *boda* remains constant at any time (averaging about 10 kilometers per hour) regardless of the traffic or road conditions, which explains why 64% of the interviewees cited this as their main motivation of use. Its agility is portrayed in that *bodas* drive on-road only 56% of the times, with the remaining time off-road. These characteristics reveal two critical

markets served: swerving through gridlock traffic on proper roads during peak hours, and entering any desired destinations even in mediocre urban environments or road facilities.

Furthermore, the *boda* trips and time period correspond with the prevailing activities within the city. Residential areas were common points of origin and destination in the morning and after working hours, especially from the lower income areas, while formal commercial areas only peak during working hours (between 10:00 and 20:00). Activities in small-scale and informal commercial areas were consistent throughout the day with a dip in the evening, signifying its importance for the area. However, between evening and dawn (20:00 to 04:59), *boda* trips in industrial areas and town centers of respective parishes escalated. This is because *boda* is the only transport mode for shift workers in the industrial areas, and supports activities in the respective town centers. Other services such as the markets, medical centers, and universities were also critical points of origin or destination.

Investigating the travel patterns also reveals the type of *boda* users dependent on it. There are indicative trends that shows that many users enter Kampala city from surrounding areas outside of Kampala, especially to the north of Kawempe and Rubaga, and east of Nakawa. These areas also maintain high population density, reflecting the high number of users dependent on it. 75 percent of the trips were made in lower income residential areas; and only 15 percent and 10 percent were in middle income and higher income areas respectively. This delineates three different user groups: people living outside of Kampala; the lower income group; and working population. By looking at the areas and people *bodas* serve, it can be suggested that *bodas* in Kampala city have socially distinctive characteristics.

RQ2: The *Boda* Market and Kampala City

Upon understanding how *bodas* serve the market, its interaction with users highlighted the locals' sentiments, perceptions, and their significance to the city. The rapid satisfaction survey on a five-point Likert scale showed that the majority were satisfied with the *boda* sector (40 percent) or neutral (22 percent). Most of the positive reasons were associated with the physical attributes of *bodas* (convenient, time saving, and affordable); while negative narrations were more connected to the *boda* drivers (unprofessional driving, mannerism, and poor safety). When satisfaction levels and affordability were gauged against gender, women were found less satisfied and generous, suggesting that the amount they pay does not justify the risk exposed to. These factors were also compared against different socio-economic groups. The lower income groups expressed higher satisfactory levels, inclining towards satisfied-neutral. Surprisingly, income groups do not correspond with affordability. These findings demonstrate that appreciation and affordability were more contingent on the personal benefits derived from *boda* use rather than on income level. This awareness is critical for transport planning, particularly in pursuit of an equitable mobility system.

In a similar vein, penetration of *bodas* across the city and society is primarily due to its demand responsive and personalised character. As public for-hire transport, it is able to cater to different needs and markets according to time, and areas. This ranges from commercial good transport especially for agriculture traders, catering for Sunday church service, door-to-door arrival at destinations, to even informal credit service for cash-tight clients. Such a relational transport form is unseen in other public transport modes and is significantly cheaper than a private hire.

Moreover, *bodas* are perceived as an economy driver to the city. They literally connect the city movements and activities, especially in Central Kampala, the epicenter that bids jobs, formal and informal trades and other economic activities. Because of the burgeoning *bodas* sector,

entrepreneurial opportunities increased for locals: there are businesses that rely on *bodas* for delivery; jobless young people becoming a *boda* driver; and there is a growing need for ancillary services (e.g., repair shops). Users view *bodas* from two perspectives: a prospect to access markets and livelihood previously denied; or as a means to expand access to better quality markets with higher efficiency and effectiveness.

The relationship between the urban form of Kampala and the *boda* sector is reciprocal. On one hand, the rise of *bodas* can be attributed to the urban environment – in a monocentric city struggling with traffic situation, problematic public transportation, and road networks allow the agile *boda* to function effectively. On the other hand, the massive amount of *bodas* redefined the city in two ways. While it reduces the need to own personal vehicles, the *bodas* are fuel-based. Moreover, its omnipresence occupies urban space as it allows users to access places, markets, and activities that contribute to the city growth. Recognition of this reciprocal relationship is crucial to form an alternative image for urban environment as it values the users (demand market) and their socio-economic aspirations that contribute to city development.

Having said that, the safety risks and poor professionalism of *boda* drivers that plague the *boda* industry cannot be discounted. This was exacerbated by the lack of regulatory control and capacity of formal institutions to govern the system, especially the traffic police and the city authority. Up to a certain point, *bodas* are seen as a panacea for access, but in light of the negative externalities, intervention is required to ensure the market operates effectively and safely. In this decentralised system, self-organisation is essential for regulation. Aside from the *Boda* Associations formed for discipline and order, new companies stepped in to use market-based strategy (e.g. market signaling) to coerce the industry standards by changing drivers' and users' behaviour and attitudes. However, for long-lasting change, leadership from formal institution is indispensable to engage the informal sector and users – to increase legitimacy and enhance implementation. This study suggests that the roles of both formal and informal institutions should be recognised and capitalised to govern this system.

RQ3: The *Boda* System and Sustainable Mobility

A burning question confronted by the city authorities if *bodas* should be retained for the city was answered by the interviewees – 86 percent were in favour because the *boda* system is embraced as a reliable transport system that retains significant socio-economic values. Nonetheless, better organisation is recognised to be necessary with most interviewees suggesting integration through improvement (41 percent); and using it as a complementary and hybrid system (39 percent) that shares in meeting the public load demand. The integration measures could be three-fold: improvement; complementary planning; and institutional reform, which reflect varying degrees and extents of efforts and resources needed:

- *Improvement*: In the shorter term, the goal of improvement measures is to enhance administrative structures; and information and transparency systems. This could include training drivers, better registration, banning two-stroke engine vehicles, implementation of driver tracking system, and others. The impacts can be significant in a shorter term.
- *Complementary planning*: To pursue a complementary system, stronger leadership by formal institutions would be required to establish an enabling infrastructure. This could be in the form of road space, or city reorganisation depending on the type of hybrid system. It views transport together with urban space and users' needs.
- *Institutional reform*: The aim is to leverage the advantages of both formal and informal governance systems for fundamental reform. An accepted leadership that engages

informal institutions (e.g., users, *boda* drivers) to spearhead and foster a system that plans and delivers effective services.

The ultimate goal is to change the narration of the *boda* industry from a negative to a positive one while providing equitable transport services.

Conclusions

While an informal transport system like the *boda* is able to provide access and offer an alternative pathway to sustainable mobility, existing institutional structures must be strengthened and engaged to integrate and sustain the system. By placing users and the functions of *boda* into the image of urban development, *bodas* could be appreciated in different ways – *a complementary system that enhances mobility and catalyses urban growth*. This is pivotal because only by recognising the *boda* demand market, are policy makers and practitioners able to strategically organise the city and the *boda* system effectively. Furthermore, this alternative image does not merely prioritise a modernised system but also the interests of the locals and the needs of the city for a sustainable urban future. With increasing urbanisation and mobility issues, the significance of informal mobility will not cease to decrease in the foreseeable future. It is thus important to rethink the city's priorities and engage with the informal mobility system as cities in the Global South continue to battle urban and global challenges.

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Abbreviations

%	Percentage
€	Euro
AEO	African Economic Outlook
ArcGIS	Arc Geographical Information System
BBC	British Broadcasting Company
Boda Association	Boda Association 2010
BRT	Bus Rapid Transit
CBD	Central Business District
EIT	Economic Intelligence Unit
GIS	Geographical Information System
GPS	Global Positioning System
GRCC	Global Rating Credit Company
IRPTN	Integrated Rapid Public Transport Network
JICA	Japan International Corporation Agency
KCCA	Kampala City Council Authority
km	kilometers
km/hr	kilometers per hour
km ²	square kilometers
MoLHLD	Ministry of Lands, Housing and Land Development
MoWHC	Ministry of Works, Housing and Communications
n	Number
P	Primary
RQ	Research Question
S	Secondary
TERI	The Energy and Resources Institute
TRP	Taxi Recapitalisation Programme
UBOS	Uganda Bureau of Statistics
UN-Habitat	United Nations Human Settlements Programme
USH	Ugandan Shilling

1 Introduction

Countries in the Global South are rapidly urbanising with striking population growth especially in the African region (Brunn & Behrens, 2014; Mutabazi, 2012). This trend is unlikely to stop or slow down. According to a UN-Habitat (2013) study, the share in total annual growth in the African region is at 19 percent (%) today and is projected to increase up to 43% in 2045. These urbanisation patterns are exerting pressure and unprecedented challenges to urban mobility systems, particularly in developing regions like Africa. In fact, the same study projected that within the next few decades, Africa will receive less than 5% of the global investments in transport infrastructure (UN-Habitat, 2013). When rapid urbanisation in cities does not correspond with the development pace of urban public transportation infrastructure, mobility becomes a challenge – either the lack of it or the never-ending traffic congestion (Cervero, 2000). Yet, mobility is imperative and is a key driver to economic growth and social development as it allows access to goods, services, activities, and places (UN-Habitat, 2013). Because of the delivery of these essential services to local economies, the demand for better transportation never ceases to decrease. For many countries, it would mean building better infrastructure to move people and freight.

With urban agglomeration, transportation paves the way for various economic benefits, including job creation, and support for manufacturing, construction and other economic services. However, without proper planning and governance, these economic benefits tend to erode. Inefficiency of transportation systems could lead to lost economic productivity, increasing air and noise pollution and impacts on human health (UN-Habitat, 2013). In a bigger picture, the transportation system is largely carbon-based and contributes a large share of global greenhouse gas emissions, raising concerns about climate change and environmental sustainability. In 2011, 22% of the 31,000 million tonnes of carbon dioxide emitted from fuel combustion come from the transportation sector, with 17% coming from the road sector (Dulac, 2013). Further, the question of who are systematically discriminated and overlooked in the policy- and decision-making process raises concerns about social equality. Inefficient investment allocated to subsidise the system results in deteriorating services and revenue. Urban dwellers unable to afford the luxury of private vehicles are the most disadvantaged. This happens in terms of non-existent travelling alternatives (e.g. buses and taxis); increasingly expensive travel options (UN-Habitat, 2013); or even residential displacement to the city periphery. To fill the gap, an organically grown solution of informal mobility is burgeoning in many developing cities.

Plying the streets of cities of developing countries are small, flexible yet informal and illicit means of transport driven by private operators. They appear in various forms in the developing world: minibuses, vans, taxis, motorcycles, rickshaws and station wagons, such as the *boda-boda* (*boda*) motorcycle taxis or *matatus* minivans in Uganda (Cervero, 2000); *okadas* and *moto-taxis* of West and Central Africa (Schalekamp, Golub, & Behrens, 2016). Consideration of informal transport as an informal sector in the developing world may have impacts on the economic, political, and cultural systems (Salomon & Singer, 2014).

The history of the notion, “*sustainable transportation*” slowly evolved from consideration of environmental externalities, to also include the social and economic aspects (Zegras, 2008). In one of the latest development, a sustainable mobility system is considered together with accessibility, irrespective of cultural or social status. It extends from merely improving the efficiency and effectiveness of the transportation system to also considering demand-responsive measures (UN-Habitat, 2013). To date, most of the discussions are focused on

formal transport. However, there is growing recognition from the international policy community that informal transport could play a role in meeting the mobility needs of citizens in the Global South, yet relatively little is known about how they are used and the services that they provide (The Energy and Resources Institute (TERI), 2013).

1.1 Problem Definition

Urbanisation in the developing world like Kampala is rapid. At 5.1% per annum, it is one of the fastest developing African cities (Mutabazi, 2012). With high rural-urban migration, new urban neighbourhoods mushroom without an orderly manner throughout the city. These neighbourhoods lack access to basic utilities, including an efficient transport network. The increase of trip distance and travel time between suburban neighbourhoods and the city center induce higher reliance on cars and other motorised transport (Zhao, 2010; Gwilliam, 2003), which result in endemic traffic congestion. Furthermore, transport modes available are either the non-motorised mode of walking or a very limited public transport system that is of low quality and has limited accessibility. Such inefficiency stems from poor financial and institutional capacity with a further lack of an integrated approach to land use and transport planning (Mutabazi, 2012). In fulfilling this middle void, informal transport such as the *boda* motorcycle taxis was invented and flourished (Cervero & Golub, 2007) in the city. It swerves through snarled-up traffic carrying passengers or goods behind the drivers.

1.1.1 Dilemma of Informal Mobility: To Shift or to Retain?

Regulation is lacking in informal transport modes. Even with the longstanding history of informal mobility, *bodas* are sidelined in the policy and infrastructural planning by policy makers and academic discussions (Salomon & Singer, 2014; TERI, 2013). Policymakers faces tough dilemma when trying to streamline the traffic system – to hate (ban and shift) or to love (accept and retain) them. In this tussle, such disorganised informal system is sanctioned by the public authority (Woolf & Joubert, 2013) because it does not portray the desired modern image. Based on Uganda's Vision 2040, the government envisions to build “a critical mass of transportation network” (Government of Uganda, 2007) which involves macadamising roads and its supporting infrastructure. While transport development does mandate road development, lack of sufficient funds and rapid overpopulation are perpetual barriers (Mutabazi, 2012). Without an immediate solution to mobility, locally grown solutions like *bodas* have the potential to be leveraged, adapted and proliferated in innovative ways which could serve as an alternative pathway to modernising urban transport instead of conventional ‘Western style’ efforts (Sengers & Raven, 2014).

Therefore, understanding the role and significance of the *boda* market in Kampala from the users' point could inform insights for better engagement and governance. There is a global emphasis on putting more importance on understanding development aspirations through communities i.e. bottom-up approach in constructioning the system (Simon, 2003). Such repository could shed light on who are the ones most reliant on such a system for mobility, which in turn could reflect on who will be the most affected should the system change. It will also show how the physical *boda* system engages with the users; as well as the general narrative associated with the *boda* industry.

1.1.2 Is Informal Mobility Actually Sustainable?

UN-Habitat (2012) and Lucas & Stanley (2013) present the social, environment, economic, and institutional sustainability as facets of sustainable mobility. All dimensions support each

other in pursuit of sustainable mobility i.e. realisation of access. Yet it is uncertain how *boda*, as a private for-hire informal transport mode, supports or hinders this notion.

Urban transport planning makes an impact on urban poverty patterns as spatial distribution of urban facilities and services have equity implications for access opportunities. Studies indicated that an individual's mobility determines his or her livelihood opportunities (Grieco, 2015). Kampalans are no exception (Mutabazi, 2012). Within such discussions on equity in transport access, the most easily disadvantaged are commonly the urban poor and women. A study by Vermeiren et al. (2015) indicates that different economic statuses within Kampala present discriminated privilege to daily mobility, with the extreme poor being more reliant on walking. In contrast, the rich have easy access to private motorized vehicles. Sadly, while discussing future transport options, the needs and perceptions of the users are often lost, particularly the cargo users, urban poor, and women (Grieco, 2015; Ferro, 2015).

Further, social processes and gender mobility patterns and transport access reinforce and shape each other. Women's mobility could affect their access to social facilities like markets or even occupational opportunities and flexibility in moving out of poverty. Limitations to access to social networks and education have even more significant repercussion on the future labour force and the social status of women in general (Porter, 2008). In eastern Uganda, women who ride bicycles are perceived as '*acting like men*' and thus are socially barred from riding astride (Calvo & Africa, 1994). However, no studies have been done on the situation in urban Kampala and women riding on *bodas*.

The usual way of relating informal transport like *bodas* to environmental sustainability is externalities like air and noise pollution. Although its importance cannot be denied, looking at transportation in relation to the urban form and land use conceive different perspectives of the environmental paradigm. This assimilates access and social cohesion (Boarnet, 2011; Gurs & van Wee, 2016). Looking at this from an economic sustainability perspective, improving accessibility does not merely mean building a better transport system, or facilitating mobility, but ensuring affordable access to jobs, markets, education, safety and others (Jones, Tefe, & Appiah-Opoku, 2015). If *boda* is considered in a traditional perspectives, *boda* may be considered as a nuisance instead of an asset for the city. Of course, this is in not trying to romanticise the *boda* system and 'demonise' modernisation. Instead, to consider that *boda* as a system so embedded within the city could possess the potential as an alternative pathway for sustainable urban mobility in Kampala (Ferro, 2015). In short, many developing cities like Kampala face challenges in meeting citizens' transport needs. Can the *bodas* be a sustainable mobility solution to the city?

1.2 Research Gap

Although there is a cascade of studies on informal transportation, most are focused on other Sub-Saharan and Asian cities (e.g., Cape Town, Rio de Janeiro, Nairobi, Bangkok, Manila) with some research on Uganda (e.g. Howe (2003)), but rarely on Kampala. These studies are concentrated on the problems, barriers for change, and regulatory or formalisation approaches. Even so, these researches heavily focus on minibuses (Van Zyl, 2008) and minivans in Uganda and Africa (Kamuhanda & Schmidt, 2009; Williams, White, Waiganjo, Orwa, & Klopp, 2015). While these modes of transport are also crucial to understand the informal transport industry, the nature of such informal minibuses and minivans is largely different from the *boda* motorcycle taxis – in form, size, route, function, organisation and market. Only few of these informal transportation studies connect with the growing discourse of sustainable mobility, with more focus on social sustainability. On top of that,

how the informal system could be improved and integrated into institutional reform projects remains under-researched in comparison to other formalised modes. Moreover, management trajectory for informal public transport modes such as the *matatus* taxi is more discussed than the public for-hire modes like the *bodas* (Schalekamp et al., 2016).

The existing literature on the *boda* industry in Kampala focuses only on *boda* operators – association, ownership and demographics (e.g. Kisaalita and Sentongo-Kibalama (2007)). There is a knowledge vacuum on the extent of *boda* operations and services it provides in Kampala – the service routes, density in different areas or stages served, travel distance, and connections within the city. Furthermore, familiarity on the demand side of the *boda* market is lacking i.e. the passenger profile, trip purpose, needs, travel patterns, user preference etc. The only study found that investigates the informal transport from the users' perspective is conducted by Joewono and Kubota (2007) to learn of the user perceptions and loyalty of users towards private paratransit operations (the *jitneys*) in Jakarta, Indonesia. Even so, this quantitative study does not present how *jitneys* connect the city, and its social significance. Nonetheless, it raises the need to explore the needs and perceptions of users from weaker groups; as well as the importance to address the clash between the informal industry and policy makers from the community's point of view, since they are the main beneficiaries of the system. This gap is also reinforced by Ferro (2015), especially when almost 100% of the public transport trips in Kampala are made on informal transports.

Overall, there is a knowledge gap on the characteristics of the demand side of the *boda* market; the significance to Kampala; and its potential as an alternative transport pathway. Understanding it from the users' perspectives is meaningful to bridge the connection between the citizen and policy makers in terms of attitude, standpoint and outlook.

1.3 Research Aim and Questions

With this background, this thesis evaluates the *boda* system through the lens of users (i.e. passengers and cargo-users), and related stakeholder groups to inform potential alternative pathways for transport planning in Kampala city. The research aims to understand the role of informal mobility in the sustainable urban mobility discourse. To achieve this, the *boda* system within the urban fabric of Kampala is investigated through three research questions, as follows:

1. **How do people use *bodas* in Kampala?**
 - 1.1. Who uses them and how?
 - 1.2. Where do people go and come from?
 - 1.3. What are the travel patterns, purpose, average distance and speed?
2. **What is the significance of *bodas* to the local populace of Kampala?**
 - 2.1. What is the significance and perception of *bodas* to users?
3. **How can the *boda* industry be governed?**
 - 3.1. Should *bodas* remain part of the city's mobility mode? What are the preferred options for the future management of the *boda* industry?
 - 3.2. How do these findings inform the current discourse of sustainable mobility and governance of informal mobility?

1.4 Methodology Overview

This thesis uses a mixed-method approach i.e. qualitative geographical information system (GIS) to address the abovementioned research questions. Firstly, *geographical information system* tools are used to analyse and illustrate *boda* coverage and travel patterns of passengers in relation to the different landuse. A *survey questionnaire* is also conducted to understand the social-demographics of users and passengers, narration of use patterns, patterns and perception towards *boda*. *Interviews* are carried out to selected interviewees from different groups (males and females from low to high income group), to glean more in-depth understanding of the role of *boda* and their aspiration for *boda* within the Kampala city. Finally, *unstructured field observation* is approached to document descriptive and reflexive notes and photograph evidences, which are useful to enrich the study. The reason for the use of qualitative GIS approach is that it not only analyses and visually illustrates the spatial data and its patterns, but it also provides robust narration to understand how and why these patterns exist. For a detailed description of the methodology, please see Chapter 4.

1.5 Research Scope

This thesis seeks to examine the demand side of the *boda* motorcycle taxi system in Kampala city i.e. users including passengers and cargo-users. Nonetheless, the *boda* supply market (*boda* drivers) is discussed to a limited extent because it is also necessary to provide context and illustrate the *boda* market in Kampala especially to readers who are unfamiliar to it. However, field research only focused on the users of *boda* (occasional and regular) and relevant stakeholders involved in the *boda* industry including the Kampala City Council Authority (KCCA); two social enterprises i.e. Tugende, a *boda* lease-to-own company, and SafeBoda, an Uber-like *boda* service provider, and the Traffic police. Studying Kampala allows to better characterise and solve informal and urban mobility challenges especially since Kampalans mostly rely on informal transport modes.

As Kampala is a large city, field research is mainly focused on Nakawa division as it comprises of various land uses including low to high income residential areas, commercial, and others, and maintains significant presence of *boda*. Field research is also conducted in Central Kampala but to a limited extent, mainly due to safety issue. However, it is still important to consider Central Kampala as it houses the highest number of *bodas* and it is also one of the pioneer areas selected for better organisation by the KCCA. Methodological limitations are discussed in Chapter 4.6.

1.6 Ethical Considerations

This thesis and the field research process endeavor to respect all survey respondents' and interviewees' anonymity and confidentiality. Cultural norms and conducts are also adhered to at all times during field survey to not offend the local populace. The use of sensitive data such as personal income and education level does not in any way intend to label and characterise any individual besides the intent to understand who uses and benefits from the use of *boda*. Further, the landuse data that exhibits socio-demographic profile only seeks to generalise the population and an area.

1.7 Target Audience

This thesis is written as part of the final semester for the Erasmus Mundus Masters in Environmental Science, Policy and Management (MESPOM) programme at one of the

consortium universities i.e. the International Institute for Industrial Environmental Economics (IIIIEE) at Lund University in Lund, Sweden. This research conducted support the larger research project funded by the National Geography, of which other researchers from the IIIIEE and Makerere University are involved. The aim of the research is to understand the *boda* industry and its role in sustainable mobility.

Research question one seeks to illustrate the coverage and travel pattern of *boda* users and passengers in Kampala city could have wide-ranging interested audience. This could be an individual unfamiliar with informal transport especially in Kampala and is interested to visually understand how *bodas* function. Besides, as presenting informal transport patterns using GIS method is new, this could be useful for qualitative GIS researchers in transportation. The second and third research questions address the social significance of the *boda* industry in Kampala and the preferred policy scenarios. This would especially be useful for policy makers in Kampala, as well as policy makers dealing with informal transport in other cities by using Kampala as a reference. Policy makers could benefit from understanding how the city is being connected with *bodas* and its relevance to different segments of society as well as their main concerns and desire for Kampala. Furthermore, the findings and conclusions contribute to the sustainable urban mobility and cities discourses.

1.8 Disposition

The thesis gives a comprehensive overview of informal and sustainable mobility. Chapter 2 sets the scene by exploring and defining informal mobility and transportation. It also gives a background of Kampala city and its characteristics such as physical feature, socio-demographic profile and transportation system to appreciate the context of *boda* system in the city.

Chapter 3 reflects on the current sustainable mobility paradigm and dimensions. It discusses the current challenges and approaches to govern or manage informal transport systems. It concludes by linking the informal transport and sustainable mobility discourses and synthesis findings to form the foundation for this research.

Chapter 4 describes the methodology for this research – GIS analysis, survey, interview, and unstructured field observation. All of which are used for data analysis and interpretation.

Chapter 5 presents the findings and analysis of the research. The structure of the findings and analysis are according to the research questions.

Chapter 6 discusses the role of the *boda* system and relates it back to the overarching sustainable mobility framework. Furthermore, it provides recommendations for the policymakers and practitioners; and reflects on the methodological and analytical choice.

Chapter 7 summarises the main findings of the research, makes conclusion of the analysis, and provides suggestions for further research.

2 Setting the Scene: Informal Transport and Kampala

The aim of this chapter is to provide a foundation for discussion of the topic. It introduces the nature of informal mobility – its attributes, benefits, weaknesses, and challenges associated. A brief overview of Kampala is presented to allow readers unfamiliar to Kampala or Uganda to learn more of city in order to appreciate the *boda* motorcycle taxi system and policy reform discussions. With this fundamental setting in mind, the final section introduces the informal transportation system in Uganda specifically on the *bodas* in Kampala.

2.1 The Nature of Informal Transport

In Global South cities, two types of transportation exist: institutionalised and formal scheduled services; and informal transport or paratransit. Both model differ significantly from each other with institutionalised services set up by private or public operators that abide to regulations promulgated by relevant transport authority. Their service quality and operational fares are maintained and monitored closely by the authority (Ferro, 2015). On the other hand, informal transport or paratransit in the developing world operates at the fringes of the institutionalised system, commonly provides services to a larger scale of general population but often weakly governed by illegal operators or self-formed organisations in the informal sector (Behrens, McCormick, & Mfinanga, 2016). At times, the paratransit form of transport takes over as the main component of the city's transportation system. In principal, informal transport describes the spectrum from private for-hire modes to public mass transportation (World Business Council for Sustainable Development (WBCSD), 2004). Examples of private for-hire modes are *boda* of East Africa, *okadas* and *moto-taxi* of West Africa. In these modes, the passengers determine the route, service time, occupancy although the passengers do not own the vehicle. On the other hand, informal public mass transportation do not share such characteristics as passengers neither determine the route, service time, and occupancy, nor own the vehicle. For example, the 14- to 25- seater *matatus* minivan of Kampala and Nairobi, and the 17-seater *dala-dala* minibus of Dar es Salaam (Schalekamp et al., 2016). Although they differ slightly in terms of the type of services they provide, travel fares, and occupancy, they both share similar roles and attributes of being the gap-filler at cities void of formal public transportation options.

In comparison to the conventional formal public transport, the informal system provides more flexibility but is highly competitive. The main objective of actors involved is to maximise profit so that the drivers may be able to pay back the vehicle rental to owners. The desire to maximise profitability by maximising occupancy or trip earnings often comes at a cost of its service quality (Cervero, 2000; Ferro, 2015).

2.2 Defining Informal Transport

How to consider a certain type of transport as informal? Recent literatures (Cervero, 2000; Golub, 2013; Ferro, 2015; Schalekamp et al. 2016; Behrens, McCormick & Mfinanga 2016) studying informal transport defined it based on elements that they share despite the origins. They are referred varyingly as '*informal transport*', '*paratransit*', '*transport artisanal*', '*third-world transport*' or '*intermediate transport*'. Though they refer to the same sector, some authors use the terminology distinctively. Cervero (2000) considers '*informal transport*' as the right term as it best reflects the *informal and illicit* nature of the system that is *officially sanctioned outside of public transport sector*. The term '*paratransit*' coined by Orski (1975) describes *flexible transport services such as shared taxi, community transit, or jitneys*. Schalekamp et al. (2016) define paratransit as a

“flexible mode of public passenger transportation that does not follow fixed schedules, typically in the form of small- to medium-sized buses”. Meanwhile, Behrens, McCormick, & Mfinanga (2016) purposely differentiate the term *paratransit* for services that may have a certain degree of regulation by public authority albeit minimally, and that all forms of paratransit originates from informal transport. Regardless, they can be distinguished from conventional transport system by sharing the following features:

- (1) *Absence or lack of efficient regulatory framework* – The informal transport can also be seen as a *laissez-faire* marketplace, with transactions according to the passengers’ willingness-to-pay and service providers’ willingness-to-provide where authorities allow very flexible regulatory environment or even deregulated environment (Cervero, 2000).
- (2) *Flexibility* – It reflects flexible transport services in terms of charges, schedules or even routes as defined by Orski (1975) and Schalekamp et al. (2016).
- (3) *Vehicle capacity* – Vehicle capacity depends on the country’s context and can range between: 1 to 3 for motorcycle taxis such as *zemidjans* in Cotonou; 10 to 15 seats microbus; 16 to 25 seats minibus; 26 to 44 seats *midibus* common in West and North African cities; and 1 to 4 seaters shared taxis. Another term describing this is *transport artisanat*, the French term for *transport artisanal*, coined by Godard (2013) as it refers to *small-scale, private enterprise-based public transport services operating in developing world cities* (cited in Behrens, McCormick, & Mfinanga, 2016). Nonetheless, vehicle capacity is subjective depending on country’s context and can be between as little as one (motorcycle taxis) to even 50 (buses) (Godard, 2013).
- (4) *Internal organisation* – The operation of public transport vehicles on individual and private scale is largely fragmented vehicle ownership. Rules of organisation and operations vary depending on associations. (Ferro, 2015).

In this thesis, the term *informal transport* is adopted instead because the *boda* sector reflects the situation of minimal organisation by the public authorities and it operates with constant misdemeanour of the rules although certain rules are upheld.

2.3 Attributes of Informal Transport

Like many other informal sectors, informal transport is formed by many low-income, self-employed and self-financing individuals who work long hours to eke out a living. There are several positive and negative attributes that dominate the sector, as described below:

- (1) *Job creation and entrepreneurialism* – It is one of the dominant sector in private sector, creating jobs directly and indirectly especially to youths. As it is entirely private, it does not receive any operating or capital assistance from public agencies. However, some cooperatives or private financing institutions may assist in providing capitals, financing schemes or even insurance schemes (Cervero & Golub, 2007; Ferro, 2015).
- (2) *Highly competitive market* – The ease of entry into the unregulated market results in a highly competitive market. The fares vary according to day, time and locality deriving from market demand. Drivers tend to compete to serve areas with higher demand, an occurrence known as *crème-skimming* (Cervero, 2000).
- (3) *Fragmented organisation* – Instead of operating in coherence with the public transport system, informal transport constitutes functions separately from the existing system. Some organisation may apply in certain contexts which basically include registration, licensing, and the role of associations (Ferro, 2015).

- (4) *Poor relations with authorities* – Drivers and their associations lack positive relations with public authorities. Lack of meaningful participation in framing policies and regulations result in very poor implementation. Formal institutions that are often marred by corruption and conflict of interests lead to inconsistent enforcement. The notion of informal nature is subtly perceived to be bad and destructive by the authorities (Schalekamp et al., 2016; Woolf & Joubert, 2013).
- (5) *Low performance service* – In competition for passengers, unsafe operations plague the industry such as poor driving ethics, lack of vehicle maintenance. This results in high accident rate and road mortality, which is one of the glaring problem (Finn, 2012).
- (6) *Environmental externalities* – Certain old-aged vehicle fleet have a direct impact on local air pollution levels (Ferro, 2015).

In contrast to the formal, scheduled public transport services, informal transport services are not bound by regulatory restrictions – thus operating on a looser margin in terms of competition regulation (self monopoly), business formality (e.g. non tax paying), and service planning (flexible routes, time, service) (Schalekamp et al., 2016). Since they are not bound by restrictions, it is able to serve local community for different purposes.

2.4 Background of Kampala, Uganda

Uganda is a landlocked East African country with the size of approximately 199,710 square kilometres (km²), surrounded by Kenya to the east, Congo to the west, Rwanda to the southwest, Tanzania to the south and Sudan to the north. Kampala is the capital and center of the Kingdom of Buganda. To the south-easterly direction is the largest freshwater lake in Africa, Lake Victoria. The metropolitan city is divided into five main divisions: Central, Kawempe, Makindye, Nakawa and Rubaga headed by a mayor and 96 parishes (Figure 2-1).

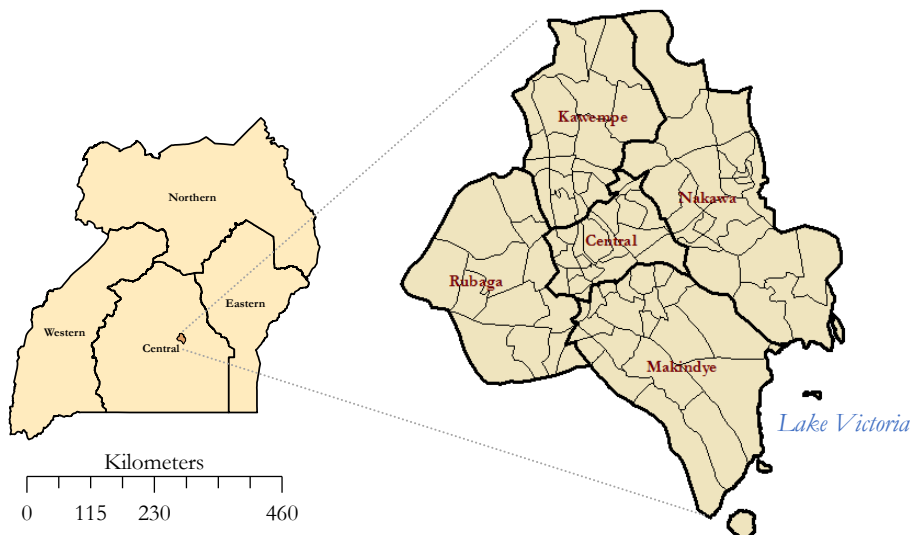


Figure 2-1 The divisions and parishes of Kampala in relation to Uganda

Upon recovery from past war conflict and tyranny, the Ugandan economy grew steadily under the leadership of President Museveni. The current real Gross Domestic Product (GDP) growth of Uganda is 4.7% and is forecasted to grow to an annual average of 5.4% in 2016 to 2020, mainly spurred by public investment and private consumption (African Economic Outlook (AEO), 2015; Economist Intelligence Unit (EIT), 2016). Kampala, as the financial epicentre of Uganda, accounts for approximately 80% of industrial and commercial

activities in Uganda, thus contributing 65% to the national GDP. As such, the city is critical to the country's continuous growth and prosperity (Global Rating Credit Company (GRCC), 2015). In recognition of the metropolitan city's significant role to Uganda, the government established the Kampala City Council Authority (KCCA) to make Kampala a “vibrant, attractive and sustainable city” (KCCA, 2016).

2.5 Socio-economic and Demographic Profile

Based on the latest population census in 2014, 2.3 million km² Ugandan capital houses a population of 1,516,210 inhabitants (Uganda Bureau of Statistics (UBOS), 2014), with the average population density in Kampala as 6,100 per km² (Vermeiren, 2012). As Uganda is one of the country with the youngest population in the world, Kampala's population is young with an estimated median age of 23 and an estimated average age of 24 years. More than one quarter of Kampala's population are in the 20 to 29 age brackets, indicating the scale of in-migration of youths from the rural areas into the city. The Government of Uganda (2005) anticipates continuous growth to 3.6 million inhabitants by 2020 in the Greater Kampala Metropolitan Area. With in-migration trend, population growth within the city is projected to accelerate to approach 20 million people by 2040 (KCCA, 2012).

With urbanisation, the city struggles to provide proper settlements with increasingly denser slums and informal settlements. As the economic structure is agro-based, it lacks significant productive and high-value sectors. With high unemployment level at almost 20% and higher underemployment, poverty is a challenge for the city. About 70% of Kampalans are categorised as lower income groups (Figure 2-2). Conditions of the housing amenities and infrastructure can be distinguished within these socio-economic groups (KCCA, 2012).

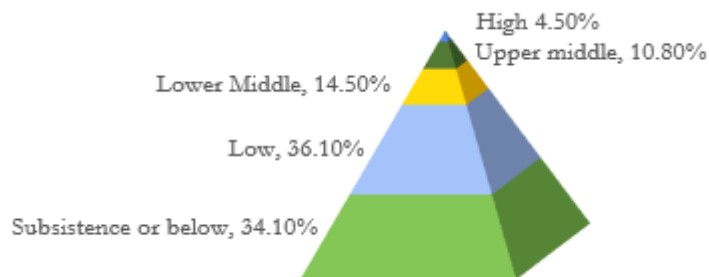


Figure 2-2 Frequency distribution of socio-economic categories in Kampala (Source: KCCA, 2012)

2.6 The State of Public Transportation System

Just like other Sub-Saharan African cities, the transport situation in Kampala is frequently in a gridlock situation despite low car ownership rate i.e. 15 per 100 (KCCA, 2012; KCCA, 2013). A northern ring road that was operational since 2009 ameliorated the urban traffic but the rapid urbanisation of the city has affected the traffic condition of the road too. Thus, entering the Central Business District (CBD) from surrounding areas may take an average of 1 to 2 hours on motorised transport (Vermeiren et al., 2015), a daily struggle for urbanites. At the same time, the traffic growth rate in the Greater Kampala Metropolitan Area expects an overall average annual traffic growth rate of about 7% up to 2020 (Mutabazi, 2012).

Kampala does not maintain an integrated public transport system. Funding remains one of the significant stumbling block to implementing and operationalising it. Currently, there are

four main public transport modes in Kampala: (1) buses; (2) *matatus* taxi or locally known as taxi; (3) *boda* motorcycle taxi; and (4) special hire. Buses are mainly for long distance interstate or inter-country connection. *Matatus* taxi, a 14-seater minivan, is another informal transport that serves fee-paying passengers based on their desired routes. It is said to account for nearly half (46%) of the Kampala traffic (Kamuhanda & Schmidt, 2009), although this figure contradicts with Vermeiren et al. (2015) figure of 20%. Nonetheless, they remain a pivotal form of transport mode and serves about 80% of Kampalans. There is an estimated of 20,000 to 25,000 taxis on road (Kamuhanda & Schmidt, 2009). The *boda* motorcycle taxi, is the main competitor for *matatus* for intra-city routes. Finally, the special hire taxis are similar to the western understanding of on-call taxi. Serving the high-end market, its fares can be 15 times higher than a *boda* (KCCA, 2013). They provide more professional services.

Another key individual mobility mode is walking. Walking is common especially amongst the poor as they cannot afford other means of transport. Some poor spend almost 22% of their income on transport (KCCA, 2013). However, footpaths are not always provided or are in poor unmaintained conditions. Street vendors occupy much spaces of the sidewalks too (Vermeiren et al., 2015). Bicycles are used for mobility or goods transport.



Figure 2-3 (a) Pioneer buses (back) and boda motorcycle taxi (top left); (b) matatus shared taxi picking up passengers at the roadside (bottom left); (c) locals walking on unused railway track (middle); (d) special hire (middle); (e) bicycle, traditionally also known as boda (right).

2.7 Informal Mobility in Kampala, Uganda

The high volume of vehicles on the road coupled with the inefficiency of the transportation has led to the massive traffic congestion in the city, particularly the abundance of *matatus* driving on narrow and poor roads (Raynor 2014). This inadequacy resulted in the proliferation of the *bodas* in the city due to the small and more flexible attributes of the motorcycles. Even with the growing importance of the *bodas* to the society, not much is known of their operations and services. Thus, this section solely focuses on the *bodas* in Kampala City – its history, organisational structure and regulatory environment.

2.7.1 Origins and History of Boda

Boda-boda or *boda*, pronounced like a tainted English version of 'border-border', traces its origin at the Uganda-Kenyan border. In the 1960s, the Ugandan smugglers invented a cheap and reliable way of moving valuable materials between Uganda and Kenya while evading the border police with bicycles. These bicycles are equipped with padded cushion fitted over the

rear carrier and a small luggage rack (Gamberini, 2014; Howe, 2003). They are sturdy and could transport passengers easily. The motorcycle version appeared in the market in 1992 enabling long-distance travel even at undulating terrains leading to the boom of the motorcycle *boda*, which coincided with the government's ease of restriction on used vehicle imports. With lesser cost to import used and reconditioned motorcycles (mainly from China or India) in comparison to cars and reliable services, the motorcycle taxi system became a popular option for the locals to transport goods and passengers (Gamberini, 2014). The reduced cost is partially attributed to Uganda's deregulation of the energy systems. Uganda has one of the highest fossil fuel cost in East Africa (€ 0.83, May 2016), hence *boda* has become a more economical option (Kisaalita & Sentongo-Kibalama, 2007). Growth rate up to a factor of 14 is observed for the most of the 1990s until the end of 1996 which slumped due to external shocks (e.g. oil price hike) (Howe, 2003).

2.7.2 Organisation and Regulation

Becoming a *boda* operator is fairly easy. Each vehicle owning operator only has to pay a registration fee to the local municipality and an annual fee to the local *Boda-Boda* association, both of which cost about USD 6 to 10 (Gamberini, 2014). The association represents the driver as insurance agents in cases of accidents, theft or security threats. The largest association is the *Boda-Boda* Association 2010 ("Boda Association") with around 100,000 members. Organisation of the *Boda* Association is bottom up in which 15 to 20 *boda* drivers are clustered and a *stage leader* is appointed. Appointed stage leaders appoint a *stage manager*. Division level leaderships are elected from the stage level. The divisions are separated according to the Kampalan divisions. Elected officials form an executive committee headed by a division chairman. There have been efforts to integrate the myriad of associations under an umbrella but efforts have failed due to internal politics. Today, the *Boda* Association remains the largest unified effort though smaller associations do exist (Raynor, 2014).

Reportedly, these associations slowly morphed from a welfare role to members to business or political entities instead (Howe, 2003). As fee collection involves cumulatively large cash transactions, urban associations tend to become highly politicised. The association becomes a cash collection engine on behalf of authorities instead of developing welfare. Cash collection in this tendering process is for the right to use municipal parking services, and others. Conflicts amongst associations are ubiquitous in the technical and political complexity in this tendering process resulting in strong monopolistic mafia-like operations (Howe, 2003). Nonetheless, the *stage committees* of the associations enforce discipline and hygiene by fines, suspension of membership or refuse right to operate (Howe, 2003). In certain cases, they maintain a credit and savings role for operators who could not afford to purchase a used motorcycle costing about three million Ugandan shillings (USH) (€ 802,29) (Raynor, 2014).

KCCA struggles to regulate the city's *boda* industry due to the politicisation of the informal transportation sector by the central government itself. Officials in the five Kampalan divisions attempted to tax the industry and contracted the revenue collection to private contractors. However, the lack of understanding of the *Boda* industry structure caused disappointing collection results; and instead, the responsibility was re-allocated to the *Boda* associations (through fee collection). Besides, the Traffic and Road Safety Act 1998 promulgated to ensure public safety after the increase of safety concerns and road traffic accidents was met with lackadaisical enforcement (Kisaalita & Sentongo-Kibalama, 2007).

2.7.3 The Nature of *Boda* Marketplace

Boda marketplace operates on a *bona fide* nature based on the willingness-to-provide by operators and willingness-to-pay of users. This section describes the *boda* industry according to the supply side of *boda* service providers and the demand side of users and service use.

2.7.3.1 The Supply Side: *Boda* Services

Service Structure and Area

In remote areas, *boda* could be the only substitute to walking. They are more ubiquitous in urbanised areas due to the presence of supporting infrastructure such as repair facilities and technical knowledge to establish them. Aside from passenger mobility, *boda* also supports goods transportation in industrial and agricultural areas (Goodfellow & Titeca, 2012).

An operation area is referred as ‘*stage*’ monitored by a stage leader. Based on a survey in 2001, there are approximately 124 stage masters and 2000 operators in Central Kampala. In 2012, there are about 40,000 *bodas* in Kampala (Goodfellow & Titeca, 2012). But, Nasasira (2015) reports an estimation of more than 100,000 drivers in Kampala alone. In contrast, a village may only have two to three stages with 10 operators. *Boda* operators tend to consistently drive in the same location and stage, especially busy market and taxi park (Kisaalita & Sentongo-Kibalama, 2007). Fees are charged for a particular stage or distance (Howe, 2003).

Operators’ Background

Most operators are male youths or young adults. Education remains low, mostly with no or incomplete primary education. The lack of women in the industry could be attributed to long working hours, customs and strenuous nature of the work (Howe, 2003).

Ownership, Income and Finance

Most *boda* drivers do not own their own vehicle (operators only), and only a very minimum percentage are both an owner and a driver (owner-operators). Occupation as *boda* driver represents the main source of income for most, even though some *boda* drivers have side economic incomes. A study by Kisaalita and Sentongo-Kibalama (2007) concludes that income does not commensurate to the long and hard work and is insufficient to improve the wellbeing of their families. Direct income is subtracted to pay rent, fuel and taxed (at 18 to 35 percent) leaving a meagre amount insufficient to eventually be an owner (Table 2-1).

Table 2-1 Average daily expenses and income in Ugandan shillings (USH) (€ 1= 3,753 USH)

	Take-home pay range	Owner payment	Fuel cost range	Fair motorcycle sale price	Tax
Operator	2,077 – 4,459	6,508	2,389 – 4,223	630,548	1,000/ 1,200
Owner-Operator	8,250 – 12,750	-	2,250 – 4,000	733,333	1,000/ 1,200

Source: Kisaalita and Sentongo-Kibalama (2007)

A similar conclusion was reached by Gamberini (2014) – personal welfare does not significantly increase personal welfare. Finance sources for *boda* operators are very limited due to several reasons: (1) the informal structure reduces credibility for a bank loan; (2) low

education inhibits understanding of complex bank loan mechanism; (3) relatives are also unable to assist in finance; and (4) unqualified for most microcredit sources targeted to disadvantaged population. With many of these options being denied to operators, livelihood of operators does not tend to improve significantly (Kisaalita & Sentongo-Kibalama, 2007).

Despite this, it remains attractive for job-seekers especially providing employment and relatively secure income for young people. The nature of the job does not require hard knowledge or expensive apprenticeship although they are required to pass driving tests (Olvera, Plat, Pochet, & Maïdadi, 2012).

2.7.3.2 The Demand Side

No current literature exists to study the demand side of the *boda* service. Access to mobility involves high disparity along the lines of gender, age, class and ethnicity. Interactions between social mobility and environmental, political and physical mobility are also unclear (Lucas & Stanley, 2013). Only one study by Howe (2003) gave a snapshot of the demand side of the *boda* marketplace in Uganda. The main findings are: (1) more man users; (2) business users; (3) reasons of use are convenience and load carriage; and (4) benefits daily life. The findings are not specific to Kampala and did not contextualise into the urban scenario – understanding the user socio-demographic profiles, trip purposes and distance, fare structure, frequency of use, and customer relations. User perceptions on *boda* services are not found although certain literature suggests divisive public opinion – it could be a convenient means to an end, but at the same time pose a health and safety risk, poor hygiene, traffic nuisance, and outright mugging (Goodfellow & Titeca, 2012; Kisaalita & Sentongo-Kibalama, 2007).

Further, transportation and mobility maintain social significance, particularly for women and the general public of different class. Although their service contributes to more equity in daily travel by enhancing access to larger population groups including the underprivileged segment of the urban poor, but an underlying influence exists that allows certain groups to access such services. A study by Olvera et al. (2012) was conducted on motorcycle taxis in Douala, Cameroon (known as *bendskin*) and Niamey, Niger (*kabu-kabu*) to ascertain the societal role of motorcycle taxis in both cities. In Niamey, *kabu-kabus* are a socially distinctive transport mode as users have a very unique profile: male with average income due to the presence of social barrier of female on motorcycle taxis. In contrast, *bendskin* in Douala are a common public transport mode for women and the working poor. Another study by Calvo and Africa (1994) commissioned by the World Bank on rural Ugandan women unsurprisingly shown that unlike men, women do not have easy access to bicycle *bodas* although its use increase utility gain. These studies suggest the importance to understand the social role and meaning of *boda* services, its underlying influences for access in order for *boda* operators and policy makers to ensure equity for access to mobility.

3 Towards Sustainable Mobility

The conventional way of thinking about mobility or transport planning is vastly different from the sustainable mobility discourse. Even the current discourse downplays the role of informal mobility. Thus, this chapter discusses the sustainable mobility discourse and presents the challenges faced and underlying influences that prevent reform for informal transportation; different options and policy responses with case studies. Finally, it places informal mobility into the wider sustainable mobility narrative.

3.1 Sustainable Mobility

“There can be no sustainable development without sustainable transportation,” (Hall & Sussman, 2006).

The adoption of sustainability into the transportation sector began in the 1980s when the term sustainable development was mainstreamed (Zegras, 2008). Similarly, the sustainable transportation concept expresses the three aspects of sustainable development – environment, economics, and social (Zietsman & Rilett, 2002). Before delving further, some terminologies should be explained. Transportation system refers to the infrastructures, vehicles and the physical means to convey people and goods. Mobility denotes the *“physical movement itself to travel across space using the transportation system”* which is also a derived demand (Zegras, 2008). In the technical view, it refers to the number of trips made by a person (Vasconcellos, 2014). But, Grieco (2015) points out that transport may be associated with its negative externalities. Due to the nuanced difference, both terminologies can be used interchangeably as a transporta system could be a mobility system (Zegras, 2008). Regardless, both Zegras (2008) and Grieco (2015) agree that the overarching purpose of transport is to gain access to: goods, services, activities and destinations. Mobility is a means to an end i.e. realisation of access (UN-Habitat 2013). Since it is the ultimate aim of any mobility, accessibility can be measured by how easy it is for people to reach their desired destinations (Vasconcellos, 2014). Geurs and Van Wee (2004) define accessibility as the *“extent to which the land use and transportation systems enable individuals to reach activities or destinations”*. This definition derives three critical elements: the urban design; functioning of transportation; and capabilities and characteristics of individuals. All of these require a sustainable system to support the functionality and performance of the system to continuously realise access.

Geels (2005) argues that transportation is not merely physical infrastructure, but a complex *socio-technical system* co-existing with no specific distinction between the physical and social elements to provide a function. The functioning system is a result of evolving elements such as infrastructure, production system, policies and regulations, social-cultural norms and markets, and user behaviour. These systems’ capabilities need to be sustained over time to continuously provide access (Zegras, 2008). Recognising this, the UN-Habitat (2013) considers sustainable mobility to *“extend beyond technicalities of increasing speed and improving the effectiveness and efficiency of transport system to include demand-oriented measures”* and equitable access. In order to support this system, the focus of sustainability in urban mobility has moved beyond the physical environment and includes social, economic and institutional dimensions.

3.1.1 Social Sustainability

One definition of social sustainability is by Polèse and Stren (2000): *“Development and/or growth that is compatible with the harmonious evolution of civil society, fostering an environment conducive to the*

compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population.”

Referring to urban mobility system that is socially sustainable in the developing world, the delivery of accessibility that is *available, affordable and acceptable* has always been a tussle (Grieco, 2015). This equality to access transport infrastructure and services should be accessible regardless of gender, age group, ethnicities or social status. Such social inclusiveness is fundamentally rooted on the principle of accessibility whereby each individual has the right, not privilege, to education, job opportunities, housing, commercial markets, and quality of life (Cervero, 2013). Affordability is central as it reflects the financial capabilities of individuals or households have to sacrifice for access (Grieco, 2015). In reality, the share of marginalised urban communities continue to increase around the developing world with the common mode available to them is walking or other non-motorised transport such as animal carts or bicycles (Ken Gwilliam, 2003). Availability refers to *en route* options, timing, and frequencies at various parts of the town. Most urban poor lives at the periphery of the city, which requires more financial and time resources to travel longer distance into the city centre (UN-Habitat, 2013; Grieco, 2015). Acceptability reflects the quality of transport mode. Passengers may not opt for a certain transport mode if it is prone to jeopardise personal safety (UN-Habitat, 2013). The notion of acceptability can extent from physical environment (e.g. road condition) to the political process. It is a necessary yet often neglected form of sustainability (Banister, 2008). Thus, access does not merely materialise the citizens’ right to use, but also to ensure such access does not socially marginalise the urban poor by integrating affordability, availability and acceptability factors.

To reiterate the link between mobility to poverty (Figure 3-1), there are four dimensions of poverty that can be improved with transport infrastructure and services (UN-Habitat, 2013):

- (1) *Opportunity* – Enhanced access to assets and markets with efficient time and increased productivity;
- (2) *Security* – Reduces security and vulnerability as a result of isolation and seclusion from society;
- (3) *Capability* – Better access to public services and institutions;
- (4) *Empowerment* – Enabling involvement in political gatherings and community involvement; and being recognised in part of the process.

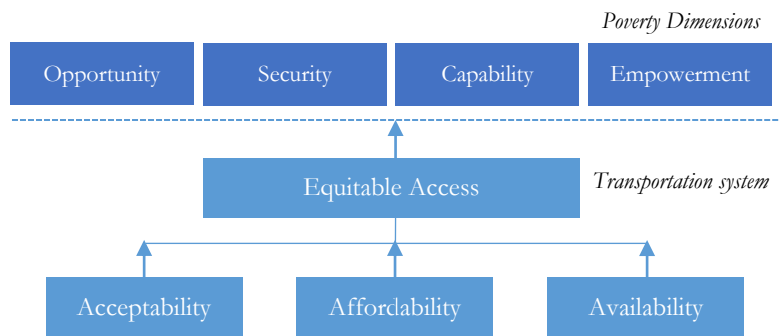


Figure 3-1 The link between transport system as an enabler to enhance the poverty dimensions

Source: Own illustration based on Grieco, 2015 and UN-Habitat, 2013

For these four dimensions of poverty, women is perceived to be the most vulnerable to be denied from these dimensions. Gender is a massive cross-cutting theme especially in African cultural contexts, given its influence on access to transport and the gender difference in

travel patterns (Porter, 2014). Frequently, women involve in the lowest productivity and most time consuming works, influencing the purpose, time and route of travel. This is known as “*time poverty*” (Turner & Adzigbey, 2012). This means an opportunity to reduce time burdens on women for greater productivity; social inclusion for work, social activities and political process; reducing even the risks to domestic violence; given the empowerment to voice out in household and community level (UN-Habitat, 2013).

There is an argument that states social sustainability is the lesser relative to environmental sustainability in the sustainability paradigm (Grieco, 2015). However, when considering informal transportation, this dimension of sustainability remains one of the most critical aspect – taking into account the urban planning, socio-economic characteristics, and transport infrastructure and services – to safeguard equitable development.

3.1.2 Economic Sustainability

Travel is considered a derived demand and is vital to the economic life of any city – in transporting passengers or goods. Cervero (2013) describes that an economically sustainable urban transport system is achieved “*when resources are efficiently used and distributed to maximise the benefits and minimise external costs of mobility, and investments in and maintenance of transport infrastructure and assets can be sustained.*” Other means of viewing at economic sustainability may be affordability, job access, market access, education access, reliability, safety, amongst others (Jones, Tefe, & Appiah-Opoku, 2015). Mobility in economic terms can be a private or public good. As a private good, it reflects the two determinants of rivalry (self-consumption e.g. buying tickets) and excludability (owners can deny use) in consumption. In cases where an individual works or lives in the city to access the city, his/her access does not cause any rivalry or excludability in ownership, but instead adds value. Thus, viewing from the transport and urban form perspective, mobility becomes a public good instead (UN-Habitat, 2013). Contrary to common public’s belief, Zheng, Atkinson-Palombo, McCahill, O’Hara, and Garrick (2011) in their study concludes that cities that rely less on automobile, a private good, performs better in terms of economic sustainability.

Informal transport operations mimic public transport but are privately organised by individuals or organisations. Entry into the market as drivers, like the *boda* riders uses private capital and does not have much financial institutions to organise it (Kisaalita & Sentongo-Kibalama, 2007). When operational, they use collectively provided infrastructure such as roads. Financing them has to be at least comparable to financing car-based travel or other form of public transport to gain attention – be it social gain or return of investments (UN-Habitat, 2013). In view of this, UN-Habitat (2013) proposes to a shift from merely calculating benefits of the time-saved (*‘economics of mobility’*) *per se*, to consider the increased agglomerated economic output (*‘economics of access’*). By looking from two of these economics perspectives, it is then necessary to understand how the informal mobility sector like *bodas* contribute or deter, in order to better justify investment of resources in governing them.

3.1.3 Environmental Sustainability

Many environmental externalities in transport is stem from use of non-renewable fuels. The most direct impact is air pollution, emissions of greenhouse gases, and noise pollution. For motorcycles, they are notoriously regarded as dirty and dangerous. New technologies may be able to abate or ameliorate the pollution issues but not so with safety (Ken Gwilliam, 2003). However, in discussion on environmental sustainability, many authors recognise the importance of urban form and land use within transport planning (Boarnet, 2011; Geurs & Van Wee, 2004; van Wee & Handy, 2016) especially with climate change threat, unstable fuel

price, and social exclusion. With the ultimate aim of mobility as access, urban planners consider the urban form critical to enhance accessibility with different transport modes by designing more compact and mixed land-use cities and regions to decrease mobility demand. Physical exclusion from job opportunities and amenities of the urban poor living at the peripheral cities imposes higher economic and time burden in travelling. Thus, shortening journeys by designing cities that make public goods and social activities available enable better community cohesion and *'place making'* (Boarnet, 2011).

Two main urban forms that influences the demand to travel are: density and spatial distribution of cities. Currently, many African cities are 35% denser than Latin American cities (UN-Habitat, 2013). Uncoordinated urban sprawl is common in these cities whereby residential areas are far from jobs, hospitals, schools, recreational facilities, commercial centres, markets and so on. This exerts more pressure and demand to travel long distance, thereby consuming more mobility and energy. The variation in quality and quantity of the origin and destination may result in competition for access particularly when it is with restricted quantity (Geurs & Van Wee, 2004; van Wee, Hagoort, & Annema, 2001). Despite this, some papers argue that land-use do not significantly impact travel behaviour. Although it makes logical sense for people to opt for shorter distance, however, land-use does not dictate their choice and it could be influenced by other factors such as habits (Aarts, Verplanken, & van Knippenberg, 1998) or residential self-selection (Mokhtarian & Cao, 2008). However, van Wee and Handy (2016) argue that even if land-use may not influence travel behaviour significantly, it definitely improves accessibility, therefore it still makes sense to consider the urban form. The article raises the need to evaluate the interaction in local contexts – to what extent would this be relevant to developing cities like Kampala?

3.1.4 Institutional Sustainability

Future visions and plans for a sustainable urban mobility system require strong institutions to continuously support and govern to realise sustainability of the other three dimensions. Firstly, many developing countries lack the human and fiscal resources to forecast, plan, manage, implement, operate and maintain infrastructures and systems. Such work could be time and labour intensive as it requires coordination between different actors. Another element is the public engagement and participation in decision making that is often lacking.

According to Jones et al. (2015), the desire to mimic the western way of development in developing states may have weakened or neglected the stakeholder involvement process to adequately identify local needs and issues. For example, the South African guidelines are largely based on American standards that lack the local contexts to sustain the system (Jennings & Covary, 2008). Therein lies the question on how well conventional transport planning can be adapted in developing countries since lack of resources is a critical hindrance. Would sustainable mobility be an achievable reality for cities like Kampala? Discussing sustainable mobility for developing cities like Kampala may be a paradox because this discourse largely originates from the Western world. In this context, Jones et al. (2015) suggest that informal and indigenous knowledge could be recognised for a better participatory process. Their involvement could be part of the *"bottom-up"* knowledge forming, problem solving, and decision-making process. Again, this process requires proper identification of who the stakeholders are: the infrastructure and service providers; and the affected users. Overall, public acceptability of the plans and process is essential for real change to take place. Table 3-1 shows the contrasting approaches to transport planning

Table 3-1 Conventional and Alternative Approaches to Transport Planning

The conventional approach: transport planning and engineering	An alternative approach: sustainable mobility
Transport as physical infrastructure	Transport as socio-technical system
Physical dimensions	Social dimensions
Mobility	Accessibility
Traffic-centred, especially vehicles	People centred – vehicles or on foot
Large scale	Localised scale
Mobility as a derived demand	Mobility as a derived demand and valued activity
Motorised transport	Hierarchy of users – with priority to pedestrian and cyclist and least priority to car users
Street as a road	Street as a space
Forecasting traffic	Visioning cities
Economic cost benefit analysis	Multi-criteria analysis including environmental and social dimensions
Modelling	Scenario development and modelling
Demand based	Management based
Speeding up traffic	Slowing movement
Lessen travel time	Reasonable and reliable travel time
Separation of urbanites and traffic	Integration of urbanites and traffic
Environment as air and noise pollution	Environment as air and noise pollution, urban form and land-use

Source: Adapted from Banister (2008)

In the alternative approach to governance, the focus is observed to be human-centric, giving priority to the vulnerable (socio-economically or non-motorised transport users). In this shift, new approaches for governance and investigating is definite. Grieco (2015) points out that institutional issues of governance could be related to the under-application of innovative information communication capabilities. GIS mappings can integrate sustainability data to conventional transport planning to complement both transport services and equity consideration (Vajjhala & Walker, 2009).

3.2 Challenges and Underlying Influences

Due to the *bodas*' electoral visibility, numbers, and the dominant role in many citizen's life, they have become a strong political force in Kampala (Goodfellow & Titeca, 2012). Thus attempts to regulate the *boda* industry by KCCA were met with overwhelming resistance and power struggle. In 2003, taxation on *bodas* could raise an estimated amount of 700 million USH (€1.9 million) annually. Taxation was subsequently imposed in 2004 but was interjected and overruled directly by President Museveni. The intervention was perceived as politicised based on the populist agenda of "a tax on the poor". Thus, the *boda* drivers only pay tax to the Uganda Revenue Authority (URA) and not to the local KCCA (Goodfellow & Titeca, 2012; Roehler et al., 2013). Besides, registration requirements were met with initial resistance until working together with the *Boda* Association. To date, not all *boda* drivers on the road are registered with the KCCA. While the associations hope to support and improve the *boda* industry, it is underfunded. The regulatory and enforcing functions could only be fulfilled by the KCCA if power and revenue were given (Raynor, 2014).

3.3 Policy Responses and Innovative Practices

Wealth and informal transport are inversely related, prompting many public authorities especially in African cities to ban informal transport desiring to portray a developed image. This leads to a spectrum of informal transport reform strategies hoping to restructure or improve informal and/or public transport operations. Cervero (2000) presented a policy spectrum ranging from *acceptance*, *recognition*, and *regulation* to *prohibition*. Acceptance represents an inaction scenario. Recognition involves slight enforcement through rules and standards (e.g. safety standards), while still allowing the informal market to self-regulate and compete. Regulation involves external regulatory control of market entry. Prohibition is the total ban of operation with stipulated consequences.

Other recent developments show efforts to improve or integrate informal transport into the formalised public transport system such as Bus Rapid Transit (BRT). The reform structure involves three dimensions: (1) regulate competition; (2) control of ownership structures; and (3) the design and management of service system (Schalekamp et al., 2016). *Improvement* programs of informal transport could involve upgrading existing services without changing the ownership or competition regulations mechanism such as operating environment and passenger information (Schalekamp et al., 2016). Examples are Digital Matatus in Nairobi or GoMetro in Cape Town.

The Digital Matatus Project in Nairobi captures data with mobile devices for all semi-formal *matatus* minibus routes. The collected data was translated into a useful map to inform transit community of the common stops, routes and time. Innovative local technology entrepreneurs also created mobile routing applications and eventually these information were uploaded to Google Maps - the first for an informal transit system. This information was proven useful for government to develop city transport plan (Kamuhanda & Schmidt, 2009). This project demonstrates a bottom-up approach to improve the semi-formal system.

Another improvement approach is through regulation of competition with no major restructuring of individual informal services. This can be carried out through franchise or concessionaire (Schalekamp et al., 2016). Moving beyond improvement towards formalisation process is the hybrid transformation process. It recognises the special attributes of informal services and endeavours to complement conventional public transportation system. According to Salazar Ferro, Behrens, and Wilkinson (2013), three typology of hybrid system exists:

- (1) *de factor hybrid system* – where cities plan major new public transport transformation process such as in Bogota, Columbia. It strives to entirely remove or substitute informal transport although they may still exist if no integration;
- (2) *modified de factor hybrid system* – the initial intention is to replace incumbent informal transport but is forced to revert proposal. In this case, informal transport services are adopted and accommodated with modifications; and
- (3) *de jure hybrid system* – authorities recognise from initial planning process a hybrid system. It aims to formalise and regulate current transport system and establish regulatory frameworks as it recognise the significance of informal transport services. For example, Accra city in Ghana where informal transport is formalised and allowed to co-exist with conventional system through a four-step transformative process. Initial literature suggests positive response although the process is painstakingly slow.

The hybrid system is observed as more common in West Africa (Schalekamp et al., 2016), whereas the advocacy for integration and formalisation are more popular in Sub-Saharan

Africa. This approach could be a stepped-up process requiring informal services to improve operationally and corporatised in hope to be operators of conventional transport services.

A summary of the above policy reform approaches is illustrated in Figure 3-2. While the mentioned approaches are not exhaustive. They demonstrate the spectrum of initiatives by policy makers *viz-a-viz* desired stringency; or level of formalisation. Each approach has different aim; demands to institutional capacity; available funding; and is dependent on the societal acceptance or willingness-to-change. Overhaul of transport system asserts overreaching impacts as transport system involves many stakeholders including passengers, informal and conventional operators, and policy makers (Schalekamp et al., 2016). Thus the impact and success of the transport reform should consider the transport system as a socio-technical system. Instead of a narrowed view of technical engineering issues and roads upgrade *per se*, transport overhaul requires comprehensive understanding of the economic, social and political dimensions for intervention (Porter, 2007).

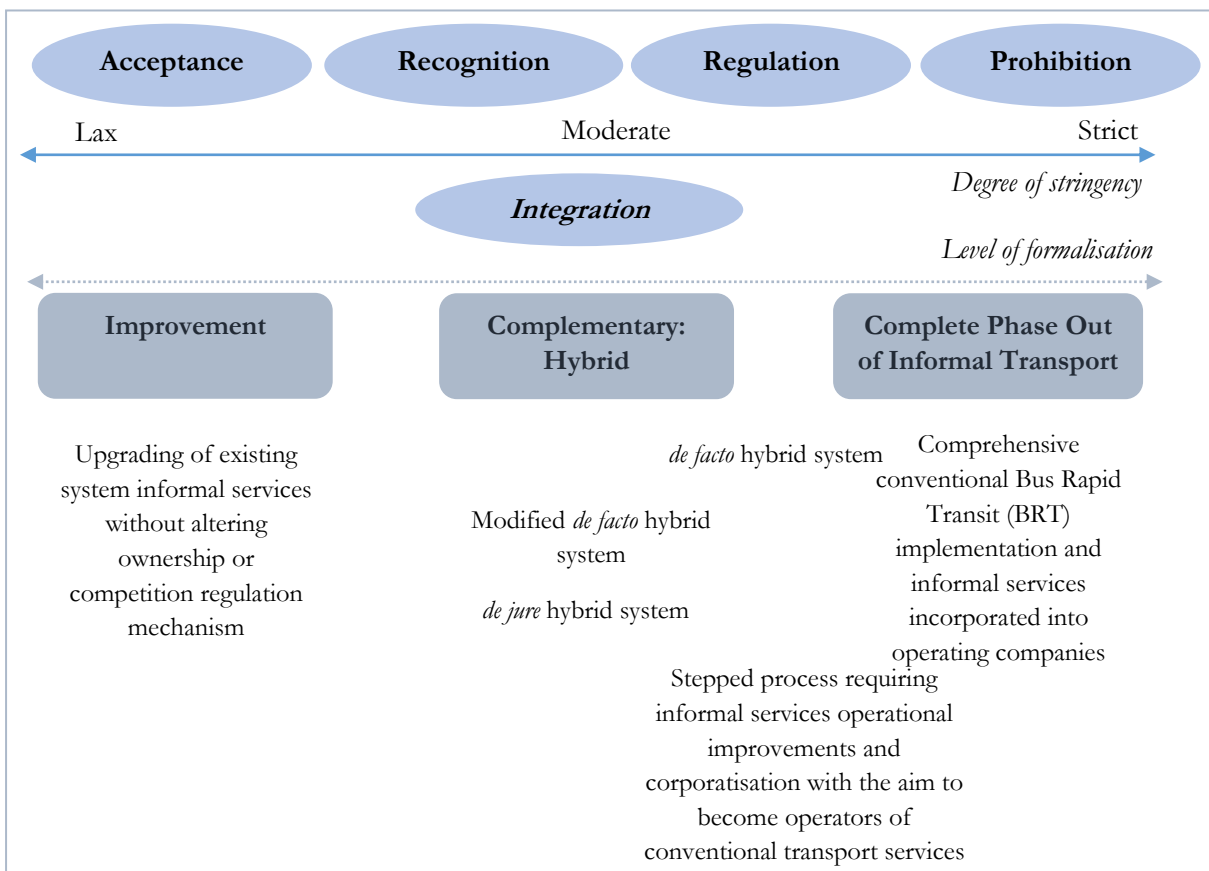


Figure 3-2 Summary of approaches to policy reform

Source: Own illustration based on Cervero (2001), Ferro et al. (2013) and Schalekamp et al. (2016)

3.4 Analytical Framework: Sustainable Mobility for Informal Transport

Even though there are many sustainable mobility literatures, few of them address and explore the nexus between the informal and sustainable mobility discourse, and how could one support the other. Mobility in many cities focuses on building the biggest infrastructure to replace current informal services instead of understanding the social, economic, and institutional dimensions of the existing systems. Sustainable mobility for the informal sector

should be *studied as a subject itself* as the role they play in the city and the attributes projected and markets served are vastly different from conventional public transport modes. More so in consideration of their roles as both passengers- and goods- carrying transport as most literatures tend to focus on passengers transport while neglecting the use of cargo transport, which is a pivotal mobility form in Africa.

Therefore, the following analytical framework was developed based on the literature review, (Figure 3-3). This framework integrates all the existing knowledge on the transport market and sustainable mobility discourse commonly used for conventional public transport to systematically investigate the informal transport sector, namely the *boda* market. It encompasses the main themes in the study's research questions too. Although transition management relates to governance, it is deemed more suitable for study subjects that have better records and understanding of existing markets.

Furthermore, the research focuses on the *boda* demand market because it seeks to construct bottom-up knowledge of the system from the users themselves. It also serves to provide empirical record on the *boda* demand system in the city since there is a significant gap in the knowledge. Is *boda* a problem or a panacea to sustainable mobility? Perspectives from diverse social groups may compare or contrast in this aspect. Hence, understanding the *bodas'* significance, society's needs, and desired future development is useful to explain how the market functions. More importantly for policymakers as they battle with the approach to organise the system. These findings will fit into the sustainable mobility dimensions, and identify potential opportunities to better organise the industry. Finally, the study relates back to the overarching sustainable mobility discourse.

IDENTIFY MARKET	Supply	Infrastructure and Operations			
	Demand	Who?	Where?	When?	How?
MARKET SIGNIFICANCE	User's Perception	Negative	Neutral		Positive
	Sustainable mobility dimensions	Social	Economic	Environment	Institution
MARKET GOVERNANCE	Is the market functioning?	+ Yes. To retain. + Yes, with caveats. To shift but to retain the positive attributes. + No. To shift.			
	Governance approaches	Acceptance (status quo)	Recognition	Integration	Formalisation/ Prohibition
<i>Sustainable mobility: Access to places, services, activities, and goods</i>					

Figure 3-3 Analytical framework

Source: Own illustration based on the Government of New Zealand (2014), UN-Habitat (2013), and Gudmundsson et al. (2016).

4 Methodology

This chapter describes the methodological approach being used for data collection and analysis process. It begins with the methods employed, and the analytical and the conceptual framework the analysis is based upon.

The research questions outlined in Chapter 1 attempts to understand the *boda* system from the user perspective i.e. the passengers and cargo-users. In general, qualitative GIS is employed to understand the demography and motivations of *boda* users, the role it plays in the city, and future governing options from the local stakeholders. Based on the findings, it could bridge the informal sector to the sustainable mobility discourse. A summary of the research methodology employed is illustrated in Table 4-1.

Table 4-1 Overview of methodology

Research Question	Methodology
<p>1. How do people use <i>bodas</i> in Kampala?</p> <p>1.1. Who uses them and how?</p> <p>1.2. Where do people go and come from?</p> <p>1.3. What are the travel patterns, purpose, average distance and speed?</p>	<ul style="list-style-type: none"> ▪ GIS Analysis; ▪ Survey Questionnaire; and ▪ Unstructured observations and conversations.
<p>2. What is the significance of <i>bodas</i> to local populace of Kampala?</p> <p>2.1. What are the significance and perception of <i>bodas</i> to users?</p>	<ul style="list-style-type: none"> ▪ Survey and interview; ▪ GIS Analysis; and ▪ Unstructured observations and conversations.
<p>3. How can the <i>boda</i> industry be governed?</p> <p>3.1. Should <i>boda</i> remain as part of the city’s mobility mode? What are the preferred options for future management of the <i>boda</i> industry?</p> <p>3.2. How do these findings inform the current discourse of sustainable mobility and governance of informal mobility?</p>	<ul style="list-style-type: none"> ▪ Interview of <i>boda</i> passengers and cargo users, and stakeholder groups involved in <i>boda</i> sector: <ul style="list-style-type: none"> ▪ Tugende; ▪ SafeBoda; ▪ KCCA; and ▪ Jinja Road Traffic Police Station. ▪ Reflection from literatures and findings.

4.1 Qualitative GIS – A mixed-methods approach

Qualitative GIS, or more specifically, qualitative visualisation was pursued for this study as a mixed-methods approach. Mixed-methods study recognises that knowledge is *‘partial’*, in which no one can know the *‘whole truth’* – be it in the data gathering, analysis or representation processes. Through this approach, the differently located knowledge can be investigated in order to have more robust understanding and complexity of a representation (Cope & Elwood, 2009; Jung, 2009; Knigge & Cope, 2006; Verd & Porcel, 2012). Thus, qualitative GIS *“integrates the qualitative and quantitative representations of spatial knowledge; by engaging modes of analysis; and by incorporating GIS and digital spatial data in research that is premised upon multiple epistemologies”* (Knigge & Cope, 2006). Adopting this method is valuable especially for transport and cities research because although rapid survey is appreciated, it lacks the depth for better analysis, especially to understand the complexity of transport behavior and social exclusion (Clifton & Handy, 2001; Porter, 2014). In this light, these visualisation techniques are able to explore, investigate and visualise spatial data to reveal patterns, clusters, and relationships; whereas small numbers of in-depth qualitative surveys and interviews enable to understand how and why they occur to synthesise richer insights and

knowledge (Clifton & Handy, 2001; Cope & Elwood, 2009; Woolf & Joubert, 2013). Just as Krygier (2006) pointed out, qualitative visualisations with GIS maps and images directs to “the point to make, the story to tell, and the knowledge to communicate”.

An overview of the entire research process is summarised in Figure 4-1. It illustrates that the process has been reflective and reinforcing with new insights at each stages. Information gathered during the exploratory phase helped to strategise, and to develop the study and field work meaningfully. Details of each approaches and processes are respectively described.

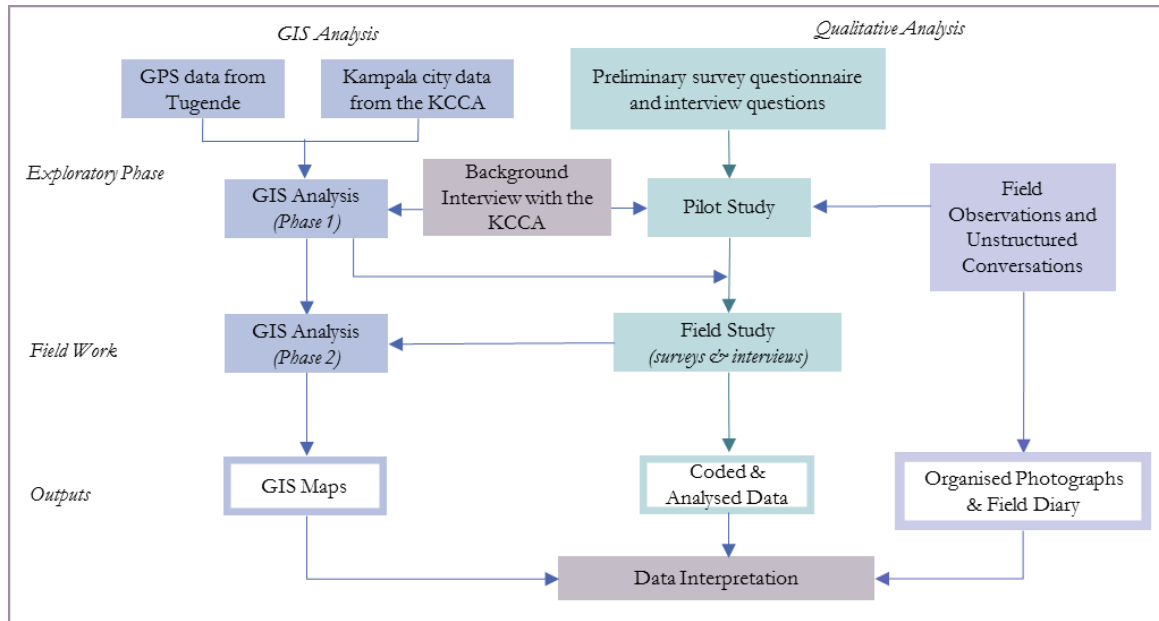


Figure 4-1 An overview of the research process

4.1.1 GIS Analysis

The objective of GIS analysis is to identify and visually illustrate how *boda* connects the city on a large scale (i.e. Kampala) with different layers of data. Geographical Positioning System (GPS) data was obtained from a local partner organisation, Tugende. Tugende engaged a third-party company (ThinVoid Uganda Limited, www.thinvoid.com) to monitor each of their *bodas* with a GPS device. A total of 302,168 data points (from November 4 and 11, 2015) were initially provided for this study. Both are working days to best represent a normal day scenario. For the purpose of this study, only GPS data points within Kampala city were utilised for GIS analysis with ArcMap 10.2.2. These represent 149,244 points from 110 *bodas*. Parameters included in the data points are: latitude, longitude, speed, direction, time, and GPS accuracy. In addition, different datasets and maps were obtained from the KCCA in order to analyse the GPS points in relation to the urban environment of Kampala. These include: roads and footpaths; *boda* stages; landuse; and other points of interest (e.g. schools).

At the exploratory phase, GIS data obtained from both Tugende and the KCCA was analysed for general patterns to plan for pilot study and field work (explained in Chapter 4.3). The Phase 1 process entails data quality checks; and simple map outputs (such as areas with high GPS density; location of *boda* stages; road classifications; land use types). Data quality checks conducted was to synchronise the different data layers given by the KCCA. Where necessary, GoogleEarth was used to digitise new points or verify for updates. In addition, a background interview with the KCCA Physical Planning Department was conducted to learn of the past and current *boda* management strategies, *boda* hotspot areas, and more

importantly, to learn about the city (e.g. past and current efforts of transport system, road and land use classifications). Several documents (e.g. National Physical Planning Standards and Guidelines) were reviewed to obtain information needed for GIS analysis such as road buffer. With regards to the GPS data, they were projected to WGS_1984_UTM_Zone_36N. Each data points were classified based on trips, trip origins and trip destinations prior to GIS Phase 2 analysis. A total of 2,238 trips were classified.

The GIS Phase 2 analysis included: density; origin and destination mapping; speed and distance; and road network. Several insights highlighted during the pilot study influenced the decision to develop extra maps to expand understanding of certain patterns. These included the road network; and speed mapping. Detailed mapping processes are described below.

Density Mapping

Density maps help to gain an overview of travel patterns, as well as an overview of which areas are the most reliant on *bodas*. Line density maps based on all the classified trips were conducted to ascertain areas with higher density. In addition, time density maps were carried out to understand the various density patterns at different areas based on time. Time classification was selected upon feedback from pilot study: (1) 05:00 – 10:00; (2) 10:01 – 13:00; (3) 13:01 – 16:00; (4) 16:01 – 20:00; and (5) 20:01 – 04:59.

Origin and Destination Mapping and Analysis

This analysis was undertaken to understand the trip service and purpose with regards to the specific land use types and at different times. Firstly, land use polygon data was transformed to centroids, and was merged with other points of interest. All merged points were categorised into five categories, namely commercial, medical centers, education, small-scale and informal commercial areas, and residential areas. These categories were selected based on literature review on the most common areas and purpose of travel (Kisaalita & Sentongo-Kibalama, 2007; Mokhtarian, Salomon, & Singer, 2015). Table 4-2 summarizes the categories and description of the points and is illustrated in Appendix A.

Table 4-2 Five landuse categories based on points of interest used for analysis

No.	Category	Point of interest	Remarks	Count
1.	Formal commercial	Main malls		17
		Main markets		8
		Mixed commercial and residential		6
		Formal commercial, urban centers, and business districts		42
		Public institutions	e.g. Parliament	4
2.	Medical centres	Hospitals and health facilities Grade IV	Only bigger medical centers and hospitals only, as <i>bodas</i> are more likely used.	40
3.	Education	Universities	All	24
		Schools	Only operating primary and secondary schools with more than 600 students	50
4.	Small-scale & informal commercial	Based on KCCA's land use classification	This was classified as a separate category as its nature is different from formal commercial and business districts.	176

No.	Category	Point of interest	Remarks	Count
5.	Residential	High income	Based on the KCCA's land use classification	38
		Middle income		126
		Low Income		230
		Very Low income		194
		Slums		40

All GPS points that were categorised based on the trip origins and destinations were used to perform spatial join and near distance analysis. In doing so, it was assumed that the respective *boda* trips' origins and destinations were selected from the nearest points given. There may be some irregularities such as a trip's destination in analysis was directed to a hospital but in reality, it may be to a park opposite to a hospital. As such, much care was taken to ensure the spatial coverage of the city to be as representative to reality as possible. Even so, it was crucial to ensure that these areas were common and pertinent areas served by the *bodas* and used by passengers for the purpose. For example, neighbourhood nurseries, schools, or clinics were eliminated due to the proximity to residential areas which locals are more likely to walk than to use a *boda*; whereas all universities are included because of its prevalence amongst university students. This process was validated through pilot interviews with knowledgeable users (e.g. Tugende and KCCA). Point distance analysis was initially conducted but due to the amount of data, the processing time and results became irrelevant.

Upon identification of the land-use points, descriptive statistics (frequency of points, and average distances between trip origin/destination to targeted land use points) were generated. Additionally, point density maps of origins and destinations were created.

Speed Mapping and Analysis

The initial intent of speed analysis was to investigate the average speed based on different time using statistical tools in ArcGIS. In calculating and projecting mean speed for each trips, each trips were dissolved with its average speed calculated. However, based on field observations, maps illustrating varying speeds of different data points at different areas could add value to show how the speed varies in each trips and areas.

Distance Analysis

Average distance of each trips according to different time were calculated with Python calculation with the following formula: $!shape.length@kilometers!$. Results were translated to histogram which was generated using Microsoft Excel to depict the overall pattern.

Road Network Analysis

The purpose of road network analysis is based on the recurring narratives and observations that *bodas* access to different types of roads, and even drive off-roads. Based on the hypothesis that *bodas* also drive off-roads, the analysis was undertaken for two reasons: (1) what kind of roads do *bodas* normally drive on and the market they serve; and (2) to illustrate the driving pattern for each *boda* trips. The road network layers were cleaned for duplicated roads and used the road classifications provided by the KCCA. For the buffer selected were based on the minimum reserve width recommended in the Guidelines provided by the Ministry of Lands, Housing and Land Development (MoLHUD) (2011); and Ministry of Works, Housing and Communications (MoWHC) (2002); and Japan International Corporation Agency (JICA) (2009). Table 4-3 describes the road type and the buffer used for analysis. The road network is illustrated in Appendix B.

Table 4-3: Road type and description

Road type	Description	Buffer
Urban Class 1 (UC-I)	<ul style="list-style-type: none"> ▪ Roads that continues from MoWHC's primary trunk road network through boundaries of the Urban Authorities; ▪ Paved, all weather service. 	40 meters (m) ⁽¹⁾
UC-II	<ul style="list-style-type: none"> ▪ Roads that continues from the MoWHC's secondary and/or tertiary Trunk Road network, including District Class I routes; ▪ Raveled, all weather service. 	30 m ⁽¹⁾
UC-III	<ul style="list-style-type: none"> ▪ Roads that continues from District Class II; ▪ May be paved or graveled. 	Tertiary local distributor – 18 m ⁽¹⁾
UC-IV	<ul style="list-style-type: none"> ▪ Roads within the central urban community serving governmental administrative facilities and local commerce. 	Average commercial shopping street – 15 m ⁽¹⁾
UC-V	<ul style="list-style-type: none"> ▪ Roads that runs at residential and agricultural areas outside the central urban community ▪ May be paved or graveled. 	Primary residential street – 15 m ⁽¹⁾
Minor roads	<ul style="list-style-type: none"> ▪ Any road that links to minor center (market or local center) and any other motorable roads. ▪ Main function is to provide access to land adjacent to the secondary road system. 	Between 6.4 to 8.6 m ⁽²⁾ . Given the lack of detailed information for individual roads, 7 m was used
Footpath	Primary footways (2 persons wide)	2 m ⁽¹⁾

Source: ¹Ministry of Lands (2011); ²JICA (2009); MoWHC (2002)

Using the GPS data points were intersected with the buffered roads to ascertain the number of data points intersected and not intersected. Spatial information of intersected data was obtained and the frequency and percentage of each road classifications represented by data points now were calculated. For accuracy, similar analysis was performed by erasing the total GPS data points with intersected data points to know the off-road points.

Formal and Informal Public Transport

To understand the extent on how *boda* fills in the gap of the public transport system, the public transport network was mapped. Current public transport operations were learnt from literature review and KCCA consultation. The formal bus infrastructure network information was retrieved from the operator's website (www.pioncereasybus.com) and was digitised with GoogleEarth and transported to ArcMap for projection. *Boda* stages as informal *boda* gathering area were obtained from the KCCA, while no information on *matatus* taxi routes are available. Only the point locations of *matatus* taxi park was mapped.

Other Analysis

Hotspot analysis was attempted to determine statistical difference of *boda* presence. However, the analysis failed to perform for uncertain reasons. Although this analysis was not done, it did not affect the study objectives as the density maps depicted an obvious pattern. Other intermediate maps that are used in consideration for the discussion of findings and analysis chapter (Chapter 5) are appended in Appendix C to E. These include: All raw GPS points in Kampala; Kampala parishes; and population density within Kampala.

4.1.2 Survey Questionnaire

The aim of survey questionnaires is to understand the socio-demographic profiles, motivations of use, and rapid perception of *boda* industry from the *boda* users themselves. With surveys, significant issues of the study are clearly distinguished and participant responses that are anticipated are included (Clifton & Handy, 2001).

During the exploratory phase, selection of study area was done based on general GIS Phase 1 analysis and in consultation with the KCCA and locals. The selection criterion were: (1) locations should have high *boda* presence; (2) representations from the different social groups (especially the poor) and the five aforementioned land use classifications; and (3) ease to approach people according to the surrounding environment. As Kampala is huge, the study location was focused at the Nakawa and the Central Divisions. Nakawa Division was selected because of the centrality of location and the varied land use types and social groups. Central Kampala was selected as it represents the highest *boda* density. In selection of study area, the assumption introduced was that the type of users (either passenger or cargo users) from varying social groups of *boda* users (i.e. low, middle, and high income) were dominantly present based on the characteristics of study areas. This was to capture predominant variations and facilitate comparisons and interests, although common themes may exist. This sampling could be known as stratified purposeful sampling or area probability sampling (Nastasi, 1999; Sandelowski, 1995). Figure 4-2 shows the study locations, while the respective general characteristics are detailed in Table 4-4.

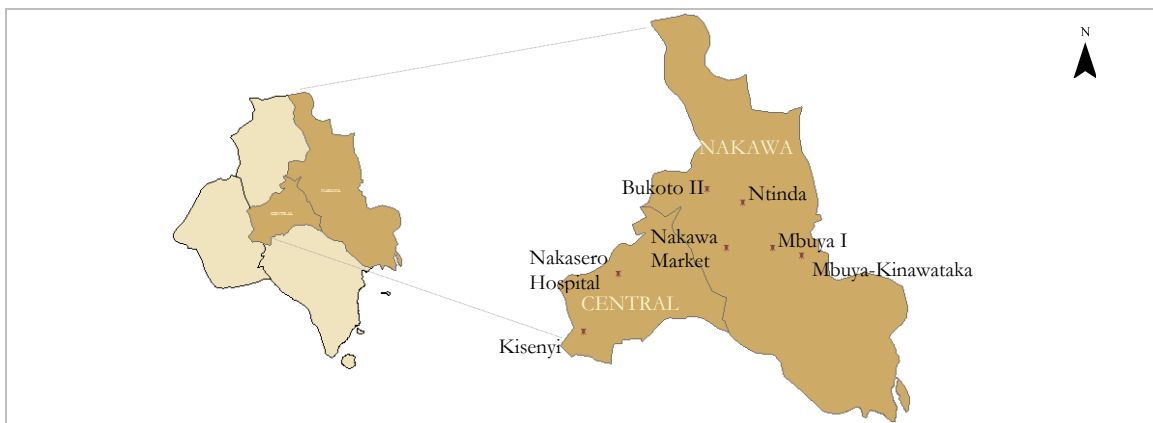


Figure 4-2 Field study locations within Kampala

Table 4-4: Description of study locations

No.	Location	Description
1.	Nakawa Market area	One of the main markets and shoplots in Kampala. However, some parts of the area does not have proper tarmac roads and potholes exist.
2.	Nakasero Hospital area	One of the biggest hospital in Kampala in a mixed land-use area.
3.	Ntinda area	High income residential and formal commercial areas with nicely paved roads but congested area.
4.	Bukoto II near to the Bukoto-Ntinda Road	Middle income, mixed land use and social groups including students.
5.	Mbuya I area	Low income residential area and school. Soil-laden roads and footpaths.
6.	Along Mbuya-Kinawataka Road	Very low income residential and small-scale commercial area. Both paved and unpaved roads.
7.	Kisenyi area	Small-scale commercial, slums. Mostly unpaved narrow roads or footpaths.

The preliminary survey was developed over the course of weeks prior to the field study with reference to methods by Denscombe (2010) and Burton and Bartlett (2005). The survey developed in English was translated to the local language, Luganda, by an engaged translator. To improve comprehension and answerability of the survey, it was structured concisely and contextualised to the local context (e.g. education level). The translator was briefed on the translation protocol. A pilot study was conducted on March 15, 2016 to test survey and train translator. Slight amendments were made to improve interpretation and quick recallability by respondents, such as changing questions that mentioned percentage; reducing age brackets.

Overall, the survey consisted of 20 questions with two sections. Part A aimed to understand the user's socio-demographic profile. To this end, a series of close-ended multiple choice questions were formulated. Part B sought to learn of their motivations of use, and view of *bodas*. Hence, multiple choice questions with possibilities for further elaboration were asked. Being aware of the attitudinal gap of the *boda* users, a five-point Likert scale was employed to determine the satisfaction level of *boda* users towards the industry. This was found helpful during the pilot study to rapidly glean attitudes of users towards *boda* and their reasons. A final optional question was more specific to know the route, distance, and price. This question was targeted to users who just hop out of a *boda*, or for users who use consistent *boda* route. The surveys are in Appendix F (English) and G (Lugandan).

A total of 46 surveys was self-administered to *boda* users. Together with the translator, the surveys were conducted on the March 17, 18, 20 and 30, 2016 after 16:30 (after working hours) to ensure that respondents have comfortable time to answer the questions. While conducting the survey, the research nature and purpose were clearly explained to the respondents based on the pre-prepared script. In most cases, filling of the surveys were facilitated and guided by the researcher and translator to ensure that all questions are filled in. This also proved helpful in identifying users for interviews at the later stage.

4.1.3 Interview

In-depth interview in the form of semi-structure questions was approached in order to elicit in-depth understanding of the *boda* use patterns, its significance and relations to the users, and their visions for the future of *boda* system and the transport system as a whole. This approach was chosen to capture respondents' opinions of the *boda*, their daily use, and the ability to ask follow-up questions when new insights or information surfaces. For the interview, two types of respondents were targeted: (1) the *boda* users (passengers and cargo users); and (2) stakeholders working with or related to the *boda* industry. With regards to the *boda* users, the interviewees were the willing respondents from the survey. The pilot study was concurrently conducted on the March 15, 2016, upon which questions were revisited for amendment. Some of the questions were formed based on the background information provided by the KCCA. Following which, the final face-to-face interviews were executed on the March 17, 18, 20 and 30, 2016. The advantage of using face-to-face interviews concurrently with survey was that the background and rapid *boda* perception were already gathered. This assisted the semi-structured interviews to take place with ease and more purposefully (Leeuw, 2008). Further, as interviews were conducted at varied geographical locations (same as surveys), this ensured coverage of targeted user groups. In order to reduce the "interviewer's effect", an interview guide was prepared and improved upon the pilot study with reference to Burton and Bartlett (2005), Denscombe (2010), and Leeuw (2008).

The interview guide consists of 21 questions separated into three parts: social significance of *boda* system; the future of *boda* industry; and questions specific for commercial cargo users

(Appendix H). A plethora of open-ended questions were prepared to understand *boda* from different perspectives. While efforts were made to follow the interview guide as closely as possible, when questions were not understood, the questions were rephrased or explained according to the spirit of the questions. In some instances, questions were adapted based on interviewee's knowledge, background and experience. Most interviews were solicited in English as the locals were fluent and comfortable with it. However, in cases where the respondents expressed uncomfortable feelings, translation was adopted. A total of 31 interviews were conducted and were audio-recorded for transcription, with the exception for interviews undertaken at the Kisenyi area due to safety reasons. In such instances, key notes and quotations were written verbatim. The interviews lasted about 10 to 25 minutes.

With regards to the stakeholder interviews, several stakeholders were identified based on literature review or local feedback. Additionally, an interview transcript from another study team (studying the *boda* drivers) in the same project was used for background information. For all stakeholder interviews, the general interview guide was adopted and tailored according to the respective organisation's nature, knowledge and experience. A list of interviewed people and stakeholders are appended in Appendix I.

4.1.4 Unstructured Field Observation

Unstructured field observations and conversations were useful when the purpose of observation was clear although the details were not. The objective for this approach is to record descriptive and reflexive notes; and take down photographic or video evidences. Even though observations were made in a natural open-ended manner without predetermined categories, it can be brought into the research during the analysis (Bell, 2014).

During the five week study in Kampala, there were various interactions or observations that supported the research even if these insights may or may not emerge directly from the qualitative survey or interviews. Hence, a field diary is kept to record some factual information like behavior observed, the setting, unstructured conversations; and reflexive thoughts such as ideas and questions. Photographs or videos were captured to support certain observations or trends (mainly on how users interact with *bodas*). It is important to note that these observations made was not a direct participatory observation method. This approach was deemed valuable for several reasons. Firstly, it assisted the development of strategic field research such as stakeholders to interview, familiarising the city, and cultural practices. Initial observations revealed emerging themes or patterns that helped to foster more investigative research for the survey and interview. Further, while the research sought to survey the *boda* users, the non-*boda* users were naturally excluded as respondents. However, a pattern of who *do not* use *bodas* surfaced during the field study and daily unstructured conversations with locals, which were deemed useful. Moreover, photo or video evidences were time and location dependent so it was impossible to limit to dedicated study time and locations. While field observations may play a minor part in this research, excluding such daily observations would miss out the potential to enrich the research. To do so, the field diary was used to record descriptive and reflexive information (University of Southern California, 2016). Photographs of study area are attached in Appendix J.

4.2 Data Analysis and Interpretation

Surveys were summarised and analysed for the descriptive statistics, while the open-ended questions were included in the coding process. Meanwhile, the interviews were analysed using the content analysis approach based on the analytical framework identified from the

literature review (see Chapter 3.4). This approach is a systematic and replicable technique to identify and classify specific characteristics of messages that is not restricted to textual analysis but also actions observed and other visuals (Holsti, 1969; Stemler, 2001). The approach and process of content analysis closely followed recommendations by Elo and Kyngäs (2008) and Hsieh and Shannon (2005).

To capitalise the advantages of qualitative GIS approach, final data interpretation was structured around the research questions. GIS analysis that is triangulated with survey and interviews allows the research to explore and visualise spatial patterns and clusters, while supplementing it with qualitative information to substantiate the hows and the whys. Finally, the research drew back onto the recurring theme of informal transport, sustainable mobility, and urbanisation by reflection on literatures and data.

4.3 Limitations

Limitations are present at the data collection and analysis process. However, the limitations were anticipated and were manageable without undermining the validity of the research. To the extent of the author's knowledge, this is the first research that uses GIS analysis to investigate informal transport and *boda* motorcycle taxis. GIS approach managed to illustrate vast number of pertinent GPS data in interesting and illustrative ways. However, the number of Tugende's *bodas* investigated (110 *bodas*) may reflect a small percentage of the city's total number of *bodas* (estimated to be more than 100,000). Even so, it was representative of Kampala with trips from various parts of the city; and provided snapshot of evidences on travel patterns and coverage. Further, the GPS data may not be entirely accurate at certain points for reasons such as lack of satellite coverage, lost signal (underground). This was mitigated by shifting through each GPS points to eliminate questionable data - by the GPS data provider company; and verified by the researcher. For example, data points that recorded speed less than 1 kilometer per hour (km/hr), same direction, and same coordinates for more than 5 minutes were discarded. This could be a stationary *boda* rather than *boda* "in-a-trip". Lastly, as each 149,244 GPS points were manually classified into respective trips, there may be human error in the classification process due to the large amount of data. For example, accidental exclusion of a GPS data point for the trip. However, a final quality check was conducted prior to confirming the 2238 trips.

The qualitative survey and interviews provided a myriad of valuable insights. Since the qualitative surveys were small-scale and concentrates at different parts of Nakawa and Central Kampala divisions, opinions and feedbacks may differ from others. While larger sample size at various parts of Kampala would be beneficial, but level of data and findings were deemed sufficient for the research objectives. The surveys served its purpose to provide in-depth narratives and anecdotal evidences for *boda* transport in Kampala. Thus instead of pursuing for representativeness for the entire Kampala, credibility of depth and breath of surveys and interviews were aimed for instead. Informal sectors are unregulated and could be harassed by officers. Thus data collection is challenging (Cervero, 2000) due to the lack of official accurate statistics, cultural barriers or social stigmatisation against the *boda* industry.

The next limitation is the language barrier. Although most Kampalans speak good English, some of the respondents and interviewees are not fluent in English or lack confidence or eloquence in expressing opinions during interviews. Even though a trained local Kampalan translator is engaged throughout all field surveys for better facilitation, but original meaning may be lost in the process of translation, undermining the context (Raynor, 2014). However, it was observed that such occurrences were limited.

5 Findings and Analysis

In this chapter, the findings from the analysis (i.e. GIS analysis, descriptive surveys, thematically-coded interviews, and visual observations) are triangulated and presented based on the research questions and identified themes. The main reason why the author chose to combine the findings and analysis together is because of the nature of the study. It leverages the benefits of qualitative visualisation method to present the findings and empirical records. An example is a study by Evans and Jones (2011). GIS analysis presents the entire Kampala scenario, while the qualitative surveys and interviews give specific insights. Firstly, the *boda* demand market and the use cases and patterns are presented. The second section explores the interaction between the *boda* market and the city. Finally, it discusses the potential governance strategies for the *boda* sector.

5.1 The *Boda* Demand Market

Despite the *boda*'s prevalence in the city, the knowledge on the market they serve is not explored in terms of locality and people. In order to deliberate if *boda* can be a sustainable transport solution for Kampala, understanding on how the *boda* sector engage with its market is instrumental to identify its nature, role, and potential. As such, this section pegs the first research question: *RQ 1: How do people use boda in Kampala?*

5.1.1 The Travel Patterns of *Boda* Users

The different types of users have been identified as passengers, cargo-users, or both. In this section, the trip service and travel patterns were investigated to identify the common trip origin, destination, and the users. Firstly in investigating the travel patterns within the city, Figure 5-1 illustrates the density variation within Kampala in *boda* trip origin and destination.

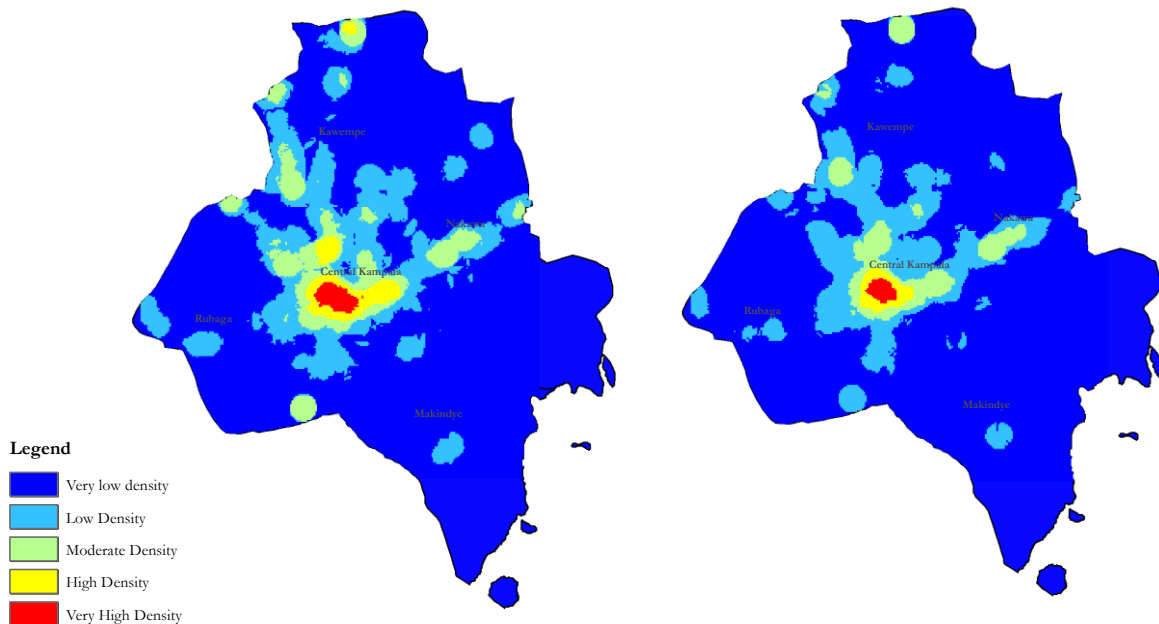
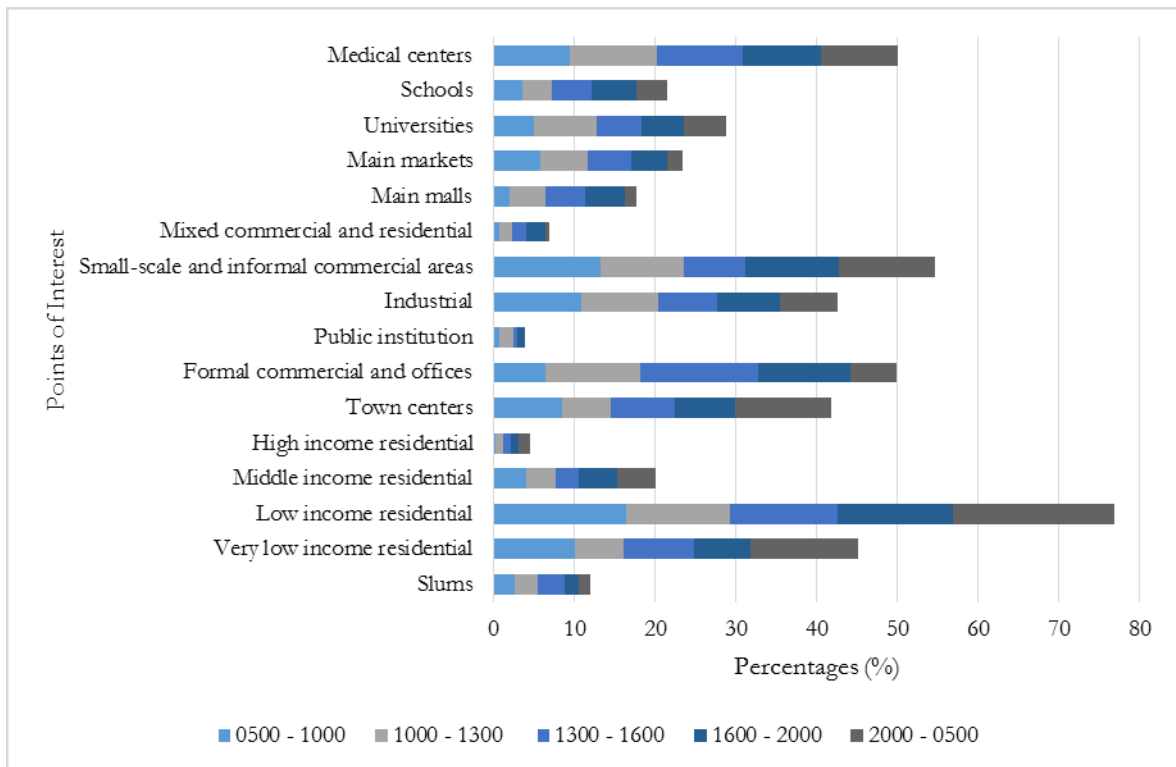


Figure 5-1(a) Density for points of origin (left); and (b) Points of destination (right) in Kampala

By comparing the figures above, the points of origin for *boda* trips appear to be more spread out coming from different areas, while points of destination are more focused towards Central Kampala. The most notable characteristic from the figures is that Central Kampala, an economically active area, remains as one of the busiest and most demanding market for *boda* services, with many trips starting and/or ending there. Although the population density¹ is lower (1,000 to 5,000 inhabitants per square kilometers, km²) in comparison to other parishes. There are notable trips made from and towards the north, and northeasterly direction of Kawempe Division. These areas have high population density (more than 10,000 inhabitants per km²). Meanwhile, the areas towards the southeastern portion represent the lowest density as these areas are dominated by wetlands and have low population density (2,000 to 5,000 inhabitants per km²). Thus, it can be said that *boda* serves a large population in Kampala especially to access the activities within the city centre.

While Central Kampala is considered the focal point for most *boda* trips, the time variations according to points of interest within Kampala could better inform the trip purpose and pattern. Hence, Figure 5-2 presents the percentage of trips made by users in different time periods based on points of origin throughout the day, while Figure 5-3 shows the percentage of points at destination according to the stipulated time period. As noted in Chapter 4.2, the points of interest are categorised based on health facilities; education; small-scale and informal commercial areas; formal commercial and business areas; and residential areas.

For better comparison between points of origin and destination, Table 5-1 ranks the points of interest in an ascending order for the most popular points of origin or points of destination to the least in different time period.



¹ For reference, Appendix D shows the parishes in Kampala; and Appendix E presents the population density .

Figure 5-2 Percentage of points of origins based on points of interest and time period ²

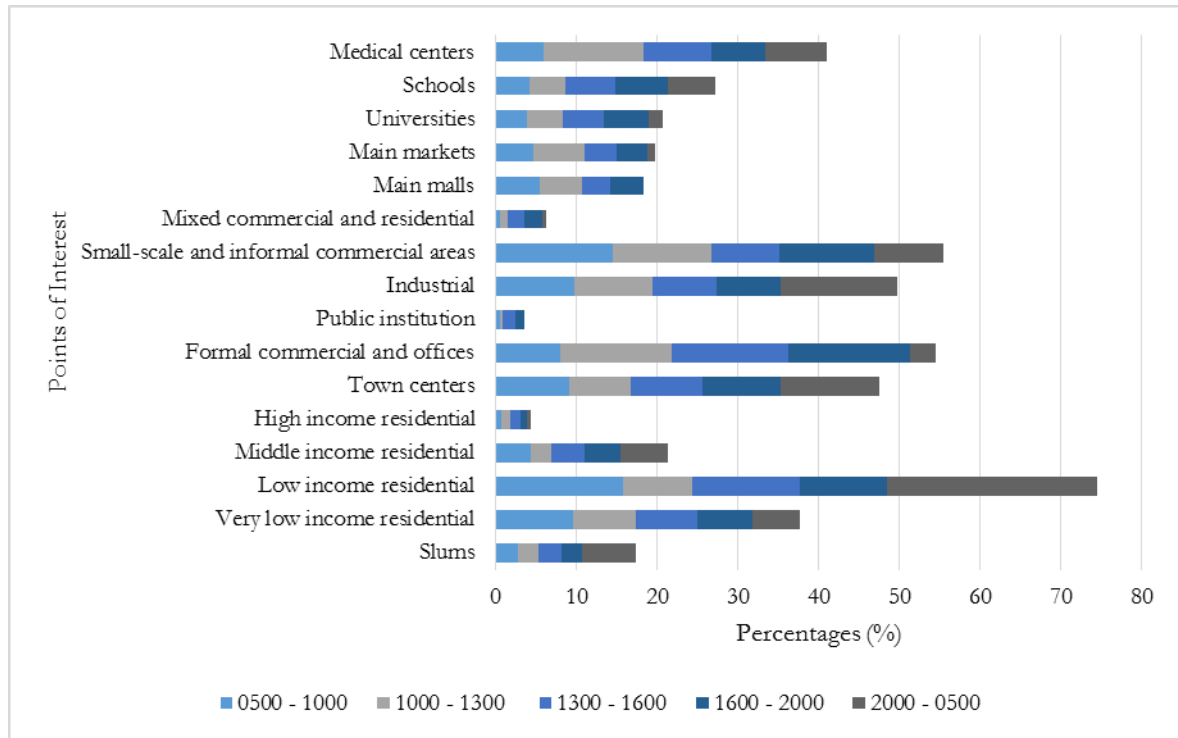


Figure 5-3 Percentage of destination points based on points of interest and time period ¹

Table 5-1 Points of origin (O) and destination (D) ranking based on points of interest and time period

Category	Point of Interest	Time									
		05:00-10:00		10:01-13:00		13:01-16:00		16:01-20:00		20:01-05:00	
		O	D	O	D	O	D	O	D	O	D
Formal commercial and business areas	Town centers	6	5	7	6	5	3	6	4	4	3
	Main malls	13	8	10	9	10	12	10	11	13	15
	Main markets	8	9	8	8	9	11	12	12	11	12
	Mixed commercial and residential	15	16	15	14	14	14	13	14	15	14
	Formal commercial, and business districts	7	6	2	1	1	1	2	1	7	10
	Industrial	3	3	5	4	7	6	5	5	6	2
	Public institutions	14	15	14	16	16	15	15	15	16	15
Medical centres	Hospitals and health facilities grade IV	5	7	3	2	3	5	4	7	5	6
Education centers	Universities	9	12	6	11	8	9	9	9	8	11
	Schools	11	11	12	10	11	8	8	8	10	9
Small-scale and informal commercial areas		2	2	4	3	6	4	2	2	3	5

² Percentage of each time period is added up to 100%.

Category	Point of Interest	Time									
		05:00-10:00		10:01-13:00		13:01-16:00		16:01-20:00		20:01-05:00	
		O	D	O	D	O	D	O	D	O	D
Residential	High income	16	14	16	14	15	16	16	16	12	13
	Middle income	10	10	11	12	13	10	11	10	9	8
	Low income	1	1	1	5	2	3	1	3	1	1
	Very low income	4	4	9	7	4	7	7	6	2	4
	Slums	12	13	13	13	12	13	14	13	14	7

Based on the figures and table, two main information can be gathered: the most served areas; and the variation of trips based on time. One of the most important areas *boda* serve are economically active areas (formal and informal). The formal commercial and business districts show the most remarkable distinction i.e. the most active points of origin and destination during working hours (between 10:00 and 20:00). Due to the commercial significance of the area, working population uses *boda* to transit for work and meetings. Different town centres throughout Kampala are active points of destination almost round the clock (13:01 to 05:00), catering to local needs (e.g. pharmacy, shops). Interestingly, industrial areas are the most active points of destination after 20:00. This is because *boda* is the only transport mode for factory workers with shift duties who do not have private cars.

Besides formal commercial areas, small-scale and informal commercial areas maintain high activity with many points of origin and destination. These areas house various petty traders, wholesalers of agricultural produce, household goods, repair shops, and others. Many goods are being transported using *bodas* to customers, and occasionally from suppliers.

Residential areas are one of the highest activity areas. When *bodas'* prevalence in the different residential areas was analysed relative to the number of neighbourhood areas within Kampala, it was found that low income area was served the most (29%), closely followed by slums (27%) and very low income areas (19%). Middle and high income areas were the least, at 14% and 10% respectively. This reflects *bodas'* dependence in lower income areas.

Boda activities at other points of interest such as medical and education centres were rather consistent, with higher demand at specific time interval. For example, between the hours of 10:00 and 16:00 which are visiting hours and lecture period for hospitals and universities; and the after school hours between 13:01 and 20:00.

By looking at the trip patterns, one significant pattern is revealed: prevailing *boda* trips in different time period correspond with the main activities in the city, especially commercial activities. This delineates how *boda* supports the city's activity based on the mobility patterns.

Qualitative Survey and Interview

While the GIS analysis reveals trip patterns of the entire Kampala, this part glimpses the socio-demographic characteristics of the *boda* users (Figure 5-4) from the 46 survey respondents. Amongst the respondents, there are 22 males and 24 females.

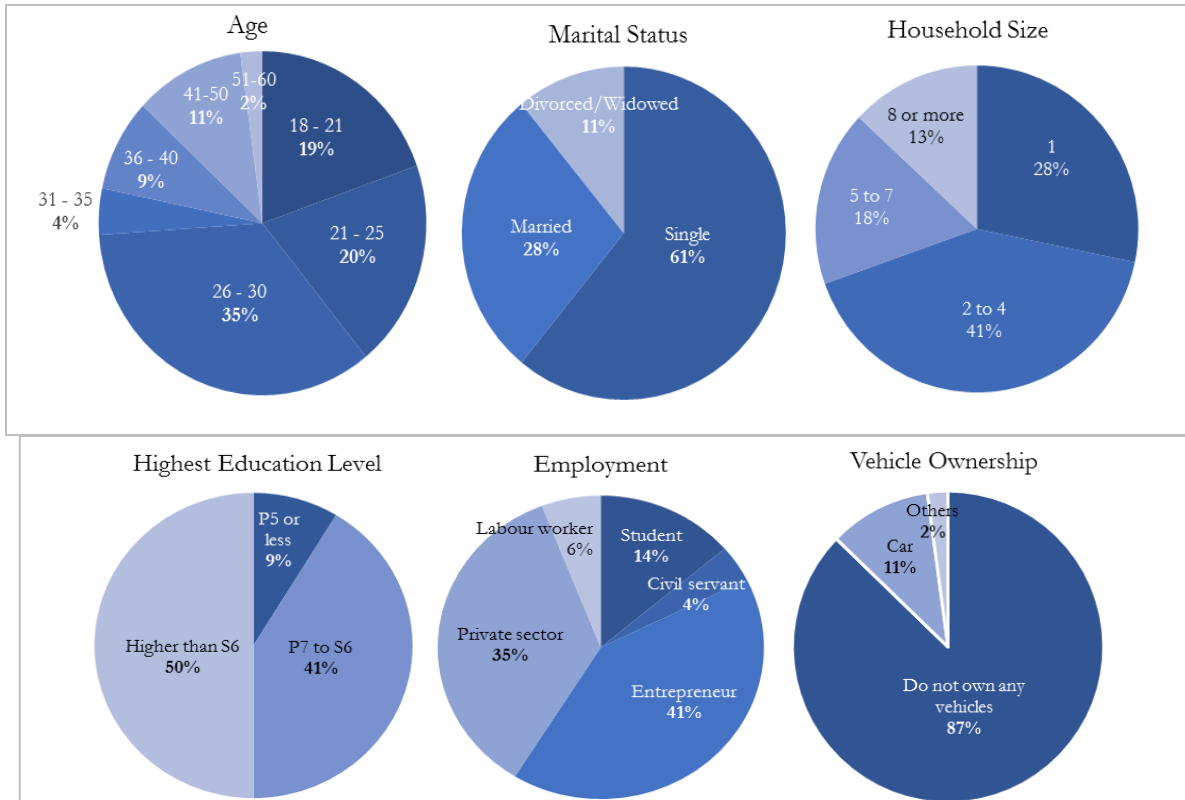


Figure 5-4 Demographic information of respondents

With regards to the age group, 20% of respondents are aged 21 and 25; and 35% of 26 and 30 year olds. No respondent was above the age of 60, perhaps due to the young city population since Uganda is one of the youngest country in the world. Most of the respondents are single (61%), and have a household size of 2 to 4 persons (41%). The highest education level obtained was college degree or higher (higher than S6) i.e. 50%. Only 9% completed primary education or less (P5 or less). The most common employment type were entrepreneur (41%); and employees at the private sector (35%). These include formal and small-scale informal commercial activities. Figure 5-5 and 5-6 depict the personal monthly income and amount spent on transportation.

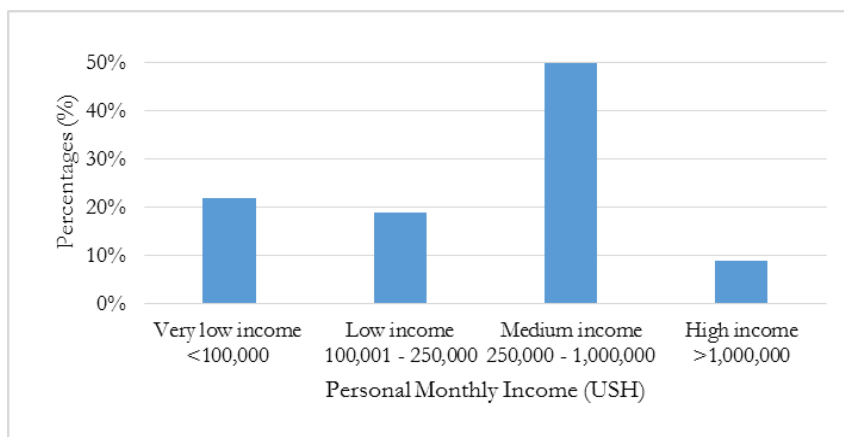


Figure 5-5 Personal monthly income of respondents

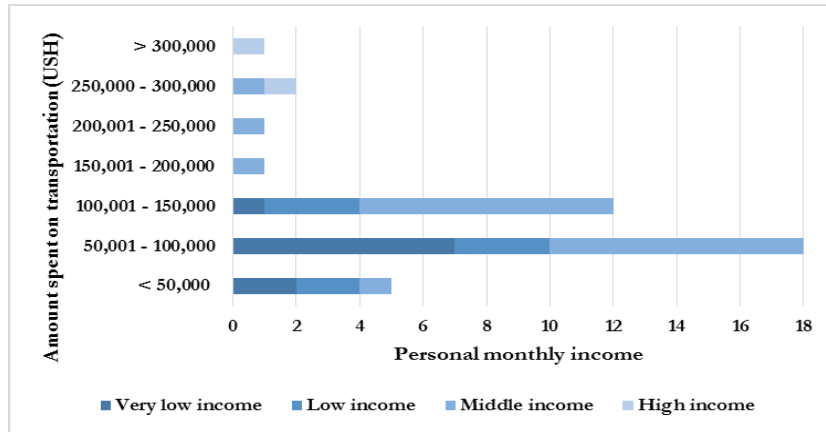


Figure 5-6 Amount spent on transportation each month by respondents based on personal income group

The amounts spent on transportation were not limited to *bodas* only, but also *matatus* taxi if used as a mobility mode. Expenditures of more than 300,000 US\$ were mainly due to very high mobility pattern or car and fuel maintenance. As reflected in Figure 5-6, very low income and low income groups spend a relatively high portion of their income on transportation. In some cases, some of the very low income group could spend up to 90% of personal income on transportation but averaged at 40.5%. The percentage of monthly transportation expenditure of low income group of respondents averaged roughly at 34.5%, which is roughly similar to the middle class groups (38%). High income groups spent about 20 to 30% of their income on transportation. This shows the disproportional transport expenditure between income groups, especially the lowest income groups who spent a high portion of income on transport. Figure 5-7 details the most common *boda* trip purposes.

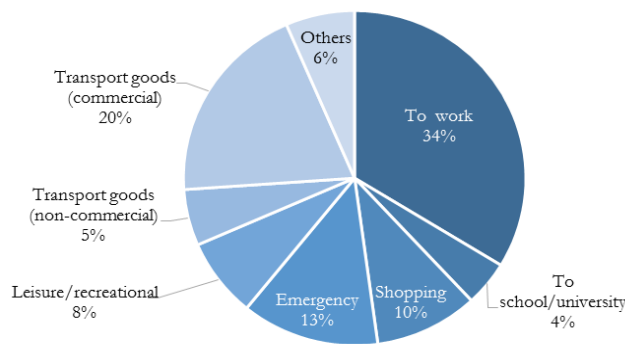


Figure 5-7 Boda trip purposes from survey respondents

Based on Figure 5-7, using *boda* to go to work is the topmost reason (34%). This motivation is similar to the GIS analysis above which showed its importance during working hours serving various formal and informal business areas. Transportation of commercial goods is the second highest reason for using *boda*. This was especially true for areas in small-scale and informal commercial areas such as respondents from Kisenyi and Mbuya I. The majority of entrepreneurs (86%) of those selling goods indicated the use of *boda* to transport goods to customers. In cases where the suppliers were unavailable, *bodas* were also used to collect goods from suppliers. These goods include clothes, beans, millets, grains, rice, maize, and many others. For example, an interviewee said, “my customers can call me and ask me, “(name), do

you have this shirt in this size?”. Then I will say, yes, and I will send my boda-boda guy to give it to him” (Interviewee 7, March 2016).

Bodas are also frequently used in emergencies (13%) for medical purposes, urgent meetings with friends or business partners, or *“whenever I need to go somewhere urgently, I just barge on a boda and go”*. A user indicated that she *“uses boda for emergency only because the risk is there”*. (Interviewee 12, March 2016). Some use *bodas* for domestic services such as shopping (10%) or for leisure activities (8%) such as dating or catching up with friends. University is one of the common destinations especially if classes are before noon. Other purposes reported include attending church services, when dangerous to walk at night, or only to enter town.

Consolidating the GIS analysis and survey results, the travel patterns reveal pertinent observations on *where do people go and come from* and *who uses boda services?* On a whole, even as the *bodas* cater to various personal motivation for travel, two significant use patterns are: serving the mobility needs of the working population at formal commercial and business areas; and transporting goods for local businesses or petty traders. With regards to *who uses boda services*, it can be pointed out that the very low and low income groups are the most reliant as projected in the high trip density amongst their residential and small-scale and informal commercial areas. Based on the interview with the KCCA, these areas represent the highest population density within Kampala. This indicates the high number of users dependent on *boda*. The middle income groups use *boda* services especially for work and social activities. Nevertheless, the author’s personal observations during the field survey noted two groups of people who never or scarcely use *bodas* (therefore not survey respondents). One of them is the upper class of society (or very high income), as they can afford more personalised options such as a private driver or personal car since the *bodas* are prone to accidents. Another group is the extreme poor of Kampala who walk or rely on *matatus* taxi. When approached by the author, the common exclamations were, *“no, no.. I do not use boda-boda. Too expensive, I cannot afford. I walk!”* or *“I use only taxis since bodas are expensive for me”*. Thus, *boda* can be said to have socially distinctive attributes.

5.1.2 Boda Trips in Different Time Periods

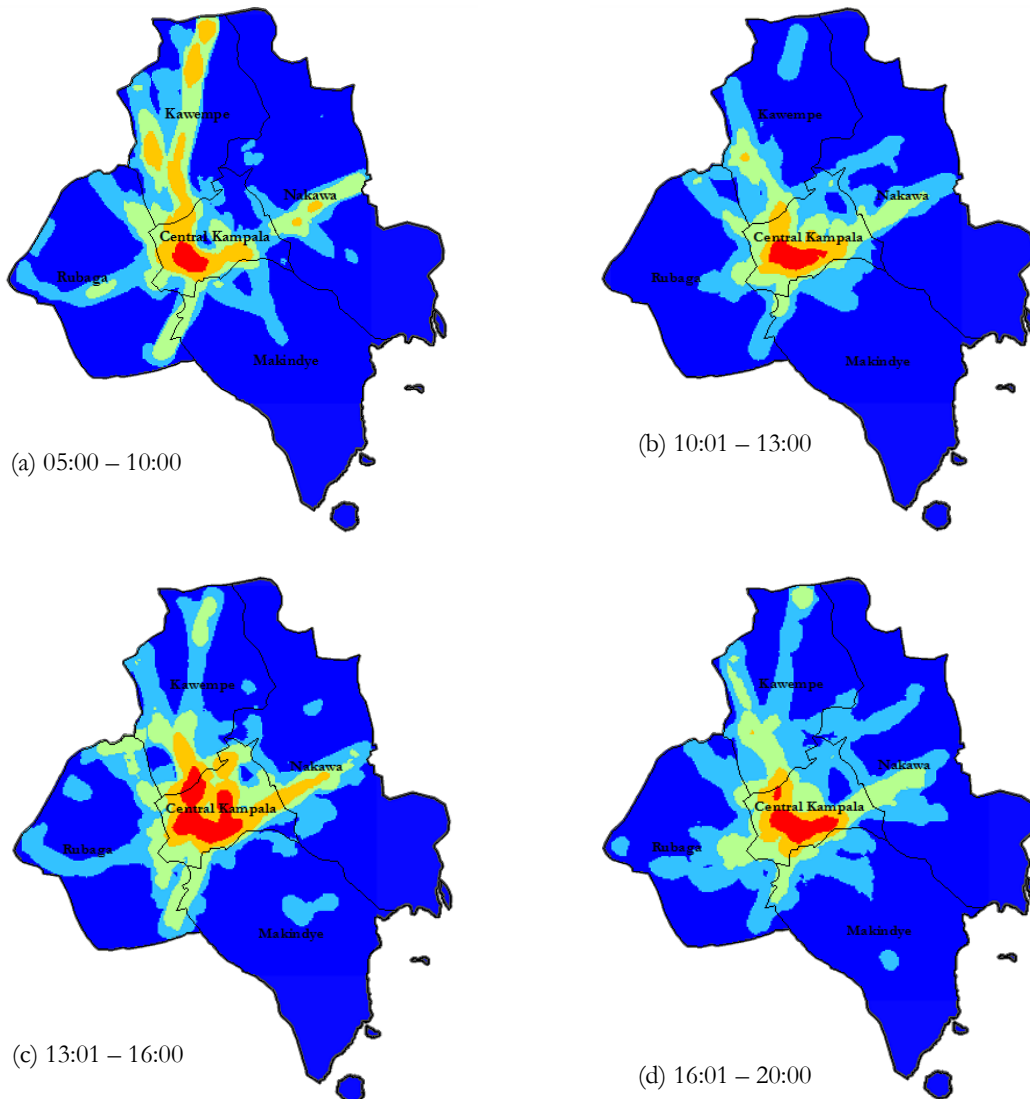
To ascertain and illustrate the *boda* trip density based on different time periods within Kampala, time density maps (Figure 5-8) were generated based on these time periods: (a) 05:00 – 10:00; (b) 10:01 – 13:00; (c) 13:01 – 16:00; (d) 16:01 – 20:00; (e) 20:01 – 04:59.

By comparing these figures, an obvious feature is the *boda* trip directions and focal areas varied with time, which highlights the trips purpose and drivers. The earliest time period, 05:00 to 10:00, depicted the high number of trips entering the city especially from the north and northwest of Kawempe with Buwambo Road and Bombo Road respectively; north of Rubaga with Hoima Road; and east of Nakawa divisions along Jinja Road. This delineates that the trips entering into Kampala with these main roads were from further parts of Kampala and even surrounding areas outside Kampala. This reflects an interviewee’s comment, *“Now there are people who sits on a taxis for three hours before they reach the places of work. You are working in Kampala and/ or outskirts of Kampala, you take a longer time. But if you are on a boda, you will be fast. In general, if you need hours but with a boda, you will take only 20-30 minutes, or 15 minutes.”* (Interviewee 23, March 2016). Between the working hours of 10:01 and 13:00, *boda* trips were concentrated within Central Kampala division, an economically active area. This was accentuated between 13:01 and 16:00, with larger spatial coverage of high and very high density areas, the economically and socially active spaces. An interviewee narrated a common scenario of *boda* use at lunch hours, *“when you are at work, you are supposed to go to town to buy*

something, you have a car. But because of the traffic that is there at lunch time, you would not be able to use the car and you will have to be very fast. So you will have to go out, take a boda-boda and go to pick whatever you need and then come back in time” (Interviewee 17, March 2016).

After 16:00 to 20:00, the trips appeared to disperse to the different divisions, reflecting that users were returning home. Finally, the most remarkable observation for the period between 20:01 and 04:59 was that highest density area shifted away from the Central Kampala towards the Kawempe and Rubaga boundaries. Central Kampala seemed to die down from activities, whilst life began in various town centres or localities such as the center of Makindye Division. Moreover, North Kawempe even recorded with very high density at similar main roads between 05:00 and 10:00, illustrating return journeys to the outskirts of Kampala.

As such, the *boda* market and drivers shift according to time periods, serving the local Kampalans and even users from neighbouring towns. The change of density patterns implies that the *boda* corresponds with the citizen’s daily life and activities – to reach different markets, activities, and places.



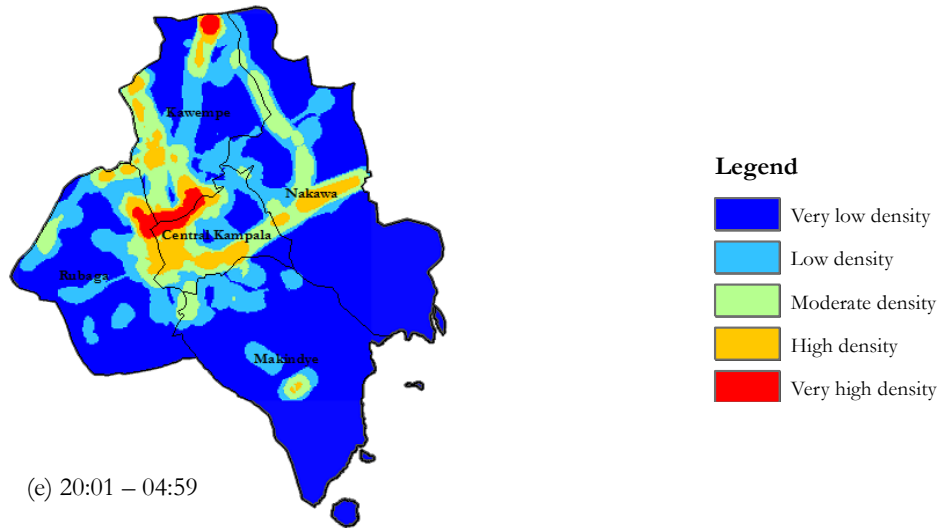


Figure 5-8 Boda trip density based on different time period (a) 05:00 – 10:00; (b) 10:01 – 13:00; (c) 13:01 – 16:00; (d) 16:01 – 20:00; (e) 20:01 – 04:59

5.1.3 Trip Distance and Speed

The distance investigated showed that the most *boda* trips were short, ranging from 200 meters (m) to 9.92 kilometers (km). The average distance for all trips were 3.04 km. Figure 5-9 illustrates the frequency distribution for all the trip’s distance. Most trips are between 600 m to 2 km, whilst longer distance trips of more than 8 km were lesser.

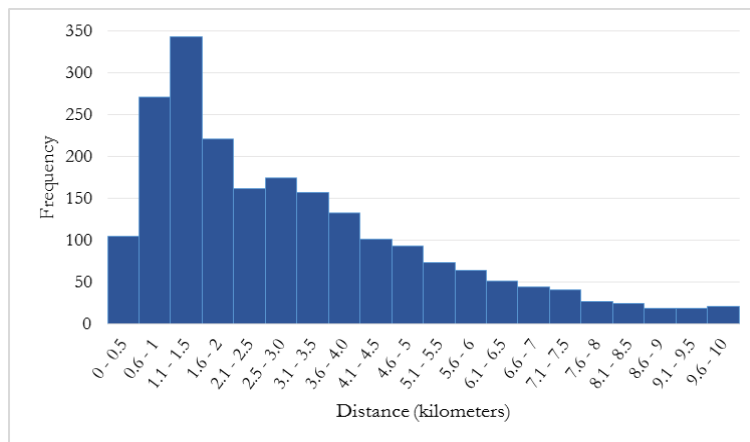


Figure 5-9 Average distance of boda trips in kilometres

When examining if distance changed with time, the results highlighted that average distances were similar across the time periods, ranging from 2.7 to 2.95 km. Each *boda* trips ranged from 4 to 45 minutes.

This was consistent with the interviews, in which interviewees indicated use of *boda* trips for shorter distance, preferring the *matatus* taxi for long distance or intercity travels. The reason for short distance trip is not because of the physical position between locations, but also the flexibility of *bodas* that can opt for different shorter routes for quicker access especially during traffic hours, as indicated by an interviewee, “... you may find a jam during the time of rain, there is heavy downpour, you may find that all roads are being so densed so, to use *boda-boda* in a situation where you

may take long but you will take shorter distance to reach” (Interviewee 23, March 2016). Furthermore, unlike taxis, *boda* do not stop at every point thus shorter distance and time taken, as echoed by many interviewees, such as “... it depends on where I am going to. If the distance is really long and I still have the time, I will take the taxi. However if the distance is short, maybe I don’t have a lot of time, like maybe the situation is an emergency, then I will take the *boda* because the taxi keeps stopping at every point along the journey” (Interviewee 15, March 2016). Amongst the interviewees who were familiar with the typical time taken on a *boda* trip or were approached once they hopped out of a *boda*, responses of time taken ranged from 3 minutes to 30 minutes. Very short trips (as short as 3 minutes) normally corresponds to urgent need (e.g. hospital visit).

Speed

The speed for each individual GPS points captured ranged between 0 and 49.89 kilometers per hour (km/hr), with the mean speed of individual points at 10.02 km/hr. In addition, mean speed for categorised trips ranged from 0.75 km/hr to 30.22 km/hr. Figure 5-10 presents the mean speed for each trips and the mean speed according to time period.

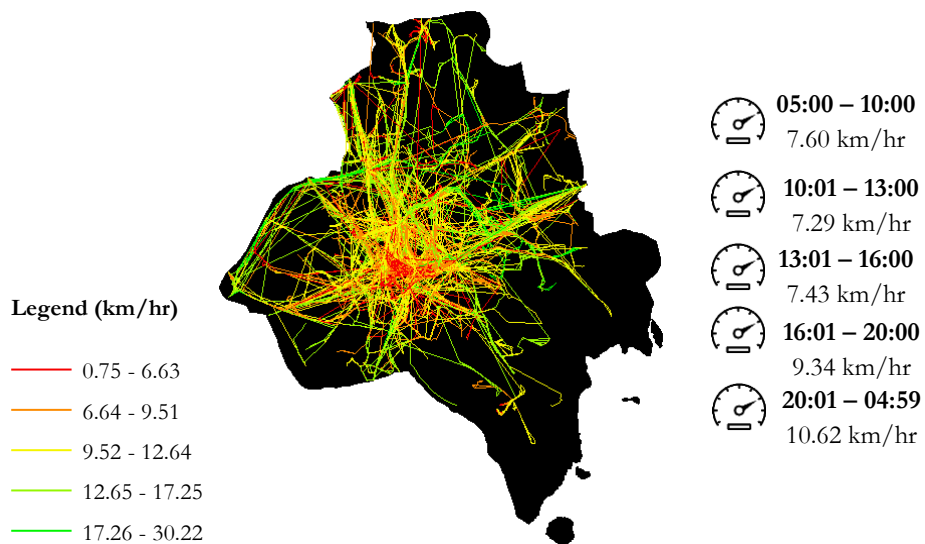


Figure 5-10 Mean speed for all boda trips within Kampala and mean speed at different time period (insert)

Overall, speed within Central Kampala tends to be slower in comparison to other locations. Speed variation with time was initially expected, but surprisingly no distinctive differences were detected. Such speed consistency despite prevailing circumstances (e.g. traffic peak) is unseen in other vehicle modes. 64% of interviewees recognises speed as *boda*’s competitive advantage. The following narration is a common amongst users, “... when I use the *boda-boda*, it takes me there fast, so I reach my work on time, and so in that case, it will save time” (Interviewee 1, March 2016). By zooming into an individual trip, speed variation within each trips were observed. A snapshot of a selected trip typical of most other trips is presented in Figure 5-11.

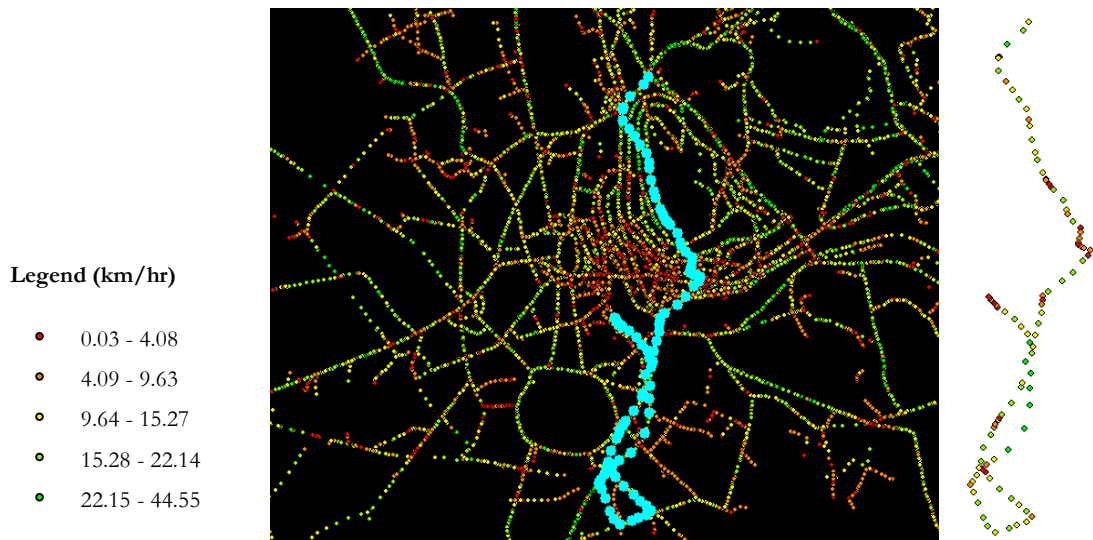


Figure 5-11 A snapshot of a selected trip showing speed variations

On ground observation of *boda* driving supported this pattern in which *boda* slows down slightly, while taking speed again once the road is clear of traffic. The meandering pattern illustrate how *bodas* weave through the traffic or potholes while driving. Both depict the agility of the *boda*.

5.1.4 Boda and User's Behaviour

This section describes the behaviour of users in using *bodas*, from approaching a *boda* to the use phase (passengers and goods transport).

Frequency of use

Figure 5-12 summarises the frequency of *boda* use by respondents. Most (36%) respondents used it more than once daily, between 2 and 3 times mainly for work purposes. 19% of respondents use it only when necessary or in an emergency. This shows that most *boda* users are very reliant on *boda* for mobility especially the working group.

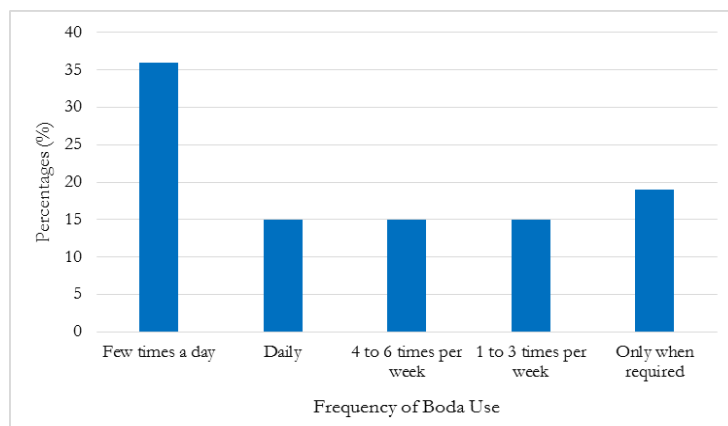


Figure 5-12 Frequency of boda use by respondents

Finding a Boda

Grabbing a boda in Kampala is easy considering the sheer amount and presence. According to the respondents, the most common ways to catch a boda were: (1) walk to a designated boda stage (65%); call a *boda* driver (31%); and being approached by a driver (4%). Interviewees who have a dedicated *boda* driver do so for convenience. Most users would approach a *boda* at a stage and mentally select a *boda* driver based on an agreed price. Some mentally filter out drivers who appear younger (less experienced), poorly dressed (dirty), or with compromised motorcycle (e.g., no side mirrors). A vigilant user who experienced severe *boda* accident previously recounted how she would normally select a *boda* driver – “So when I am going to a stage and say this is what I am going to take, I lay down the ground rules for me to get into your motorcycle”. In addition, companies such as SafeBoda’s drivers at the stage can be easily distinguished and tend to attract more females and foreigners for better safety (SafeBoda, personal comm, March 2016).



Figure 5-13 (a) Designated boda stage (left); (b) Boda stage with a SafeBoda driver (pointed with arrow)

Pricing and Bargaining

Upon informing the *boda* driver their desired destination, the driver would indicate the price. If the price is unsatisfactory, the user could either bargain or move on and search for another driver with more of a reasonable price. A lady indicated that the price “depends on how you bargain – your bargaining power. Or the way you dress... So they judge according to appearance. as long as they dress up presentable, they charge you accordingly” (Interviewee 16, March 2016).

Price paid for trips vary. For example, an 8 minutes trip could cost 3,000 USH³ but a 10 minutes trip could cost between 1,000 and 2,000 USH. Trips more than 15 to 25 minutes ranged from 3,000 USH to 5,000 USH. During raining season, the price may double or more. An interviewee mentioned that “during raining season, at a distance of maybe 2 km you may find charging you at 5,000 USH which is more expensive than say the taxis and non-raining season at 2,000 USH or less”. However, not all respondents were able to pinpoint the price paid, the price range were only an estimate. Prices vary for various reasons: (1) time of the day; (2) distance; (3) locations; (4) weather conditions; or even (5) location of hailing down a *boda* (e.g. at a stage or on the road). Users have the liberty to choose a *boda* driver that meets their budget.

On a Boda

To economise trips, it is a norm to have two or more passengers and even goods on a *boda*. Sometimes, parents and child squeeze together in a *boda*. In rare cases, a helmet is provided by the *boda* drivers or users carry their own. Through daily observations, foreigners or former severe accident victims tend to carry helmets more frequently than others. Instead of

³ 1,000 USH = €0.26 (exchange rate, May 2016)

straddling bike as normal, well-dressed ladies tend to sit with both legs saddled at the same side although it has higher risk to be dislodged from the *boda*. Interviewees indicated this is more likely due to dress code rather than social taboo. Besides, *bodas* transport commercial and non-commercial items. These include normal items such as groceries, bananas, boxes, to more peculiar items such as furniture.



Figure 5-14 (a) Four persons with a baby on a *boda* (left); (b) a lady sidesaddled while the man sat normally (second left); (c) transporting goods on *boda* (second right); (d) passenger holding a door on a *boda* (right).

On the Road

Because of *boda's* agility, they drive on both main roads and off-roads or pavements. The GPS points analysed indicated that 56% of the *boda* drove on-roads, and 44% drove off-road. Of the on-roads points, *bodas* were on all types of roads, principally larger roads (Table 5-2). Description of road classifications can be referenced in Table 4-2, but in general UC-I road type is the widest and macadamised roads.

Table 5-2 On-road types the *bodas* drove on

Road Type	UC-I	UC-II	UC-III	UC-IV	UC-V	Minor roads	Footpath
Percentage, %	35.1	28.2	12.3	15.1	2.8	6.5	0.1

This illustrates the *boda's* ability to: manouver traffic at roads or pavements, and provide point-to-point access even at small roads. Figure 5-15 provides a classic snapshot on how *bodas* drive on-roads and off-roads.



Figure 5-15 *Bodas* driving on-roads (left) and off-roads (pavements or at road fringes) (right)

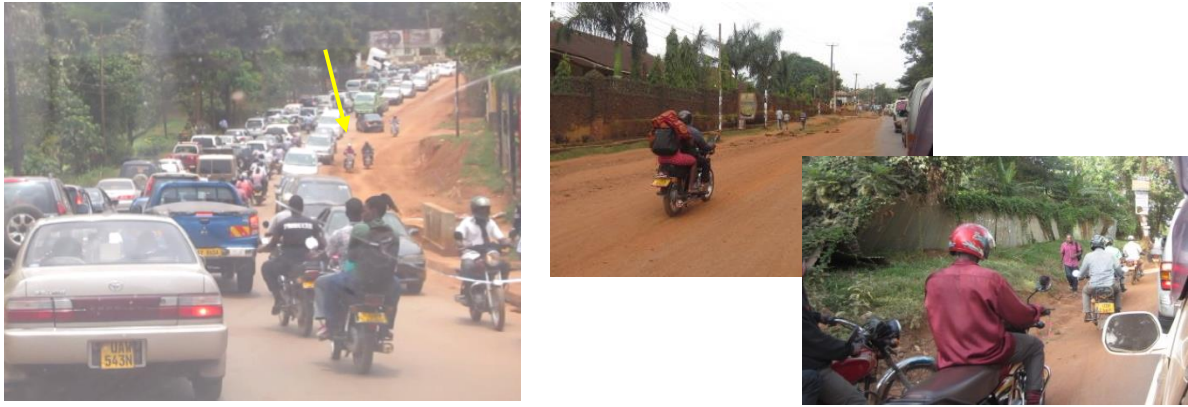


Figure 5-16 (a) Bodas driving on on-roads and off-roads to avoid traffic (left); (b) boda driving on side pavements and road reserve to skip through traffic (middle); (c) boda driving at the fringes of the road (right)

Trip Chaining and Transport Mix

Due to the personalised *boda* service, trip chaining is occasionally noted when the passengers have to personally attend to activities such as selecting goods for shop. Sometimes, a mix of transport modes would be use as well, with *boda* intended to access quicker to specific locations. This could include using *matatus* taxi up to a certain area, and supplement with *boda*. For users with cars, it is quite common to park-and-ride since “your car can’t fly definitely and there are 30 cars in front of you. So some people what they do is, they park and they keys out, lock the car, jump on a boda-boda and go for the meeting and come back, enter the car and continue driving” (Interview 18, March 2016). Aside from using *bodas*, respondents depend on other transport modes, mainly walking (31%) and *matatus* taxis (24%) (Figure 5-17a). Motivation to use *boda* may differ according to time, price, and destination.

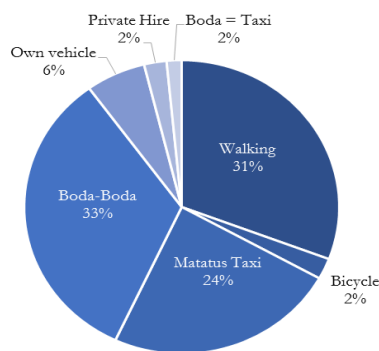


Figure 5-17 Transport modes used by respondents

5.2 The *Boda* Market and Kampala City

Just by the sheer amount of *bodas* in Kampala, it has inevitably shaped its urban form in one way or another. This section explores the interaction between the *bodas* and local populace. It begins by identifying the local sentiments towards *bodas*, and then uncovers its significance and externalities resulting from its presence and services. These analysis are based on the four sustainability dimensions identified in Chapter 3 i.e. social, economic, physical environment, and institutional. Overall, this seeks to answer RQ2: *What is the significance of boda-bodas to the local populace of Kampala city?*

5.2.1 Boda Users' Satisfaction

In building the case to perceive *boda* as a problem or as a panacea to mobility issues in Kampala, the users' satisfaction and perceptions are valuable especially when they are the main customers of the *boda* market. These could identify the *boda's* attributes, performance, and potential areas for development. Based on the survey ratings on a five-point Likert scale, the responds were ranked as follows: (1) satisfied (40%); (2) neutral (22%); (3) dissatisfied (16%); (4) very satisfied (13%); and (5) strongly dissatisfied (9%). The reasons are summarised in Table 5-3.

Table 5-3 Reasons of satisfactory level

Negative	Neutral	Positive
<i>Boda</i> drivers: bad driving, mannerism and professionalism (20%) Safety (thefts and accidents) (13%) Price: Expensive (2%)	Necessary and assist to keep time, but inherent safety risks exist (11%)	Convenience (13%) Saves and keep time (13%) Price: Cheap (11%) <i>Boda</i> drivers: knowlegable, truthworthy, and relational (7%) Beat traffic jams (4%)

Most respondents were satisfied with the *boda* services, mainly because of the physical characteristics of the *boda*, while negative reasons were mainly related to bad driving. A comparison of satisfaction level with gender was done to ascertain any underlying influences or differences, as shown in Figure 5-18.

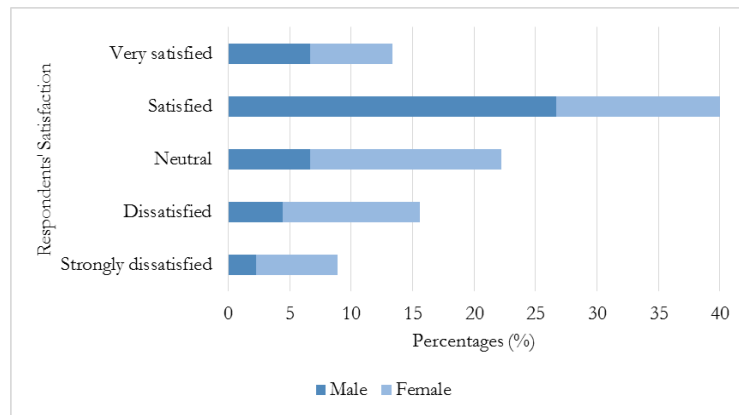


Figure 5-18 Boda satisfaction level of respondents based on gender

Figure 5-18 reveals that men were more satisfied with *boda* services than women, and more women maintained neutral stance. Such neutral stance is the struggle to fear them for the safety risks but favours them for their convenience and speed. Three view differentiations between genders prevailed. Firstly, more women (number of coded reference, n=5) raised safety related issues compared to men (n=1). Secondly, women perceived *boda* drivers' mannerism and behaviour more negatively (n=6) compared to men (n=3). Three males even commended the *boda* drivers. Thirdly, more men (n=4) consider *boda* affordable than women (n=1). These trends were similar to the coded interviews, in which more men referred *bodas* as cheap or affordable in comparison to women, as quantified in Table 5-4. A female interviewee complained, "It's like it does not match to what I earn" (Interviewee 9, March 2016),

while a male respondent perceived it as *“I think they are not expensive, they are reasonable”* (Interviewee 11, March 2016).

Table 5-4 Coded references referring to affordability of boda based on gender

	Male	Female
Expensive	3	4
Cheap/ Affordable	10	2

In addition, Figure 5-19 compares the satisfaction levels based on different income groups.

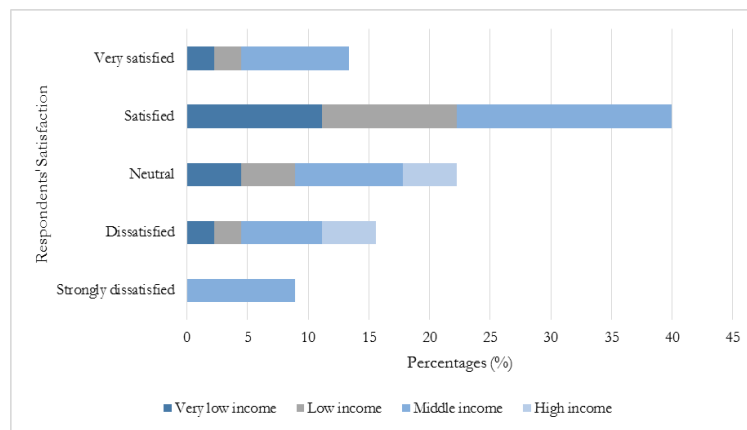


Figure 5-19 Boda services satisfaction level based on income group

The lower income groups had similar satisfactory level, inclining towards satisfied-neutral due to the access given. Whereas high income group was more inclined towards neutral-dissatisfied spectrum because of the drivers’ behaviour and safety risks associated. Interestingly, income level did not correspond to affordability (Table 5-5). Even at the very low income group, the affordability of *boda* services were attributed as being very positive (n=2), while some from the high income group considered *boda* as expensive (n=2). Most middle income group consider them affordable.

Table 5-5 Coded references referring to affordability of boda based on income group

	Very Low Income	Low Income	Middle Income	High Income
Expensive	2	5	1	2
Cheap/ Affordable	5	1	8	0

The question of *boda* as cheap or expensive is subjective and may not be biased based on income groups. Two interviewees with comparable demographic background responded contrastingly. The first said *“I am saying that they are reasonable looking at the fact that even the common man, even the lowest. I mean from physical observation, even the lowest man can carry boda-bodas”* (Interviewee 24, March 2016). On the contrary, another interviewee indicated that *“if I speak for myself then I think it is reasonable. But if I speak for majority of Ugandans, then I think it is expensive. However it is cheap in a long run because it saves you a lot of time.”* (Interviewee 25, March 2016). Thus, opinions on affordability hinge closer to the interviewee’s appreciation on lifestyle changes and income enhancement due to the change, rather than on the income level.

5.2.2 Significance

In order to embody the *boda's* significance and negative impacts to the city, interviews and observations that were thematically-coded were used supplemented by results from GIS analysis and survey for analysis. An overview of the analysis is illustrated in Appendix K.

5.2.2.1 Social

Just as the urban landscape influenced the *boda* system, it also shapes the people living in it. This section discusses the *boda* system and the society.

Equitable Access

As discussed in Chapter 4.1.1, the pillars for equitable access would be acceptability, affordability, and availability of transport services without discriminating social status. Particularly for the urban poor to enhance the poverty dimensions i.e. opportunity, security, capability, and empowerment. While *boda* system is definitely not a utopia, it is nonetheless undeniable that *boda* enabled better access for locals to realise activities and services.

The GIS analysis and qualitative surveys revealed that *bodas* do not only serve one segment of society but range from very low income to middle-high income. Even if some of the very poor struggled to afford the luxury of speed, sacrificing time for walking or *matatus* taxi instead, they nonetheless use *bodas* for cargo goods delivery. These are generally true for the petty traders selling food items. “*Like my bag of millet, it cannot be delivered on buses or other means especially in this area*” (Interviewee 44, March 2016). The sole manner to transport goods at an affordable price is with *bodas* without personally attending to it. The price of delivery is normally charged to customers (Interviewee 5, March 2016), giving them more financial incentives (Interviewee 2, 10, March 2016). Therefore, it is common to see *bodas* even at the smallest roads at informal commercial centres strapping on *matookees* (cooking bananas), rice, and grains for delivery. Moreover, some poor women (n=4) indicated that *bodas* were opted because it was their only option, compared to men (n=1). Unlike some cities that discriminate women riding behind a male driver, no females indicated any prejudice.

Such demand responsiveness service coupled with service innovation (e.g., new ways to tie goods) constantly meet new demands and enable penetration into new markets, especially the more vulnerable groups. These new opportunities unveiled expanded the range of activities and enhanced performance previously isolated from them, which explained the higher satisfaction level of lower income groups.

In addition, access to services such as medical centres are frequently done with *bodas* too. During a field study at Nakasero Hospital, a pregnant lady with her husband arrived at the hospital for an emergency treatment on a *boda*. The journey took them approximately 10 minutes although it was peak hour (18:00). Reportedly, medical services such as Care Uganda were set up with *bodas* to prevent mothers from dying especially at night (Kasujja, 2016).

Access to social gatherings is another integral part. As one interviewee exemplified, “*In Uganda, it is such a nice thing for us to sit together. But err, what it helps, socially, we are able to catch up with social activities. Catching up is a very, very important thing. Not on boda but if I want to meet someone. It helps me, social activities.*” (Interviewee 20, March 2016). Besides, using *bodas* to attend Sunday church services were ubiquitous. Certain *boda* drivers intentionally work on Sunday mornings to meet this demand. Temporary *boda* stages were even formed outside larger churches on

Sunday mornings. Involvement in social and community gatherings improves social cohesion and empowers people while reducing vulnerability (UN-Habitat, 2012).

Personalised Service

As *boda* is a public for-hire form of transport, relationship with the *boda* driver allows flexible customer service. These include calling them for service, or taking customised routes. A noteworthy feature that favours the poor is the credit service – use first, and pay later. That is why some users only employ drivers whom they know and drivers who “*know their story*” (Interviewee 19, March 2016). The story of the urgency to be at a certain place (Interview 20, March 2016), or even financial situation (Interviewee 10, 18, 45, March 2016). “*At least in Uganda where money is hard to come by, ... the guy who I have. Sometimes I don't even have money, but I tell him I don't have money but if you can pick me and drop me, I will give you when I get the money so like some of them give you services on credit. But you can't enter a taxi, and explain to a conductor and say I don't have money. They could beat you up!*” (Interviewee 18, March 2016).

Users who know their drivers maintain better trust, and receive better services. “*I use my friends so I have never got any (safety) concerns*” (Interviewee 5, March 2016).

5.2.2.2 Economic

Value of Access

Besides measuring the opportunity cost (the value of time), a new paradigm in measuring the value of access considers the agglomerated economic output, known as economics of access (UN-Habitat, 2012). *Bodas* are the economic powerhouse of Kampala, without which “*the entire city paralyses*” (Anonymous, personal communication, March 12, 2016). Paralysing the city does not merely refer to physical movement, but the support structure that mobilises labour, trade, and social development. Although this thesis does not calculate economic benefits *boda* provides, it sheds light on how the *boda* sector contribute to local economy.

Users rarely take a *boda* trip for pleasure (only one indicated it has a soulful experience). Instead, the end goal is access to job opportunities and markets. “*Attending these meetings on time means making a lot of money*” (Interviewee 18, March 2016). One of the main source of income for Ugandans are working as small entrepreneurs and petty traders. Most of them rely on *bodas* to make business happen and business expansion. A bean seller literally said that “*Bodas are always important for the running of my business. They help me to run it.*” (Interviewee 11, March 2016). The use of *boda* creates a competitive advantage for businesses because of on-time delivery (Interviewee 20, 22, 45, 46, March 2016). An interviewee who sells edu-tablets for young kids to schools reported that “*If they are needed urgently (by customers), just run, pick them from the store, run to the square and just deliver so you don't have to spend so much time, and say that you will be late and all that*”. During the field research around the informal commercial area, many shops use *bodas* for delivery. Whenever needed, the owner would wave a *boda* from the nearby stage, strap bags of goods on it, and off to the customers. Furthermore, just like in other cities, some established companies utilise these motorcycle mode for delivery such as logistics (Aramex, DHL) and food delivery companies (Hello Food). “*Boda-bodas are the life of business in this town*” (Kasujja, 2016). Thus, “*it is hard for us to do without them*” (Interviewee 46, March 2016).



Figure 5-20 (a) Bodas in the CBD (middle); (b) Boda stage at Kisenyi I, mainly supporting locals in goods delivery (right); (c) food delivery with bike (right).

Enhanced access translates to businesses penetrating into new and less accessible markets and customers; improved reputation with affordable means (cheaper than for-hire private drivers). More importantly, such immense mobility network is even free of government subsidisation and market regulated, which otherwise would require a huge financial investments to establish and sustain the public transport network.

The Boda Economy

Uganda is said to have a *boda* economy in addition to an agriculture-based one. This is a massive industry network hiring *boda* drivers and supporting entrepreneurs (e.g. repair and sustenance services) (Howe, 2003). The competitiveness of *boda* economy moderates price and service quality (Interviewee 18, 19, 29, March 2016). Just like in other markets, *boda* drivers who are “*smart*” maintain competitive advantage over their comrades to ensure constant customer flows and increased income (Interviewee 28, March 2016). Adopting the power of market signaling (Tugende, personal communication, March 30, 2016), drivers distinguish themselves by appearing more professional at the *boda* stage to: attract customers, maintain customers, and perhaps to demand higher price. For example, not selecting motorcycles without side mirrors (Interviewee 19, March 2016), or sleeping drivers while waiting at the stage (Tugende, personal communication, March 8, 2016). Innovative solutions were even invented in this competitive environment such as an umbrella to prevent passengers being drenched (Interviewee 4, March 2016).



Figure 5-21 (a) boda washing service; (b) which boda would you choose? – the power of market signalling; (c) innovative solutions

5.2.2.3 Physical Environment

Physical environment considers the physical transport infrastructure, the urban form and the natural environment.

Reliable public transport system

Boda fulfilled a gap unmet by public transport system and even informal *matatus* taxi by providing reliable and constant transport system to the locals. This reliability is most appreciated by respondents and interviewees, which refers *boda* as fast (n=23), able to avoid traffic (n=11), convenient (n=9), flexible (n=9), available (n=6), and effective (n=1).

One of the main reasons Kampalans embraced *boda* immensely is because of the constant suffering from snarled up traffics in Kampala so there is a dire need for a convenient mode of transport to move about (Kasujja, 2016). Recapping from the average speed of *boda* trips were within the range of 0.7 to 30.5 km/hr, which technically speaking were not as fast as a car's capability. But, the official figure for a vehicle's speed during Kampala's traffic is less than 15 km/hr (Kiggundu & Mukiibi, 2012). This shows the *boda's* flexibility to manoeuvre the traffic and dilapidated road conditions, which echoed an interviewee's comment: "*they easily go through the traffic so I will be on time for my appointment.*" (Interviewee 22, March 2016).

Although *matatus* taxi maintains the competitive edge of cost, passengers opt *bodas* for its speed. "*If I am going to town with a taxi, it is 1000 USH but if I am taking the boda, it's minimum 3000 USH. So it is more expensive. But if you weigh in the opportunity cost like the time you are going to save and then it becomes cheaper. If you weigh in all the other factors, it becomes cheaper. Time is money!*" (Interview 19, March 2016). The notion of time saving was repeatedly emphasised.

Convenience refers to access, the ease in catching a *boda*, connection to locations - anytime and anywhere. *Boda* attributes are well summarised by Interviewee 8 (March 2016), "*So I need to rush home early so they are convenient and they are always available. So, yes, convenient and available and they are quick!*". At the core of *bodas'* effectiveness is the physical nature and the vast army straddling on it to serve the city's mobility needs – transporting items and passengers.

Realisation of Access to Places

Bodas facilitate access to locations within and even outside of Kampala. As discussed in Chapter 4.2.3, the urban form – design, density, and spatial distribution – influences travel demand and need. Aside from mere traffic, there are other inherent reasons that may explain the omnipresence and reliance of locals on *bodas*. "*So many people depend on the boda system as their source of transport. So if you pull boda-boda out of the city, you basically bring the city to a standstill and a lot of people won't be able go get around quickly at all.*" (Kasujja, 2016). *Bodas* connect the city in remarkable ways as illustrated, but what are the inherent drivers that derived this travel demand and the people's reliance on the system? Answering this not only explains the effect of *boda's* absence but also consideration for urban development. There are three main reasons: (1) Kampala's urban design as a monocentric city; (2) lack of public transport; and (3) main and feeder road conditions.

Kampala's urban form is a monocentric structure, which means most jobs, business activities are focused within the central business districts (CBD) while residential areas lies at the periphery of the city (Kiggundu & Mukiibi, 2012). Figure 5-22 shows the land use of Kampala and the CBD which is the dominant formal and informal commercial activity areas.

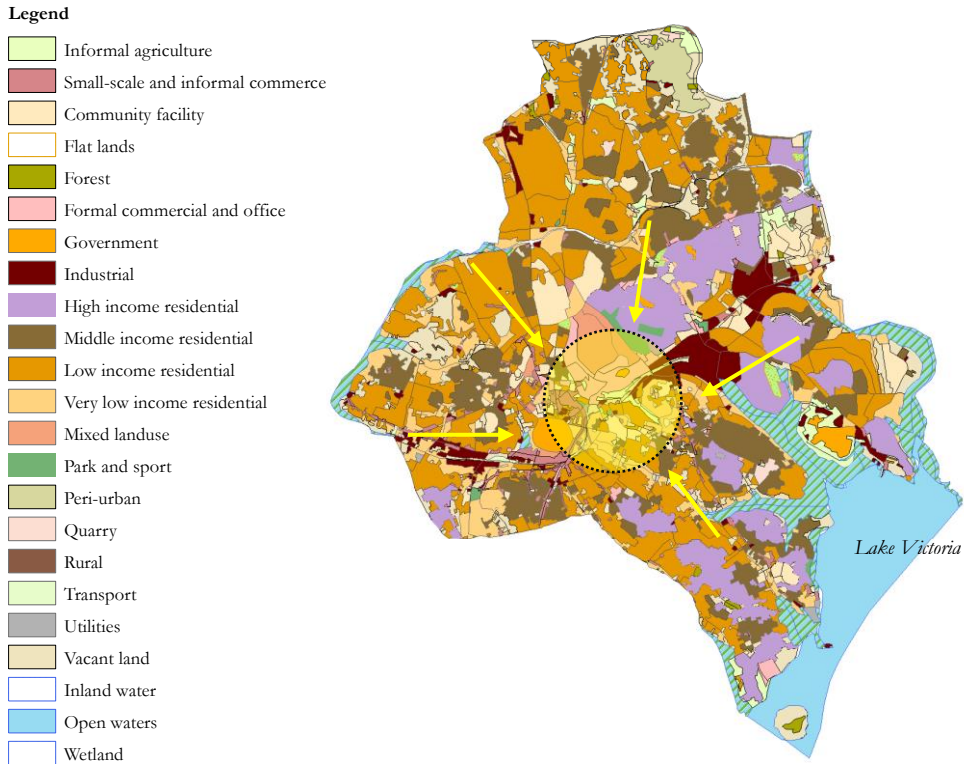


Figure 5-22 Kampala landuse as a monocentric city

Data Source: KCCA, 2012a

Goswami and Lall (2015)'s study indicated the employment and commercial clusters within the CBD is the densest up to 3 km radius. This morphology encourages more unidirectional radial trips and traffic as reflected in the travel patterns analysed. Beyond this radius, employment opportunities are more spatially dispersed with five potential subcenters. Even so, these areas are not significant economic centers. It was argued that with the potential development of subcenters, the mobility demand for surrounding locals may be reduced (Goswami and Lall, 2015). To a certain extent, this may be true for passengers movement but not so for delivery of goods, as discussed below.

This leads to the second discussion on the void of an efficient public transport system. Although an effective mass transport could ease the traffic within monocentric cities as high density may induce good public ridership (Kiggundu & Mukiibi, 2012), the intra-city bus system introduced in 2013 were limited at two routes only. Conversely, *boda* stages are ubiquitous throughout Kampala, more so in the CBD. Figure 5-23 compares the bus routes, *matatus* taxi parks and *boda* stages⁴.

⁴ There are more *boda* stages than presented. The figure represents only some of the registered stages by the KCCA which was last updated in 2012.



Figure 5-23 Formal public bus routes; taxi parks for matatus taxi; and boda stages in Kampala

Data Source: KCCA, 2014; Pioneer Easy Bus, 2015

The typical routes and coverage of *matatus* taxis were not mapped in Figure 5-23 due to data paucity. It was observed that the *matatus* taxi tend to congregate around areas with high ridership, a form of “cream skimming” (Cervero, 2000). Moreover, “there are some places the taxis can’t reach and if you don’t have a car. Obviously the boda-boda is going to help.” (Interviewee 22, March 2016). For example, the areas surrounding Nakawa Market do not have any other transport option aside from *boda*. It is not even an exaggeration to say that *bodas* are literally everywhere especially in the CBD where it moves from every streets in every directions.

Reaching areas that “you can’t reach” could be associated with the road conditions. In certain parts of Kampala, roads were either not wide enough or maintained for conducive car driving. It was observed that this is more important for transport of goods at smallholdings such as Kisenyi II, Mbuya-Kinawataka (Figure 5-24). Even where Ugandans struggle with roads networks, *bodas* provided the access to places that are much needed.

Therefore, the urban landscape in Kampala shaped the *boda* system in two ways. First the monocentric urban form that increased travel demand; and on the other hand, the lack of proper road network to access outskirts or less affluent areas. This is further accentuated by the lack of efficient public transport network to meet the access demands.



Figure 5-24 (a) Boda transporting goods at small and informal commercial areas (left); (b) poor and small roads at Kisenyi I; (c) groceries transport on unpaved roads along Mbuya

Reduced Personal Fuel Consumption

Car ownership in Kampala is low. 89% of the respondents do not own any vehicle. One interviewee who owns a car frequently opt for *boda* to reduce personal fuel consumption because “I would use lots of fuel because I go to so many places.” (Interviewee 22, March 2016). However, it is uncertain how the use of *boda* contribute to carbon footprint in quantitative terms (outside of the thesis scope). *Bodas* consume approximately 17 liters, L per week on fuel (Tugende, personal communication, April 1, 2016). However, as more people own vehicles, collective fuel consumption may increase.

5.2.3 Negative Perceptions of the *Boda* Industry

5.2.3.1 Social and Economic: Poor Safety and Accidents Record

Everyday, *boda* drivers are seen driving on wrong lanes and directions, swerving through heavy traffic even at junctions, riding on pedestrian pavements, speeding past traffic lights, transgressing safety and traffic regulations and so on. Some of the *boda* drivers started driving after being informally trained for just a week (Interviewee 14, 22, March 2016). Furthermore, robbery and thefts were frequent – with *boda* drivers as the victimiser or the victim. These were similar concerns voiced by almost all respondents and interviewees. Some interviewees recounted their accidents, with one of the most serious injury being head fracture.

Hospital Mulago even established a Department for *Boda* Injuries. The Head of Emergency Ward of Hospital Mulago, Alexander reported that 50% of road traffic patients were from *bodas* (Kasujja, 2016). A study by Galukande, Jombwe, Fualal, and Gakwaya (2009) on *boda* accidents at Hospital Mulago indicated that injury kinds were mainly soft issue, chest, head, abdominal injuries and fractures. There were no differences between accidents occurrence and gender in this interview. However, women highlighted the issue on safety stronger than men. More female passengers opt for safer alternatives such as SafeBoda services (SafeBoda, personal communication, March 30, 2016). But, the same study indicated that most victims were male with the ratio of 3.5 to 1, and average age of 28.5 years. In many of these cases, helmet use were low (only 17.7%), which was another typical observation in the city. Similar results were provided by Kamulegeya, Kizito, Nassali, Bagayana, and Elobu (2015). Users disliked using helmets (if provided) due to hygiene reasons. Some believe diseases could be spread with helmets. No apparent difference between gender and accidents were noted here.

Tumwesigye, Atuyambe, and Kobusingye (2016) attributed several factors to accidents amongst *boda* riders, which were: (1) younger age; (2) current alcohol drinker; (3) use of lower engine capacity (<100 cc); (4) less than 3 years of riding experience; (5) rode longer in a day; (6) *boda* sharing; (7) poor traffic rules knowledge; (8) avoidance of traffic police; and (8) late working hours. The high amount of patient admission put a strain on the healthcare system as the patient loads were high too. Reportedly, 3% of GDP were spent on *boda*-related healthcare system (SafeBoda, personal communication, March 30, 2016). Each patient spent about €267 per accident (Kamulegeya et al., 2015). Undeniably, these unruly behaviour and poor accidents record caused society at large to perceive them very negatively, even naming them as “*hooligans*” (Goodfellow, 2015), “*lower class*”, “*thiefs*” and “*robbers*” (Interview 9, 22, March 2016). This negativity represent two challenges: authorities to organise the industry; and *boda* drivers who are stigmatised in the society.

5.2.3.2 Physical Environment: Cause of Congestion

The irony is that even as *boda* solve traffic problems, they also contribute to congestion. The huge amount of *bodas* occupy space on the road and sidewalks since no dedicated lane or space is provided for them. Some *bodas* that carry long items (such as bamboos) clog the already narrow roads. Bad driving behaviours further slowed the traffic as vehicles tried to avoid colliding into them.



Figure 5-25 (a) Boda carrying long items occupying more road space; (b) cars slowed down to avoid bodas from all directions

5.2.3.3 Institution: Difficulty in Enforcement

KCCA as the main policymaker and registrar of *bodas* struggled with *boda* regulation while facing various political interventions and interests (Goodfellow, 2016; KCCA, personal communication, April 8, 2016). Additionally, driving schools were not well tapped upon to train young and inexperienced *boda* drivers. While an interview with the Boda Association was not secured, an interviewee commented that corruption may exist within the system (Interviewee 8, March 2016), although some regard them to be stringent in enforcing discipline and democracy (Kasujja, 2016) and have rigid formation (Goodfellow, 2016).



The main enforcement arm of the *boda* driving is the traffic police. Insufficient manpower is reportedly the main reason (Traffic Police, personal communication, March 30, 2016). Enforcement was made more challenging when *boda* drivers swerve through traffics to escape from inspection that made it dangerous for traffic police to go after them. This problem was recognised by *boda* users too.

Figure 5-26 Confiscated bodas that do not meet safety requirements placed at the Jinja Traffic Police Station

5.3 Boda System and Sustainable Mobility

At what point does the *bodas* provide adequate service, and at what point intervention should be required? In considering this, there is one main distinction between the positive and negative aspects of *boda*. *Boda* in itself is not that bad – the agility to provide the quickest means of transport to the city. But, it is the inexperienced or non law-abiding *boda* drivers who defamed the system (Interviewee 14, March 2016). Thus, up to a certain point, *boda* seems to be the panacea of access but the *boda* drivers are the main problem. In this regard, the role of institutions should not be undermined in nurturing a sustainable urban transport system. If organisation were done, who would be the institutions for change and what could be done. From participatory governance perspective, understanding users' needs and desires

could strengthen governance. As such, this section questions the necessity of *bodas* for Kampala city, and describes the aspirations voiced out by the locals in organising the system. It answers RQ3: *How can the boda-boda industry be governed?*

5.3.1 The *Boda* System: To Shift or To Retain?

Despite the chaotic reflection of *bodas* in the city, 86% of the interviewees expressed that *bodas* are necessary for the future of Kampala. Meanwhile, 12% maintained a more neutral stance i.e. they would be needed but with better organisation. Only one interviewee believed that *bodas* are unnecessary because they cause congestion. While some interviewees expressed total acceptance to the current system “*I hope it is impossible to stop them*” (Interviewee 13, March 2016), one considered it a “*necessary evil*” to have (Respondent 18, March 2016). Being more diplomatic, the KCCA Director, Jennifer Musisi, addressed it as a “*necessary inconvenience*” (Kasujja, 2016). Necessary because of the access it realises, but evil because of the precarious disorganisation. Interviewees’ case for *bodas* in the city are summarised in Table 5-6.

Table 5-6 Interviewees’ responses on why *bodas* are necessary for the city

Theme	Percentage	Description
Reliable transport system	31	Quick; door-to-door transport service; availability; convenience; no need to walk long distance to a stage to search for a bus stop or taxi; avoid traffic congestion; saves time; only efficient transport mode
Organisation	18	Better organisation; training of drivers; limit numbers; proper stage and parking; less disorder; feeder service
Business	13	Spurs city development; benefits business operations and growth
Access	13	Connect different kinds of roads, locations, and distances
Cars and other public transport system	9	Increase in car ownership would exacerbate traffic conditions; expensive to own a vehicle; unreliable and congested mass public transport
Employment	7	Employment for <i>boda</i> drivers in light of high unemployment rate
Cost and affordability	4	Affordable transport; opportunity cost; credit service
Habit	2	Part of daily life to enjoy the speed and convenience; the number of people dependent on them is huge from business to school children.

Users do not just recognise *boda* as a form of transport that realises their mobility needs, but also other socio-economic benefits derived from *boda* use. These findings are noteworthy because as much as many policymakers desire to do away with informal transport modes, users who depend on them for their daily lives appreciate the value and benefit derived from its use. Having said that, the need for better organisation is called for in one way or another.

5.3.2 Making the Case: Governance Approaches

Informal transport like the *bodas* maintains features and benefits that public transport system fail to provide – access and employment. “*I do not know anything that can do like the boda-bodas*” (Interviewee 6, March 2016). Moreover, their use is so ingrained in the public’s daily life. Nonetheless, the recurring issues of safety, and disorder should justify improvements to the system that bears direct impact to many users and the city. Capitalising on their strength and the niche that they provide could generate widespread positive impacts to the city.

Drawing from the policy reform approaches presented in Chapter 3.3 (i.e. acceptance, recognition, regulation, integration, prohibition), the status quo of *boda* management could be judged to loosely lie between the acceptance and recognition spectrum. Some enforcement measures were introduced (e.g. safety standards) and registration of the *boda* drivers were conducted in 2013. In May 2015, the KCCA attempted to move towards regulating the *boda* industry by implementing a three-phased “Boda-Free” city zoning plan. However, the plan was met with strong resistance especially from the *boda* drivers resulting to the plan’s abandonment. *Boda-Free* signages were damaged and vandalised. In this process, engagement with locals and stakeholders was reportedly not done. Since then, no reformation strategies were introduced to organise the *boda* industry although KCCA desires to implement a Bus Rapid Transit (BRT) system and phasing out *matatus*. Funding remains as the main stumbling block to materialise the plan (KCCA, personal communication, April 8, 2016).

When the interviewees were asked if it was practical for these parts of Central Kampala to be *boda*-free but have BRT instead, 47% indicated no, while 30% indicated yes. Remaining 23% indicated yes, provided that buses are timely, well organised, drive on proper roads, affordable, and maintain good coverage. This could indicate the mixed openness of users towards change. One main reason is that many businesses rely on *bodas* to transport goods, thus questioning other transports’ ability to replace this function.

Interviewees expressed opinions and rationales on potential approaches to organise the industry based on their day-to-day encounters and experiences. As much as *bodas* are necessary, they highlighted the need for organisation to be a sustainable mobility solution in Kampala. Figure 5-27 categorises the users’ opinions on organising *boda* industry.

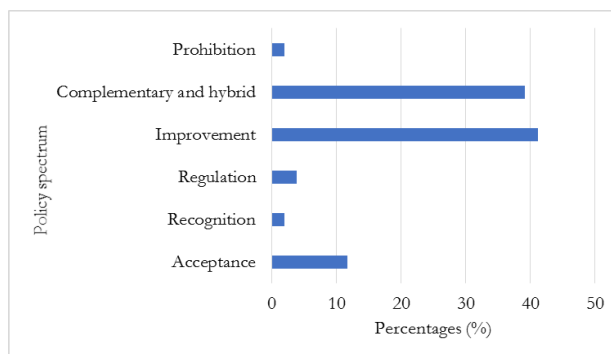


Figure 5-27 Interviewee’s opinions on organising the *boda* industry categorised based on policy spectrum

Interviewees who entirely embrace status quo indicated no needs for change (6%), such as “I like the way they are. They are already good. So no need for further improvement!” (Interviewee 2, March 2016). Recognition refers to slight enforcement such as wearing a helmet (2%). Regulation (4%) refers to screening and limiting *boda* drivers’ market entry. Another 2% indicated total prohibition of informal transport services and implement only formal public buses. However, the largest percentage recognises the potential of integrating the *boda* system i.e. improvement (41%); and complementary and hybrid system (39%), to share the load of public transport demand. These represent two alternative pathways to improve the system. At a smaller-scale is the improvement of operations for better passenger service delivery. At a greater scope is the fundamental system reform through involvement of regulatory structures institutions to support this transformation (African Centre for Cities, 2015; Behrens et al., 2016). Brunn and Behrens (2014) classified improvement measures into business development, operating environment, vehicle fleet, and operations. These classifications were adopted to categorise interviewees’ integration measures in Table 5-7.

Table 5-7 Categorised integration measures of boda system indicated by the interviewees

Business environment	Operating environment	Vehicle fleet	Operations
<p>IMPROVEMENT</p> <p>Business skills training (e.g., driving skills, first aid, financial management)</p> <p>Insurance coverage</p> <p>Financial service e.g., loan provision</p> <p>Fare affordability (market based or based on guidelines)</p>	<p>Better road condition to improve safety</p> <p>Provision of shelter for wet seasons</p> <p>Enforcement of laws and regulations</p>	<p>Proper functioning motorcycles e.g. side mirrors</p> <p>Vehicle maintenance</p> <p>Registered <i>bodas</i> that can be traceable even with the change of ownership</p> <p>Banning of two-stroke engine motorcycle taxi</p>	<p>Limit working time</p> <p>Provision and wearing of helmet, reflective vest, hairnet</p> <p>Easy identification – uniform, identification card, number plates, business cards</p> <p>Registration and belonging to a stage</p> <p>An updated central registration</p> <p>Driver screening at the stage</p> <p>Improve customer service</p> <p>Use of cashless payment (e.g. through app or Mobile Money)</p>
<p>COMPLEMENTARY AND HYBRID</p>	<p>Designated road space prioritisation for <i>bodas</i></p> <p>Dedicated zones and routes</p> <p>Signages at dedicated <i>boda</i> stages and zones</p> <p>Park-and-ride</p>		<p>Hybrid function as co-existing or feeder service</p> <p>Stage organisation</p>
<p>INSTITUTIONAL</p> <p>Leadership: business associations or corporations or authority</p> <p>Companies</p> <p>Accountability</p>	<p>Empowerment of <i>boda</i> drivers through training and education</p>		<p>Passengers taking ownership and responsibility</p>

The three levels of integration represents different efforts, capital, timeline, and impacts. Most *improvement* programs could be implemented on a shorter timeline and are more targeted towards the *boda* drivers to improve safety and customer service. In doing so, the main responsibilities lie on the traffic police to enforce traffic laws and regulations; and the KCCA to register the *boda* drivers and their stages. Many interviewees strongly articulated the need of registration with either the *Boda* Association or preferably with the KCCA. This is to ease the tracability of the *boda* driver in the event a misfortunate event. Although this was initiated, maintaining the system is necessary because enforcement becomes harder without a central traceability mechanism in place (Traffic Police, personal communication, March 30,

2016). This includes updating the registry in the event of a change of motorcycle ownership. In addition, air pollution issue could be significantly improved if new laws are promulgated to phase-out motorcycles with two-stroke engines but favour four-stroke engines. Some cities have introduced this law such as in Vietnam and India (Kenneth Gwilliam, 2013).

The *complementary and hybrid system* demands more political will and stakeholder acceptance to implement as it requires higher and joint effort, at least within the city planning authority. Two types of dual-system exist: (1) the *boda* and other forms of formal public transport co-exist serving different market needs; or (2) an integrated service in which *bodas* serve more as a feeder service instead (Brunns & Behrens, 2014; Interview 19, March 2016). The former would require road space dedication and prioritisation at high *boda* density areas, while the latter demarcate zones (e.g., CBD) to introduce other form of transport and use *bodas* to access areas that are inaccessible. The latter was attempted by KCCA but was unsuccessful. An interviewee presented a good analog of the need for a complementary system, “*if everybody is a doctor, who will teach, who will treat? So if we only have cars or buses, who is going to provide those services to bring people to a place like this (fast, quick, easy access).*” (Interviewee 18, March 2016).

Moreover, some interviewees pointed out the need to view the *boda* system in relation to the wider urban landscape and physical infrastructure. By viewing transportation together with city and space, it could potentially reduce the need to travel, shortening journeys, or providing infrastructure for safer and more organised journeys. This may include providing proper parking areas; reducing heavy vehicles from entering the town during peak hours; relocating warehouses; space allocation for *bodas*, vehicles, pedestrians, and road-side sellers.

This leads to the third level of integration, *institutional reform* that require fundamental restructuring of organisation and engagement of various stakeholders. Who are the institutions? The *Boda Association's* function is the *de facto* regulator in market entry and competition. They maintained rigid structure and democratic system but were not exempted from political and financial interests too (Kasujja, 2016; Goodfellow, 2016). It was noted that many interviewees are familiar with the *matatus* association, Utoda, in their representation and organisation roles but are unaware of the *Boda Association*. Further, the public authority has a role to play i.e. enforcing safety, vehicle's condition, organising operations, and infrastructure provision (African Centre for Cities, 2015). In the past, the KCCA used to deliberately promote *bodas* to increase job opportunities (Kasujja, 2016) and even engaged businesses to provide sheds at *boda* stage. But this has been stopped as KCCA tried to control the system (Anonymous, personal communication, March 12, 2016). Moreover, government imperatives that contradicted (Kasujja, 2016) and lacked cooperation with one another (Traffic Police, personal communication, March 30, 2016; KCCA, personal communication, April 8, 2016) made the organisation more political and disputed.

In view of this, private companies has stepped up to meet critical social needs such as BIMA Insurance, Tugende and SafeBoda. All work intensively in different ways to improve the safety and professionalism in the *boda* industry. BIMA pioneered a microinsurance project to provide hospital coverage and cash payment for hospital in the event of accidents (SafeBoda, personal communication, March 30, 2016). Tugende helps drivers to own their *bodas* as ownership would lead to more responsibility (Tugende, personal communication, March 30, 2016), while SafeBoda's model is by positioning themselves as a safer and customer-oriented service through market signalling. They tap into mobile technology to better service users (SafeBoda, personal communication, March 30, 2016). These initiatives are powerful in engaging users to coerce the market to prioritise safety (Interviewee 21, March 2016) – by meeting needs and changing habits of both the drivers and users. By and large, the locals'

lives have been “*made easy*” (always having *bodas* or *matatus* taxi that literally stops everywhere even for an individual). As such, for long lasting change, a change of mindset and habits would be required (Interviewee 15, March 2016). To achieve this, the system put in place must be consistent for behavioural change and trust. For example, a bus that leaves on time regardless if it is still empty, so that people would be more time-sensitive.

This adds on to another pivotal role of the public authority as the leader, which is needs identification of the society to plan and implement an equitable and acceptable system (Interviewee 21, March 2016). This includes identifying “*the people they have, what they do, what their needs are, where they need to go and come back, what kind of transport would be easy*” (Interviewee 15, March 2016). However, this takes “*heartfelt*” work because “*our layman here have a lot of social issues. They would see that if the politicians come from high place and wants to present like the policy to them, it’s like they are being suppressed. So somehow they need the connection. They need the connection with them and they would like to feel that this person cares. So it takes a lot of effort to be relational to these guys. How to address their lives. I believe that even moving them to any place would be possible. The policy could be executive but our people need to feel that their leaders really mind and not just for the policy*” (Interviewee 24, March 2016). This point was emphasised by Goodfellow (2016). One of the reasons of the successful reform of the motorcycle taxis in Kigali, Rwanda was due to strong recognition of the users and their needs.

Institutions represent not just formal establishments but corporations and individuals who should be engaged, empowered to improve the market. Even as self organisation can be efficient but to be impactful, political leadership is still integral to fill in the leadership gap to strengthen institutions that regulate, plan, and deliver transportation services.

5.4 Summary

By investigating the *boda* users and their travel patterns, the use of *boda* is motivated by various reasons, from work to leisure. One notable pattern identified is that the travel patterns within the city correspond with the prevailing activities at different time periods, which reflects how *bodas* interact and drive movements in the city. The *boda* demand market revealed that working and lower income groups are the most dependent on it. The *bodas*’ significance to the city do not lie at provision of mobility *per se* but their interaction with the society’s daily life reap various socio-economical benefits and challenges. Even so, locals did not disregard *boda*’s importance in realising their needs of access – locations and activities. In light of such challenges, governance in the form of self organisation and political leadership is called for by many.

6 Discussion

This chapter discusses the findings and analysis of Chapter 5, and aims to place informal mobility within the sustainable mobility discourse. It then makes recommendations for policy makers and practitioners and reflects on the methodological choice.

6.1 The role of motorcycle taxi as public for-hire transport

Previous literature pointed out the characteristics of informal transport in general – its flexibility, demand responsiveness, and chaotic safety situation. This study differentiates the nuanced distinctions between mass public informal transport (e.g. 14-seaters shared taxi) and private two-seaters (e.g. *boda*), which are summarised in Table 6-1. Upon understanding the market and use cases of the *bodas*, it highlights the motorcycle taxi’s role as being complementary rather than competitive to the public transport system.

Table 6-1 The differences between informal mass public and public for-hire transport modes

Aspect	Mass Public	Public For-Hire
Route	Main roads, lucrative routes (i.e. higher passenger demand)	Traffic: Congested roads and areas Access: Minor roads and unpopular routes
Users	Passengers	Passenger and cargo users
Distance	Short and long (intercity)	Mainly short (rarely intercity)
Speed	Dependent on traffic, generally slow	Consistent, fast
Competitive advantage	Cheapest form of transport	Fast, flexible, personalised (route, payment method), better access, goods transport
Market served	The poorest of society to a lesser extent, the middle income (Kamuhanda & Schmidt, 2009)	Very low to middle income; working population; the poorest only if access is a problem and speed is required
Threats	Theft and accidents	Theft and accidents – higher severity and mortality rate in comparison to other vehicles
Organisation	Association – route organisation	Association – stage organisation
Competition	Strong competition with each other to fight for routes	Competition is not so apparent. Only within the same stage during passenger selection

One of the main reasons *boda* serves many socially excluded neighbourhoods is the less competitive environment it operates in. Shared taxis compete to serve at profitable routes, excluding many remote areas and unsurfaced roads (Porter 2014). Nonetheless, the high density of *bodas* at different timing corresponds with the main activities within Kampala, with high passenger from the residential areas to work in the morning; in the formal business and commercial areas during working hours; in the industrial area during shift hours; and in the respective town centers out of the working hours. These reflect the role of *bodas* in supporting the various main economic and livelihood activities (work and commercial transport), followed by other social, emergency, and domestic activities. These trips could be direct point-to-point service or the initial or final segments of a longer trip, depending on the users’ budget, time, and accessibility factors. This is why some users opt for trip chaining and transport mix. Time saved represents a major deciding factor for *boda* use. The GIS analysis revealed that the *boda* speed does not vary significantly with time, serves shorter distances, and thrives on both main and minor roads. This confirms the *boda*’s physical characteristic to be adaptable to prevailing conditions: (1) weaving through areas and main roads plagued by

traffic; and (2) providing access to inaccessible areas or poor minor roads by other transport modes (private car or shared taxi) (Howe, 2003). Howe's (2003) study of *bodas* in Uganda indicated more man users than women, but this study did not note any gender differences. This may be due to the city culture that is receptive. Therefore, as *bodas* serve different segments of the society and in various localities, the use and motivations of use are generally associated with its physical attributes, making *boda* a form of complementary mode to the public transport system. This is similar to the *bendskin* motorcycle taxis in Douala, which is socially distinctive in serving the working poor and women (Olvera et al., 2012).

The complementary potential of the informal sector has been increasingly recognised in recent years (Ferro, 2015; Salazar Ferro et al., 2013; Woolf & Joubert, 2013). This study distinguished the market niche for the private for-hire mode through empirical records of *boda* use in the city. Hence instead of *in toto* transformation of the sector, various approaches could be explored to integrate it as suggested by the locals.

6.2 Rethinking Sustainable Mobility

Even as current reseaches on sustainable mobility focus on formal public system, the question posed right from the beginning of the thesis was: can informal transport be sustainable? This is the main dilemma faced by many policy makers in shifting or retaining the system. Using the “*bottom-up*” approach to construct the significance and narration of the *boda* industry, it is recognised that the the informal mobility sector has the potential to be an alternative pathway to sustainable urban mobility although admittedly caveats do exist. Thus, this section demonstrates the nexus between the sustainable and informal mobility paradigms and shows how informal transport mode can support the sustainable mobility discourse.

6.2.1 Equitable Access

By far, this is the most critical dimension to make the case for informal mobility since informal transport can be also perceived as the mobility mode “*for the poor*” (Lucas & Stanley, 2013). It was previously thought that the *boda* market served the middle class income group due to the higher fare charged for its speed (Raynor, 2014). However, this study reveals that while it is true that the mobility budget of the middle class income group is higher, the lower income working poor heavily rely on *bodas* for mobility and business, but not the richest of the society as they could afford private hire or vehicles. The poorest rely on the shared taxis, walk, or on the *bodas* if access is an issue since their residences tend to be more isolated from the central. Interestingly, the perception on affordability of the *bodas* is not dependent on the income earned nor the amount of money spent on transport, instead the personal utility gained because of the possibility of access and the service quality. The lower income group appreciates the widened opportunities for access and improved personal productivity. Meanwhile, the entrepreneurs factor in the opportunity costs provided by the *boda* or to increase their business's competitive advantage.

Contrary to the findings of Howe (2003) on *bodas* in Uganda, women in Kampala seemed to be less generous on *boda* expenditure compared to men, complaining the lack of professionalism and safety risks although women did not mention any discrimination faced. Unfortunately, there is a strong public perception against the safety of the *boda* industry with high accident rates and risks of robbery. This negative narrative of the *boda* industry was consistently highlighted in most other studies (Howe, 2003; Jackson, 2015; Nasasira, 2015). Nonetheless, it is observed that users who have a personal relationship with their *boda* drivers are more trusting as they can negotiate the safety terms with the drivers; and value the *boda*

services more (e.g. credit service), benefitting the cash-constrained group the most. This arrangement is certainly impossible with conventional public transport.

Equitable provision of efficient transport services to access locations, services, and activities allow vulnerable groups to improve their income level, participate in opportunities, and social inclusion which may not even be met by formal transport services (Lucas & Stanley, 2013; Woolf & Joubert, 2013). The “*equitable*” connotation should correspond with quality transport services – fast, convenient, and reliable – especially for many lower income urban dwellers. The ability to achieve this also hinges on the *relational* aspect between a driver and a user. Due to the *bodas*’ informal nature, services can be dynamic, innovative and customisable to individuals’ needs, which is most observable when interviewees recount their use scenarios of the *bodas*. This relational factor builds on the aim of better social inclusion, connectivity, and personal productivity for lower income urban dwellers. As such, this study argues that the relational aspect enhances the complementary potential of public for-hire mode.

6.2.2 The Economy Driver

This free market form of service delivery requires no subsidy or capital investment to establish the system, yet versatile and efficient in responding to the mobility needs of the urbanites (Cervero, 2000). In Kampala where formal public transport is almost non-existent, the *bodas* literally drive the economy, transporting people and goods. Operating on a for profit basis, Boudreaux (2006) even considered it “*heroic entrepreneurship*” especially in light of high youth unemployment. While transporting passenger maximises utility by realising access, cargo transport is a profit-seeking activity by delivering goods available to customers (UN-Habitat, 2013). As a public good, the *boda* industry contributes to economic growth and alleviates poverty in several ways:

- Provides a chance for self-employment as a *boda* driver and even in the supporting industries. With ease of market entry that lacks bureaucracy, it is seen as the pathway to increase resources. Competent *boda* drivers who manage their finance well could even invest in other business platforms (Tugende, personal communication, April 8, 2016).
- Generates income for local formal and informal industries and entrepreneurs by transporting goods to different actors within the supply chain. Their flexibility penetrates even into low income neighbourhoods and narrow roads (Grieco, 2015), their affordability does not discriminate users, and their efficiency improves the competitive edge and reliability of businesses. Moreover, logistic companies have yet to meet this demand at a competitive price.
- *Boda* enables passengers to access development opportunities that enhance their livelihood, such as work, education, hospitals. Because of the *boda*’s efficiency, passengers increase their network and capacity to provide a living that was previously denied to them, especially when most locals do not own a vehicle.
- *Boda* improves quality of life by allowing users to spend less time on the road, channeling it instead to other more productive activities such as social or family time.

In a way, such “*informal socio-economic systems represent free local development*” (Godard, 2013). The convenience of such socially and economically significant journeys is unique, which rigid conventional transport system by the city may struggle to deliver (Grieco, 2015). One key

factor of *boda*'s popularity is the economic facet. For poor users who seek to 'survive', *bodas* are seen as a prospect to *access* markets, activities, livelihood formerly denied. For users who seek to improve financial standing, *bodas* are valued to *expand* their access to markets more efficiently and effectively. Thus, catering to the utility needs of various social class.

6.2.3 An Alternative Image of the Urban Environment

This study finds that the relationship between informal transport and the urban environment can be reciprocal. Firstly, the urban form contributes to the rise of the *bodas* – a monocentric city, lack of public transport, and poor roads. All of which contribute to reliance of personal vehicles and traffic congestion. Even the presence of *boda* at different timing corresponds with the city's activities. In turn, *boda* services influence the urban environment in two ways. On one hand, they connect and navigate through roads and places due to its versatility despite the fragmented roads and monocentric urban scene. The convenience and availability of the service supports users' mobility desires even without owning personal vehicle. On the other hand, the environmental problems caused are rooted from their fuel-based system, impacting local air and noise pollution, and carbon footprint. Further, while the *boda* system connects places, uncoordinated transport and landuse planning may lead to urban sprawl (Godard, 2013) especially within the monocentric city like Kampala. Thus, integrating transport and landuse development is essential for sustainable urban futures (Cervero, 2013).

One of the main contensions of informal transport modes of policy makers is the image they project does not fit into the image of a modern city like in Western or East Asian countries (Rollason, 2013). Rather than making social and economic goals as the priority, the image of a modern or future urban city is pursued by city councils and national strategy (e.g. Kampala Vision 2040). Rakodi (2006) argues that many Sub-Saharan African cities "*emphasise the extent to which their built environments fall short of the visions of the powerful, rather than how economic and social organisation actually functions*". In this study, this image was not revealed as the users' key concern at all. Instead, their desires of a transport system are reflective of socio-economic goals (e.g. improve daily life and financial resources, safety, reliability) and recognise the role of such informal transport system in supporting these goals. In fact, if modern image were to be pursued by focusing on building better roads to expedite motorised vehicles, it may be hard for *bodas* or other non-motorised transport to co-exist in the city. Rethinking of the image in terms of urban space and landuse together with the demand market may be able to prioritise users' needs, particularly the urban poor. For example, having mixed landuse type to shorten or reduce journeys, making *bodas* more affordable to even the lowest of the society. A critical

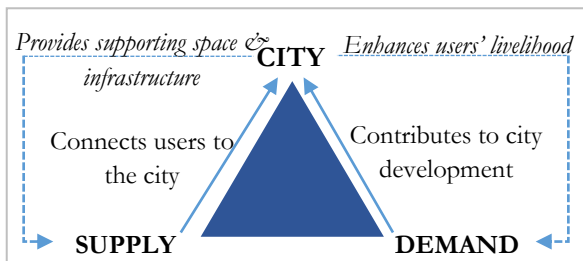


Figure 6-1 An alternative image

the existing infrastructures to serve users (demand). Without discounting either entities would make the pursuit of an inclusive urban future possible.

Recognising the demand market (users' needs and behaviour) and the reciprocal relationship between a city and the informal transport system form an alternative image that supports one another for urban development and growth (Figure 6-1). The city could leverage on the physical adaptability of *bodas* (supply) to complement

6.2.4 Institution as an Enabling Medium

For informal transport to operate efficiently and safely, the role of institutions is critical especially in improving safety, environmental performance, and professionalism (Godard, 2013). Organisation in this decentralised system could be of two types: self regulating and to a limited extent top-down governance. Self organisation is currently practiced in the *boda* sector with elected leaders to represent their interests. But since the current narration of the *boda* industry is plagued by safety and rogue driver behaviour, other actors are required to step in, which includes individual users and companies. While it is easy to enter the market, the drivers compete with one another at the *boda* stage (not for routes like shared taxis), whereby users skim and select preferred drivers that meet their requirements, also a form of self regulation. Private companies like SafeBoda recognise this market power and capitalise it by linking it with technology to further differentiate their drivers. In doing so, they subtly increase the safety standard and professionalism of the *boda* drivers, while educating previously ignorant users about the need to adhere to safety standards themselves like wearing a helmet. As such, market pricing can be used to: leverage on self regulation as shown here; and reduce politicisation for private gain (Cervero, 2000).

Although citizens need to organise themselves to fulfil the regulatory void, leadership from formal authorities (e.g. city council, traffic police) could catalyse the transition process for better governance and regulation. Their leadership is needed all the more for the long-term vision of integrating landuse to transport planning (Godard, 2013). In doing so, engagement of users to understand the needs and interests of various parties is crucial for the planning outcome – to increase acceptance and implementation chances. This demands a paradigm shift in organising priorities (Cervero, 2013) – to favour sustainability yardsticks rather than a modern image, and frames resources and investments (Rollason, 2013).

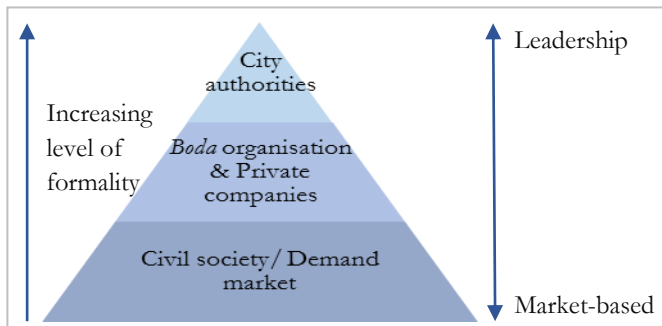


Figure 6-2 Role of institutions in governance

governance involves various actors and stakeholders. It speaks of how the system is navigated and by whom (Gudmundsson et al., 2016). This is the basis for Figure 6-2 that stipulates the actors and roles played in governing the *boda* sector.

Therefore, this study argues that in governing informal sectors like *boda*, relying purely on informal or formal institutions *per se* would not be able to function effectively. The pursuit of sustainable mobility should not only entail top-down government but governance (Gudmundsson, Hall, Marsden, & Zietsman, 2016).

Government is an actor, whereas

Many locals recognise the *boda* drivers’ knowledge – local roads, areas, and more importantly, about other *boda* drivers at a stage. These are bottom up knowledge that would be of value for formal institutions. For example, registration that is mandated top-down and the *boda* drivers’ bottom-up knowledge can ease the process of identification in the event an incident occurs to trace the perpetrator. Thus, formal and informal institutions complement each other in nurturing an active medium to improve other sustainability goals.

6.3 Sustainable Solutions in Practice: Policymakers & Practitioners

Narratives are powerful for transition (Smith & Raven, 2012). Present narratives of the *boda* industry are overwhelmed by the negative publicity of poor safety and disorganised structure.

Such disdain that is further politicised deterred a meaningful engagement process with the *boda* drivers. The goal of institutions is to coerce the market and society to embrace more sustainable practices, and changing the narrative of the *boda* industry. It is undeniable that there is a need to identify measures to improve the image and professionalism, and more importantly, the way to implement (Rollason, 2013). Shifting stances and goals by the State in removing motorcycle taxis to modernise the city have negative effects especially on the drivers' livelihoods (Diaz Olvera, Guézéré, Plat, & Pochet, 2015). This section explores potential sustainable solutions. It refers to the integration measures in Table 5-10, and expands the policy goals and instrument mix in Table 6-2. It may not be exhaustive but provides a good foundation. The implementation pathways for the policy goals (improvement, complementary planning, institutional reform) need not be mutually exclusive. It encourages both formal and informal institutions to step in to govern the sector but expects formal institutions (e.g. KCCA) to take the leadership role.

Table 6-2 Policy goals and instruments to organise the informal *boda* sector

Improvement		Complementary Planning	Institutional Reform
Administrative	Information & Transparency	Enabling Infrastructure	Governance system
Registration (identification mechanism)	Train and educate drivers – driving, safety, customer service, financial management	Provide physical or temporal space for informal transport to operate:	Political agreement on long-term strategies (include landuse, public transport planning)
Complain and report mechanism	Educate public on safety precautions and their role	(1) Peak-lopping, to allow informal modes to support during peak periods;	Corporation or leadership that brings together critical stakeholders e.g. <i>Boda</i> associations, traffic police, the KCCA, private companies, representatives of civil society for decision making and problem solving
Regulation and law enforcement	Capitalise on signalling at each stage with easy identification and tracking system (e.g. uniform, number plate)	(2) Shared-lanes, exclusive lane designed to cater informal services; or	
Enforce vehicle maintenance and standards		(3) Parallel services, with formal transport catering the main central and informal modes as feeder services (Ferro, 2015).	
Strict recruitment	Use technology to improve existing service (e.g. mobile phone for hire and feedback)	Financial incentive or disincentive for good behaviour e.g. reduced registration fare for good record	Engage <i>boda</i> drivers in community development or other volunteer projects
	Educate enforcement agencies	Replacement with less polluting vehicles	Equitable, acceptable, and participatory process
		Consideration of city and space	Educated users who take responsibility and ownership

The reason formal institutions should provide resources to govern the *boda* industry is because the strong recognition by users to integrate the system to the city's mobility system. In the short to medium term, *improvement* programs can be implemented through administrative means (e.g. imposing registration or regulation); or improving information and transparency of the system through education (Diaz Olvera et al., 2015). To have an integrated *complementary* system, a strong political will would be required for investment and allocating resources to establish an infrastructure that leverages on the positive physical

features of the informal system. To materialise implementation, Goodfellow (2015) argues that bureaucratic capacity is not a deciding success factor as Kampala has a relatively huge base. Rather, a long-term commitment to engage the sector, and manage competing interests that may be fragile and opportunistic (Goodfellow & Titeca, 2012).

Furthermore, understanding the *boda* demand is pivotal for success. One of the reasons KCCA's attempt to implement *Boda-Free* zones in parts of Central Kampala failed could be the nature of the area that has high demand almost at all times, as seen in the density maps. Moreover, the demand market shifts with time. Hence, a mix of complementary strategies that reflects the needs and nature of different areas based on time is more prudent. Shared-lanes can be considered only for busier roads since *bodas* tend to drive on existing pavements. The reciprocal relationship showed that indirect measures need to be taken to organise the system through strategic urban planning and transport development. For instance, if the city wishes to reduce the number of *bodas* on the road, controlling through administrative means *per se* would not work because the *boda* demand is still high. Instead, considering it together with the urban space, activities, use patterns, and time draws new perspectives for better governance.

Finally, a *governance* structure that allows formal and informal institutions to function optimally. Importantly, the central government has to commit to supporting institutionalised interaction instead of circumventing and manipulating the interaction between state government and informal sectors for political gain. Partnership is needed instead to mainstream the informal economy such as establishing specific committees with representatives from informal and formal sectors (Goodfellow & Titeca, 2012; Kisaalita & Sentongo-Kibalama, 2007). Drawing on Rwanda's experience, a corporation under the purview of the city council was established to improve safety and prevent criminal activities from infiltrating the sector. For example, their motorcycle associations and a telecommunication company partnered to develop new identification and reporting mechanism for users to report misconducts, accidents etc. (Rollason, 2012, 2013).

Additionally, the relational aspect of the system should be capitalised but this is possible only with the city's clear and credible commitment. For example, encouraging citizens to get to know their *boda* drivers could improve personal experience and compel drivers to improve their services in this competitive environment. Engaging *boda* drivers in other community development projects may allow the drivers a chance to reintroduce themselves to the society. Through time, the negative narrative of the sector could be altered in the interest of urban development; rather than merely occasional political exchange (Goodfellow, 2015).

6.4 Reflection on Methodological Choice and Analytical Framework

The thesis aimed to understand the role of informal mobility in the sustainable mobility discourse. In doing so, three research questions were investigated: to understand current users' interaction with the *boda* motorcycle taxis, its significance to society; and exploring potential governance strategy in pursuit of a sustainable urban future. A mixed-method approach with qualitative GIS was employed.

Although the operations of the motorcycle taxis are known (e.g. fast, flexible), this is the first known attempt to employ GIS analysis to investigate the informal sector and illustrate the pattern. Adopting this methodology is in itself a significant contribution to the informal mobility field. Furthermore, GIS analysis allowed the research to not be confined to one specific Division just as in the surveys and interviews. Instead, it provides a general

understanding and pattern of the entire city, which is very useful especially if policymakers are interested to understand the bigger picture for management. Preliminary GIS analysis proved useful in identification of the locations for interviews and surveys. For the scale of the research, the number of *bodas* analysed was meaningful to identify patterns and trends although the *bodas* investigated may be just a fraction of the entire sector.

Survey questionnaire was adopted to gain insights of the users' demographic background, and conduct a rapid survey of use patterns and motivations in the *boda* use to support the GIS analysis. Further, it provided valuable data from larger number of respondents than could possibly attained through interviews. Since the survey was administered face-to-face, it was easier to ensure that all forms are completed. The survey that was intentionally made short to increase responsiveness of respondents, which was useful as some busier respondents skimmed through the survey before deciding to answer it.

The interview process was insightful and helped the researcher to glean local insights and way of viewing the informal system, as well as understanding of the city and culture which were useful for the research. Building up the rapport from the survey, securing interviews were easier. Moreover, since basic information of the interviewees were provided, it aided the interview. This allowed case comparisons during analysis process to ascertain prevailing trends (e.g., gender, income level). Since interview conducted was personal, there was no worry of response rate though the process was time and labour intensive. It was observed that the length or depth of answers varied rather distinctively according to education level or English fluency although the main messages were conveyed. Time was needed to grasp local expressions and meanings.

Unstructured observations and conversations enabled engagement and appreciation of the phenomenon that could not have been gleaned or easily overlooked in interviews. This was pertinent especially at the start of the process because of the lack of literature on this subject. But, since this is unstructured, there may be certain interpretation inferred by the author.

The analytical framework was developed based on different literatures. It had good coverage to enable systematic investigation of the informal mobility within the lens of sustainable mobility. Since the mixed-method approach generates different findings within the same theme, structuring the findings and analysis according to the thematic analytical framework capitalises the strength of such approach to improve breadth and depth (Johnson, Onwuegbuzie, & Turner, 2007). This framework could be duplicated to investigate other informal mobility modes in other cities, especially if existing empirical records are lacking.

Generalisability of this research is deemed moderate. Limitations to the generalisability apply to motorcycle taxis in cities only. The results may differ if this were shared-taxi as they play different roles and exhibit different characteristics. Motorcycle taxis in villages could exert different patterns and importance, possibly serving more long distance trip in sporadically spreaded villages and vitally for emergency hospital cases. Nonetheless, the general conclusions and findings of this study can be generalised for public for-hire modes in other cities and geographical contexts. For example, the behaviour and characteristics of the motorcycle taxis on the road may be similar in other African cities. Secondly, users' appreciation of the role of motorcycle taxis – the pros and cons – may be shared in other cities too. However, findings may differ as the country progresses economically since informal modes play less role in richer countries. Thirdly, the needs expressed by users of informal transport could be applicable. Finally, the complementary role of public for-hire services could be considered for other cities.

7 Conclusion

Considering the sustainability dimensions of informal mobility may be paradoxical or counterintuitive for many policy makers of the developing world. On one hand, they provide mobility and job needs of locals but on the other hand, their disarray system raises critical safety risks that do not fit in the image of a modernised city. Since informal transport modes are almost omnipresent in developing cities where access to efficient mobility system is limited, the perceptions and needs expressed by the users bounded by this system could offer valuable insights and appreciation to this informal system. The *boda* motorcycle taxi sector in Kampala offers a perfect opportunity for such investigation – an organically grown solution as a result of atrocious traffic congestion and poor public transport system in the city. As such, the purpose of this thesis is to understand the role of informal mobility in pursuit of sustainable mobility in cities from the user's perspective. To investigate this, three research questions are posed:

- How do people use *bodas* in Kampala?
- What are the significance of *bodas* to local populace of Kampala?
- How can the *boda* industry be governed?

By answering these questions, this thesis contributes to the literature in four ways. Firstly, by studying the *boda* sector in Kampala, it contributed to the empirical records of ways users interact with the *bodas*, and the *bodas'* presence and interaction with the city. Secondly, adopting the qualitative GIS approach demonstrated the way to harmonise rich disciplinary study of the *boda* sector to the analytical and representational ability of GIS. Thus the study advanced understanding of the informal transport sector especially when informal system is hardly recorded or studied. Thirdly, this study enriches the conceptualisation of sustainable mobility by integrating the informal mobility into it, particularly from the users' perspectives and experiences. Finally, all of these have potential significance for practitioners to rethink how sustainable urban mobility could be approached in their cities.

The first role of the *bodas* is *the complementary potential as a public for-hire transport* – to ferry passengers and goods to different locations and services with personalised time and purposes. This is mainly because of the physical characteristics of the *boda* that differs from conventional private and public transport, enabling it to thrive within the urban environment of Kampala. Serving mostly short distance trips with consistent speed that is unaffected by traffic or road conditions, it meets two critical needs of the urbanites: (1) avoidance of traffic at peak hours; and (2) driving on poor roads to access inaccessible areas with other transport modes. While other studies suggested this role, this thesis managed to illustrate and simulate on-ground scenarios to identify and explain this role with GIS analysis.

Trip patterns varied with time period according to the city's prevailing activities, most notably destinations with high economic activities. This was exemplified by the *boda* trips made in different areas according to the working and non-working hours. The market most served were in: (1) lower income residential; (2) small-scale and informal commercial; and (3) formal commercial areas. Moreover the way users use *bodas* differ – while most only uses *boda* for assess, others use it to complement with other transport modes such as the *matatus* taxi or personal vehicle. More importantly, *boda* is the only public transport mode that allows for affordable goods transport. This is a significant part of the service that is appreciated by the locals, and is one of the key reason for *bodas* to be a complementary public transport mode.

In making the case to advocate for its complementary, the users' and locals' acceptance is necessary for participative governance. Thus, a rapid satisfaction survey performed to gauge user's appreciation and satisfaction towards the *boda* sector. While satisfaction ranged between neutral and satisfied level, there were clear distinction between groups. Between the two genders, men considered *bodas* to be more affordable and were more generous and fond of the sector although both genders concurred that safety is a problem. Furthermore, the lower income groups showed higher satisfaction compared to the middle and higher income classes. This is mainly driven by the improved opportunity and livelihood due to access – especially for small-scale and informal entrepreneurs who rely heavily on *bodas* to transport commercial goods to earn a living. Nonetheless, almost all users recognised the significance of *boda* for the future of the city.

These findings reveal how *boda* activities permeate into the citizen's daily life and the city itself. Firstly, it improves human capital by enabling working population and student's access to work or education activities, particularly the urban poor. Secondly, it drives the local economy by supporting various formal and informal commercial activities and industries. Thirdly, it supports various social and domestic activities which improve social cohesion and security, not forgetting, its role for emergency cases, meetings or medical care.

This leads to the second role of the informal transport sector i.e. *it supports urban development and sustainability goals*. The four sustainability dimensions were adopted to ascertain the significance of the *boda* system to the society. Looking at the social dimension, it provides equitable opportunity for access with affordable pricing. *Boda* drivers are demand responsive and adaptive to markets, thus can be seen as a relational transport mode. Such innovation and personalised service benefit the urban poor the most because of their heavy reliance on *bodas*. Furthermore, *boda* services can be personalised, providing door-to-door service and even informal credit service for the cash-tight clients.

Aside from the provision of transport service that is entirely free of subsidisation or public investments to build otherwise exorbitant infrastructure, the *boda* sector offers positive economic opportunities to many locals. Besides enhanced personal productivity, the value of access poses multiplied effects to the local economy, enabling users to access to markets, investments and jobs that were previously isolated; or access to better quality markets. The sheer amount of *bodas* and the daily trips taken can be considered as a huge economic engine.

In relation to the physical environment, the *bodas* flourish in the monocentric urban landscape of Kampala since most economic-related activities are concentrated in Central Kampala. With most traffic directed towards the same direction and exacerbated by the lack of reliable public transport and proper roads, locals embrace the *boda* as a means for quick access. Additionally, personal fuel consumption could be limited as most locals do not own a personal motor vehicle, although the cumulative effect is not quantitatively ascertained. All of which shows the dynamic relationship between the city and space; *boda* supply; and *boda* demand. Recognising the behaviour of the demand market gives new perspectives and solutions to develop the urban environment and transport infrastructures as it values the needs and aspirations of the users, instead of merely pursuing for a modern image.

Up to a certain point, *boda* seems to be the panacea of access. Removing *bodas* from any parts of the city could cripple movement and activities in that area since its use has shown to be so interwoven into the urbanites and the city's life. Nonetheless, negative narratives persist: the social costs from accidents and theft, bad driving, and pollution from the old vehicles. In this light, institutions are fundamental to govern the system.

This means that civil society organises themselves to respond to this regulatory void – with rigid structures within the *Boda* associations; and private companies providing alternative services to the market by engaging with the *boda* drivers who are otherwise frowned upon by the authorities. Such efforts could slowly coerce the industry standards and behaviours of both *boda* drivers and users to a positive one. This thesis argues that governance and institutions do not necessarily point to formal structures *per se*, but also the power of the civil society as the demand market. Besides being the end consumer, they could take more of an active role in exerting pressure to improve the system. With the advent of technology, innovative measures can be integrated into providing sustainable solutions. However, for long-term sustainable urban development, consistent and resilient commitment from formal institutions are vital – to engage the industry and community, and cast visions.

Finally, this thesis exerts that the informal transport system possesses the potential to complement other public transportation system, even more so if sustainability yardsticks are measured and prioritised. This calls for practitioners to rethink the notion and image of sustainable mobility to also identify with the informal mobility modes. Ultimately, the goal of mobility is to provide access – to places, markets, services and activities – which informal transport system supports. In view of this, leadership from institutions are needed to empower and build on existing realities for an equitable, accessible, and sustainable city. Such attention and commitment from city leaders and global community are imperative and urgent as urbanisation trend is unlikely to slow down, requiring ever more resources to meet the increasing demand. This exerts global implications as the climate change battle will be won or lost based on the ways in which cities in the Global South develop over the next 50 years.

7.1 Further Research

This thesis sheds light on how new software technology can provide analysis and illustration in a simple yet communicative way. As smart cities research is increasing in the developed world, it is overlooked in the developing world, especially in the field of informal mobility services. The Digital Matatus project in Nairobi, Kenya is an exemplary case that integrated both technology and informal transit to provide a solution to the system – a minivan bus route mapping. It would be beneficial to also evaluate potentials of such technology in engaging users of the private for-hire public transport services like *bodas*. The purposes of the research could be in used in a different direction: “Can the smart city discourse be applied for informal transport services?”; and “If informal transport services can be ‘smartified’ with technology and data to improve its services?”. This could be a possibility as banking with mobile phones is ubiquitous in many developing cities in Africa. Furthermore, developed countries appear to become more flexible and informal with technology (e.g. Uber). A comparative study could be undertaken to investigate the role of technology in supporting informal transport in developed and developing world to allow two-way knowledge exchange. This could potentially build on to the complementary role of the informal services, and leapfrog development of urban mobility.

One main drawback of the informal mobility studies is the lack of concrete quantified data. This would be useful to assess the performance of the industry, and to build a business case to justify investment in the sector especially for banks or development agencies that would most likely request for concrete data. This could include the economic value contributed by the informal mobility sector (social benefits and costs); emissions and carbon footprint of the sector; and influence of personal income and expenses of operators and representative organisations in monetary terms.

Bibliography

- Aarts, H., Verplanken, B., & van Knippenberg, A. (1998). Predicting Behavior From Actions in the Past: Repeated Decision Making or a Matter of Habit? *Journal of Applied Social Psychology*, 28(15), 1355-1374. doi:10.1111/j.1559-1816.1998.tb01681.x
- African Centre for Cities. (2015). *Urban infrastructure in Sub-Saharan Africa – harnessing land values, housing and transport. Literature review on public transport. Report 4*. Retrieved from University of Cape Town, Rondebosch, South Africa http://r4d.dfid.gov.uk/pdf/outputs/misc_infrastructure/61319-Dfid_Land_value_capture_and_infrastructure_finance_literature_review.pdf
- African Economic Outlook (AEO). (2015, 28 May 2015). Uganda 2015. Retrieved from http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2015/CN_data/CN_Lon_g_EN/Uganda_GB_2015.pdf
- Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy*, 15(2), 73-80. doi:10.1016/j.tranpol.2007.10.005
- Behrens, R., McCormick, D., & Mfinanga, D. (2016). *Paratransit in African Cities - Operations, Regulations and Reform*. Oxon: Routledge.
- Bell, J. (2014). *Doing Your Research Project: A guide for first-time researchers*: McGraw-Hill Education (UK).
- Boarnet, M. G. (2011). A Broader Context for Land Use and Travel Behavior, and a Research Agenda. *Journal of the American Planning Association*, 77(3), 197-213. doi:10.1080/01944363.2011.593483
- Boudreaux, K. (2006). Taxing Alternatives: Poverty alleviation and the South African taxi/minibus industry. *Minibus Industry (February 2006)*.
- Brunn, E., & Behrens, R. (2014). *Paratransit in Sub-Saharan African cities: Improving and integrating 'informal' services*. Paper presented at the Shaping the New Future of Paratransit: An International Conference on Demand Responsive Transit, Transportation Research Board, Monterey.
- Burton, D., & Bartlett, S. (2005). *Chapter 8 Questionnaires and interviews. Practitioner Research for Teachers. SAGE Publications, Ltd*. London, England: SAGE Publications, Ltd.
- Calvo, C. M., & Africa, U. N. E. C. f. (1994). *Case study on intermediate means of transport: bicycles and rural women in Uganda*. Citeseer.
- Cervero, R. (2000). *Informal transport in the developing world*: UN-HABITAT.
- Cervero, R. (2013). *Transport Infrastructure and the Environment: Sustainable Mobility and Urbanism*. Paper presented at the 2nd Planocosmo International Conference, Bandung Institute of Technology.
- Cervero, R., & Golub, A. (2007). Informal transport: A global perspective. *Transport Policy*, 14(6), 445-457. doi:<http://dx.doi.org/10.1016/j.tranpol.2007.04.011>
- Clifton, K. J., & Handy, S. L. (2001). *Qualitative methods in travel behaviour research*: Institute of Transportation Studies, University of California, Davis.
- Cope, M., & Elwood, S. (2009). *Qualitative GIS: a mixed methods approach*: Sage.
- Denscombe, M. (2010). *The good research guide : for small-scale social research projects : Open UP study skills*. Maidenhead: McGraw-Hill International (UK) Ltd.
- Diaz Olvera, L., Guézéré, A., Plat, D., & Pochet, P. (2015). Earning a living, but at what price? Being a motorcycle taxi driver in a Sub-Saharan African city. *Journal of Transport Geography*. doi:<http://dx.doi.org/10.1016/j.jtrangeo.2015.11.010>
- Dulac, J. (2013). *Global land transport infrastructure requirements: Estimating road and railway infrastructure capacity and costs to 2050*. Retrieved from Paris: https://www.ica.org/publications/freepublications/publication/TransportInfrastructureInsights_FINAL_WEB.pdf
- Economist Intelligence Unit (EIT). (2016). Uganda. Retrieved from <http://country.eiu.com/uganda>
- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107-115. doi:10.1111/j.1365-2648.2007.04569.x
- Evans, J., & Jones, P. (2011). The walking interview: Methodology, mobility and place. *Applied Geography*, 31(2), 849-858. doi:<http://dx.doi.org/10.1016/j.apgeog.2010.09.005>

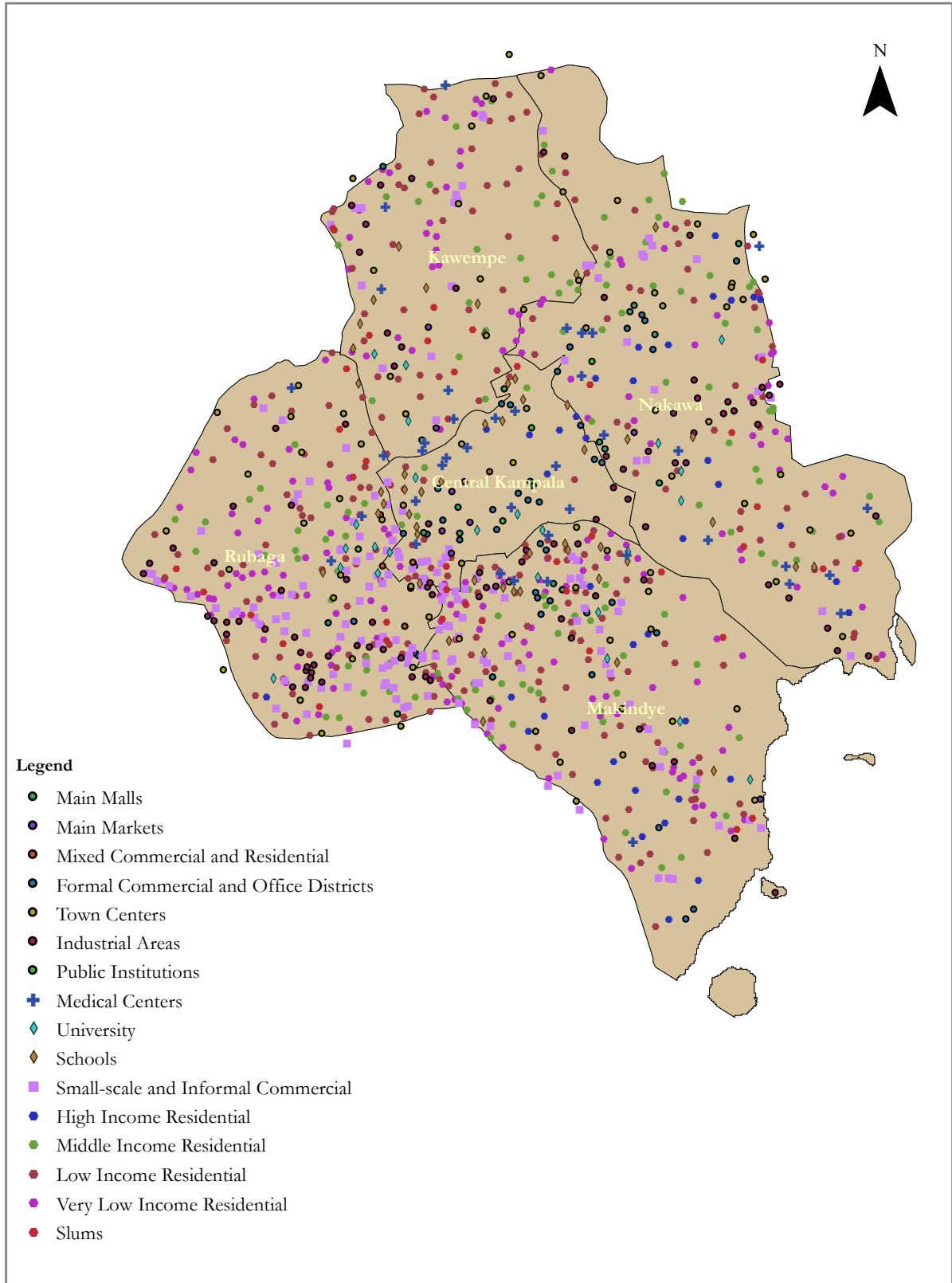
- Ferro, P. S. (2015). Paratransit: A Key Element in a Dual System. Retrieved from <http://www.unep.org/Transport/astf/pdf/Paratransit.pdf>
- Finn, B. (2012). Towards large-scale flexible transport services: A practical perspective from the domain of paratransit. *Research in Transportation Business & Management*, 3, 39-49. doi:<http://dx.doi.org/10.1016/j.rtbm.2012.06.010>
- Galukande, M., Jombwe, J., Fualal, J., & Gakwaya, A. (2009). Boda-boda Injuries a Health Problem and a Burden of Disease in Uganda: a Tertiary Hospital Survey. *East and Central African Journal of Surgery*, 14(2), 33-37.
- Gamberini, G. L. (2014). Boda Boda: The Impact of Motorbike Taxi Service in Rural Uganda. *Student Pulse*, 6(11). <http://www.studentpulse.com/a?id=942> Retrieved from <http://www.studentpulse.com/a?id=942>
- Geels, F. W. (2005). *Technological transitions and system innovations: a co-evolutionary and socio-technical analysis*: Edward Elgar Publishing.
- Geurs, K. T., & Van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: review and research directions. *Journal of Transport Geography*, 12(2), 127-140.
- Global Rating Credit Company (GRCC). (2015). Kampala Capital City Authority: Uganda Local Authority Analysis. Retrieved from <http://www.kcca.go.ug/uDocs/KCCA%20credit%20rating%20report.pdf>
- Godard, X. (2013). Comparisons of urban transport sustainability: Lessons from West and North Africa. *Research in Transportation Economics*, 40(1), 96-103. doi:<http://dx.doi.org/10.1016/j.retrec.2012.06.033>
- Goodfellow, T. (2015). Taming the Rogue Sector: Studying State Effectiveness in Africa through Informal Transport Politics. *Comparative Politics*, 47(2), 127-147. doi:10.5129/001041515814224462
- Goodfellow, T., & Titeca, K. (2012). Presidential intervention and the changing 'politics of survival' in Kampala's informal economy. *Cities*, 29(4), 264-270. doi:<http://dx.doi.org/10.1016/j.cities.2012.02.004>
- Goswami, A. G., & Lall, S. V. (2015). Spatial dispersion of Jobs in an African city: Evidence from Kampala.
- Government of New Zealand. (2014). *Analytical Framework*. Wellington Retrieved from <http://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/Analytical-Framework-Final.pdf>.
- Government of Uganda. (2007). *Uganda Vision 2040*. Retrieved from <http://npa.ug/wp-content/themes/npatheme/documents/vision2040.pdf>.
- Grieco, M. (2015). Social sustainability and urban mobility: shifting to a socially responsible pro-poor perspective. *Social Responsibility Journal*, 11(1), 82-97. doi:doi:10.1108/SRJ-05-2014-0061
- Gudmundsson, H., Hall, R. P., Marsden, G., & Zietsman, J. (2016). Governance and Decision-Making in Transportation *Sustainable Transportation* (pp. 111-136): Springer.
- Gwilliam, K. (2003). Urban transport in developing countries. *Transport Reviews*, 23(2), 197-216. doi:10.1080/01441640309893
- Gwilliam, K. (2013). Cities on the move – Ten years after. *Research in Transportation Economics*, 40(1), 3-18. doi:<http://dx.doi.org/10.1016/j.retrec.2012.06.032>
- Hall, R. P., & Sussman, J. M. (2006). Promoting the concept of sustainable transportation within the Federal System—The need to reinvent the US DOT. *TRB Paper*, 07-0565.
- Holsti, O. R. (1969). Content analysis for the social sciences and humanities.
- Howe, J. (2003). 'Filling the middle': Uganda's appropriate transport services. *Transport Reviews*, 23(2), 161-176. doi:10.1080/01441640309890
- Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, 15(9), 1277-1288. doi:10.1177/1049732305276687
- Jackson, T. (2015). Apps for safe roads and boda bodas (pp. 52-53): IC Publications Ltd.
- Japan International Corporation Agency (JICA). (2009). *The Feasibility Study on the Construction of A New Bridge across River Nile at Jinja. Final Report* Retrieved from http://open.jicareport.jica.go.jp/pdf/11969466_06.pdf
- Jennings, L., & Covary, N. (2008). *A partnership towards sustainable transport: the urban TRANSIT model*. Paper presented at the Proceedings of the 27th Southern African Transport Conference. SATC.

- Joewono, T. B., & Kubota, H. (2007). User perceptions of private paratransit operation in Indonesia. *Journal of Public Transportation*, 10(4), 5.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research*, 1(2), 112-133. doi:10.1177/1558689806298224
- Jones, S., Tefe, M., & Appiah-Opoku, S. (2015). Incorporating stakeholder input into transport project selection – A step towards urban prosperity in developing countries? *Habitat International*, 45, Part 1, 20-28. doi:<http://dx.doi.org/10.1016/j.habitatint.2014.06.017>
- Jung, J.-K. (2009). *7 Computer-Aided Qualitative GIS: A Software-Level Integration of Qualitative Research and GIS*. *Qualitative GIS*. SAGE Publications Ltd. London, England: SAGE Publications Ltd.
- Kampala Capital City Authority (KCCA). (2012a). *Kampala landuse* [Geographical information system data].
- Kampala Capital City Authority (KCCA). (2012b). Updating Kampala Structure Plan and Upgrading the Kampala GIS Unit - Draft Final Report. Retrieved from <http://www.kcca.go.ug/uploads/KPDP%20Draft%20Final%20Report.pdf>
- Kampala Capital City Authority (KCCA). (2013). *Promoting Non-motorised Transport: Case Study of the NMT Pilot Corridor* Paper presented at the UNEP Share the Road Event, Nairobi, Kenya.
- Kampala Capital City Authority (KCCA). (2014a). *Boda stages and matatus taxi parks* [Geographical information system data].
- Kampala Capital City Authority (KCCA). (2014b). *Roads with names and roads without names in Kampala* [Geographical information system data].
- Kampala Capital City Authority (KCCA). (2016). The Authority. Retrieved from http://www.kcca.go.ug/?jsp=About%20the%20Authority&com_id=1537
- Kamuhanda, R., & Schmidt, O. (2009). Matatu: A Case Study of the Core Segment of the Public Transport Market of Kampala, Uganda. *Transport Reviews*, 29(1), 129-142. doi:10.1080/01441640802207553
- Kamulegeya, L. H., Kizito, M., Nassali, R., Bagayana, S., & Elobu, A. E. (2015). The scourge of head injury among commercial motorcycle riders in Kampala; a preventable clinical and public health menace. *African Health Sciences*, 15(3), 1016-1022.
- Kasujja, A. (Writer) & A. Kasujja (Director). (2016). *The Boda-Boda Boom* [Documentary], *The Boda-Boda Boom*. England: BBC World Service.
- Kiggundu, A. T., & Mukiibi, S. (2012). Land use and transport planning in the Greater Kampala, Uganda. *Indonesian Journal of Geography*, 44(1).
- Kisaalita, W. S., & Sentongo-Kibalama, J. (2007). Delivery of urban transport in developing countries: the case for the motorcycle taxi service (boda-boda) operators of Kampala. *Development Southern Africa*, 24(2), 345-357. doi:10.1080/03768350701327319
- Knigge, L., & Cope, M. (2006). Grounded Visualization: Integrating the Analysis of Qualitative and Quantitative Data through Grounded Theory and Visualization. *Environment and Planning A*, 38(11), 2021-2037. doi:10.1068/a37327
- Krygier, J. (2006). *Jake Barton's Performance Maps: An Essay*.
- Leeuw, E. d. (2008). *Self-Administered Questionnaires and Standardized Interviews*. *The SAGE Handbook of Social Research Methods*. SAGE Publications Ltd. London: SAGE Publications Ltd.
- Lucas, K., & Stanley, J. (2013). *Achieving socially sustainable transport in the development context*. Paper presented at the 13th World Conference on Transport Research, Rio de Janeiro, Brazil. 15 - 18 July 2013 retrieved from <http://www.wctrs-society.com/wp/wp-content/uploads/abstracts/rio/selected/969.pdf>
- Ministry of Lands, H. a. U. D. M. (2011). *National Physical Planning Standards and Guidelines*. Kampala.
- Ministry of Works, H. a. C. (2002). *Planning Manual. Manual A: Functional Road Classification System & Route Numbering*. Uganda Retrieved from http://ric-uganda.com/rc/files/5.20.1_Manual_A.pdf
- Mokhtarian, P. L., & Cao, X. (2008). Examining the impacts of residential self-selection on travel behavior: A focus on methodologies. *Transportation Research Part B: Methodological*, 42(3), 204-228. doi:<http://dx.doi.org/10.1016/j.trb.2007.07.006>
- Mokhtarian, P. L., Salomon, I., & Singer, M. E. (2015). What Moves Us? An Interdisciplinary Exploration of Reasons for Traveling. *Transport Reviews*, 35(3), 250-274. doi:10.1080/01441647.2015.1013076

- Mutabazi, S. S. (2012, 22 - 25 October 2012). *Uganda's Urban Development: A Scrutiny of Transport Planning and Mobility in Towns and Cities*. Paper presented at the CODATU XV: The role of urban mobility in (re) shaping cities, Addis Ababa, Ethiopia.
- Nasasira, R. (2015, 15 September). The boda boda economy defining the streets of Kampala. *Daily Monitor*. Retrieved from <http://www.monitor.co.ug/Business/Prosper/boda-boda-economy-defining-streets-Kampala/-/688616/2869756/-/82s1jd/-/index.html>
- Nastasi, B. (1999). Study notes: qualitative research: sampling & sample size considerations. Retrieved from https://my.laureate.net/Faculty/docs/Faculty%20Documents/qualit_res__smp_l_size_cons_id.doc.
- Olvera, L. D., Plat, D., Pochet, P., & Maïdadi, S. (2012). Motorbike taxis in the "transport crisis" of West and Central African cities (Publication no. 10.4000/echogeo.13080). <http://echogeo.revues.org/13080>
- Orski, C. K. (1975). Paratransit: the coming of age of a transportation concept. *Transportation*, 4(4), 329-334.
- Pioneer Easy Bus. (2015). Pioneer Easy Bus. Retrieved from <http://pioneereasybus.com/>
- Polèse, M., & Stren, R. E. (2000). *The social sustainability of cities: Diversity and the management of change*. University of Toronto Press.
- Porter, G. (2007). Transport planning in sub-Saharan Africa. *Progress in Development Studies*, 7(3), 251-257. doi:10.1177/146499340700700305
- Porter, G. (2008). Transport planning in sub-Saharan Africa II: putting gender into mobility and transport planning in Africa. *Progress in Development Studies*, 8(3), 281-289. doi:10.1177/146499340800800306
- Porter, G. (2014). Transport Services and Their Impact on Poverty and Growth in Rural Sub-Saharan Africa: A Review of Recent Research and Future Research Needs. *Transport Reviews*, 34(1), 25-45. doi:10.1080/01441647.2013.865148
- Rakodi, C. (2006). Relationships of power and place: The social construction of African cities. *Geoforum*, 37(3), 312-317. doi:<http://dx.doi.org/10.1016/j.geoforum.2005.10.001>
- Raynor, B. (2014). *Informal Transportation in Uganda: A Case Study of the Boda Boda*. Independent Study Project (ISP) Collection. Unpublished masters thesis. Retrieved from http://digitalcollections.sit.edu/isp_collection/1923
- Roehler, D. R., Naumann, R. B., Mutatina, B., Nakitto, M., Mwanje, B., Brondum, L., . . . Dellinger, A. M. (2013). Using baseline and formative evaluation data to inform the Uganda Helmet Vaccine Initiative. *Global Health Promotion*, 20(4 suppl), 37-44. doi:10.1177/1757975913509657
- Rollason, W. (2012). Youth development success amongst motorcycle taxi drivers in Kigali. Retrieved from https://www.brunel.ac.uk/_data/assets/pdf_file/0018/241335/Report.pdf
- Rollason, W. (2013). Performance, poverty and urban development: Kigali's motari and the spectacle city. *Afr. Fokus*, 26(2), 9-29.
- Salazar Ferro, P., Behrens, R., & Wilkinson, P. (2013). Hybrid urban transport systems in developing countries: Portents and prospects. *Research in Transportation Economics*, 39(1), 121-132. doi:<http://dx.doi.org/10.1016/j.retrec.2012.06.004>
- Salomon, I., & Singer, M. E. (2014). 'Informal Travel': A New Conceptualization of Travel Patterns? *Transport Reviews*, 34(5), 562-582. doi:10.1080/01441647.2014.930075
- Sandelowski, M. (1995). Sample size in qualitative research. *Research in nursing & health*, 18(2), 179-183.
- Schalekamp, H., Golub, A., & Behrens, R. (2016). Approaches to paratransit reform. In R. Behrens, D. McCormick, & D. Mfinanga (Eds.), *Paratransit in African cities - Operations, regulations and reform* (pp. 100-125). Oxon: Routledge.
- Sengers, F., & Raven, R. (2014). Metering motorbike mobility: informal transport in transition? *Technology Analysis & Strategic Management*, 26(4), 453-468. doi:10.1080/09537325.2013.870991
- Simon, D. (2003). Dilemmas of development and the environment in a globalizing world: theory, policy and praxis. *Progress in Development Studies*, 3(1), 5-41. doi:10.1191/1464993403ps048ra
- Smith, A., & Raven, R. (2012). What is protective space? Reconsidering niches in transitions to sustainability. *Research Policy*, 41(6), 1025-1036. doi:<http://dx.doi.org/10.1016/j.respol.2011.12.012>

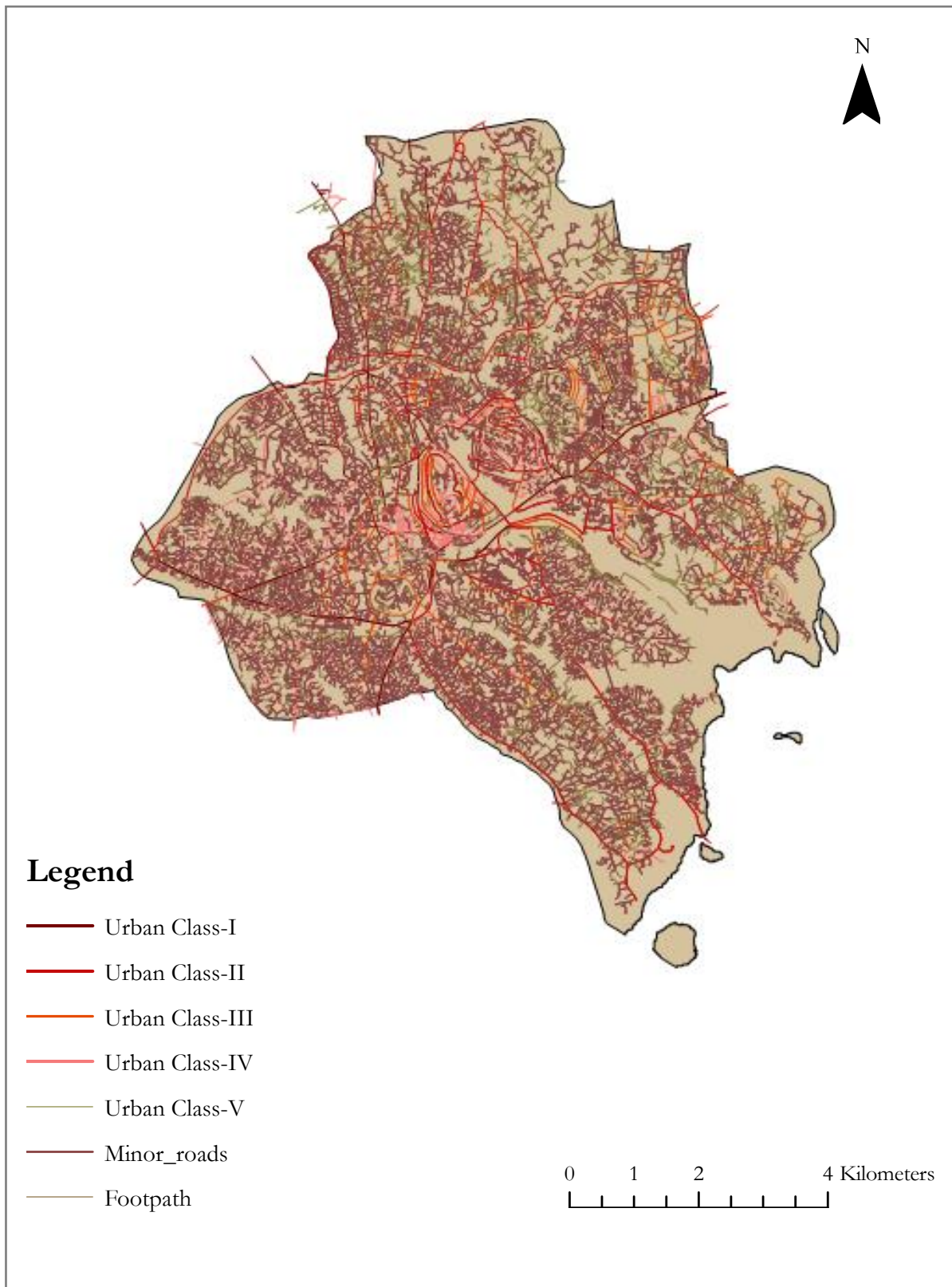
- Stemler, S. (2001). An overview of content analysis. *Practical assessment, research & evaluation*, 7(17), 137-146.
- The Energy and Resources Institute (TERI). (2013). *Pro-poor mobility - Policy guidelines and case studies*. Retrieved from New Delhi, India: http://www.slocat.net/sites/default/files/pro-poor_mobility_guidelinesbest_practices.pdf
- Tugende. (2015). *GPS points of Tugende's bodas* [Geographical positioning system data].
- Tumwesigye, N. M., Atuyambe, L. M., & Kobusingye, O. K. (2016). Factors associated with injuries among commercial motorcyclists: evidence from a matched case control study in Kampala City, Uganda. *PLoS one*, 11(2), e0148511.
- Turner, J., & Adzigbey, M. (2012). *Accessibility, Planning and Urban Poverty: Tools for Equitable Transport Planning in Developing Cities*. Paper presented at the CODATU XV: The role of urban mobility in (re) shaping cities, Addis Ababa, Ethiopia.
- Uganda Bureau of Statistics (UBOS). (2014). *National Population and Housing Census 2014 - Provisional Results*. Retrieved from <http://www.ubos.org/onlinefiles/uploads/ubos/NPHC/NPHC%202014%20PROVISIONAL%20RESULTS%20REPORT.pdf>
- UN-Habitat. (2013). *Planning and design for sustainable urban mobility: Global report on human settlements 2013*: Taylor & Francis.
- University of Southern California. (2016). Organizing Your Social Sciences Research Paper: Writing Field Notes. Retrieved from <http://libguides.usc.edu/writingguide/fieldnotes>
- Vajjhala, S. P., & Walker, W. (2009). Roads to Participatory Planning: Integrating Cognitive Mapping and GIS for Transport Prioritization in Rural Lesotho.
- van Wee, B., Hagoort, M., & Annema, J. A. (2001). Accessibility measures with competition. *Journal of Transport Geography*, 9(3), 199-208. doi:[http://dx.doi.org/10.1016/S0966-6923\(01\)00010-2](http://dx.doi.org/10.1016/S0966-6923(01)00010-2)
- van Wee, B., & Handy, S. (2016). Key research themes on urban space, scale, and sustainable urban mobility. *International Journal of Sustainable Transportation*, 10(1), 18-24. doi:10.1080/15568318.2013.820998
- Vasconcellos, E. A. (2014). *Urban Transport Environment and Equity: The case for developing countries*: Routledge.
- Verd, J. M., & Porcel, S. (2012). An Application of Qualitative Geographic Information Systems (GIS) in the Field of Urban Sociology Using ATLAS.ti: Uses and Reflections. *Forum: Qualitative Social Research*, 13(2), 1-20. Retrieved from <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=83402717&site=eds-live&scope=site>
- Vermeiren, K., Van Rompaey, A., Loopmans, M., Serwajja, E., & Mukwaya, P. (2012). Urban growth of Kampala, Uganda: Pattern analysis and scenario development. *Landscape and Urban Planning*, 106(2), 199-206. doi:<http://dx.doi.org/10.1016/j.landurbplan.2012.03.006>
- Vermeiren, K., Verachtert, E., Kasaija, P., Loopmans, M., Poesen, J., & Van Rompaey, A. (2015). Who could benefit from a bus rapid transit system in cities from developing countries? A case study from Kampala, Uganda. *Journal of Transport Geography*, 47, 13-22. doi:<http://dx.doi.org/10.1016/j.jtrangeo.2015.07.006>
- Williams, S., White, A., Waiganjo, P., Orwa, D., & Klopp, J. (2015). The digital matatu project: Using cell phones to create an open source data for Nairobi's semi-formal bus system. *Journal of Transport Geography*, 49, 39-51. doi:<http://dx.doi.org/10.1016/j.jtrangeo.2015.10.005>
- Woolf, S. E., & Joubert, J. W. (2013). A people-centred view on paratransit in South Africa. *Cities*, 35, 284-293. doi:<http://dx.doi.org/10.1016/j.cities.2013.04.005>
- World Business Council for Sustainable Development (WBCSD). (2004). *Mobility 2030: Meeting the challenges to sustainability* (2-940240-57-4). Retrieved from Hertfordshire, England: <https://www.oecd.org/sd-roundtable/papersandpublications/39360485.pdf>
- Zegras, C. (2008). *Mainstreaming sustainable Urban mobility*: Routledge, forthcoming in.
- Zheng, J., Atkinson-Palombo, C., McCahill, C., O'Hara, R., & Garrick, N. (2011). Quantifying the Economic Domain of Transportation Sustainability. *Transportation Research Record: Journal of the Transportation Research Board*, 2242, 19-28. doi:doi:10.3141/2242-03
- Zietsman, J., & Rilett, L. R. (2002). *Sustainable transportation: Conceptualization and performance measures*. Retrieved from <http://static.tti.tamu.edu/swutc.tamu.edu/publications/technicalreports/167403-1.pdf>

Appendix A: Points of Interests, Kampala



Data Source: KCCA, 2012a

Appendix B: Road Network, Kampala



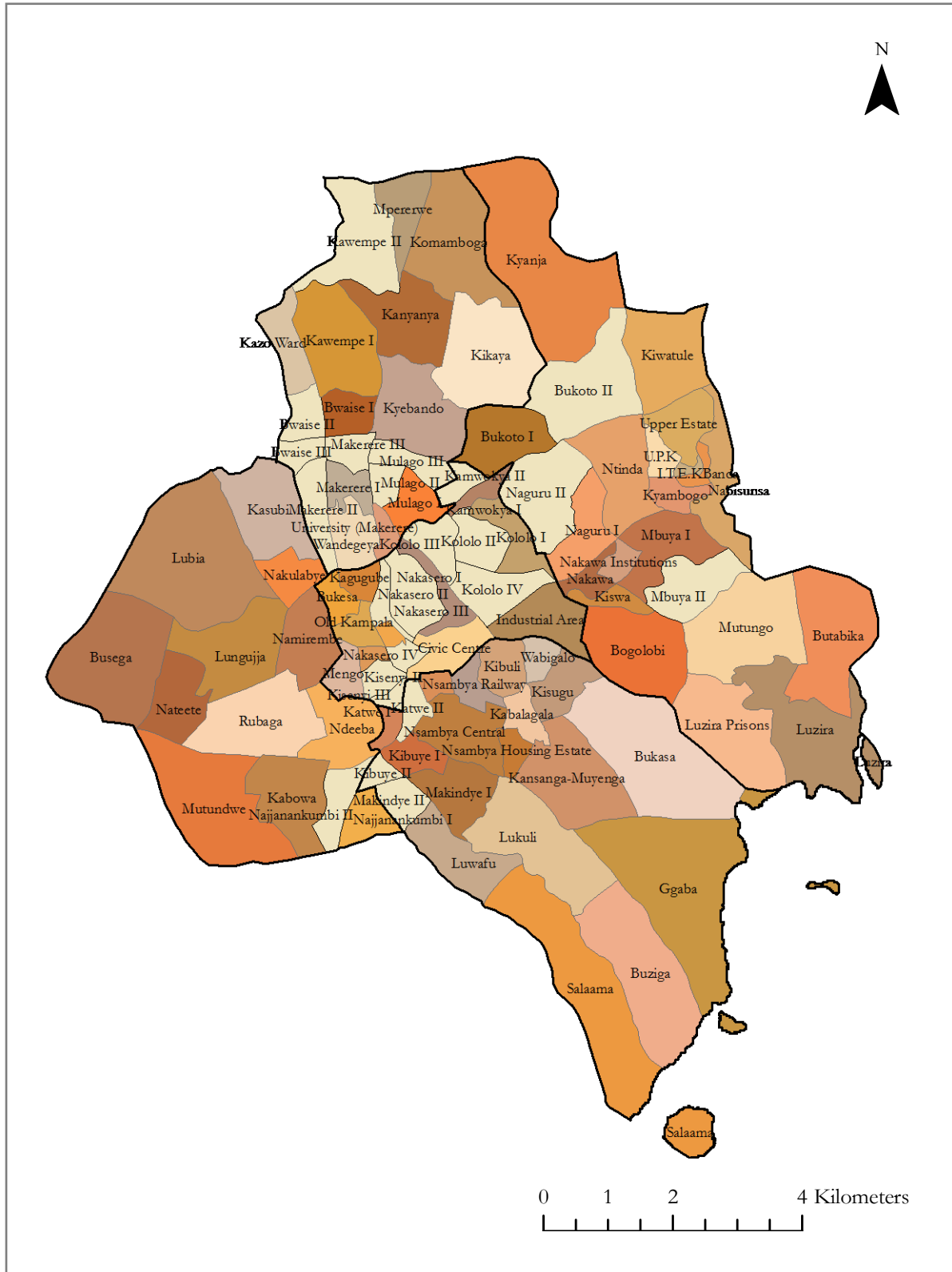
Data Source: KCCA (2014b)

Appendix C: All Boda GPS Points in Kampala



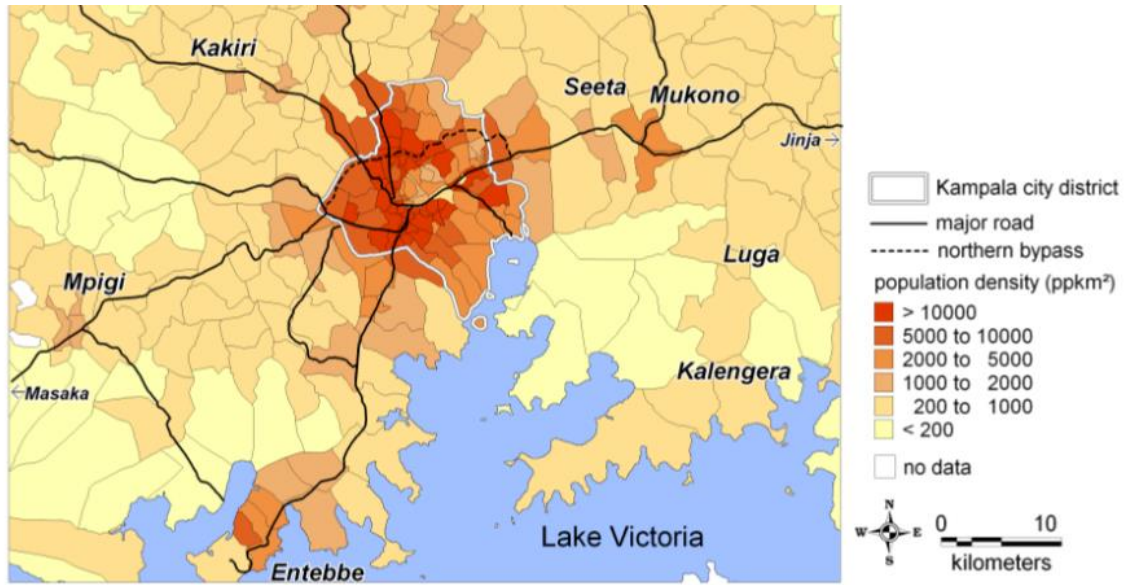
Data Source: Tugende (2015)

Appendix D: 96 Parishes of Kampala



Data Source: KCCA (2014a)

Appendix E: Population Density of Kampala



Source: Vermereien et al. (2012)

Appendix F: Survey Questionnaire (English)

DAY: _____ TIME: _____ LOCATION: _____

SURVEY QUESTIONNAIRE TO UNDERSTAND THE USE OF BODA-BODA SERVICES IN KAMPALA, UGANDA

Thank you for your participation. This questionnaire is divided into two main parts. All answers will remain confidential for research purposes only. Please answer ALL the questions in both sections and further elaboration is appreciated.

PART 1: BODA-BODA USER (Please tick accordingly)

- 1) Sex Male Female
- 2) Age 18 – 21 years old 36 – 40 years old
 21 - 25 years old 41 – 50 years old
 26 – 30 years old 51 – 60 years old
 31 – 35 years old > 61 years old
- 3) Marital Status Single Married Divorced/
Widowed
- 4) How many people do you live with now? 1 5 – 7
 2 – 4 8 or more
- 5) Highest school grade completed P5 or less P7 to S6
 P6 Higher than S6
- 6) Occupation Student Labour worker/ peasant
 Civil servant Housewife
 Entrepreneur, please specify: _____ Other, please specify: _____
 Employed in the private sector _____
- 7) Personal income level per month ≤ 100,000 USH 250,001 – 1,000,000 USH
 100,001 – 250,000 USH > 1,000,000 USH
- 8) Amount spent on transportation each day/month: _____ USH
- 9) Are you the sole breadwinner at home? Yes No
- 10) Vehicle ownership Do not own any vehicle Automobile
 Bicycle Other, please specify: _____
 Motorbike

PART B: BODA-BODA SERVICES

- 11) How often do you use boda-boda? Many times in one day: _____ 1 to 3 times a week
 Daily Only when required: please elaborate: _____
 4 to 6 times a week

DAY: _____ TIME: _____ LOCATION: _____

12) At which time of the day do you normally use boda-boda? (You could tick more than 1)

Day - Afternoon

- 05:00 am – 10:00 am
- 10:01 am – 01:00 pm
- 01:01 pm – 04:00 pm
- Only when required.

Evening - Night

- 04:01 pm – 06:00 pm
- 06:01 pm – 08:00 pm
- 08:01 pm – 04:59 am

13) In general, what do you use boda-boda services for? (Maximum 4 top most)

- To go to work
- To go to school/ college/ university
- Shopping
- Emergency/ medical services
- Leisure/ recreational

- To transport goods (non-commercial): _____
- To transport goods as part of my commercial activity: _____
- Others, please specify: _____

14) Why do you use boda-boda services? (Maximum 3 priorities)

- Convenience
- Avoidance of traffic congestion
- Cost effective
- Only mode of transport

- Trustworthy (can arrive locations punctually)
- Other, please specify: _____

15) Are you satisfied with the services boda-boda provides?

- 




- Strongly dissatisfied Dissatisfied Neutral Satisfied Very satisfied

Please explain: _____

16) Please rank in order based on the frequency you use the following transport mode (1: most frequent to 5: least frequent):

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Walking | <input type="checkbox"/> Boda-boda |
| <input type="checkbox"/> Bicycle | <input type="checkbox"/> Own car/ motorcycle |
| <input type="checkbox"/> Matatus Taxi | <input type="checkbox"/> Private hire |

17) How do you find a boda-boda?

- | | |
|---|--|
| <input type="checkbox"/> Walk to a boda stage | <input type="checkbox"/> The boda driver approached me |
| <input type="checkbox"/> Call the boda driver that I know | <input type="checkbox"/> Others, please specify: _____ |

18) With regards to your most used trip/ route (if relevant):

- a) What is the purpose?

- b) Where do you normally come from and go (area)?

- c) How long do you expect it to take you? _____
- d) How much money do you expect to pay? _____

Appendix G: Survey Questionnaire (Lugandan)

Olunaku: _____ Essaawa: _____ Ekifo: _____

OKUNONYEREZA MUBIBUZO OKUTEGERA EMPEREZA YA BODA-BODA MU KAMPALA, UGANDA

Webale kwetaba mukunonyereza kuno. Ebibuzo bya mirundi ebiri. Okudibwamu kwakusigala ng'ekyama mu kunonyereza kuno. Yamba oddemu ebibuzo byona mu bitundu ebibiri.

EKITUNDU 1: ABAKOZESA BODA-BODA (Please tick accordingly)

1) Sex

Musajja

Mukazi

2) Emyaka

Emyaka 18 – 21

Emyaka 21 - 25

Emyaka 26 – 30

Emyaka 31 – 35

Emyaka 36 – 40

Emyaka 41 – 50

Emyaka 51 – 60

Emyaka 61

3) Marital Status

Toli
mufumbo

Mufumbo

Mwayawukan
a/Namwanu
/Ssemwandu

4) Obeera n'abantu b'amekka?

1

2 – 4

5 – 7

> 8

5) Wasoma kyenkana wa?

P5 n'okudda wansi

P6

P7 to S6

N'okusinga S6

6) Kyokola

Musomi

Mukozi wa gavumenti

Wekozesa: _____

Nkolera ekitongole
ky'anakyewa

Bankozesa

Housewife

Ekilala: _____

7) Enyingiza yo buli mwezi

≤ 100,000 USH

100,001 – 250,000 USH

250,001 – 1,000,000 USH

> 1,000,000 USH

8) Ensimbi ezisasanyizibwa ku by'entambula buli mwezi: _____ USH

9) Yegwe alabilila ewakka?

Yee

Nedda

10) Obwananyini bw'ekidduka

Sirina kidduka

Eggali

Piki piki

Motokka

Ekilala: _____

Ekitundu 2: ENKOZESA YA BODA-BODA

11) Boda-boda ojikozeza oluvannyuma lwabanga kki?

- Emirundi minji olunaku: _____
- Buli lunaku
- 4 - 6 buli wiiki
- 1 - 3 buli wiiki
- Buli wekyetagisa

12) Budde ki mu lunaku lw’otela okukozesa boda-boda? (Osobola okugobola n’okusinga 1)

Mulunaku - Emisana

- 05:00 am – 10:00 am
- 10:01 am – 01:00 pm
- 01:01 pm – 04:00 pm
- 04:01 pm – 06:00 pm

Olweggulo - Ekisiro

- 06:01 pm – 08:00 pm
- 08:01 pm – 4:59 am
- Buli wekyetagisa

13) Boda-boda ojikozeza mirimu ki? (okusinga 4 ebisooka waggulu)

- Okugenda okukola
- Okugenda ku someero/ yunivasite
- Okuggula ebikozesebwa
- Okugenda muddwaliro
- Ggandalo
- Ekilala, yawulamu: _____
- Okutambuza eby’amagguzi: _____
- Okutambuza eby’amagguzi nge kimu kuby’enkola okufuna ensimb: _____

14) Lwaki okozesa boda-boda? (Ggoolola 3 ebisinga)

- yeyomubwangu
- Kwewala jamu
- Omuwendo o’gusanidde
- Yentambula yoka
- Yesigika (ekutusa jolaga mubudde)
- Ekilala, bambi yawulamu: _____

15) Oli mumatiziddwa eri empezeza ey’entambula ey’aboda-boda?

- 




- Siri mumatizibwa ddala
 - Siri mumatizibwa
 - bwentyo
 - Mumativu
 - Mumativu nnyo

16) Ssengekka jokozeesamu entambula zino wammanga

(1: least frequent to 5: most frequent):

- okutambula
- Eggaala
- Taxi
- Boda-boda
- Motokka/ pikipiki
- Entambula empangise

17) Boda-boda ojizula/ ojifuna otya?

- Ntambula mpaka ku boda sitegi
- Nkubira omuvuzi wa boda gw’emanyi
- Omuvuzi wa boda antukilila
- Ekilala, bambi yawulamu: _____

Bambi onyonyole: _____

18) Ekikwatagana n'olugendo luno:

a) Ekigendererwa kye ki?

b) Oviridde wa? Olagga wa (ekifo)?

c) Osubila kinakutwaliira banga ki okutuusa? _____

d) Osubila okusasula sente mekka? _____

Appendix H: Semi-Structured Interview Guide

Interviewee : Organisation :

Title :

This interview is in conjunction with a thesis as a part of the Erasmus Mundus Master's programme in Environmental Science, Policy and Management (MESPOM) at the International Institute for Industrial Environmental Economics of Lund University. This thesis seeks to understand the boda-boda system in Kampala from the passenger perspective. The findings hope to inform potential governance options for the boda system. The purpose of this interview is to gain your insight of the overall understanding of the boda system in Kampala and the future transport options in Kampala. Thank you for agreeing to participate in this interview which will take about 30 - 45 minutes to complete. The conversation will remain confidential and anonymous, which will be used for the research purposes only. If it is fine with you, may I record this interview? Any questions before we get started?

Social significance of boda system

1. Does the use of boda-bodas improve your daily life? If so, how?/ How does the use of boda-boda benefit you?
2. Does the use of boda-boda bring you economic or financial benefits? If so, how?
3. What do you like about boda-boda?
4. What do you dislike about boda-boda?
5. Have you ever been involved with a boda related accident? If so, how severe?
6. Why do you choose boda-boda instead of matatus taxi? (Does the service and price have significant difference?)
7. As a woman, do you feel disadvantaged when using boda-boda service? Or are there any hindrances when you use boda-boda? (at night?)

The future of boda industry

8. Do you think boda-bodas are necessary for the future of Kampala city? Why?
9. How should the boda industry be regulated/organised? How could the boda-boda industry be improved? What about the safety aspect?
10. KCCA indicated plans to pilot Bus Rapid Transit and dedicate certain parts of central Kampala as no boda areas, what do you think about this plan? Are they practical or desirable for Kampala? Will you prefer buses or will you still use boda-boda? Are you aware of such plans?
11. How should KCCA deal with the taxis (matatus)? Do you think they are needed for the city?
12. How should the KCCA prioritise improving Kampala's transportation system?/ How can transport in Kampala be made better?

Commercial Cargo-users

1. What do you transport? How frequent?
2. Why do you use boda-boda?
3. Were your goods robbed before?
4. What benefits does the use of boda-boda bring to you?

5. Are there any potential dangers or risks when you use them? What are they?
6. Do you think boda-boda bring you any economic benefits?
7. Without boda-boda, what would be your alternative to transporting goods?
8. How should the boda industry be organised? How can it be improved?
9. How should the KCCA prioritise improving Kampala's transportation system?/ How can transport in Kampala be made better?

OTHER STAKEHOLDERS

Cargo Companies/ Users

1. What do you transport? How frequent?
2. Why did you choose boda-boda to transport goods?
3. Without boda-boda, how will it affect your business? What are your alternatives?
4. How many percentage of your revenue do you spend on transportation?
5. What do you like about it? What do you dislike about it?
6. What do you think the future of boda-boda should be for Kampala city? OR Do you think boda-bodas are necessary for the future of Kampala city?
7. How should the boda industry be organised?
8. How can we improve the safety of boda-boda?
9. What should the priorities of improving Kampala's transportation system be?

SafeBoda

1. Please tell me the history of your organisation. What do you do?
2. Is KCCA aware of your initiatives? Do you communicate with KCCA often or coordinated any campaigns together?
3. What are your main challenges and successes?
4. Please tell me about the application process. How do you think technology can change the boda industry? Have you seen users changing? Any behavioural change? KCCA's comments? Any feedbacks?
5. What testimonials do you get from your passengers? Do you have passengers who only use SafeBodas and not others?
6. Do you provide insurance for your drivers or passengers?
7. What do you like about it? What do you dislike about it?
8. What do you think the future of boda-boda should be for Kampala city? OR Do you think boda-bodas are necessary for the future of Kampala city?
9. How should the boda industry be organised?
10. KCCA indicated plans to pilot Bus Rapid Transit, what do you think about this plan? Are they practical or desirable for Kampala? Will you use it or will you still use boda-boda? Are you aware of such plans?
11. How can we improve the safety of boda-boda?
12. How should KCCA deal with the matatus? Do you think they are needed for the city?
13. What should the priorities of improving Kampala's transportation system be?

Tugende

1. Please tell me the history of your organisation. What do you do?
2. Are KCCA aware of your initiatives?
3. Do you communicate with KCCA often or coordinated any campaigns together?
4. What are your main challenges and successes?
5. What initiatives to do you to connect the passengers and cargo users? How does it affect you?

6. Why would the passengers choose Tugende rather than just a normal boda-boda?
7. With your business model, wouldn't the number of bodas increase in the city? Do you think this is sustainable?
8. What do you like about it? What do you dislike about it?
9. What do you think the future of boda-boda should be for Kampala city? OR Do you think boda-bodas are necessary for the future of Kampala city?
10. How should the boda industry be organised?
11. KCCA indicated plans to pilot Bus Rapid Transit, what do you think about this plan? Are they practical or desirable for Kampala? Will you use it or will you still use boda-boda? Are you aware of such plans?
12. How should KCCA deal with the matatus? Do you think they are needed for the city?
13. What should the priorities of improving Kampala's transportation system be?

Kampala City Council Authority

1. What are your past and current initiatives in managing/ organising boda-bodas?
2. Please tell me about the registration process – the current status, success and challenges? How many bodas are registered with the KCCA currently?
3. How much money is involved in the boda industry – cost of regulation etc.
4. How do you work with the Boda associations, drivers in organising the bodas?
5. What are the main challenges you encounter or any backlash in your attempt to organise the city?
6. Do you engage the boda drivers and the citizens at large in your transport planning process? If so, how? Who do you consider as the main stakeholders in this process?
7. What are your main considerations and priorities when organising the city's transportation system?
8. What is the most pressing need for Kampala's transportation system?
9. How do you wish to organise the city's public transportation in the future?

Traffic Police Department

1. Where are the hotspots for accidents?
2. What are the specific regulations for them to adhere?
3. What are your struggles in regulating them or enforcing the law? What are your current and future initiatives?
4. How should the boda-boda be organised?
5. Do you work with the KCCA and Boda Associations? If so, how
6. How do you envision the boda sector to develop in the future? What role will it play for the city?

TRANSLATOR NOTES

- Please translate everything said by the participants, if possible verbatim. I want to hear exactly what they say; even if you do not agree with it, please continue exactly what they say.
- Please do not include personal views in the translations, remain serious and neutral.
- If you are unclear with my question, please seek for clarification immediately. This is to ensure all questions asked to participants are conveyed as intended.

Appendix I: List of Interviewees

PART A: Interviewees who are *boda* users (anonymous due to confidentiality)








Date	Interviewee No.	Gender	Cited as
15 March	1	Male	Interviewee 1, March 2016
	2	Male	Interviewee 2, March 2016
	3	Female	Interviewee 3, March 2016
	4	Female	Interviewee 4, March 2016
17 March	5	Male	Interviewee 5, March 2016
	6	Female	Interviewee 6, March 2016
	7	Female	Interviewee 7, March 2016
	8	Male	Interviewee 8, March 2016
	9	Female	Interviewee 9, March 2016
	10	Female	Interviewee 10, March 2016
18 March	11	Male	Interviewee 11, March 2016
	12	Female	Interviewee 12, March 2016
	13	Male	Interviewee 13, March 2016
	14	Male	Interviewee 14, March 2016
	15	Female	Interviewee 15, March 2016
20 March	16	Female	Interviewee 16, March 2016
	17	Male	Interviewee 17, March 2016
	18	Female	Interviewee 18, March 2016
	19	Female	Interviewee 19, March 2016
	20	Female	Interviewee 20, March 2016
	21	Male	Interviewee 21, March 2016
	22	Male	Interviewee 22, March 2016
	23	Male	Interviewee 23, March 2016
	24	Male	Interviewee 24, March 2016
30 March	25	Female	Interviewee 25, March 2016
	26	Male	Interviewee 26, March 2016
	27	Male	Interviewee 27, March 2016
	28	Female	Interviewee 28, March 2016
	29	Male	Interviewee 29, March 2016
	30	Male	Interviewee 30, March 2016
	31	Female	Interviewee 31, March 2016

PART B: List of Personal Communications

Stakeholders who are related to the *boda* industry

Organisation	Date	Name
Tugende	8 & 11 March	Lucy Oxby, Head of Business Analytics and Research
	1 April	Emmanuel Yetware, Head of Marketing
SafeBoda	30 March	Alastair Sussock, Co-Founder
KCCA	10 & 11 March	Joy Mike, Directorate of Physical Planning
	8 April	
Jinja Road Traffic Police Station	30 March	Head of Jinja Road Traffic Police Station Musinguzi Obah, Police at Headquarters
Individual businessman previously worked with the KCCA to prepare <i>boda</i> sheds	12 March	Anonymous, Business Owner

Appendix J: Photolog

Field study locations	
	
Nakawa market (Source: Nordic Development Fund)	
	
Ntinda commercial center, a high income residential and formal commercial area	
	
Butoko-Ntinda road, a middle income, mixed land use and social groups including students	
	
Mbuya - Low income residential area and school	



Mbuya – Kinawataka road, a very low income residential and small-scale commercial area



Kisenyi, a small-scale commercial area and slums

Other photos obtained from unstructured observation



Bodas at *boda* stage, also available at night

Central Business District of Kampala



Boda stage at the side of the road in CBD



Very slow moving traffic in CBD



Passengers in working attire during peak traffic hour.



Working lady on a *boda* during peak traffic hour.



Boda pick up and drop off outside of a shopping mall during peak traffic hour.



Jinja Road, one of the main road connecting Kampala – Jinja. The first road *boda* appears in Kampala.

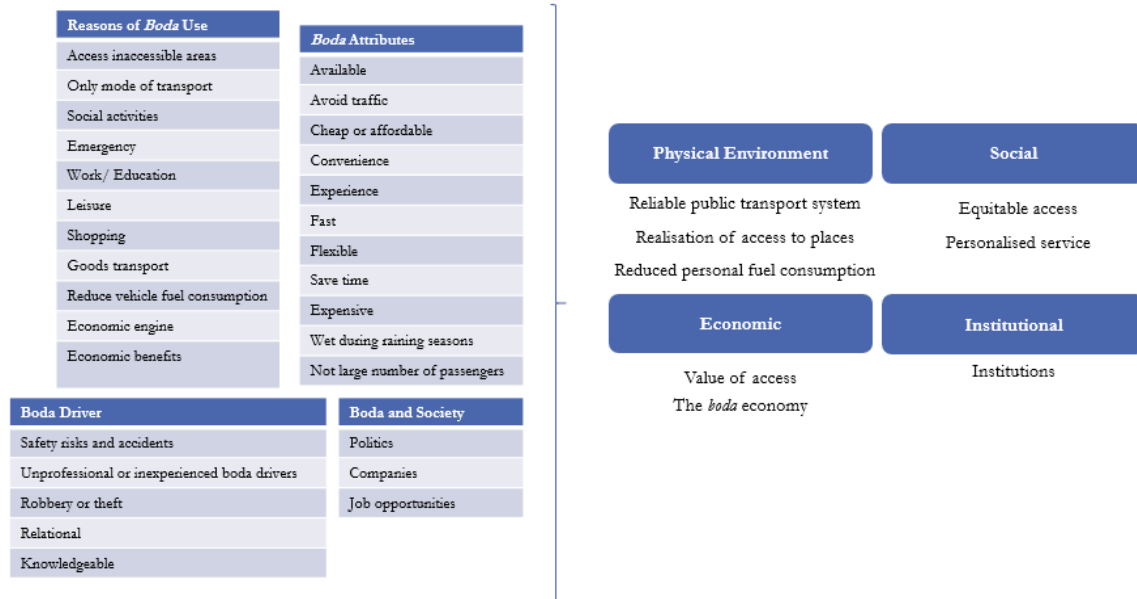


“No boda allowed” signage seen outside of the Makere University



Lorries are used for goods delivery for bigger shipments from suppliers.

Appendix K: Coding Analysis



Appendix I: An overview of coded themes to analyse boda's significance to the city