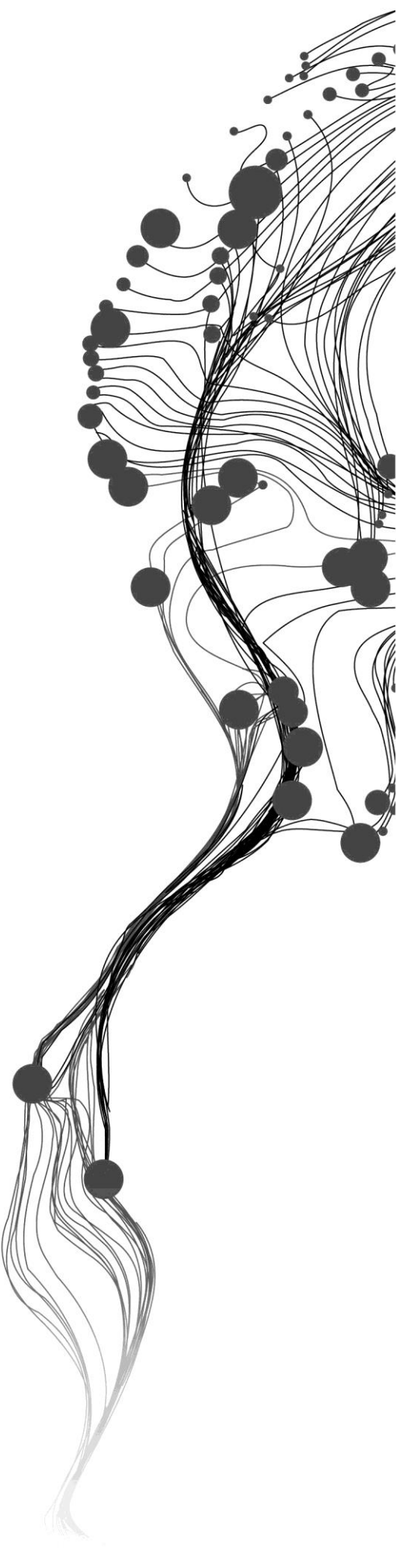


**STREETS AS BINDING FACTOR:
MEASURING THE QUALITY OF
STREETS AS PUBLIC SPACE
WITHIN FRAGMENTED CITY.
A CASE STUDY IN
DAR ES SALAAM**

BOLATITO TITLOPE DAYO BABATUNDE
February, 2015

SUPERVISORS:
Dr. J. A. Martínez
Ms. M. Kuffer, MSc



STREETS AS BINDING FACTOR: MEASURING THE QUALITY OF STREETS AS PUBLIC SPACE WITHIN FRAGMENTED CITY. A CASE STUDY IN DAR ES SALAAM

BOLATITO TITIOPE DAYO BABATUNDE
Enschede, The Netherlands, February, 2015

Thesis submitted to the Faculty of Geo-Information Science and Earth Observation of the University of Twente in partial fulfillment of the requirements for the degree of Master of Science in Geo-information Science and Earth Observation.

Specialization: Urban Planning and Management

SUPERVISORS:

Dr. J. A. Martinez

Ms. M. Kuffer, MSc

THESIS ASSESSMENT BOARD:

Prof. dr. ir. M.F.A.M. van Maarseveen: Chair

Drs. M. Zwanenburg: External Examiner, Erasmus University - IHS

Dr. J. A. Martinez: First Supervisor

Ms. M. Kuffer, MSc: Second Supervisor

DISCLAIMER

This document describes work undertaken as part of a programme of study at the Faculty of Geo-Information Science and Earth Observation of the University of Twente. All views and opinions expressed therein remain the sole responsibility of the author, and do not necessarily represent those of the Faculty.

ABSTRACT

Urban development in African cities is characterized by rapid urbanization process that has given rise to unplanned developments amidst planned developments, and of recent the proliferation of gated communities. Resulting from this urban fragmentation are several problems such as lack of street connectivity, social exclusion and lack of cohesion among others that affect the quality of life and prosperity of the people. The street as a public space has been identified as a binding factor that can contribute towards social integration of the urban fragments and mitigation of these problems.

Therefore, this study endeavours to measure the quality of streets as a public space between different urban fragments in the city of Dar es Salaam, in view to identify and understand the role of streets as a binding factor towards integrating the fragmented settlement. In doing this, a case study strategy, based on mixed method approach using quantitative (objective) and qualitative (subjective) indicators was adopted. These mixed methods include observation, measurement, and mapping of activities. In addition to questionnaire survey and interviews within the planned, gated, and unplanned neighbourhoods of three selected streets in the fragmented settlement of Msasani Bonde La Mpunga.

Findings from this study revealed a slightly higher level of street connectivity contrary to the report for Dar es Salaam from another study (UN-Habitat, 2013). In addition, observed footpaths within the neighbourhoods of one street (gated/unplanned) and another street (planned/unplanned) have improved pedestrian connectivity. Furthermore, there exists an appreciable level of social interaction and integration that varies among the different urban fragments, in which street economy and employment opportunity was identified as a notable street binding factor on the street (gated /unplanned) towards social integration of the upper and lower class neighbourhoods respectively.

This study showed that for African city, pedestrian connectivity should include the 'informal connectivity' (footpaths) that are commonly neglected in street connectivity analysis. Furthermore, in contrast to studies relating to streets and urban fragments in European and Latin American cities respectively, 'street economy' binding factor have a dominance importance towards social integration of urban fragments in the study area.

Keywords: Streets; public space; planned; gated; unplanned; neighbourhoods; social integration; quantitative indicators; qualitative indicators; urban fragments

ACKNOWLEDGEMENTS

The contribution of some organisations and individuals to the successful completion of this research is well acknowledged. I am immensely grateful to the World Bank (JJWBGSP Scholarship) for providing the entire funding and my office Federal Capital Development Authority (FCDA) Abuja for granting approval to undertake this study.

My profound gratitude goes to my supervisors, Dr. Javier Martinez and Ms. Monika Kuffer for their relentless guidance, supervision, and constructive criticism throughout the course of writing this thesis, which has undoubtedly brought out the intuitive research skill in me. Special thanks go to my tutors and the entire UMP staff, for their respective role in teaching and counselling during the period of this program. Notable is Drs Emile Dopheide for his concern and counselling throughout the course of study.

The fieldwork experience was amazing; I appreciate the assistance from the Ardhi University to facilitate collection of both primary and secondary data. Most especially, the ever-willing assistance and counsel from Professor Kyessi, thanks to Dr. Mrema for having interviewed him on a short notice and to my competent research assistants Resituta and Alpha for your friend ship and ensuring that I pick some words in Swahili *Asante!*

To all my friends, and colleagues representing the different part of the world thank you for the understanding and memories we share going through this program, I am indeed grateful to having met you all. Worthy to be mention are Tosin, Banda, Emma, Tunde and Appolonie for your support and friendship, likewise the entire members of RCCG amazing grace sanctuary Enschede, especially Bro. Donald thank you for the fellowship God bless you all.

Words alone can hardly express my profound gratitude to my parents, sisters, and brothers both biological and by marriage, I appreciate your prayers and well wish throughout this period.

Finally, immeasurable thanks go to my husband, Arc. Dayo Babatunde for his understanding, encouragement that kept me going and for enduring my absence especially coping with the cares and demands of my lovely boys Kolade, Korede and Ololade, loving you all more than ever!

To God who is able to keep, ever faithful, ever reliable, and ever dependable to you alone I ascribe all glory. May God name be highly exalted Amen.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	ii
LIST OF FIGURES	v
LIST OF TABLES	vi
LIST OF ACRONYMS	vii
1. INTRODUCTION	1
1.1. Background and Justification	1
1.2. Research Problem	2
1.3. Research Objectives and Questions	3
1.3.1. General objective	3
1.3.2. Specific objectives and questions	3
1.4. Conceptual Framework	4
1.5. Thesis structure	5
2. CONCEPTUALISING STREETS AS PUBLIC SPACE AND URBAN FRAGMENTATION	7
2.1. Public space	7
2.2. Street as a public space	7
2.2.1. Street as a physical space	8
2.2.2. Street as channel of movement	8
2.2.3. Street as public realm	8
2.2.4. Street as a place	9
2.3. An overview of concepts on urban fragmentation	9
2.3.1. Manifestation of urban fragmentation in African cities	10
2.3.2. Significance of streets as public space towards social integration	11
2.4. Factors constituting to the social dimension of streets	12
2.4.1. Activity	12
2.4.2. Connectivity	13
2.4.3. Other physical street qualities	14
2.5. Measuring street qualities using indicators	15
2.5.1. Overview of methods	16
3. BACKGROUND TO CASE STUDY AREA	19
3.1. Case study area	19
3.1.1. Criteria for the selection of the study area	20
3.1.2. Evolution of morphological characteristics of Msasani Bonde la Mpunga	21
3.2. Criteria for the selection of case study streets	22
3.2.1. A brief description of case study streets	22
4. RESEARCH METHODOLOGY	25
4.1. Research design	25
4.1.1. Selected relevant indicators	26
4.2. Data sources and method	27
4.2.1. Field observation and measurement	28
4.2.2. Activity/behavioural mapping	28
4.2.3. Interviews	28
4.2.4. Secondary data	30
4.2.5. Limitation and quality control	30

4.3.	Data analysis methods	30
4.3.1.	Analysis techniques.....	30
5.	MEASURING THE QUALITY OF STREETS AS PUBLIC SPACE.....	33
5.1.	The physical qualities of streets in Msasani Bonde la Mpunga	33
5.1.1.	Level of connectivity	36
5.1.2.	Level of connectivity within the different urban fragments	38
5.2.	Activity.....	39
5.2.1.	Observed uses and activities on the three selected streets.....	39
5.2.2.	Activity mapping.....	40
5.2.3.	Flow of people	42
5.3.	How residents perceived the streets	44
5.3.1.	Safety and security	44
5.3.2.	Comfort.....	46
5.3.3.	Sense of belonging.....	47
5.3.4.	Social interaction	47
5.4.	Impact of perceived street quality on residents usage	49
5.5.	Reflection on street qualities	50
6.	COMPARISON OF STREETS QUALITY: A DISCUSSION TOWARDS SOCIAL INTEGRATION	55
6.1.	Relation between activity, connectivity and perception across and within selected streets.....	55
6.1.1.	Reflection on variation of binding factors towards social integration	55
6.2.	Impact of physical characteristics of streets on social integration	61
6.3.	Contribution of key findings to urban planning policy intervention	63
7.	CONCLUSION AND RECOMMENDATION	69
7.1.	Conclusion	69
7.2.	Recommendation for further research	70
	LIST OF REFERENCES	71
	APPENDICES	75

LIST OF FIGURES

Figure 1-1: Conceptual framework	4
Figure 2-1: Quality of physical environment.....	12
Figure 3-1: Map of case study area in Dar es Salaam.....	19
Figure 3-2: Morphological pattern of the study area.....	21
Figure 3-3: Existing land uses 2014	21
Figure 3-4: Satellite imagery of Street 1 and segment photo	23
Figure 3-5: Satellite imagery of Street 2 and segment photo	23
Figure 3-6: Satellite imagery of Street 3 and segment photo	23
Figure 4-1: Flowchart on data collected and analysed.....	31
Figure 5-1: Photos of Street 1 physical characteristics.....	35
Figure 5-2: Photos of Street 2 physical characteristics.....	35
Figure 5-3: Photos of Street 3 physical characteristics.....	35
Figure 5-4: Map of street connectivity for the entire study area	36
Figure 5-5: An example of accessibility index- previous network	37
Figure 5-6: An example of accessibility index- current network.....	37
Figure 5-7: Street connectivity within gated communities	38
Figure 5-8: Day time activity map	40
Figure 5-9: Evening time activity pattern.....	41
Figure 5-10: Pedestrian flow at different time of the day.....	42
Figure 5-11: Pedestrian morning flow	42
Figure 5-12: Modal split flow.....	43
Figure 5-13: Satellite imagery showing mixed uses on Street 2.....	43
Figure 5-14: Perception of daytime safety	45
Figure 5-15: Perception nighttime safety	45
Figure 5-16: Perception of comfort	46
Figure 5-17: Perception on the effect of traffic	46
Figure 5-18: Perception of sense of belonging	47
Figure 5-19: Perception on interaction within neighbourhood	48
Figure 5-20: Perception on interaction between neighbourhoods	48
Figure 5-21: Perception on type of interaction	49
Figure 5-22: Perception of street usage.....	50
Figure 5-23: Perception of overall street quality	50
Figure 6-1: Network view of perception of gated community	57
Figure 6-2: Network view of perception of unplanned neighbourhood	57
Figure 6-3 a, b, c and d: Observed physical qualities that influence social integration.....	62
Figure 6-4: An overview of key findings measuring streets qualities based on activity, connectivity, and perception	67

LIST OF TABLES

Table 2-1: Measure of street connectivity by various studies	13
Table 2-2: Indicators proposed and compiled by UN-Habitat (2013).....	14
Table 2-3: Other physical street qualities.....	15
Table 2-4: Other relevant indicators on street as public space	16
Table 3-1: Land use allocation in the study area.....	22
Table 4-1: Data requirement and methods	25
Table 4-2: Selected relevant indicators	27
Table 4-3: Types and list of person interviewed.....	29
Table 4-4: Phrases used in network analysis	32
Table 5-1: Comparative matrix of streets physical characteristics	34
Table 5-2: Connectivity measurement within urban fragments	38
Table 5-3: Observed behavioural activities and analytical categories.....	39
Table 5-4: Total pedestrian and vehicular flow	44
Table 6-1: Across and within streets comparison	59

LIST OF ACRONYMS

AI	Accessibility Index
CBD	Central Business District
CISCI	Composite Street Connectivity Index
DCC	Dar es Salaam City Council
DES	Dar es Salaam
GC	Gated Community
GIS	Geographic Information System
LAS	Land Allocated to Street
MBLM	Msasani Bonde La Mpunga
NBS	National Bureau of Statistics
PRD	Pedestrian Route Directness
TANESCO	Tanzania Electrical Supply Company
UN-Habitat	United Nations Human Settlements Programme

1. INTRODUCTION

Cities in the global south have continued to experience rapid urbanisation that has resulted in a spatial pattern of different urban fragments of planned areas, unplanned slum settlements (Balbo, 1993) and recently the gated communities (Asiedu and Arku, 2009). Resulting from this urban fragmentation are several problems such as lack of street connectivity, social exclusion and lack of cohesion among others that affect the quality of life and prosperity of the people. The street as public space has been identified as a binding factor (Janches, 2011; Loukaitou-Sideris and Banerjee, 1998; Trancik, 1986) that can contribute towards social integration of the urban fragments and mitigation of these problems.

The study about streets as public space is not new. In fact from the late nineteen century till date there has been various studies on street designs, street significance, measurement and reclaim (Appleyard and Lintell, 1972; Jacobs, 1961; Mehta, 2013). Likewise, the UN-Habitat (2013) recently recognized streets as drivers of city prosperity for the overall quality of life and social wellbeing of the people. However, literatures that focus on the street as public space within cities of Africa are limited; few empirical studies have focused on the qualities of informal settlements in the area of housing, land tenure, and infrastructure. Not much is known about the social dimension of the streets as public space towards integration and interaction of the different social groups, the consequence of this inadequate theoretical and empirical knowledge is inappropriate planning intervention (Mrema, 2013).

Hence, the purpose of this study is to measure the quality of streets as public space between different urban fragments. That is the planned, gated, and unplanned neighbourhoods in fragmented settlement of Dar es Salaam. This study combined both the quantitative (objective) indicator of street connectivity proposed by the UN-Habitat (2013), its physical characteristics and qualitative (subjective) indicators based on residents' perception to measure the quality of street. It is expected that the knowledge from this study will assist local planning authorities, policy makers in areas of policy intervention and contribute to fill the knowledge gap that exists in literature pertaining African cities.

1.1. Background and Justification

Historically, streets have played a significant role in facilitating mobility, social interaction, and commerce by connecting places, people, and goods. The street being the widest and most accessible public space network have always played a major role in providing public space in cities. By examining the street, one can come to understand the city and the society in which the street is located as they form an integral part of the social and commercial fabric of the city (UN-Habitat, 2013).

However, during the motor revolution, roads for vehicular movement replaced streets. As a result, the role of the street as public space has been poorly integrated and in most cases neglected due to the replacement of streets by roads built for fast movement of traffic (UN-Habitat, 2012a).

The replacement of streets by roads, have triggered the formation of various movement, such as the "liveable street" and the "complete street" for street reclaiming (National Complete Streets Coalition | Smart Growth America, 2014). The liveable and complete street movement recognizes streets as basis for a healthy community and advocate for streets design, amenities, and operation that ensures safety and comfort of all users. Such as lanes for different travel modes, trees, pedestrian sidewalks to make children,

women, and elderly people comfortable. Furthermore previous researches in the global north (Frank et al., 2010) and global south (Shumi, 2013) respectively, have shown that the quality of street for cycling and walking has an influence on the quality of life of the population especially the vulnerable groups.

A prosperous city is based largely on its street life and the way activities occur in space. The streets as public space provides the terrain for social encounter and interaction such as street vendor and pavement activities (Montgomery, 1998). Likewise, in its report UN-Habitat (2013) described street connectivity as a fundamental feature that determines streets as prosperous. In which the quality of the street is strongly link with the other dimension of city prosperity¹. The report summarized, measured and analysed several street connectivity indicators for example (street density, intersection density, and land allocated to street) and evaluate it in global comparison.

By contrast, lack of street connectivity in cities in the global south has hindered the provision of basic services; reduce travel option, walkability, and opportunity for social interaction. In addition, lack of street connectivity has aggravated problems associated with urban fragmentation. For instance, the growing suburbanisation of the elite that has resulted in the emergence of gated communities and slums formation by the urban poor. In which according to Janches (2011), fragmented city means the disappearance of public space as a space of integration and interaction among the different social groups. According to Carmona, Tiesdell, Heath, and Oc (2010) the gated community with its imposing walls and fences have prevented public access to streets, playgrounds etc. that would otherwise be open and use by all residents in the locality.

Likewise, in Dar es Salaam, the quantity and quality of public space has been a problem particularly in the unplanned settlements, where according to UN-Habitat (2009), inhabitants of unplanned settlements make up about 75 per cent of the population. These inhabitants are constantly pressurizing land for development; as such, public open spaces are repetitively converted for housing development. Furthermore, knowledge on the formation process of the public space which can inform government intervention and urban upgrading are not available (Mrema, 2013). This lack of knowledge of a theoretical framework developed from empirical observation have caused ineffective urban development policies (Lupala, 2002). In addition, the few existing studies in Dar es Salaam have been on the qualities of informal settlement as a whole (Kombe, 2005; Nguluma, 2003). Others studied the public space in different perspective. For instance Lekule and Arkitektaskole (2004) study was based on the meaning of space for user, Brown (2004) on street economy and recently Mrema (2013) on public space creation and control. However, no study exists that relate to the quality of streets as a public space between neighbourhoods of different socio-economic characteristics.

Subsequently, this research will follow the initiative from various reports of UN-Habitat (2012a; 2013) in documenting the role of streets as public space and its potential as binding factor between urban fragments. A combination of objective (physical characteristics) and subjective (perception) measures (Pacione, 2003) will be included to measure the quality of streets as public space to foster better understanding of social integration between different urban fragments in Dar es Salaam.

1.2. Research Problem

The lack of street connectivity has aggravated problems associated with urban fragmentation such as social exclusion and lack of cohesion (UN-Habitat, 2013). In cities of the global south, this is most evident

¹ Dimension of city prosperity includes Infrastructure development, Environmental sustainability, Productivity, Quality of life, Equity, and social inclusion.

with the continued slum formation and emergence of gated communities. This has a negative influence on quality of life and social wellbeing of the people (Madanipour, 1999).

Consequently, various attempts have been made to study urban fragmentation and its resulting fragments (e.g. gated communities and slums), its cause, consequence and how to integrate the urban form. Most of these studies were focusing on experiences from Latin America, Asia, and Caribbean cities (e.g. Borsdorf, Hidalgo, and Sánchez, 2007; Coy, 2006; Hernández Bonilla, 2013). Studies on the African region are relative few despite the increasing evidence of the phenomena in Africa's big cities (Asiedu and Arku, 2009; Landsman, 2011a). In addition, recommendation for the integration of the fragmented city from such studies ranges from urban planning policy regulation to reduced urban expansion and urban renewal. In which the role of street as a binding factor was not considered to integrate the different urban fragments.

Particularly in Dar es Salaam, previous research relating to public space focused mainly on the informal settlements and on street economy. Study relating to the street as public space between different urban fragments was yet to be explored. Furthermore, a study by UN-Habitat (2013) focuses on global scale and street measurement based on the quantitative (objective) indicators while the qualitative(subjective) indicators relating to local context and residents perception was not considered.

Therefore, to contribute to a better understanding of this problem, this research attempts to measure quality of streets between planned, gated, and unplanned neighbourhoods of Msasani Bonde la Mpunga settlement in Dar es Salaam. This was done based on quantitative (objective) and qualitative (subjective) indicators of street connectivity, activities, and residents' perception. Hence, this study assists in understanding to what extent the quality of street have enhanced the social integration of urban fragments. In addition, this study contributes to fill the knowledge gap that exists in literatures on the street, as public space required for appropriate planning policy interventions.

1.3. Research Objectives and Questions

1.3.1. General objective

The main objective is to measure the quality of streets as public space between gated, unplanned slum and planned neighbourhoods in Dar es Salaam.

1.3.2. Specific objectives and questions

In order to achieve the general research objective, the following specific objectives and research questions were addressed.

- 1. To measure the physical qualities of the streets.**
 - What are the physical characteristics of streets?
 - What is the level of street connectivity?
- 2. To identify uses and activities on the streets.**
 - What are the uses and activities on the street?
 - To what extent do activities vary at different time of the day?
 - Where are areas of activities?
- 3. To understand residents' perception of their streets quality.**
 - What are the residents' perceptions of the quality of the street?
 - What impact perceived quality has on residents' usage of the street?

4. To analyse and compare street qualities between the urban fragments.

- What is the relationship between level of streets connectivity, activity, and perceived street quality?
- What is the impact of the physical qualities of street on social integration of planned, gated, and unplanned neighbourhoods?

1.4. Conceptual Framework

The conceptual framework (Figure 1-1) elucidates the relationship between the different concepts, in which the quality of the streets as public space has an influence on the level of social activities that takes place on the streets (Gehl, 1996) and subsequently contributes to enhance social interaction between the different urban fragments. The three main concepts are ‘connectivity’, ‘activity’, and ‘perception’.

In urban planning, one element that determines urban form is the street plan and therefore if the physical quality of the street that includes ‘connectivity’ and other street design features are good it can stimulates activity and positive residents’ perception. ‘Activity’ refers to the street vitality and diversity (Montgomery, 1998; UN-Habitat, 2012a), the presence of people in a street at different time of the day makes a street lively, street vitality can be achieved where there are diversity of street uses, thereby this increases the chance of social encounter (Jacobs, 1961). Lastly, ‘perception’ relates to awareness of the environment and how the place is perceived reflect an individual feeling and impression about a place such as (safety and security, comfort etc.). The feeling and impression by an individual is however guided by the individual cultural, social and moral values, this in turn may informs what level of activity they are willing to perform in the street. Hence, a higher street quality as public space will support social integration of the fragmented neighbourhoods.

However, to operationalize these concepts in the case study area, indicators that relates to activities, perception as well as to connectivity were measured (see Figure 1-1).

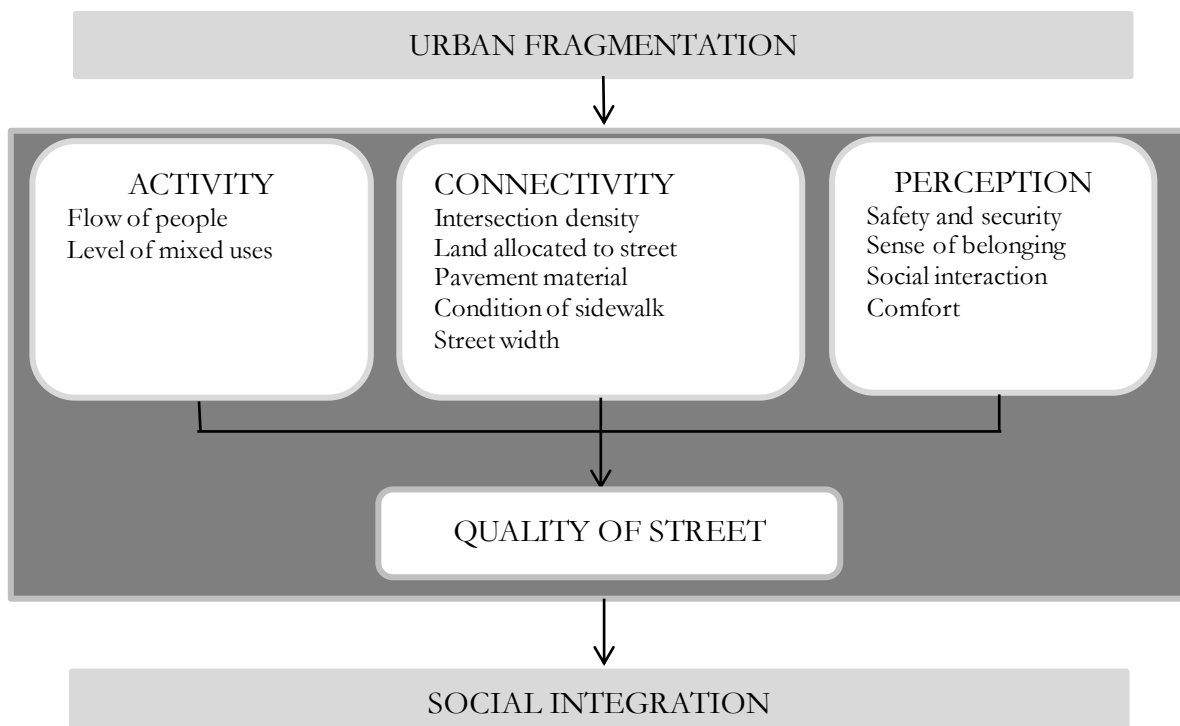


Figure 1-1: Conceptual framework

1.5. Thesis structure

The thesis consists of seven chapters.

Chapter 1: *Introduction*, introduces the research topic and issues to be deliberated, the background information on the context of the study, to justify the research problem, objectives, and questions. The chapter concludes with an outline of the conceptual framework.

Chapter 2: *Literature Review*, the chapter reviews relevant literature through the discussion of concepts on streets as public space and urban fragmentation that will illuminate the subsequent chapter of the research.

Chapter 3: *Study Area*, the chapter introduces the study area, with a brief description of selected streets within the study area.

Chapter 4: *Methodology and Data Collection*, the chapter provides information on fieldwork and methods used for data collection and data analysis.

Chapter 5: *Results*, this chapter focus on research findings on connectivity, activity, and residents' perception to answered research objectives and questions and lastly a reflection on the findings.

Chapter 6: *Discussion of Result*, the chapter analysed and discussed results implication on social integration of the urban fragments and elaborates on identified binding factors

Chapter 7: *Conclusion and Recommendation*, the chapter is devoted to concluding remarks to summarize the study and suggest further research directions.

2. CONCEPTUALISING STREETS AS PUBLIC SPACE AND URBAN FRAGMENTATION

The chapter attempts to review various literatures on key concepts and their definition, on streets as public space, urban fragmentation and the significance of streets as a binding factor towards integrating the urban fragments. It also identifies relevant indicators and methods. Thus, it offers conceptual overview of the role of streets within the fragmented city for better understanding of subsequent part of the study.

2.1. Public space

There exists in literature different definitions as to what constitute a public space, in relation to its ownership, control, cultural, political, and economic perspective. Janches (2011) defines public space as a space owned by all and from a socio-cultural point of view is a place where the community expresses contact among individuals. Arendt (1998) also reflects on public space as an idea of political action that involves all human activity taking place outside the private realm, in interaction with others and where an individual constitutes himself/herself as a person. It is through this interaction with others that an individual discovers himself/herself and finds what distinguishes him/her from others. A place in which demonstration and protest takes place, celebration of cultural and religious festivals (Dijkstra, 1999). Other definition looks at public space in relation to its physical boundary of external and internal space, external such as streets, parks and highway, while the internal are public institutions and public transport facilities such as museums, libraries, and airport (Carmona, 2003).

This definition however does not clearly reflect in practice what is obtainable in which not all that is publicly owned is accessible to everyone at all time for instance a museum or government offices. In the same manner, some privately owned public squares are freely accessible to the public such as some shopping malls. Furthermore, public space includes all parts of the urban form in which everyone has both physical and visual access (Gehl, 2008; Tibbalds, 2012). Both authors reiterated that public spaces need to be accessible for people to meet and take part in public life. To this extent accessibility of a space to the general public irrespective of class, gender age and regardless of ownership status which gives opportunity to occupied and interact illustrate the meaning of being a public space. To this extent, reflect street as a public space.

2.2. Street as a public space

Streets are the widest and most accessible public space that gives more opportunity for social activities and interaction (Oranratmanee and Sachakul, 2014). Jacobs (1961 p.39) stated that, "Streets and their sidewalks, the main public spaces of a city, are its most vital organs". She furthered buttressed that an interesting streets implies an interesting city and on the contrast if the street is dull the city will be dull. The street being a multifunctional space, its role as a public space can be understood from different perspectives. That includes street as physical space, as a channel of movement, as public realm as well as place.

2.2.1. Street as a physical space

The Merriam-Webster Online Dictionary and Thesaurus (2014) describes “streets as a thoroughfare in a city or town that has houses or other buildings on one or both sides and that usually includes sidewalk”. Streets designed without sidewalks will only act as channel of predominantly motorized movement and thereby discourage interaction that can be encounter along the sidewalk. Reflecting situation in global south where according to the data from UN Millennium Cities Database, 65 per cent of streets in Africa region has no sidewalk². The non-availability of sidewalks endanger pedestrian to traffic hazards and where these sidewalk exist are mostly of low quality and are frequently obstructed and unkempt (Howe, 2001). Morphologically a street is defined as linear three-dimensional spaces between buildings. Furthermore, a street has a strong physical character in which the continuity of the street wall and the height to width ratio determine the sense of spatial enclosure within the street (Carmona et al., 2010). This definition of a street as space between buildings makes streets to be viewed as an extension from building rather an independent entity this can be observed, for example the use of street by street vendor (Brown, 2004), the extension of shop front to the street by the displays of wares etc. However, the intimate physical relationship between the street and buildings are gradually diminishing in the new approach to planning of cities whereby roads are separated from buildings in the mega developments and new street planning (Moudon, 1991). Hitherto, of interest to this research are the linear spaces between buildings that are the streets form and associated functions.

2.2.2. Street as channel of movement

The primary purpose of a street is to be thoroughfare for both vehicular and pedestrian movement. Both form of movement is purely for circulation, however there exist the opportunity for social interaction and cultural exchange for instance window shopping; a talk with a friend; for the pedestrian movement, which is lacking for vehicular movement unless the car is parked (Carmona et al., 2010; Jacobs, 1961). Unlike other public space for instance the urban square, that gives a visual static character, street are visually dynamic and there is sense of movement. Its role as a channel of movement for both vehicular and pedestrian has always been in conflicting with one another this has resulted in more space been allocated for vehicular traffic and a reduction in pedestrian space (Wolf, 1986).

In cities of the global south, lanes for vehicular movement is what is provided for which leaves the pedestrian to compete with traffic on the street, thereby impaired the walkability of cities (Nguma, Rwebanira, and Mbella, 1993; Pirie, 2013). Therefore, heavy traffic frustrates the use of street for social activities.

2.2.3. Street as public realm

The street has been historically used for different social interaction ranging from cultural celebration, political gathering, civic ceremonial to economic activities (Hass-Klaus, Crampton, Dowland, and Nold, 1999). According to Carmona et al. (2010) public realm combines both the physical space and the social activity dimension, which includes spaces or setting that may be physical and publicly owned and that support or facilitate public life and social interaction. Montgomery (1998, p.110) also stated that, “streets are undoubtedly the most important elements in the city’s public realm. The network of spaces and corners where the public are free to go, to meet, gather and simply to watch one and other” the author also pointed out that streets have proven to be one of the oldest element of public realm and a vital organ for livelihood and in many places the only space available for social interaction.

Furthermore, Tiesdell and Oc (1998) also identified qualities that makes up a public realm: (i) universal access (open to all); (ii) inclusive and pluralist (it accommodate people from different background); (iii) symbolic and representative of the collective and of sociability (a reflection of cultural identity of the city,

² Data from UN Millennium Cities Database was cited in UN-Habitat (2013) report

rather than individual agenda); and (iv) neutral territory (free from impartiality). The street as a public realm exhibit these attributes, however the public realm has been challenged by factors such as the increased competition for allocation of space for vehicular movement and the privatization of infrastructure (Graham, 2001) street inclusive. The privatization of infrastructure and liberation has caused the proliferation of gated communities in which street as public realm is being challenged.

2.2.4. Street as a place

A place is defined and understood by the physical characteristic of the place, the activities in them and the meaning they hold to people (Montgomery, 1998; Relph, 1976). In this definition, a place goes beyond its physical characteristic but rather a combination of the physical attribute, activity, and conception.

The role of street as a public space is its ability to serve as a place. In which the street as a place is a destination aside also serving as a link for movement according to Dijkstra (1999) when a street is attractive enough it can draw wide range of users (such as shoppers, residents, workers visitors etc.) to spend time in the place. Through the group or individual actions and ideas a place comes to live, therefore the essence of a place is derived from its local identity and distinct character that foster people's socio – cultural life (Harvey, 2006). For the purpose of this study, street as public space are the physical spaces between buildings that includes the sidewalks, buildings frontage etc. to which the public has physical and visual access.

Therefore, to achieve a street multifunctional role as discussed above requires a holistic approach that studies the combination of the physical characteristics, activity and how user perceives the street. Thus if there is harmony between these concepts then such a street can be assess as 'Quality Street' that encourage interaction.

2.3. An overview of concepts on urban fragmentation

Cities over the years especially in developing countries have continued to exhibit some distinct social and morphological characteristics in the process of development typically referred to as urban fragmentation. It is therefore pertinent to understand this concept and its implication on social interaction and integration.

Urban fragmentation is a dicey concept which can easily be recognized but difficult to define with correctness (Harrison, 2003), due to the multidimensional nature of the concepts and its many faces that makes it difficult to define. For example, Harrison (2003) differentiate between institutional fragmentations (relating to the decentralization of political structure), social fragmentation (relating to increase gap between different socio-economic strata of the society), and spatial fragmentation (understood as the breaking into part the urban form). Furthermore different concepts and terms has been used to refer to the same phenomena for instance the dual city, disconnected city, divided city and splintering urbanism (Balbo, 1993; Graham and Marvin, 2001; Madrazo and van Kempen, 2012). The dual city concept reflects the social fragmentation, in which the city is divided into a two-class society one for the rich and the other for the poor. As a result, it is difficult to separate which concept contribute to what of the type of urban fragmentation.

The term urban fragmentation therefore refers to the breaking into fragments, part or pieces the urban environment (Hidding and Teunissen, 2002; Landman, 2011b). Both authors illustrated this by comparing the cities in the 18th to 19th centuries with cities of 20th century. In which the latter is more fragmented than the former, due to urban sprawl and the introduction of new uses such as residential and industrial in natural areas of homogenous entities. Another definition, looks at fragmentation of urban form as a disorderly process of development that leads to the splintering of urban space and makes the city a mosaic without a distinguishable centrality (Burgess, 2005).

In urban geography research fragmentation can be grouped into different aspects as described by Deffner and Hoerning (2011), that includes socio-spatial fragments (e.g. spaces of exclusion versus spaces of inclusion), physical – material spaces (e.g. housing style), diverse spatial function (e.g. spaces for living, consumption or leisure). In addition, other aspects are the polarization of the “poor and wealthy” and in the analysis of access to “private or public” spaces.

Based on the definition above, the cities in the global south reveal a distinct spatial pattern characterized by fragmentation of urban space.

2.3.1. Manifestation of urban fragmentation in African cities

The manifestation of the distinctive morphological characteristic of African cities can be traced back to the pre-colonial era. According to Pacione (2009) the processes of urban development reflect a relationship between global economic forces and local cultural context in which African cities exhibit the greatest variety of urban form. The diversity occurs from the distinctive traditional urban form and the influence of the colonial authorities. O’ Connor (2013) identifies six types of African city that includes:

1. The Indigenous city: These cities were constructed before the colonisation in which the spatial pattern followed the local and cultural values of the people. For example the city of Ile-Ife in Nigeria
2. The Islamic city: Built by African initiative but influence by the Islamic culture.
3. The colonial city: These cities were established because of European colonisation, they are mainly the urban centre representing most of the today’s African capital cities.
4. The European city: founded mainly in the southern and east Africa for example Nairobi and Johannesburg, these cities were established primarily for European. However, such monopoly no longer existed, that the African population lives in the segregated areas in the urban fringes.
5. The Dual city: Here two or more type of cities mentioned above were combined together such as the city of Kano, Nigeria where the walled Islamic city is surrounded by the modern colonial type city. The dual city concept was also mentioned by Peter (1989) are other form of dual city that is a division of the city base on the socio- economic status of different neighbourhood for the poor and the rich.
6. The Hybrid city: Just as the dual city combines the indigenous and alien element in roughly the same proportion, but in which the part are more integrated. This is also evident in the case of Dar es Salaam and Lagos.

However, it worth noting that most of cities in Africa today have gone beyond the above listed types but array of different urban fragments that includes the indigenous , planned, unplanned, illegal and more recently the gated communities, creating a distinctive spatial pattern. Balbo (1993, p.24) stated, “An aerial view of the city shows a spatial structure made of different pieces drawing together in a rather accidental way”. Three different fragments were identified for the purpose of this study in DES base on the peculiar morphological characteristics,

1. Planned neighbourhood: also referred to as formal developments are preconceived and occur base on the urban planning standard and regulation. Emphasis here is to achieve a coherent spatial structure with streets and building laid out as conceived in the planning scheme. Streets within such neighbourhood are open and accessible to all. However, local planning authorities in DES are faced with challenges of managing urban developments, among these challenges are inadequate technical knowledge, expertise to cope with the rapid growth (Mrema, 2013; UN-Habitat, 2009). Resulting in the proliferation of unplanned settlements.
2. Unplanned or slum neighbourhood: These neighbourhoods are mostly illegal where the inhabitants are characterised as having inadequate housing and lacks basic infrastructure including, regular street pattern (UN-Habitat, 2002). Public spaces in such neighbourhood are limited; making street in most cases the only available public space for interaction.

3. Gated community: GC is new urban phenomena exhibiting the morphological characteristics of the pre-colonial walled Islamic African cities. These residential areas are characterised by designated perimeter wall, fences and controlled gated entrance to prevent access by non – residents (Asiedu and Arku, 2009; Landman, 2011a) of key interest to this study is that such communities also restrict access to street thereby making such street no longer public space but private. Being a super block, connectivity of the settlement is reduced (Burke and Sebaly, 2001; Online TDM Encyclopedia, 2014). According to Burke and Sebaly (2001), gated communities exhibits some basic features that includes. First, GC is less integrated with their surrounding communities due to the perimeter walling. Secondly, these neighbourhoods are privatised with private streets, securities and facilities that are manage privately. Thirdly, they are residential estates with mini commercial outlets, school, swimming pool, gymnasium etc. that varies based on size and developers concepts.

2.3.2. Significance of streets as public space towards social integration

Apart from playing a main role of serving as a link, streets as public space plays significant role in the urban structure and city life by becoming an important element in promoting social spatial integration, resulting from urban fragmentation (Janches, 2011). The street as public space within a fragmented city serves as a connector for binding together the urban fragments of these heterogeneous neighbourhoods and enables them to become neighbours with their different socio-cultural identity. According to Trancik (1986) the linkage function of the street helps to 'glue' the city together and determine the order of buildings and open space for social interaction and exchange. Loukaitou-Sideris and Banerjee (1998) also argue that instead of treating street as a link only for movement in the modernist era, street should be recovered to play the social role as a connector that 'stitches' together and often penetrate the dissimilar downtown realm of different urban fragments. However, elements that acts as a binding factor towards social integration varies between settlements. While studying the gated communities and the poor in Santiago, Sabatini and Salcedo (2007) identifies some forms of social integration in which the author redefine the concept of social integration into three dimension, that includes

Functional integration: here the author buttress that integration can occur through the functional means of exchange that is power and money and therefore can be measure according to the participation of the poor in the market, either as a consumer or worker in terms of access to services and facilities and lastly through political process of having privileges and rights. In African context this can be seen with the street life induce activities in form of street economy such as the street vending and other informal trading (Brown, 2004).

Symbolic integration: this refers to the degree of attachment an individual feels towards his or her place of residence the author argue that sense of belonging has been confuse with community integration in literature many time. In which community integration requires certain degree of sameness and level of equality, while symbolic integration can occur under unequal relationship.

Community integration: This type of integration goes beyond functional integration but a recognition of social ties that is express in friendship, family relations and solidarity network, in which people are recognize as equal that is more of intimacy and involvement.

Recognizing these distinction of social integration that may exist, it can be argued therefore that different combination of integration pattern might be found within different urban fragment and thereby contribute in the better understanding of social relationship that exist in order to strengthen it for social integration.

2.4. Factors constituting to the social dimension of streets

The understanding of the relationship between people and their physical environment is essential component that contribute in shaping street as a public space for social interaction and integration (Carmona et al., 2010; Gehl, 1996; Jacobs, 1961). Social activities response to the environment, as such what people are able to do is constrained or enhanced by the environmental opportunities available to them. Carmon et al (2010) also stated that the relationship is best conceive as a continuous two way process in which people create and transform spaces while at the same time being influenced by those spaces. While studying the street in Copenhagen Gehl, (1996) identifies outdoor activities (see Figure 2-1) in the public space that are determined by the quality of the physical environment and categorizes it into three. (i) Necessary (work) activities (activities that are regarded as compulsory, for example, going to work, school, shopping); (ii) Optional activities (for example, people watching, taking a walk to get breath air) such activities only take place when the external environment is good and (iii) Social activities such as, (chatting, conversation and other passive contact such as seeing and hearing other people). To this end, there is a direct connection between quality of street and street activities people are willing to take part. Thus, the quality of street will induced social activities.

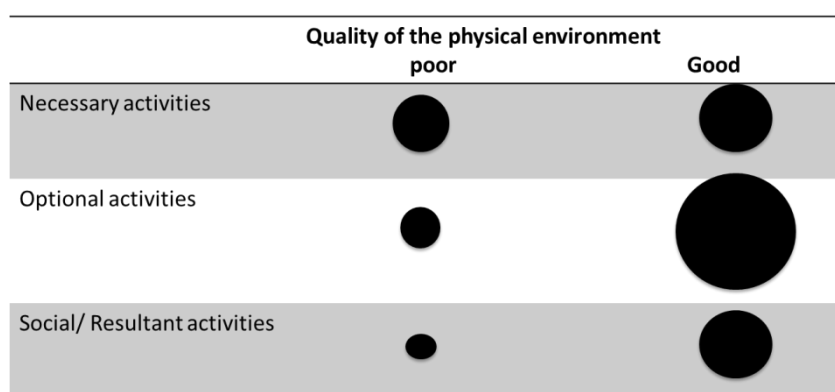


Figure 2-1: Quality of physical environment

Source: (Gehl, 1996)

2.4.1. Activity

Activity relates to the combination of two concepts that is vitality and diversity (Montgomery, 1998). Vitality refers to the number of people seeing around the street at different time of the day. Urban vitality can only be achieve where there is a complex diversity of mixed activities and land uses. According to Jacobs (1961), a neighbourhood is said to be diverse, if it caters for different services and allow for different people to occupy the street at different time of the day and for various purpose. Furthermore, an important element of such streets is that it contributes to safety of the neighbourhood, since there is always people watching, strolling along the street. Therefore, Jacobs (1961) suggested that a district should have more than one functions for the purpose of diversity.

However, the viewpoint advocated by Jacobs (1961) is the post-modernist view, which celebrates complexity, and diversity of mix uses is contrary to the view of the modernist who advocate for the simplicity, order and uniformity of land uses. According to Taylor (1998), Jacobs suggestion will be a total paradigm shift as this question the rationality of planning at all. Taylor (1998) mentioned two broad nature of town planning that include sound judgment about what best to do and making value judgment about how best to plan the environment. The latter about making value judgment can be seen in most of the traditional master plan and land uses zoning prevalence in cities in global south that seen not implementable as it amount to unrealistic standard expect in a more innovative way (UN-Habitat, 2010). Here it is argue that the modernist approach of uniform land use zoning and master plan fail to recognize

and accommodate the way of life of inhabitants where there are informality and diversity of uses and activities facing the 21st century cities in global south (UN-Habitat, 2010), thereby indirectly contribute to social and spatial marginalization.

In sum, the modernist (uniform land use) and postmodernist (mix land uses) planning approach in isolation may not be appropriate to address the dynamism of the urban area. But rather a different style of town planning approach some of which may be complimentary to the ideology of Jacobs (1961) of mixed land uses but such uses need to be compatible. In that case such activity will stimulate more activity thereby increase social interaction in the public space (Gehl, 1996).

2.4.2. Connectivity

Street connectivity is the density of connection in path or road network and directness of link (Online TDM Encyclopedia, 2014). As a result, an increase in street connectivity results in a decrease in travel distance and an increase in route option and thereby creating more accessibility. Dill (2004) describes connectivity as a measure of the quantity of connection in a network from the transportation viewpoint that links location people want to travel. The advocates of new urbanism (Congress for the New Urbanism, 2001) and UN-Habitat (2013) has included street connectivity as a key element of the urban form for good neighbourhood design and for city prosperity respectively.

Table 2-1 below indicates various street connectivity measures identified and used in different studies.

Table 2-1: Measure of street connectivity by various studies

Measure	Literature
Block length	Cervero and Kockelman (1997)
Block size	Reilly and Landis (2002), Zhang, et al. (2012)
Intersection density	Reilly and Landis (2002), (Dill, 2004)
Block density	Frank, et al. (2000)
Per cent four- way intersections	Cervero and Kockelman (1997)
Street density	Mately, et al. (2001)
Link- Node Ratio	Dill (2004)
Per cent Grid	Greenward and Bornet (2001)
Pedestrian Route Directness (PRD)	Hess (1997)
Walking distance	Aultman-Hall et al. (1997)

Source: (Dill, 2004)

However, recently the UN-Habitat (2013) compiled sets of indicators to measure street connectivity, in which three of these indicators (proportion of land allocated to street (LAS), intersection density and street density) was selected based on their relevance to policies and the availability of large datasets. These three indicators were used further to compute the composite street connectivity index (CSCI) for cities around the world.

The measures used by the various studies in (Table 2-1) and by UN-Habitat (2013) see (Table 2-2) are all quantitative(objective) measure which computation does not require any form of subjectivity except in one case (Hess, 1997). According to Dill (2004), PRD is better measure for pedestrian and cycling connectivity analysis despite the subjectivity of selecting pairs of points for origin and destination for distance travelled. PRD compute the distance travelled, a factor that determines if a person will walk or use other transport means.

Nevertheless, a well-connected street has been link to foster economic activities and safety that attract social encounter and interaction within settlements (e.g. UN-Habitat, 2012b). In which high street connectivity is not solely on connecting places but also connecting people and stimulate social interaction.

Table 2-2: Indicators proposed and compiled by UN-Habitat (2013)

Indicator	Definition
Street Density	Street density is measured as the total length of linear kilometres per one square kilometre of land
Intersection Density	Street intersection density measured as the number of intersections per one squares kilometre of land. An 100 intersection is desirable
Proportion of LAS	The proportion of land allocated to streets is the total land area covered by street as a percentage of the total land area
Connected Node Ratio	The connected node ratio is the number of street intersection divided by the number of intersection plus cul de sacs; the maximum value is 1.0 Higher value indicates that there are fewer cul de sacs therefore a higher level of street connectivity. A perfect grid, that implies absence of cul de sac, will be ratio of 1. A connected node ratio of 0.75 is desirable
Link- to – Node Ratio	Link- to –Node Ratio is equal to the number of links divided by the number of nodes. Links are defined as street or pathway segment between two nodes. Higher link node ratio implies higher street connectivity. A ratio of 1.4 is the minimum requirement for a walk able community
Accessibility index(AI) - Pedestrian Route Directness Index(PRD)	AI also refers to as PRD is calculated as the actual travel distances divided by the direct travel distances. An index of 1.0 indicates that pedestrians can walk straight to a destination. An average value of 1.5 is considered suitable
Walking Permeability Distance Index (WPDI)	WPDI is an accessibility index specific to walking trips. It calculates the total sum of walkability factors, such as street width , street connectivity, and sidewalk quality
Alpha Index	The Alpha Index uses the concept of circuit a finite, closed path starting and ending at a single node. It is the ratio of the number of actual circuits to the maximum number of circuits.
Gamma Index	The Gamma Index is the ratio of the number of links in the network to the maximum possible number of links between nodes. Values for the gamma Index range from 0 to 1. Indicating that a gamma index of higher value implies higher connectivity
% of Obstacle –free sidewalks	Obstacle free sidewalks make street more accessible to pedestrians
% of paved sidewalks	Paved sidewalks promote cycling and walking

Source: UN- Habitat (2013)

2.4.3. Other physical street qualities

Apart from the street connectivity to link places and people, other street design characteristics and elements require to improve and enable a street to function effectively as public space. Various combinations of these design characteristics and elements but not limited to those compiled and listed in (Table 2-3) will increase environmental and physical comfort of resident to linger longer and interact on the streets as a public space.

Table 2-3: Other physical street qualities

Characteristic	Indicators	Remarks
Street Design	Street width	Studies have shown that streets with narrow width and fewer traffic experience more social interaction than street with wider and heavy traffic (Appleyard and Lintell, 1972). Street as public space should provide protection against traffic accidents or fear of accidents
	Street pavement material	The choice of paving material, in terms of quality, colour, depth and size, should ensure pedestrian comfort thereby enhancing the hierarchy of street as public space
	Sidewalks	Streets that encourage interaction should demarcate path for pedestrian movement. A study by Mehta (2013) revealed that there is a positive correlation between width of sidewalk and sociable street. Therefore, advocate that provision of sidewalks should be generous enough to accommodate social interaction.
Street furniture	Street light	Streetlight is a critical element to increase safety and security especially during the nighttime against crime. Studies has shown the important of streetlight to people perceive safety (UN-Habitat, 2012a)
	Seating material	According to various studies (e.g. Gehl, 2008; Mehta, 2013; Whyte, 1980) the provision of movable and non-movable seating furniture such as benches, chairs etc. has been considered valuable to facilitate social interaction.
	Trash and recycling bin	People like to interact in a clean environment. Trash cans are needed to ensure that the street is clean
	Barriers and screens	Such as planter boxes, planter screens etc. are valuable to provides separation and protection from other street activities.
	Landmark and signage	The use of signs and symbols to communicate direction, location etc. is also an essential street furniture to identify places of social activities and encourage sense of belonging.
Landscape element	Canopies, tents and trees	These landscape elements provides residents protection from different environmental condition such as rain, sun etc. Soft landscape such as trees and green also contribute to the character and aesthetics quality of the street

Compiled by author from various sources: (Appleyard and Lintell, 1972; Gehl, 1996; Jacobs, 1995; Mehta, 2013; Whyte, 1980)

2.5. Measuring street qualities using indicators

Indicators are quantitative and qualitative variables that helps to describe and communicate an assessment of a phenomena (Innes, 1990; Wong, 2006). The main purpose of an indicator therefore is to measure features of a particular phenomenon in an objectively verifiable way and communicate an assessment of the phenomenon involved. The quantitative (objective) indicators are observable and measurable condition, for example presence of sidewalk, durable housing while the qualitative (subjective) indicators relate to the perceived or self-expressed satisfaction or dissatisfaction with specific quality of life (Martinez, 2014; Pacione, 2003).

Several indicators have existed in literature concerning the quality of streets. For instance, the UN-Habitat (2013) proposed and compiled indicators such as (street density, intersection density, land allocated to street) among others to measured street connectivity (see Table 2-2). The study did not take into account the subjective indicators that could measure the perception of resident pertaining streets in their

neighbourhood. According to Pacione (2003) the combination of the two types of indicators can contribute to the interpretation and better understanding of the other. However, few other studies have employed both the qualitative and quantitative indicators to measure environmental qualities of streets (Appleyard and Lintell, 1972), walkability (Shumi, 2013) and to document the role of streets in slum upgrading (UN-Habitat, 2012a). Such as, (flow of people, illegal activities, connectivity, spatial typologies, safety, level of noise, privacy, access route choice, social interaction and sense of belonging) as shown in (Table 2-4).

However, there are no universal indicators relevant in all cases; indicators were selected based on the nature of the problem, policy priority, cost effectiveness, as well as scale of analysis. Equally, selected indicators can be a focal point in the allocation of resources in an equitable manner. Such indicators must be reliable, valid and methodologically sound and well understood by the experts, policy makers and other stakeholders (Innes and Booher, 2000).

Table 2-4: Other relevant indicators on street as public space

INDICATORS	DEFINITION
ACTIVITY AND LAND USES	
Flow of people	Continuous flow of people
Flow of capital	The flow of capital as it relates to business and other form of investment such as rents, land and house values etc.
Flow of traffic	Continuous flow of traffic in terms of vehicular traffic and types
Type of mixed uses	Indicate the type of function or activity that occupied the individual building along the selected streets such as variety of business and services. Street level uses are primary factors that determine the flow of people and are important attractors of pedestrian.
Observed activity	Refers to the behavioural lingering activity people are engaged
PERCEPTION	
Safety and Security	This refers to experiencing freedom of dwelling in an area with no feeling of being vulnerable or expose to harm or danger.
Sense of belonging	Sense of belonging means the degree of attachment or involvement a person feels towards a place or community that he/she lives
Comfort	A sense of physical, environmental, and psychological ease a person feels. A state or situation in which a person feels relaxed and do not have any physically unpleasant feeling cause by pain
Social interaction	Social interaction describes the way people talk and act to those around them. It is an exchange between two or more individual
Privacy and home territory	The level of sufficient privacy, and feeling of stewardship over their environment.

Compiled by author from other various sources (Appleyard and Lintell, 1972; Madanipour, 2010; Mehta, 2013; Montgomery, 1998; UN-Habitat, 2012b)

2.5.1. Overview of methods

In order to measure the quality of street as public space, various research tools, and techniques exist in the field of geography, urban planning, and transportation. These include both qualitative and quantitative measures. Jacobs (1985) suggested an effective traditional method involving the observation of street use, with a behavioural mapping technique that includes bicycle flow, counting of pedestrian and mapping of

physical streets. The UN-Habitat (2013) for example focus on the quantitative measurement of certain indicators of streets connectivity while the qualitative aspect was not included base on the limited information, data collection was done with the use of satellite imagery, field verification and document from government transport ministries. In line with connectivity measurement, Dill (2004) elaborated different methods and indicated what level of connectivity is appropriate based on the research context and the availability of GIS data from the local planning authority. Other researchers have employed both qualitative and quantitative measurement (Appleyard and Lintell, 1972; Asiedu and Arku, 2009; Dill, 2004; Landman, 2004; UN-Habitat, 2012a). These studies involved a triangulation of several sources of knowledge such as observation (photo, sketch, activity mapping and field data collection), dialogue (semi structure interview with focus group, walk) and questionnaire survey. Subsequently, this research will make use of mixed methods approach (Bryman, 2012) to include a combination of both qualitative and quantitative methods. The use of mixed method will enabled comparison and triangulation of the indicators

3. BACKGROUND TO CASE STUDY AREA

This chapter introduces the case study area that includes its location within the context of Dar es Salaam and Msasani ward, the typology of land uses and the criteria used in the selection of the case study streets. Finally, the three selected streets namely Street 1 (planned/gated), Street 2 (gated/unplanned), and Street 3 (planned/unplanned) for the purpose of this study were briefly described.

3.1. Case study area

Dar es Salaam is the largest and major commercial city of Tanzania and the largest city in East Africa (UN-Habitat, 2014). DES lies between the 6°48' South latitude and 39°17' East longitude and covers an area of approximate 1600 square kilometre. The city is demarcated into three administrative unit of Ilala, Kinondoni and Temeke district with seventy-three wards affiliated to them (See Figure 3-1).

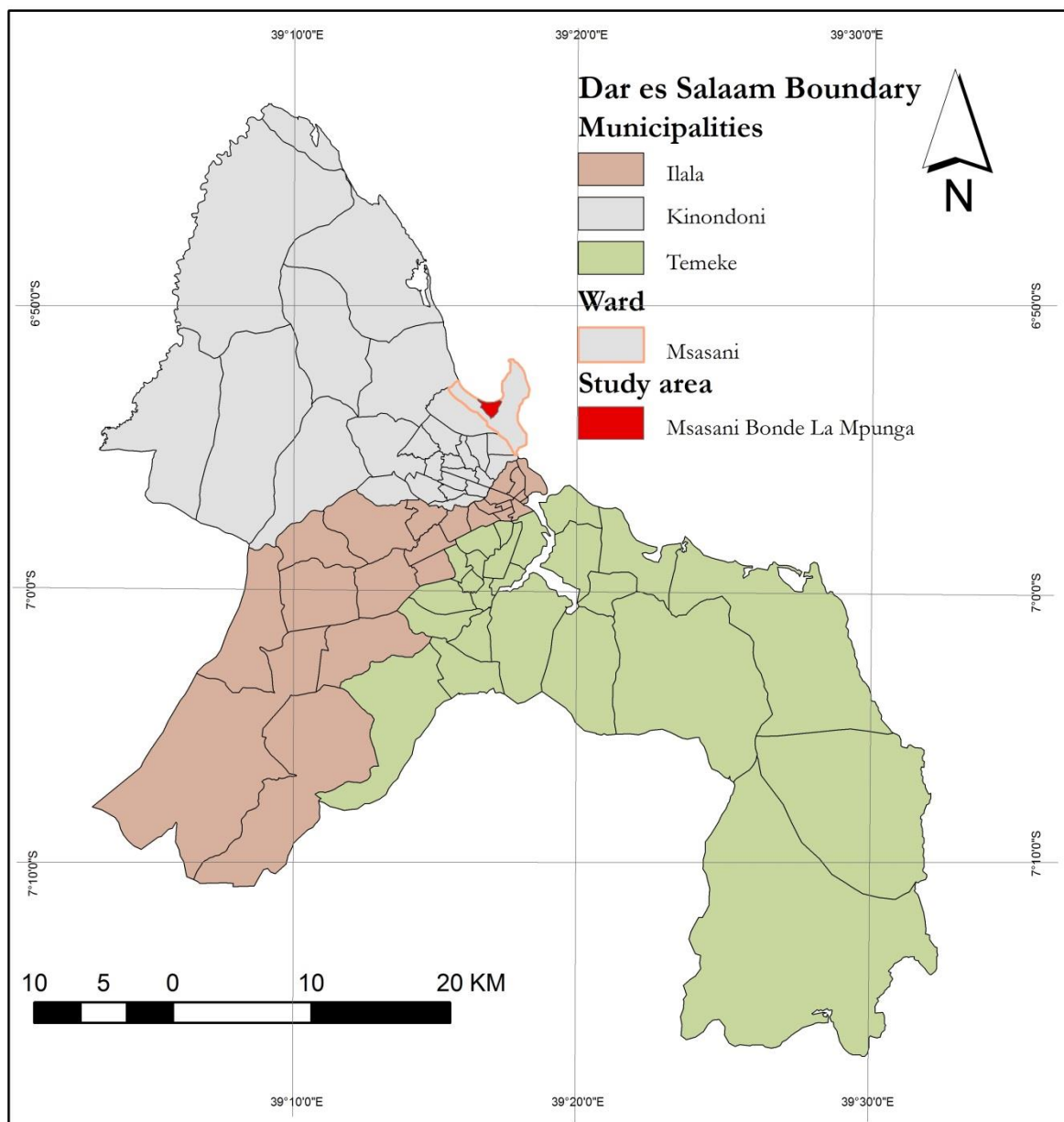


Figure 3-1: Map of case study area in Dar es Salaam

The city has experienced rapid urban growth, from being a coastal fishing village on the periphery of Indian Ocean to a city with approximately 4.4 million inhabitant (NBS, 2013). This rapid urban growth has led to an increase development of unplanned settlements where 75 per cent of the population reside, that lack access to adequate basic services such as water, streets, public spaces, and standard housing. According to the 2002 Tanzania World Bank Country Strategy Paper (as cited in UN-Habitat, 2009), more than 105 unplanned settlements were formed in 2002, amidst planned developments and of recent the proliferation of GC.

3.1.1. Criteria for the selection of the study area

Three criteria were used in the justification of the selected study area. This includes

- Information rich study area
- Identification of distinct morphological characteristics
- Identification of shared streets

Three possible wards were identified to conduct the study that is Kariakoo, Msasani, and Mikocheni. The settlements of Msasani Bonde la Mpunga (MBLM), in Msasani ward were chosen in line with the above criteria, after consultation with local expert and site reconnaissance.

Information rich: According to Nguluma, (2003) the selection of case study should be based on ability to provide rich information, in which such information rich cases gives better and in depth understanding of the phenomena under study. Information rich studies such as those conducted by Leader and Lupala (2009); Lerise and Malele (2005) in MBLM can be used as sources of evidence in this study. These studies provide rich information on history and evolution of the urban fragments of the settlement.

Identification of distinct morphological characteristics: In MBLM, the different urban fragments, that include the gated community, planned neighbourhood and unplanned neighbourhood are recognised from the morphological pattern of the settlement as shown in (Figure 3-2). This aspect is important as the study aims to measure the street quality for better understanding of the different urban fragments towards social integration.

Identification of shared streets: Within the chosen study area, the author was able to identify streets that are shared between of two urban fragments for instance, planned, and gated community. Such streets allow for investigate the level of interaction and activities between these fragments. As such, MBLM offers the opportunity that was missing in the other two earlier identified settlements whose borders streets are arterial roads, it would have been difficult to study social interaction.

Msasani Bonde la Mpunga: MBLM³ covers an area of 1.17 sq. km with a population that exceed 13,000. According to Casmiri (2008) the settlement is one of the faster growing settlements in Kinondoni municipality, due to it close proximity to some major institutional, residential and commercial buildings such as the (American embassy, referral private hospital, formal senior government officials residence and major shopping mall). Moreover, MBLM is located about six kilometres from the CBD. The settlement (see Figure 3-2), is border in the western side of the Mwai kibaki road, in the north is the Indian Ocean while at the northeastern is the Kimweri road. The unplanned neighbourhood is located on the southern part and on the northern part is the planned, sandwiched between the two are the gated communities of Highland villa and Mayfair apartments

³ The word Bonde la Mpunga in Swahili means valley of rice, area was use in the past for rice farming. (information from key informant)

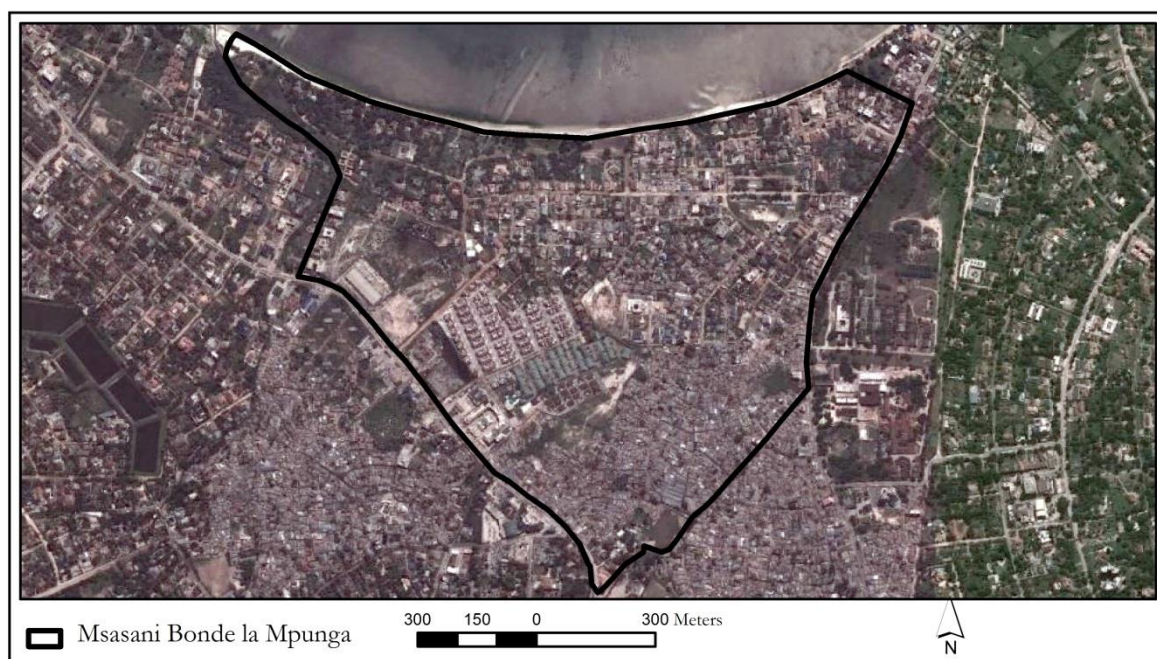


Figure 3-2: Morphological pattern of the study area

3.1.2. Evolution of morphological characteristics of Msasani Bonde la Mpunga

Before the 1980s, the area was designated in the 1968 and 1970 DES city master plan as a hazard land (Lerise and Malele, 2005) at that period few informal houses existed and area was predominantly use for rice farming. However, by mid 1980s there was a rapid increase in the developments of residential houses, due to the liberalization policies and economic reform of that period, which favour market forces.

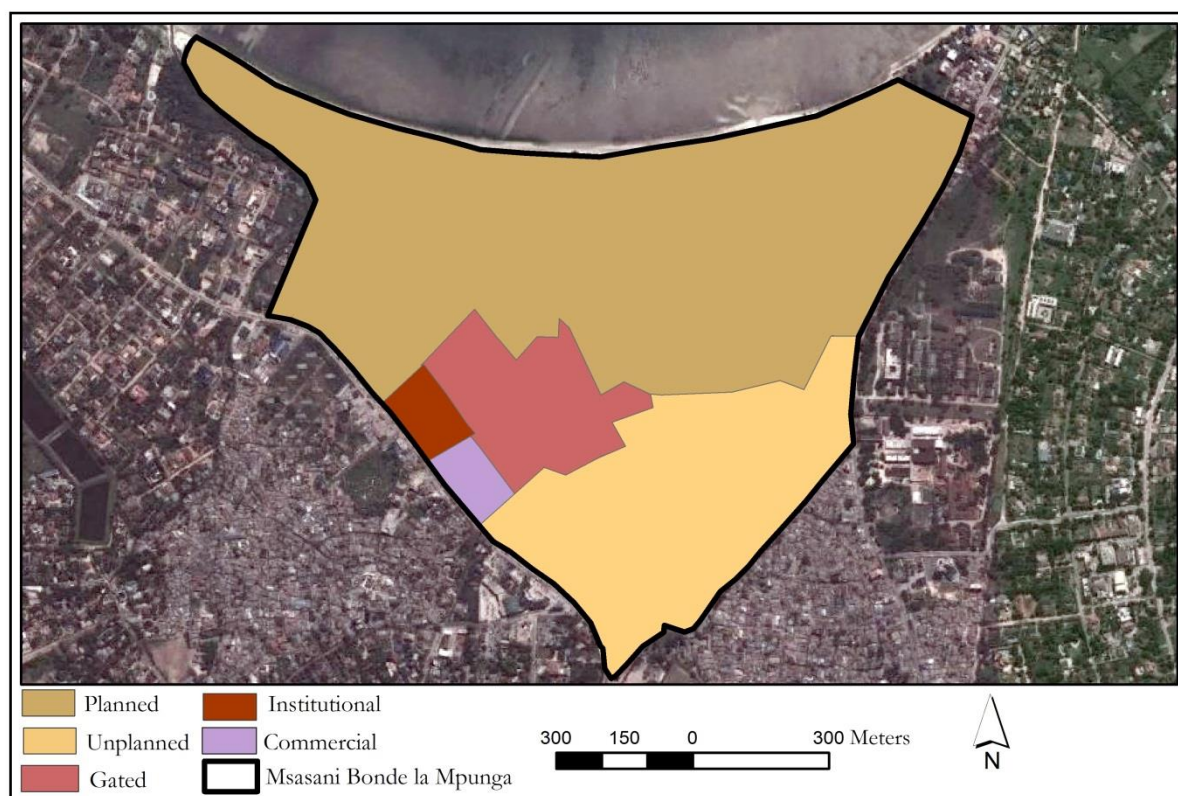


Figure 3-3: Existing land uses 2014

By 1992 and 2001, the DCC and the municipality in conjunction with other urban planning agency prepared and approved two subdivision schemes (Leader and Lupala, 2009). Such that, plots were allocated for the development of private residential, estate for gated communities and other land uses amidst the existing informal developments. Thus given rise to the existing urban fragments (Figure 3-3).

The main land uses of the study area comprises of five categories. This includes the planned residential neighbourhood that account for more than half of the total land area, located mostly at the northern part of the settlement, next to this in terms of area covered is the unplanned residential neighbourhood in the south eastern part. The third category is the gated communities accounting for the 10 per cent of the area which is then followed by the institutional and commercial areas (Tanesco and Mayfair shopping plaza) accounting for 2 per cent respectively see Table 3-1 below.

Table 3-1: Land use allocation in the study area

Land uses	Area (ha)	Percentage (%)
Planned residential	74	63
Unplanned residential	29	25
Gated communities	10	8
Institutional	2	2
Commercial	2	2
Total	117	100

3.2. Criteria for the selection of case study streets

A pilot survey of streets within MBLM was carried out initially to determine suitable streets between the different urban fragments, for instance the gated community and the unplanned neighbourhood. Street considered include Kimweri Avenue, Tanesco road, Alibaba road, Menrab and Mayfair road. Tanesco road, Mayfair and Mehrab Street were selected based on the criteria below that includes

- Location: For better understanding of the role of street as a binding factor, streets are selected based on their location between combinations of two different urban fragments, in which such street serve as border between two neighbourhoods.
- Shared access: The selected street should share access between two distinct urban fragments for instance between the gated and unplanned neighbourhood. In which a shared access ensures that both neighbourhood constantly uses the street to access their homes as well as ensures opportunities to perform activities, this is necessary in order to study the social interaction that exist between the neighbourhoods of different urban fragments.
- Street type: The street type in terms of hierarchy of roads plays a fundamental role in the selection of streets within the study area. That was why Alibaba and Kimweri Avenue were not chosen because they serve as arterial road. However, Tanesco, Mayfair, and Mehrab were chosen, as these are neighbourhood residential streets for better study of the social relation between the urban fragments.

Other, reasons is that the selected streets covers a combination of the different urban fragments as briefly described below.

3.2.1. A brief description of case study streets

Street 1 (planned/gated): The Street bordered and served as the shared access to the Highland villa formerly known as the Dar villa a gated community and the planned non-gated neighbourhood⁴.

⁴ Majority of the individual buildings within the planned neighbourhood are fenced but with open streets. (further details in section 5.1)

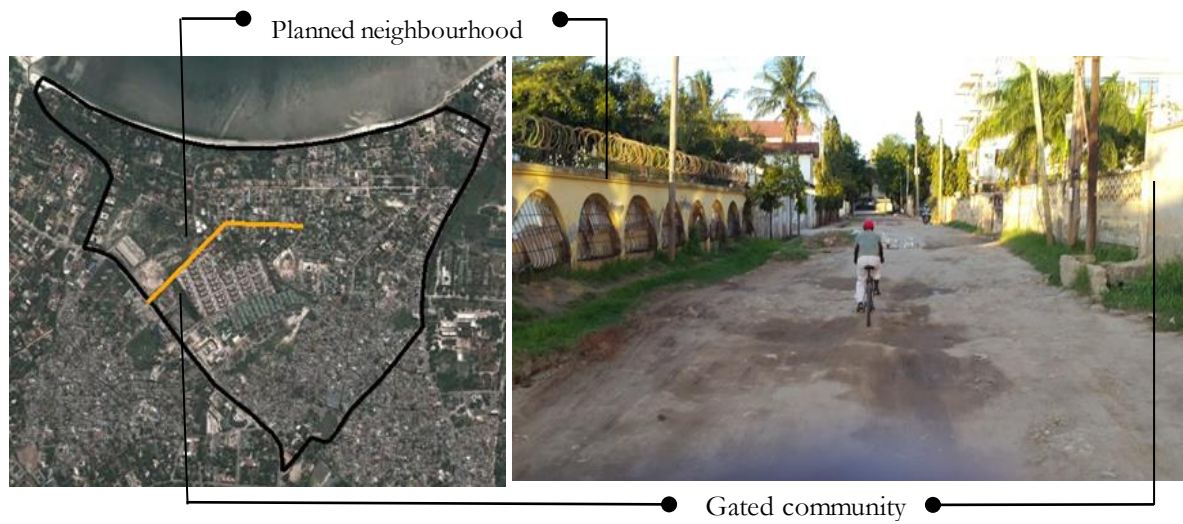


Figure 3-4: Satellite imagery of Street 1 and segment photo

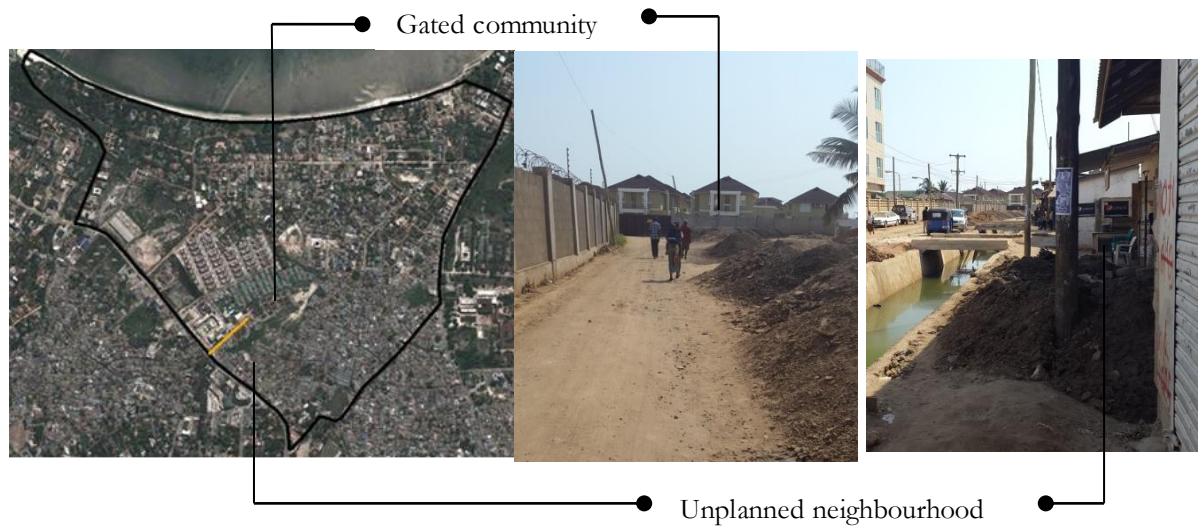


Figure 3-5: Satellite imagery of Street 2 and segment photo

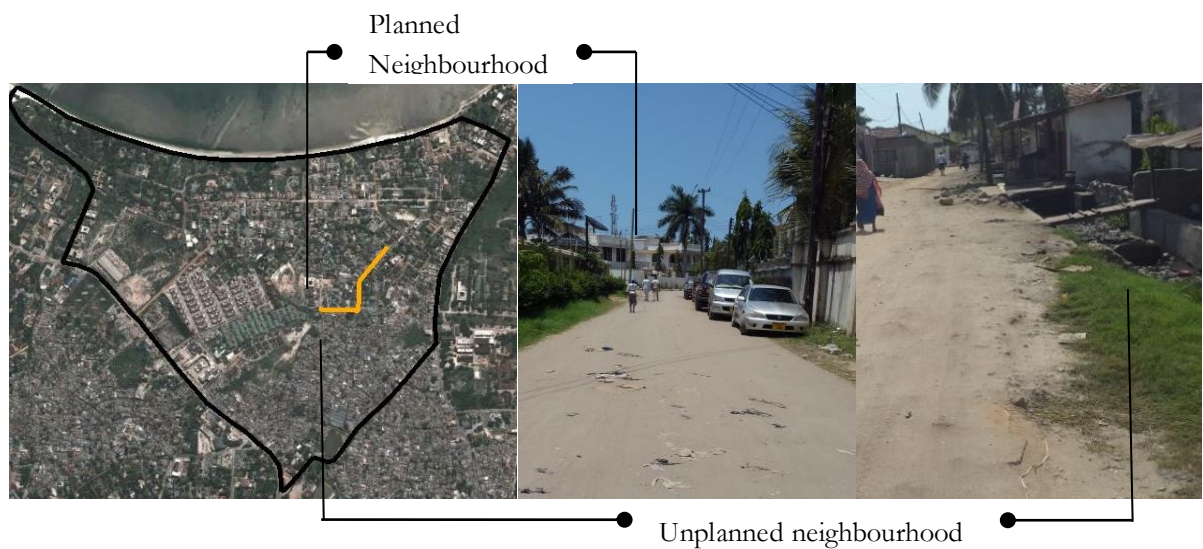


Figure 3-6: Satellite imagery of Street 3 and segment photo

The street popularly referred to as Tanesco road by the residents was named after the first institutional building (The Tanzania electrical supply company regional office) located on the first plot at the entrance of the street. The road also serves as one of the main entrance to the Msasani beach. As at time of fieldwork, a contract has been awarded for the upgrading of road from gravel to tarmac (Figure 3-4).

Street 2 (gated/unplanned): Locals referred to the street as Mayfair Street, it serves as a shared access to two different communities. The street (Figure 3-5) bordered to the right an unplanned slum neighbourhood, (Bonde la Mpunga) and on the right by Highland villa and Mayfair apartment. The Highland villa only has its eastward perimeter fenced (adjacent to the street). The street is composed of a 198-meter clear delineated street segment that intersect with a 395-meter length of undefined open space that connects several footpaths serving as access to some part of Bonde la Mpunga unplanned neighbourhood. The street intersects with the Mwai kibaki major road at the southern part thus having good accessibility, the street has variety of small holding street level commercial activities such as restaurant, grocery stores etc. also located along the street, with its entrance to the major road is the Mayfair shopping plaza. Construction of culvert for the improvement of drainage system is underway along the street.

Street 3 (planned/ unplanned): Mehrab Street named after a foreigner who was the first to build and settled within the planned neighbourhood along the street⁵. The street serves as shared access between the planned and unplanned slum neighbourhood. As one moves along the street towards the unplanned settlement, one begins to observe footpaths that were used by some resident of unplanned neighbourhood to access their homes and the neighbourhood in general. The street connects through another street to link up with the Kimweri major road on the northern segment see (Figure 3-4c).

⁵ Information on Mehrab Street was history was from the key informant representing Msasani subward.

4. RESEARCH METHODOLOGY

This chapter contains methodologies used in the research design phase to the process of analysing the data. This includes research design developed in a consistent manner to guide the various stages of the research; followed a list of indicators with a brief description of criteria used in their selection. Next is a discussion of data collection process during the fieldwork that includes observation, activity mapping, and interviews. Finally, the data analysis section explains the data organisation and analysis techniques in the measurement of the street quality in order to answer the research question and realise the research objectives.

4.1. Research design

The research design constitutes the plan in a logical and consistent manner for the collection of data, measurement and means of analysing the data collected, it connects the empirical data to the research question and to its conclusion (Yin, 2014). The research design therefore guides the researcher to ensure an effective answer to the research question. A research design matrix in (Table 4-1) was used to guide this research, Table 4-1 indicates an overview of data requirement, data collection methods and data analysis techniques to answer the research questions in a bid to achieve the research main objective.

Table 4-1: Data requirement and methods

Data required	Data required	Source of Data	Methods of Data collection or analysis technique
•What are the physical characteristics of street?	Observed physical characteristics of street indicators	Primary source(field observation)	Comparative analysis
•What is the level of connectivity?	Street network	Secondary/ primary data	Field measurement/Network analysis
•What are the uses and activities on the street?	Observed street uses and activities	Primary data (field observation)	Field observation, photos
•Do activities vary at different time of the day?	Pattern of observed activities	Primary data (field observation)	Activity mapping
•Where are areas of social activities?	Location of activities	Primary data (field observation)	Activity classification and mapping
•What are the resident's perceptions of the quality of the street?	Perception of resident on street quality	Primary data (survey and interviews)	Structured questionnaire survey and semi –structure walking interview/textual and descriptive analysis

•What impact does perceived quality has on resident's usage of street?	Information on resident perception	Primary Data (field work survey and interviews)	Walking interview, on street questionnaire survey / textual and descriptive analysis
•What is the relationship between level of streets connectivity, activity, and perceived street quality?	Level of connectivity, activity and perception and literature	Primary (results from analysis) and secondary(literature)	Inductive
•What is the impact of the physical characteristics of street on social integration of gated, slum and non-gated communities?	Perception, physical characteristics street and literature	Primary (results from analysis) and secondary(literature)	Inductive

4.1.1. Selected relevant indicators

There are no universal indicators as mentioned earlier in the literature review; therefore, the selection of indicators should be based on certain relevant criteria (see Section 2.6, Chapter 2). In view of the reviewed literature, the selected indicators (see Table 4-2) is based on the following criteria

- Indicator type: The indicators that are selected took into cognizance the two types of indicators identified quantitative and qualitative indicators (see Section 2.6). Reason is that unlike the measurement by UN-Habitat (2013) that focus on the quantitative indicators for their study, the combination of both types can contribute to the understanding and interpretation of the other. As such, the presence of street furniture can help to explain and understand resident perceived level of safety etc.
- Scale of analysis: The study by UN-Habitat (2013) was based on a global and aggregated scale, according to Pacione (2003) aggregated indicator on a national, regional or global scale are specific for such national goals while local situation which is hidden within the aggregate might leads to ecological fallacy (Martínez, 2009). Consequently, the main indicators listed in (Table 4-2) were selected in order to measure on a disaggregated and local scale of analysis, in this case, the ward for the purpose is to revealing street qualities that might be hidden in the aggregated measurement. For instance, indicators such as the presence of a footpath was included after the field reconnaissance survey in which footpaths was realised as a means of pedestrian connectivity in the unplanned neighbourhood of the study area.

Table 4-2: Selected relevant indicators

INDICATORS	DEFINITION
CONNECTIVITY	
Intersection density/connection	This refers to the number of intersection per one square kilometre. The more connected the network the less barriers to the different urban area. This also leads to an increase urban circulation.
Street density	The street density is measured in term of the total length of linear kilometres of the street as per one square kilometre of land
Proportion of land allocated to street	The total land covered by streets as a percentage of the total land area of the study area.
Accessibility index	The accessibility index calculates the actual travel distance by the direct distance. An index of 1.0 indicate a straight route for pedestrian
Street pavement material	Street pavement materials refer to the type of road surfacing, for instance gravel, earth, and murrum. The condition of such street pavement
Presence of Sidewalk	A pathway, that runs along the side of the road. It makes street to be more accessible to pedestrian
Footpath	A path that is intended for pedestrian only. A thoroughfare, for people moving on foot, which also encourage social interaction
ACTIVITY AND LAND USES	
Flow of people	Continuous flow of people, quantifies movement of pedestrian by counting at different time of the day. The demographic characteristics of the pedestrian in the case study area are noted.
Flow of traffic	Continuous flow of traffic in terms of vehicular traffic quantifies the motorised movement and categorise the flow by the type. Vehicles were counted at different time of the day at designated location.
Type of mixed uses	Indicates the type of function or activity that occupied the individual building along the selected streets, such as variety of business and services. Street level uses are primary factors that determine the flow of people and are important attractors of pedestrian.
Observed activity	Refers to the behavioural lingering activity people are engaged
PERCEPTION	
Safety and Security	This refers to experiencing freedom of dwelling in an area with no feeling of being vulnerable or expose to harm or danger.
Sense of belonging	Sense of belonging means the degree of attachment or involvement a person feels towards a place or community that he/she lives
Comfort	A sense of physical, environmental, and psychological ease. A state or situation in which a person feels relaxed and do not have any physically unpleasant feeling cause by pain
Social interaction	Social interaction describes the way people talk and act to those around them. It is an exchange between two or more individual

4.2. Data sources and method

According to Yin (2014) collection of data for case studies research depends on different sources of information that includes direct observation, measurement, interviews, documentation and other sources such as videotapes and photographs.

During the period between September and October 2014, the author collected fieldwork data that covers measurement and observation of selected indicators and other streets physical characteristics. This followed the direct observation of people activity and mapping of stationary and lingering activity. Interviews to get in-depth understanding of the study as well as resident perception of the quality of the street and social interaction that exist within and across the different neighbourhoods were conducted.

4.2.1. Field observation and measurement

The observation was carried out for different purposes and at different time of the day, between the period of 30th September to 14th October during weekday and at weekend. Purposes included:

A- To capture and measure indicators that relate to physical characteristics of the streets as earlier identified in the literature review and modified for this study (Table 4-2). In addition thirteen other indicators to capture the physical street characteristics were included such as presence of trees, benches etc. (See appendix 1)

B- The author conducted a direct walk by observation of people activity such as chatting with friends, standing alone, eating at a food vendor stand, and conducting business. The observed behavioural activity covers all forms of social, optional, and necessary activity in order to determine the typology and hierarchy of activities. Observation was structured to capture activity at different time of the day, this include 0800hrs-0900hrs for morning, 1200hrs – 1300hrs for midday and 1700hrs- 1800hrs to capture activities at evening.

C- The author observed the flow of people and counted at a strategic location, this was carried out at (Gehl, 1996) intersections and entrance to the street in order to capture everyone that entered the street. This involved a fifteen-minute count of both pedestrian and the number of people inside the vehicular flow at different time of the day.

4.2.2. Activity/behavioural mapping

Mapping of stationary and lingering activity of people, according to the literature is an effective method to understand preferred location where people gather and the type of activity they are engaged in (Francis, 1984; Ittelson, Rivlin, and Proshansky, 1976; Mehta, 2013). Thereby providing spatial pattern and evidence of the location of preferred activity, in this case, the author conduct a walk- by observation, aided with the GPS to mark location of such activity. Mapping activities cover the three selected streets, during the period; the number and gender of people involved in such activity was recorded.

4.2.3. Interviews

The forms of interview identified by Yin (2014) includes open- ended, structure question and focus groups interview, in which an interview was described as one of the most important source of information in a case study research. An interview helps the author to understand resident and stakeholders' perception it also aids to validate and strengthen the empirical data. The author adopted three form of interviews that includes walking interview (Evans and Jones, 2011), structured questionnaire and face-to-face semi structured interview with key- informant. Based on ethnical consideration, the author sought permission from the local municipal authority, facility managers at the gated community, as well as from the individuals. The final decision was based on the individual willingness to participate. Table 4-3 indicates types and list people interviewed.

Sampling strategy: Formulating a sampling strategy, requires taking into consideration the desired level of accuracy, time and resources available (Kumar, 2005). For that reason, the sample was based on the non-probability quota sampling, due to the lack of sampling frame, most especially for the unplanned neighbourhood. Other reason was the prospect of accessing the respondent in a more convenient

strategic location along the selected streets. The proportion of respondent in terms of gender and age interval was a good representation of the district and ward population characteristics (see Appendix 2). Furthermore the researcher adopt purposive sampling to select three key informant based on their experience, current position, years of stay in MBLM in order to acquire more information regarding the research interest.

Table 4-3: Types and list of person interviewed

Form of interview	Role	No of interview
Questionnaire survey	Resident	60
		(20 respondents per three selected streets)
Walking interview	Resident	6
Key informant	Academia, HOD landscape Architecture Ardhi	1
	University	1
	Government Official Kinondoni Municipality/Urban planner	1
	Representative of sub ward MBLM	

Questionnaire survey: The survey was conducted with resident and workers to inquire about their perception of their street regarding the quality of the street and their feeling about the neighbourhood, social interaction between and within the different urban fragments. Aspect covered ranges from issue of safety, comfort, and sense of belonging. For questionnaire sample, see Appendix 2.

The survey was based on closed structured questionnaire in a likert scale format of 1 to 5. The questionnaire was administered with the help of research assistants from the Ardhi University who have been involved in such researches and have fore knowledge of the study area in Msasani. The research assistant translated the questionnaire to the local language Swahili also detailed instruction and training of how to administer the questionnaire was conducted prior to the exercise. The exercise was carried out during both the weekday and weekend to capture perception of residents that maybe out of the neighbourhood during daytime for work purpose. Interview lasted an average of 20 minute, as some respondent cannot read. Therefore, researcher asked the questions and the responses are indicated on the questionnaire sheet by the author. This also gives ample time for the respondent to express their opinion.

Walking interview: The semi structured walking interviews⁶ were conducted to have an in-depth understanding of the perceived street quality. This allows ample time for the participant to narrate their experiences more so the interviewer is able to probe further for more details. More importantly a walking interview is effective in understanding and capturing the relationship between perceived quality and the spatial environment (Evans and Jones, 2011) in context of what people say and where it was said.

A preschedule appointment was organised for four out of the six participants to allow for a convenient time the participant is willing and available for the interview. The interviewee takes the interviewer along their route relating and pointing out areas perceived as pleasant or unpleasant by the participant along their route.

The interviews and the routes followed was recorded and tracked respectively. Likewise, interesting places referred to by interviewee as pleasant or unpleasant was marked as point (see Appendix 4). This involves the use of tools such as audio recorded, notepad, gps tracking device and camera for photo taking.

Key informant: A face-to-face interview of key informant based on criteria mentioned above was conducted. This includes one academia who has considerable knowledge relating to the topic, representative from the Msasani sub ward (respondent has lived 29 years in the community) to give more

⁶ It involves walking along with participate base on their permission and in line with rules of ethnic conduct. The participants have no objection to the use of the data for academic purpose, provided their personal information remains confidential.

insight into the historical development of the area and a government official to give insights into government policy. The interview with the government official that was initially meant to be face-to-face ends up being a mailed interview.

4.2.4. Secondary data

Secondary data was source from reports, document, books and maps from desktop internet resources, library as well as from the Ardhi University and Kinondoni municipality in Dar es Salaam

4.2.5. Limitation and quality control

In view of the limited time for data collection, to ensure quality of data and ethical consideration, adjustment was made regarding certain part of the data collection process.

Time required for securing local permission from the municipality to conduct fieldwork was longer than expected, this affect the administration of questionnaire which was reschedule and an extra research assistant was trained in order to administer the required number of sample within the limited time. Gaining access into the gated community was also a challenge eventually permission was granted by the facility manager. To ensure quality only the graduate research assistant who was recommended from the Ardhi University was recruited and trained to have a clear understanding of the research. Furthermore because of language barrier the questionnaire was translated to the language Swahili by the research assistant also the audio-recorded interviews was transcribe back to English. The researcher try to cross check some of the translation using Google translates and areas of concerns was revised before the administration. Likewise, the researcher repeatedly asks for interpretation during the interview in which notes was taking to verify the transcript audio.

In most of the cases the interview was recorded based on the consent of the respondent, however where there was an objection from the respondent the researcher continued by taking notes.

The counting of flow of people was reduced to fifteen minute interval avoid fatigue experience by long time counting thereby ensure more accuracy. In addition, measurement of indicators such as street width was verified with secondary data for validation.

Some residents were unwilling to be interviewed based on what they stand to benefit financially and in some cases resident are just tired of being repeatedly interviewed for different reason because of previous research. This necessitates the researcher to sample only those that are willing as the responses from such unwilling respondent may not be accurate.

4.3. Data analysis methods

After the fieldwork period, the quantitative and qualitative data collected was organised, updated, and clean up for the purpose of data analysis. The walking interview was translated and transcribed, also the interview with key informant was gathered for textual analysis using Atlas-ti software and the structured questionnaire from the survey was assembled using Microsoft excel. Furthermore, the GPS walking tracks and activity points were prepared using GIS software for visualisation of walking tracks and activity point on Google earth and ArcGIS.

Lastly, the available street network dataset (Road_2002) had to be updated by digitising the new roads, erasing road segment that no longer exist, the process was performed using the editor tool in ArcGIS which was verified with data from field observation and satellite imagery from Google earth. Updating of roads data is required for the calculating level of connectivity. The flowchart in (Figure 4-1) illustrates process of how data collected was analysed.

4.3.1. Analysis techniques

Activity analysis: The generalised quantitative and qualitative data on observed behavioural activities was categorised to analytical category (Ittelson, et al.1976) .The author categorised the observed activities into three types of activities that is necessary, social and optional as describe by (Gehl, 1996) also (see Section

2.4 Chapter 2). This was to further assess the quality of the street as public space by differentiating social and non-social activity as applied for example by (Lipovska and Stepankova, 2013). Subsequently, the data from GPS was used to create an attribute table in ArcGIS. Activity during the morning and midday was collated as daytime activity based on inappreciable change in activity between the two time differences. Each dot represent an activity thereby gives a spatial context to the analysis for visualisation of activities at different time of the day and supported with site photos. Finally, the pedestrian flow count was analysed using Microsoft excel, graphs and tables showing frequencies was produced for further analysis.

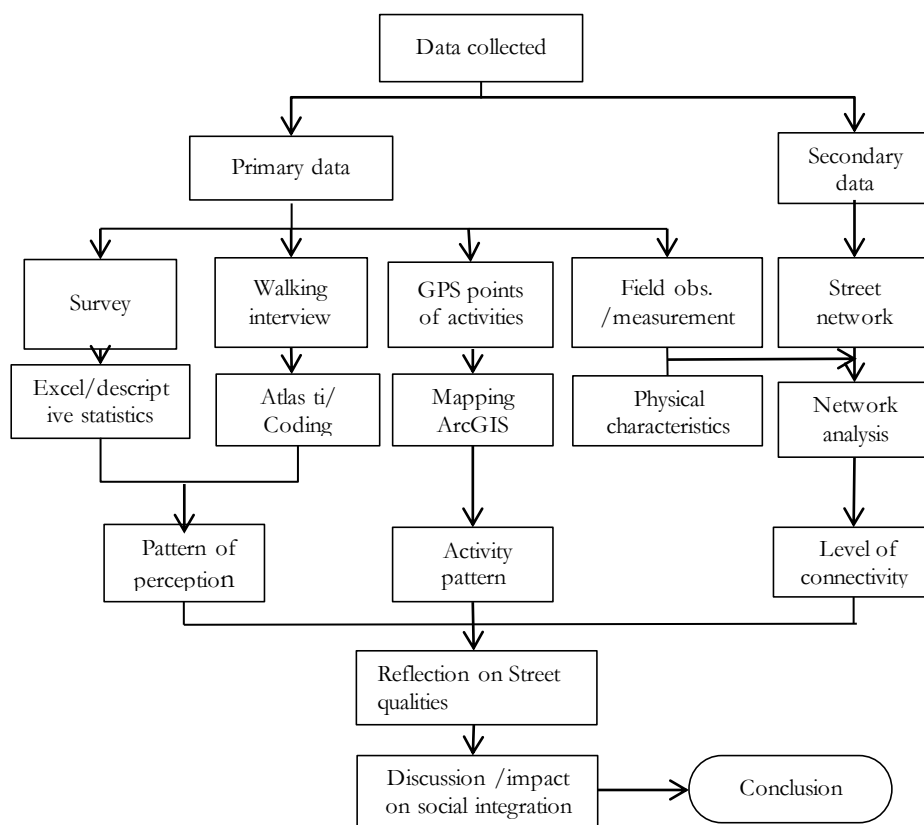


Figure 4-1: Flowchart on data collected and analysed

Network analysis: The connectivity measurement was analysed using network analysis an extension in ArcGIS after the updating of street network data (road_2002) of the study area in ArcGIS, using the network analyst. The computation of the intersection density in which the nodes are reclassified to real node and dangling nodes see definition of phrases in (Table 4-4) was realised. The streets within the GC were excluded from the connectivity analysis for the entire settlement, because of the disconnection of the streets from the entire settlement street network. Furthermore, the street network within the GC is private streets that are not accessible for public use of all residents of the study area. However, separate analysis was computed for the each neighbourhood to measure level of street connectivity within different neighbourhoods. Similarly the network analyst was used to compute the accessibility index by creating a new network layer of OD cost matrix for some specific location by subjectively identifying an origin (residential) and destination (shopping plaza) to established new routes while a layer of closest facility routes for visualisation.

Others connectivity indicators such as LAS and street density were calculated in ArcGIS using the definition formula (see Section 4.2.1 Chapter 4); the street width used in the calculation was based on the average street width identified for the different urban fragments.

Quantitative and qualitative analysis (Perception): The qualitative and quantitative data on perception was transcribed in word document and analysed using the Atlas-ti software for analysing qualitative data, which also included data of the interview from academia and representative from the sub ward. Atlas-ti software supports coding and revealing of trend in data.

Table 4-4: Phrases used in network analysis

Phrases	Definition
Link	Street between two intersections or a dead end to an intersection. This is also the segment between two nodes
Network	These are set of lines representing the geographic phenomena in this case roads in transportation
Node	A node can be real or dangling node. This is an endpoint of a link
Real node	This is an end point that connect to other links
Dangle node	An endpoint that does not connect to other connection refers to dead end or cul de sac

In addition, the quantitative data from the structured questionnaire survey was analysed and graphs, tables and charts to show frequencies and percentage for better understanding and clarification of the result was prepared using Microsoft excel. In which most of the question from the questionnaire was rated using the likert scale format 1-5, where 5 means strongly agree and 1 means strongly disagree and 3 refers to neutral that is neither agree nor disagree. Other questions are also rated between 1-5 for instance question on level of contact within and between the different neighbourhood indicate 5 as highest level of contact that is very good and 1 the lowest level of contact that is bad.

5. MEASURING THE QUALITY OF STREETS AS PUBLIC SPACE

This chapter documents the outcomes of the research phase on measuring the quality of streets as public space within different urban fragments, in MBLM settlement in DES, based on the quantitative and qualitative indicators. The chapter begins with a comparison of the physical characteristics of the three selected streets, followed by measuring the level of street connectivity of entire study area and within the individual urban fragments. Moreover, a detailed description of findings is provided, on observed activities and their locations. The documentation of findings ends with results on residents' perception of their streets qualities and usage. The chapter concludes with a reflection on findings from the study, as its relation to other studies particularly the UN-Habitat (2013) report on streets as public spaces.

5.1. The physical qualities of streets in Msasani Bonde la Mpunga

Centred on the research objective, certain indicators were identified to measure the physical characteristics of three selected streets. A comparative matrix of physical street characteristics in (Table 5-1) shows the measured indicators. The physical characteristics of the street contribute to how the streets are used as public space, in which the physical qualities of the street environment has an impact on the behavioural pattern exhibited by the street users.

Physical characteristics of Street 1 (planned/ gated)

The street can be characterised as a backside wide street. The street is dusty and when it rains muddy. However, the street is not defined in terms of demarcating into zones, such as space for pedestrian sidewalk, lanes, and street furniture etc. The street has a private residential feeling with low-level activities. Structures observed are of high quality standard (see Figure 5-1), majority of buildings within the planned neighbourhood are fenced, gated with security presence. However, the difference is that the entire neighbourhood of the gated community is fenced and gated. Furthermore, while the streets in the planned neighbourhood are accessible to the public, streets within the gated community are prohibited to public use. Though public streetlights are not present, the street is illuminated at night from security light in private houses within the neighbourhood, thus contributing to the level of safety perceived by the residents of this neighbourhood. Soft landscaping is present contributing to the shading of the neighbourhood also having positive effect on the physical quality of the environment.

Physical characteristics of Street 2 (gated/ unplanned)

The street is shortest of the three selected streets with a Street length of (192 metre) next is Street 3, it can be observed that the level of obstruction such as abandoned cars, construction waste and temporary business stalls have obstruct pedestrian free movement.

The street is well defined with drainage and building frontage on the side of the unplanned neighbourhood, (see Figure 5-3) this building frontage however are irregular therefore varies in width. On the other side of the street is the perimeter fence of the GC that stretches down to the end of the street. This demarcates the shopping plaza and the eastern part of another gated community (Highland villa) from the street. The street ends at a cul de sac that serves as access to the gated community (Mayfair apartments); there are low standard structure on the side of the unplanned neighbourhood and high standard structure on the side of the gated community. Street 2 is characterised by high level of commercial activities and movement of people this is attributed to permanent and temporary business along the street. The street is partially illuminated at night from security light at the shopping plaza.

Table 5-1: Comparative matrix of streets physical characteristics

Physical characteristics of street		Comparative Matrix		
Street Name		Street 1 (planned/gated)	Street 2 (gated/unplanned)	Street 3 (planned /unplanned)
Characteristic	indicator			
Street Design	Street width (in meters)	10	9	6
	Street length (in meters)	705	192	392
	Street pavement material	Gravel	Murram	Murram
	Presence of drainage	no	yes	yes
	Condition of drainage	-	Bad	Very bad
	Presence of defined sidewalk	-	-	-
	Presence of footpaths	-	Yes	Yes
	Condition of footpaths	-	Bad	Bad
Land use	Type of land uses	Residential	Residential	Residential
	Presence of mix uses	+	++	+
Street furniture	Presence of streets benches	-	-	-
	Presence of street light to illuminate street at night	-	-	-
Landscape element	Presence of soft landscaping such as trees, shrubs	++	-	+
Other issue	Obstruction of footpath (such as garbage, abandon cars etc.)	-	++	-
	Presence of police post	-	-	-
Key ++: largely achieved or presence +: presence but achieved to a minimal extent -: not achieve or absent Bad: open drainage dumped with garbage Very bad: shallow open drainage dumped with garbage				

Source: Author fieldwork, 2014

Physical characteristics of Street 3 (planned/ unplanned)

The street is basically a narrow street with a defined open drainage along the unplanned area, no setback from the buildings, high volume of waste are dumped in the drainage thereby having negative effect the physical quality of the street as shown in field work photos (Figure 5-3). Private buildings in the planned neighbourhood of this street are fenced with security gates though this does not affect the connectivity of the street, as street are publicly accessible, in addition there are footpaths that contribute to ease of pedestrian connectivity.



Figure 5-1: Photos of Street 1 physical characteristics



Figure 5-2: Photos of Street 2 physical characteristics

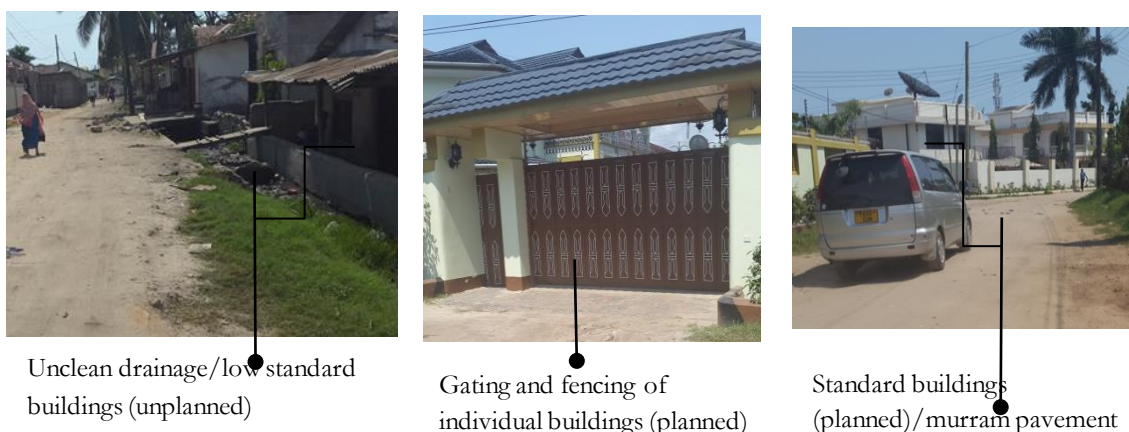


Figure 5-3: Photos of Street 3 physical characteristics

5.1.1. Level of connectivity

Three connectivity indicators were applied to measure street connectivity within the road network of MBLM that includes

- Proportion of land allocated to street (LAS)
- Street Density
- Intersection Density

The LAS is determined by two variables the total length of the street and the width (average of 8m and 3.5meter for the planned and unplanned respectively) which is computed as a percentage of the total land area (1.17 km²). In which 9.5 per cent of land within the study area is allocated to street and a street density of (12km/km²), this is relatively low and still slightly lower than the aggregate for the city of DES.

The intersection density is an important element that determine the street connectivity, in which the higher the number of intersection the more connected and walk able the street. The Figure 5-4, indicates the street connectivity in the study area, this was carried out by computing the connectivity in network analyst in which the nodes were reclassified into two groups, the real nodes representing the intersection and the dangle nodes the dead ends. The intersection density of (50 per sq. km) of land was realised, however, planned neighbourhood account for 76 per cent of the connection in the street network. The level of connection in the street network can be attributed to the barrier posed by the gated communities and irregular short streets pattern of the unplanned neighbourhood with predominant dead ends has shown on the map. This level of connectivity contributed to the less integration of the settlement.



Figure 5-4: Map of street connectivity for the entire study area

The siting of the gated community further contributed to the disconnection of the street in term of accessibility to facilities shown in (Figure 5-5 and 5-6).

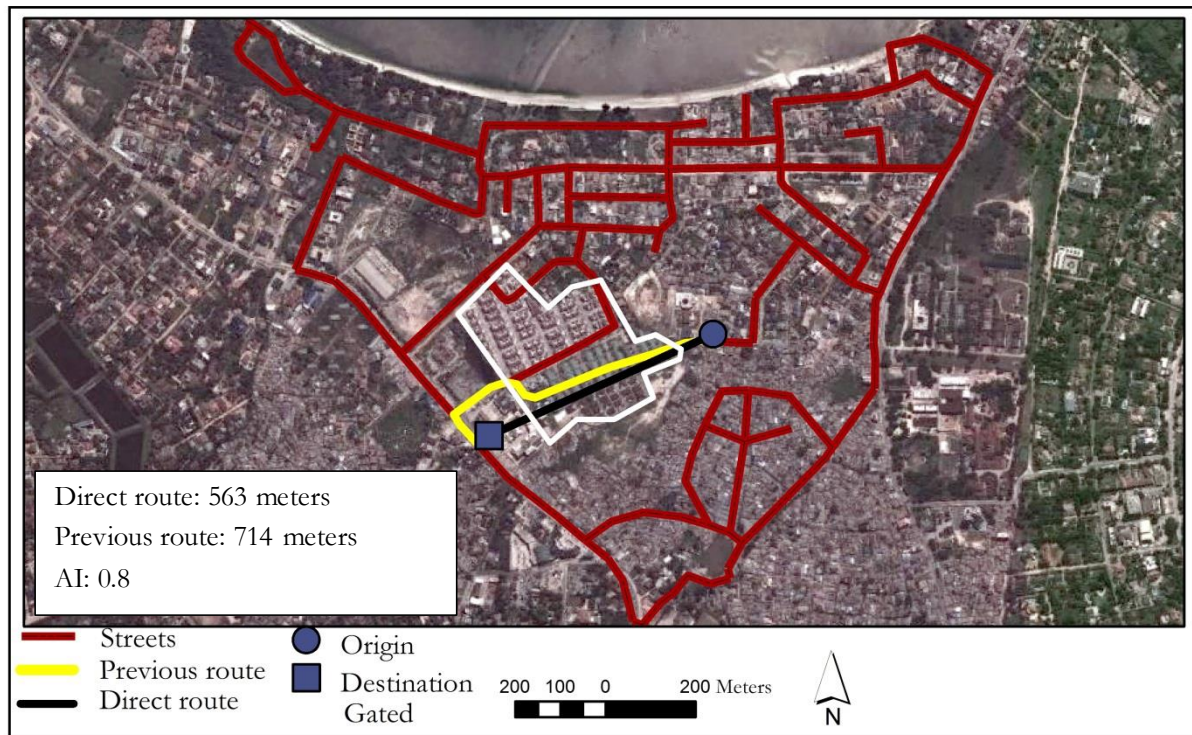


Figure 5-5: An example of accessibility index- previous network

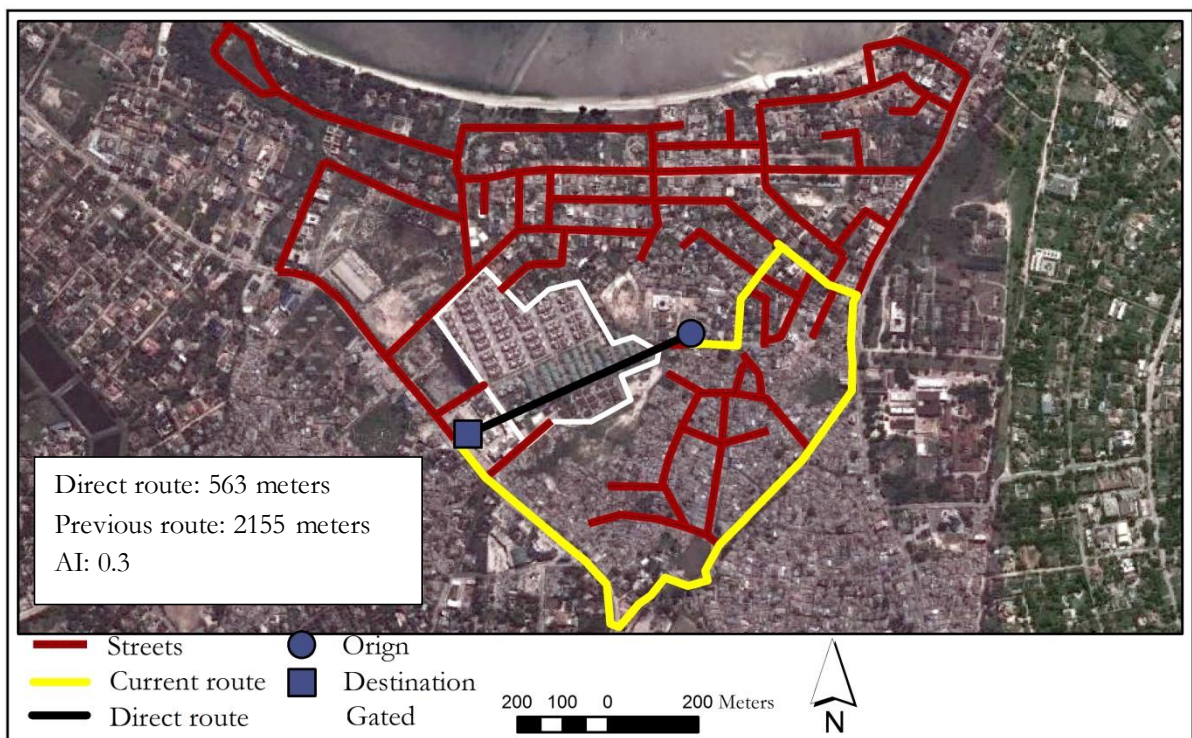


Figure 5-6: An example of accessibility index- current network

The map represents the travel distance from an origin(residential) to a destination(shopping plaza) within the settlement, results show an increased from the previous travel distance of 714meters to the current

travel distance of 2155 meters as compared to a direct distance on a straight line of 563 meters. Indicating that, the accessibility index (actual distance/ direct distance) has dropped from the previous 0.8 to a current 0.3 (see Figure 5-5 and 5-6). Meaning that in the previous street network before the development of gated communities, residents in that origin could easily walk directly to the destination. When compared to the current level of connection, which is two times longer than the previous route, while the direct route is two and half times shorter (563 versus 2155 meters). The differences in travel distance might affect resident modal choice to get to their location thereby reduce opportunity for social encounter.

5.1.2. Level of connectivity within the different urban fragments

Street connectivity also varies greatly between the three different residential urban fragments when measured individually (see Table 5-2). Results indicate that the gated communities allocated more land to street, with an overwhelming intersection density (261/sq.km) a figure that is four times higher than for the planned and unplanned neighbourhood respectively.

Table 5-2: Connectivity measurement within urban fragments

Neighbourhoods	Proportion of LAS (%)	Street design (km/km ²)	Intersection density (#/km ²)
Planned	10	14	61
Gated	12	26	261
Unplanned	9	12	50

The level of connectivity can be attributed to the shorter block length and therefore more connection (Figure 5-7). Nevertheless, this connectivity has no value to the connectivity of the entire settlement of MBLM, since GC is not accessible to the public. As anticipated, the unplanned neighbourhood has the least connection, however this is compensated for by the observed internal footpaths.

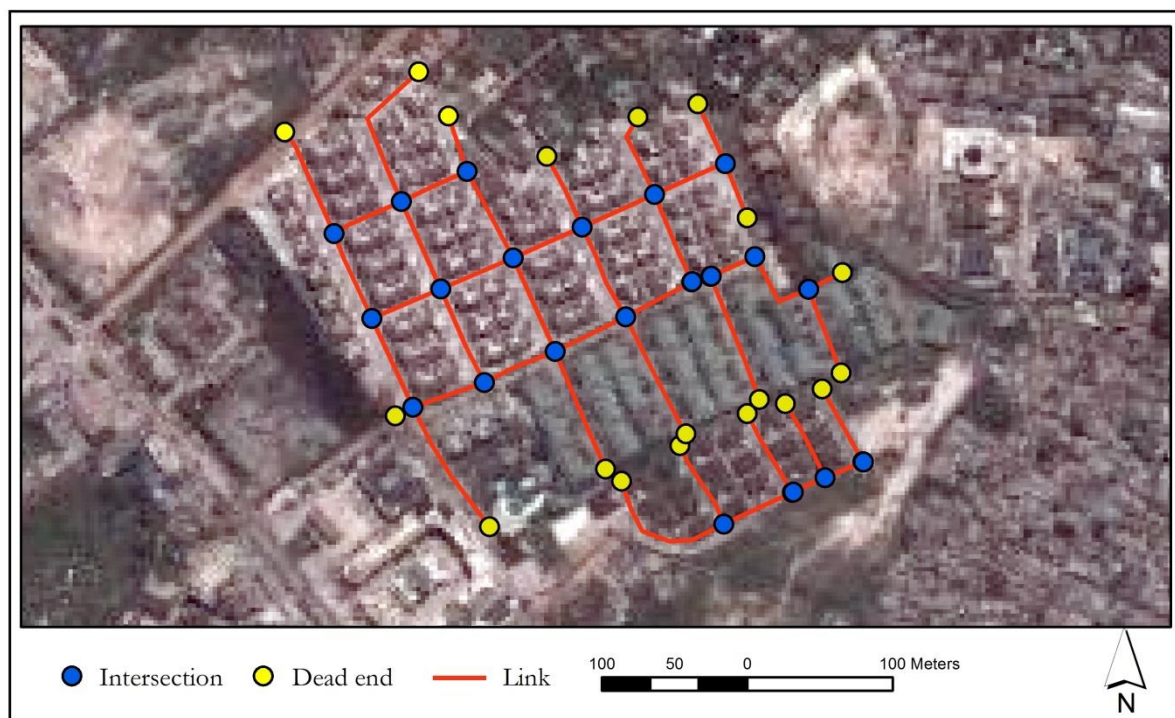


Figure 5-7: Street connectivity within gated communities

5.2. Activity

Activity assessment within the study area was based on two indicators, diversity of activity and vitality regarding the flow of people. The methods involves recording and mapping of resident activities, in addition counting of pedestrian and vehicular flow for better understanding the street vitality as a public space.

5.2.1. Observed uses and activities on the three selected streets

The activities considered during observation were stationary and lingering activities relating to the use of the street and its environment as a public space. The observed behavioural activities reflect on the quality and character of the street.

Table 5-3: Observed behavioural activities and analytical categories

Observed Activity	Analytical Category
Mechanics fixing a cars	Work
Couple of men operating and moulding blocks	
Men at work on road construction	
Car washers, washing cars	
Kiosk operator selling at a stall	
Woman attending to customers at a local restaurant	
Security operator patrolling a building	
Street vendor attending to buyer	
Children washing plates in front of a house	
Motorbikes drivers negotiating with customer	
Shop operator sitting outside the stall	
Man offloading from a vehicle	
Security man opening the gate	
Store operator watching street activity	
Woman cooking outside a local food restaurant	
Shoe maker repairing a shoes	
Store keeper talking on the phone	
Motorcycle transport rider waiting for passenger	
A lady buying from the store keeper	
People chatting and drinking	Social
Women standing and chatting outside a store	
Men drinking at a local bar	
Shop operator chatting with people outside the stall	
Young men chatting, drinking and smoking	
Children playing outside	
Two playing draught outside a store	
People seating and watching street activities	
Children playing football	
Lady tapping on her mobile phone	Optional
Standing and resting by a car	
Boy seating under a tree resting	
Man observing the street outside a local bar	
People seating and watching street activity under a shade	

Source: Author fieldwork, 2014

During the observation more than 30 different behavioural activities were observed these were categorised into three analytical categories based on literature (see Section 2.4, 4.3.1 Chapter 2 and 4 respectively) these includes the necessary and social and optional activities.

Table 5-3 indicates observed activities, which were reclassified into analytical category. The table reveals that 58% of observed activities were work based, such activities will occur regardless of the street quality, (such as men operating and moulding blocks, security operator patrol etc.). Social activities that involves two or more people account for 27% of the observed activities though some of the work based activities involves interaction between more people (such as men at work on construction and mechanics fixing cars) they are not included under social activities due to their occurrence is majorly based on work related. Furthermore, optional activities such as people sitting and watching under a shade occur if the quality of the street enable it they account for less than 15% such as availability of sufficient space to dwell in, shade, benches and other enabling street furniture's.

5.2.2. Activity mapping

Map in (Figure 5-8 and 5-9) show daytime activities (morning and midday) and evening activities. This indicates location, type, and frequency of activities resident are involved.

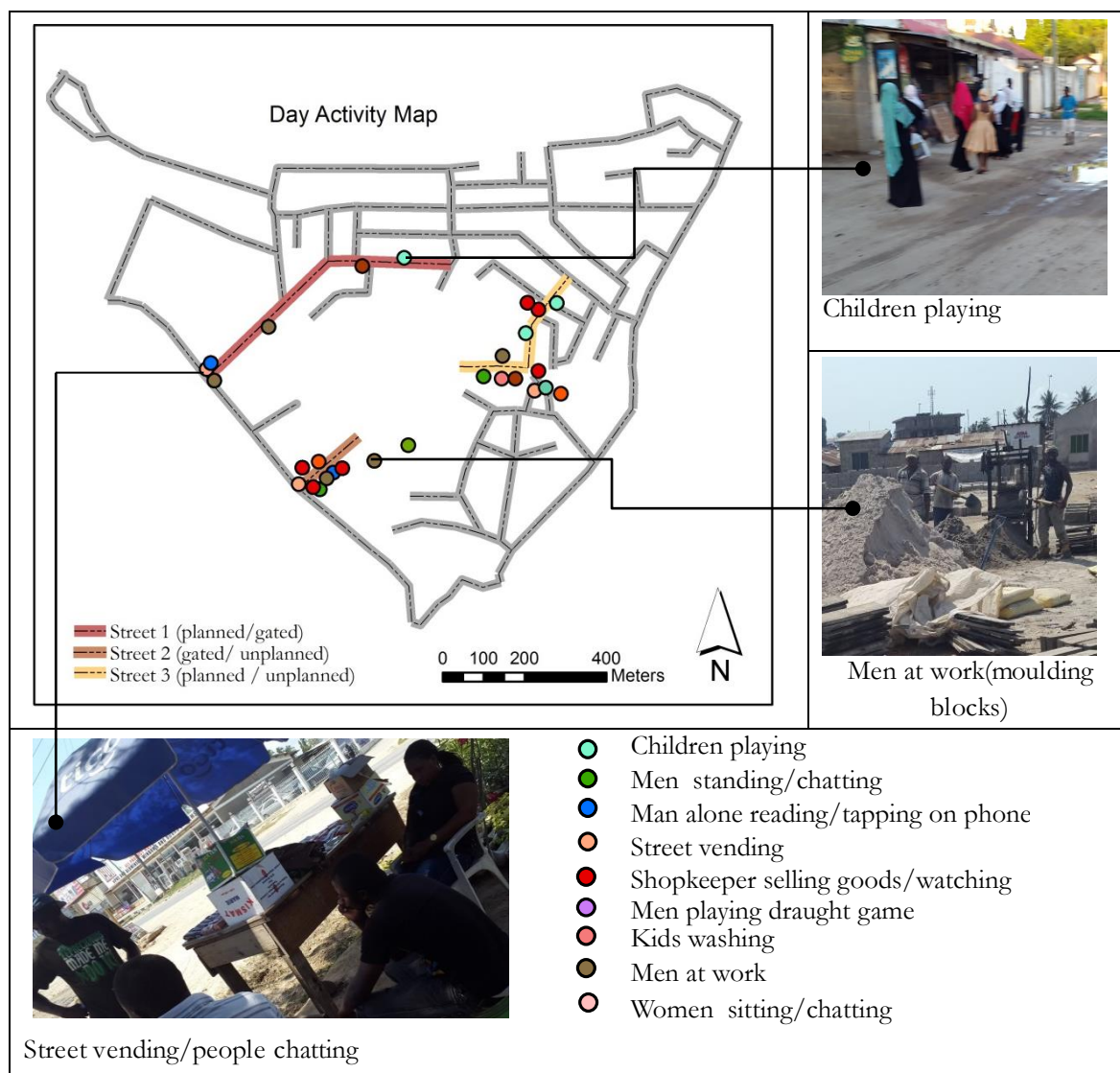


Figure 5-8: Daytime activity map

On Street 1(planned/gated) despite its length (see Table 5-1) activities were basically low, work-based activities were found at the entrance such as street vending and car washing activities. Other point of activities are mainly at a street grocery stall which serves as area of social interaction such as children playing, at both daytime and evening time groups are seen playing draughts game. There are however variation at different time of the day in terms of type and amount of activities. As indicated on the map (Figure 5-8), Street 2(gated/unplanned) generates the highest amount of work based activities that includes street vending, mechanics, motorcycle and tricycle transport activities (these were located along the street at daytime).

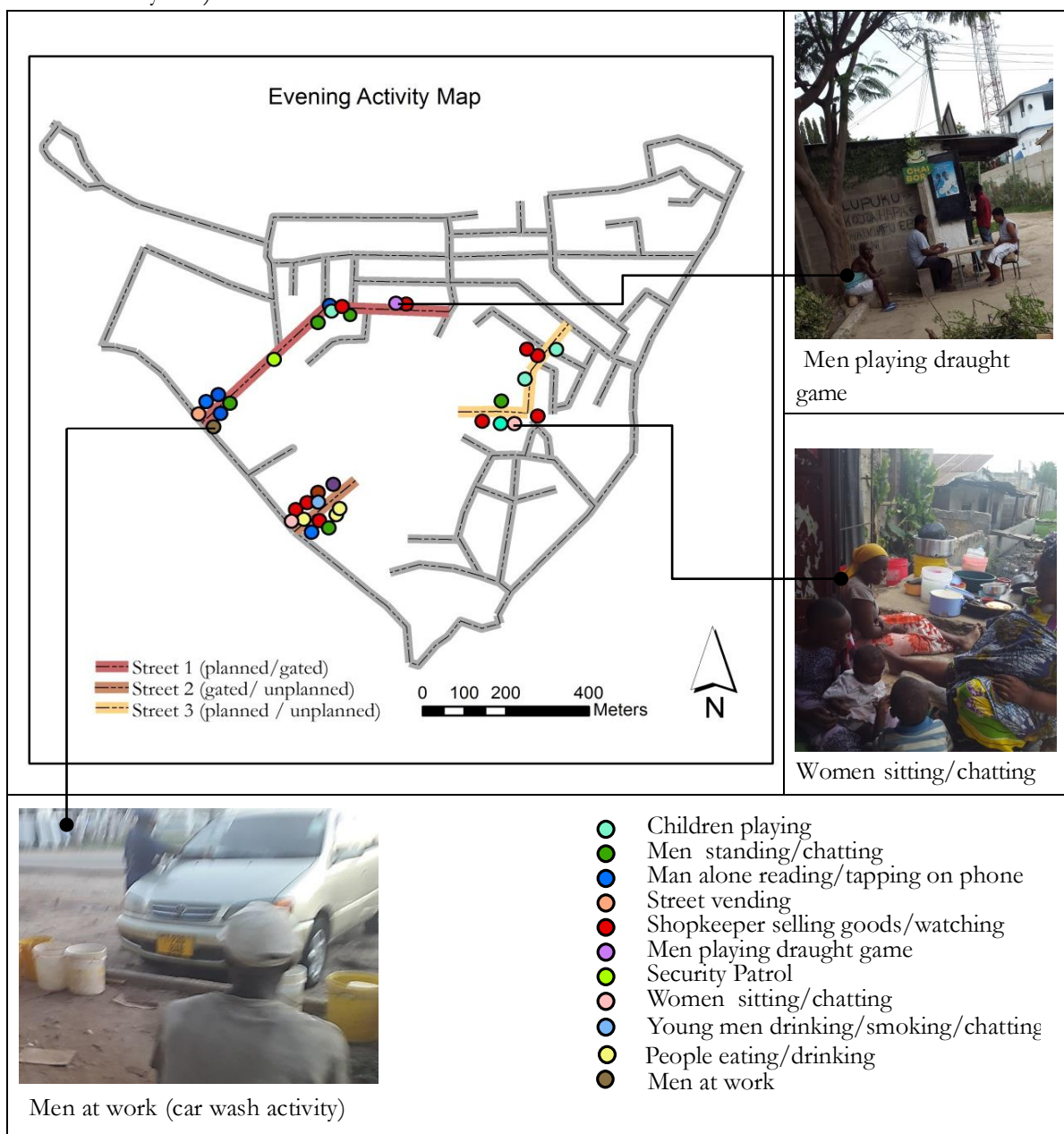


Figure 5-9: Evening time activity pattern

However, social activities people drinking, smoking, and chatting were observed at evening time, on Street 3 (planned /unplanned), both optional and social activities are predominant. For example, people watching, reading and children playing etc. Activities at Street 3 are minimal and varies slightly both at the evening and daytime.

5.2.3. Flow of people

The flow counts reveal the number and group in term of demographic composition of people who uses the street and the variation in the intensity of flow at different time of the day. For the purpose of comparison, vehicular flow was also counted for better understanding of street activity and the impact of vehicular traffic on the role of the street to serve as a public space. Figure 5-10 provides information on pedestrian flow, as observed at different time of the day. For the three selected streets, morning flow account for the highest and followed by the pedestrian flow in the evening. The graph also reveals that Street 2 (gated/unplanned) account for the highest number of pedestrian flow at different time of the day. In terms of demographic composition of flow, the male adult account for the largest number of pedestrian flow at different time of the day. The graph in (Figure 5-11) indicates pedestrian morning flow in which the male account for the highest flow with the exception of Street 1(planned/gated). In all the cases children account for the least flow.

However, comparing the total pedestrian flow with vehicular flow as shown in graph on modal split flow (see Figure 5-12) car flow on Street 1(planned /gated) was prominent accounting for 45 per cent of the flow while on Street 2 (gated/unplanned) pedestrian flow was recorded highest.

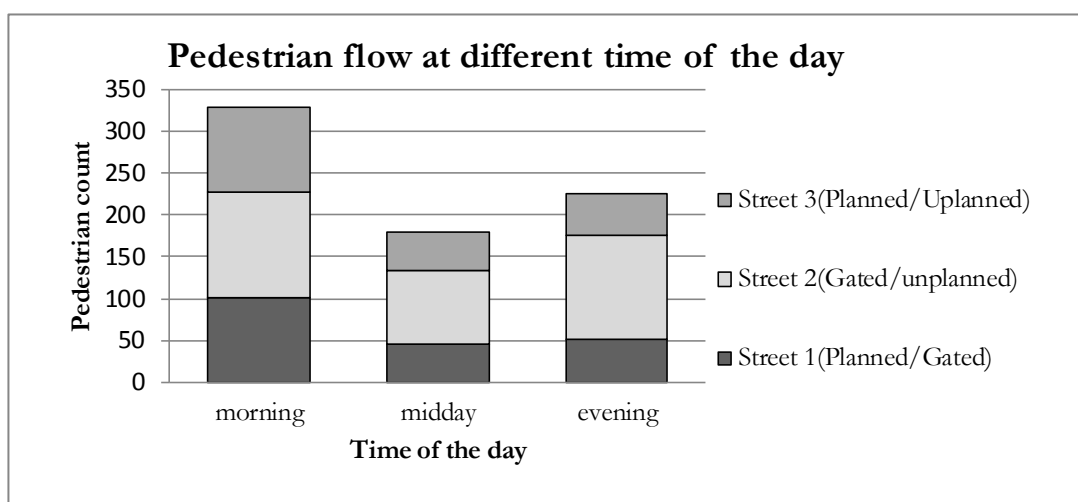


Figure 5-10: Pedestrian flow at different time of the day

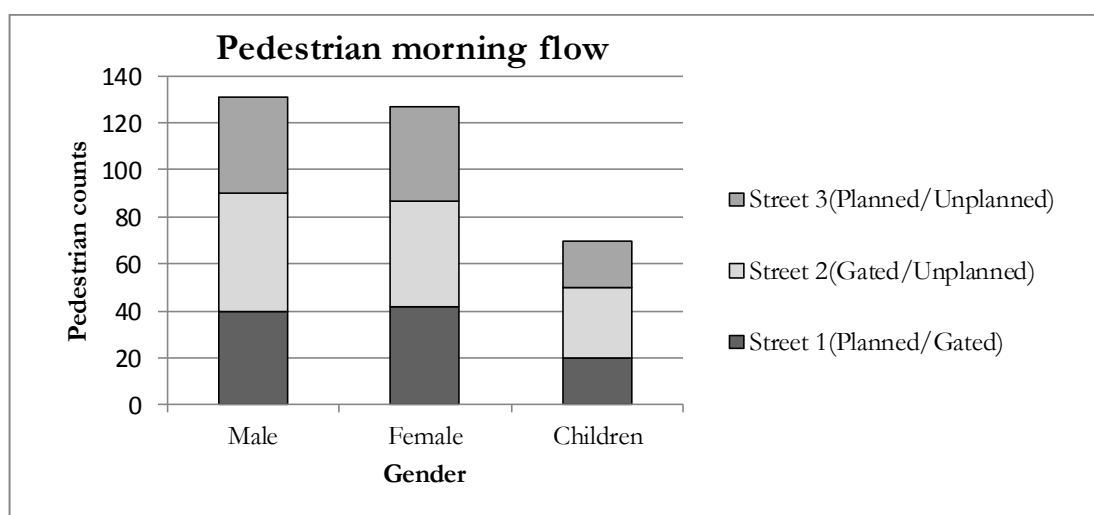


Figure 5-11: Pedestrian morning flow

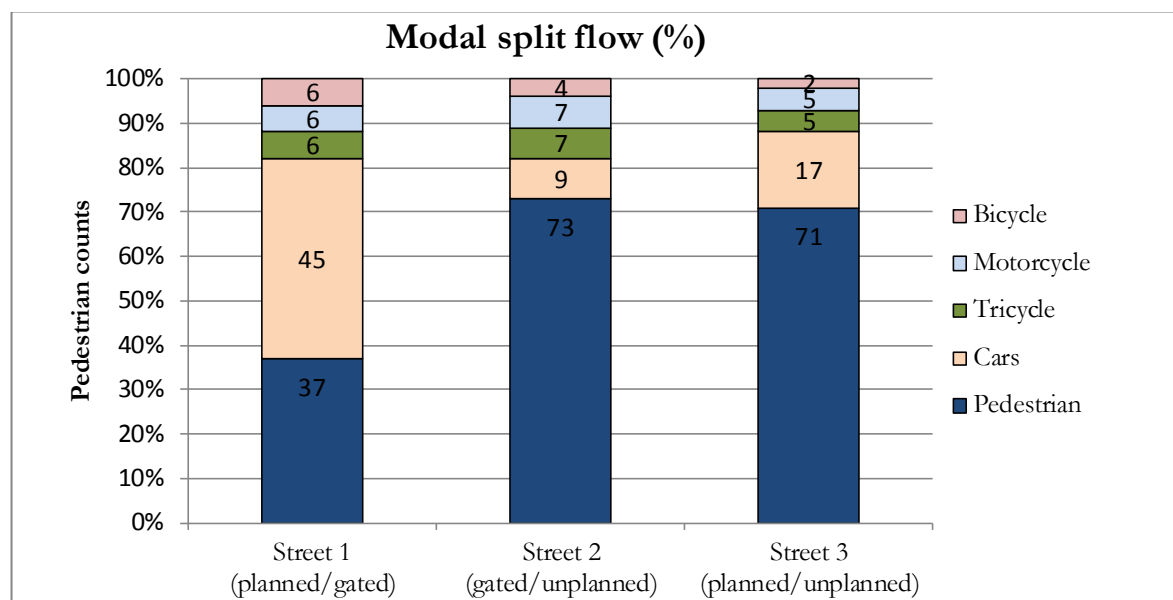


Figure 5-12: Modal split flow



Figure 5-13: Satellite imagery showing mixed uses on Street 2

In summary, from both the activity mapping and flow count, it was gathered that for the three selected streets, most observed activities were found at the entrance of the streets and at streets corners. Furthermore, since activities generate activities, most activities are found where there are mixed uses that serves as an attraction for social interaction. For instance, Street 2 (gated/unplanned) generates more activities because of different commercial activities visible along the street. That includes both temporary like the street vendors; permanent local businesses such as restaurant, bar, welding etc. that occupies the front row of buildings on the side of the unplanned neighbourhood and the shopping plaza on the side of the gated community as apparent in the satellite imagery (Figure 5-13). Likewise the higher number of pedestrian flow observed during morning and evening flow (Figure 5-10) can be credited to work based flow and the evening flow resulting from people returning back home from their work.

Table 5-4: Total pedestrian and vehicular flow

Modal Spilt	Street 1	Street 2	Street 3
Pedestrians	198 (37%)	388 (73%)	197 (71%)
Cars	244 (45%)	49 (9%)	46 (17%)
Tricycles	35 (6%)	37 (7%)	13 (5%)
Motorcycles	32 (6%)	34 (7%)	14 (5%)
Bicycles	32 (6%)	21 (4%)	6 (2%)
Total # (%)	541 (100%)	529 (100%)	276 (100%)

Table 5-4 indicates the total amount of flow observed during the survey count, in which Street 2 account for highest pedestrian flow and vehicular commercial transport flow in the study area. The flow tricycles and motor cycles can be attributed to the mixed uses of the street as indicated earlier. Likewise, during fieldwork the author observed a closure of one out of two gates into the gated community (Highland villa), as such, the only available entrance and exit gate into the gated community was through Street 1, this might also have contributed to the heavy traffic of car flow recorded on Street 1. In addition to the fact that residents of these neighbourhoods (planned and gated) are mostly of higher income class that can afford the use of private cars.

5.3. How residents perceived the streets

The residents' perceived quality of the street and usage was measured using qualitative indicators that include mainly safety and security, comfort, sense of belonging and social interaction based on the questionnaire survey and walking interview. The perception was measured on a likert scale of 5 means strongly agree and 1strongly disagree that is from positive to negative depending on the question. The pattern of perception varies individual, collectively as a neighbourhood as well as socio-economic status and background.

5.3.1. Safety and security

Figure 5-14 represents the outcome of respondents' perception of daytime safety and security in the various When ask to response to the statement "The Street is safe during the day" neighbourhoods of the three-selected street between the different urban fragments. The questionnaire survey established that the majority perceived the three neighbourhoods as being safe during the daytime. 20 out of 20 surveyed on Street 1(planned/gated) agree to the statement of safety during the daytime. None of the respondents from the three selected streets disagrees to the statement on daytime safety.

However, Figure 5-15 reveals a contrary perception, only respondents from Street 1(planned/gated) agreed to the statement of safety and security at nighttime, precisely half of them agreed that their street is safe even at night. While respondents from Street 2 (gated/unplanned) perceived their street as unsafe during the nighttime, three quarter of respondents disagreed to the statement, indicating a high perception of unsafe environment. During the walking interview, interviewees was asked the reason for perceived level of safety, the interviewees talked about criminal activities, rape especially when walking along the footpaths, beach and open space because it is dark, no streets light and isolated. Interviewee 1(from planned neighbourhood) and interviewee 5 (from unplanned) commented respectively

"During the night only the street isn't safe because of the darkness there is no streetlights... and around the beach because most of robbers hide there".

"at night because of the boys (which boys interviewer asked) those boys that use to snatch peoples bags and phone mostly at night time especially those passage like this one (pointing at the footpath) when is dark you cannot see who is hiding in the dark..."

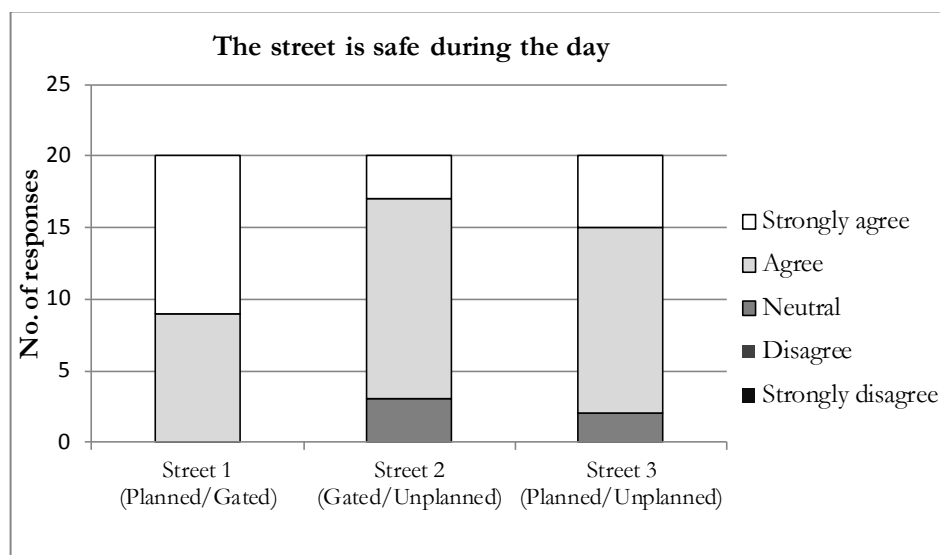


Figure 5-14: Perception of daytime safety

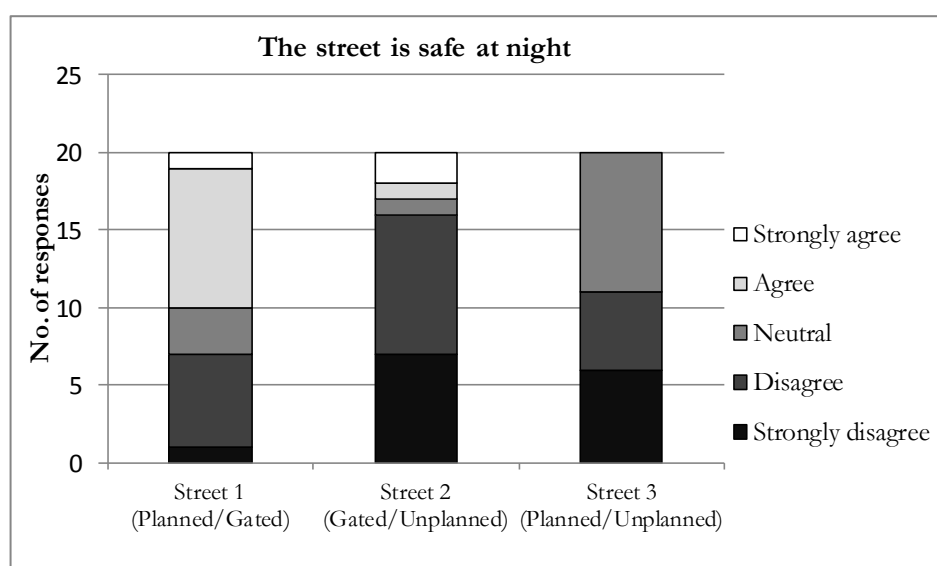


Figure 5-15: Perception nighttime safety

Notable is that perception of safety also varies from one neighbourhood to the other of the shared street. For instance, Interviewee 2 (from the gated community of Street 2) expressed her opinion that within the gated community is relatively safe⁷. According to her

“This place is safe there are security gate check, I know you were check at the gate (referring to the author) gate is well protected also individuals protect their homes with additional security devices. The estate also have CCTV camera all around so to me this place is safe”.

⁷ This is consistent with author observation of the gated community, in which gate is secured with security patrol, the author obtained internal permission before granting access

5.3.2. Comfort

In order to find out how comfortable residents feel staying on the street, respondents were asked to grade their perception by responding to these statements (see Figure 5-16 and 5-17). Responses shown in (Figure 5-16) indicates that more than half of the respondents do not feel comfortable in their street presence condition expect for Street 3, where a little lower than half disagree to the statement. Figure 5-16 also indicates that considerable number of responses on Street 2 and Street 3 felt neutral to the statement, however when probe further during the walking interview reveal reasons (see Section 5.4). More than half of the respondents on all the three selected streets disagree to the statement that “traffic does not affect their stay or movement on the street”(See Figure 5-17) Some of interviewees during the walking interview complained of the lifting of dust and splashing of dirty water during the dry and rainy seasons by fast moving vehicles. Interviewee 3 resident unplanned neighbourhood explains

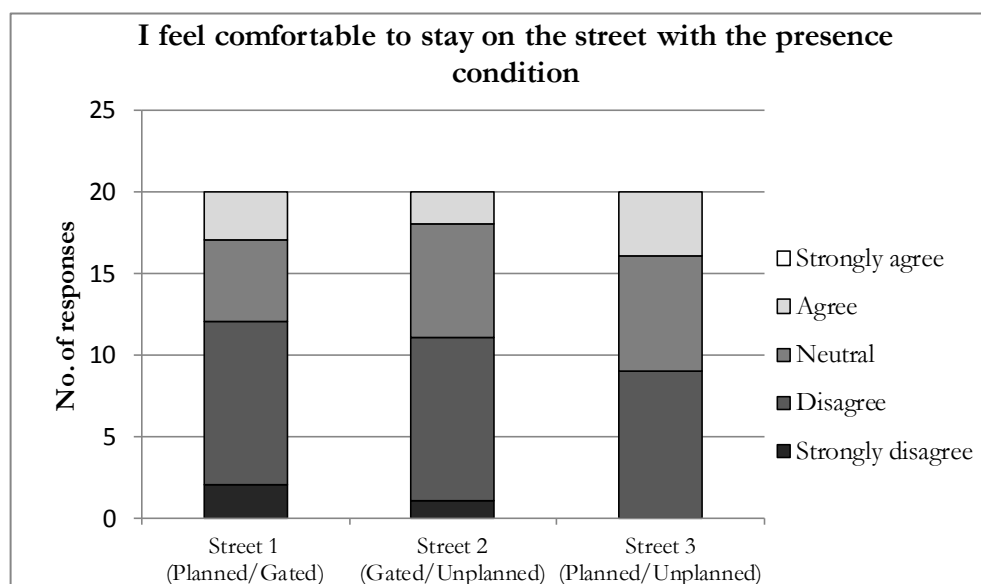


Figure 5-16: Perception of comfort

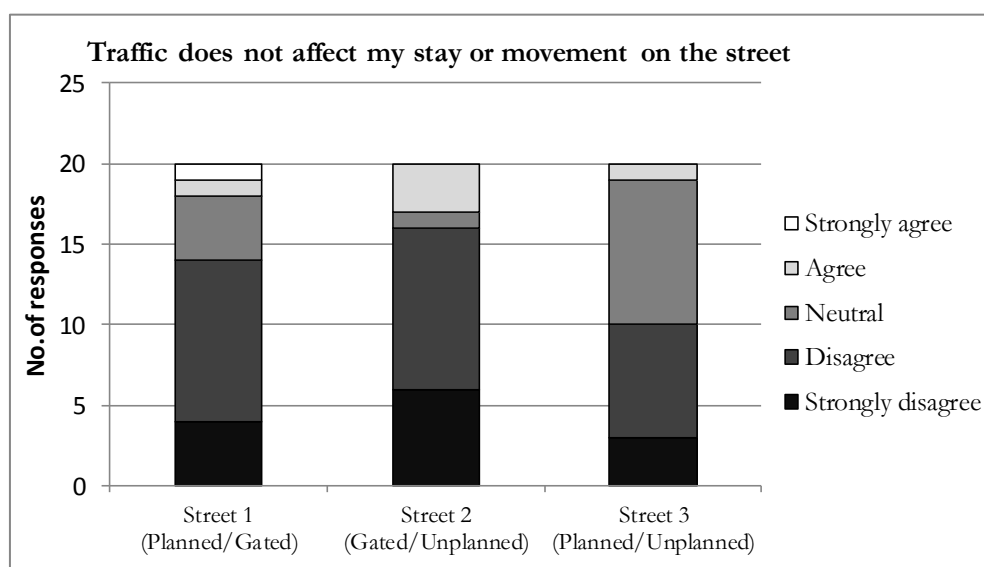


Figure 5-17: Perception on the effect of traffic

“No it does affect my movement because sometimes I have to stand aside when the car pass and there is also dust because of the earth road, generally the street I stay isn’t that good because when it rain even a little it’s a problem”.

Remarkably, in (Figure 5-17), a considerable number of respondents on Street 3 (planned/unplanned) felt indifference about the effect of traffic on their stay and movement on this street. As such, the author further probe during the walking interview, in which one interviewee from the street talked about moderate speed by vehicle along their street. This might be due to the narrow width of the street as observed, will be discuss in more detail in the next chapter.

5.3.3. Sense of belonging

Figure 5-18 represents residents perception on sense of belonging, respondent were ask if they feel at home, that is having identity and attachment to the neighbourhood. Findings from the questionnaire survey and walking interview revealed that the residents are generally proud of their neighbourhood in varying degree, more than half of respondent in all the streets feel at home in their neighbourhood. However, a minimal number of respondents were not satisfied with their neighbourhood. Interviewee 3 who live in the unplanned area expressed,

“I don’t feel at home in my neighbourhood because, I would like to have place of my own that I can call home. But for now am just a tenant and there is a lot of disturbances including robbery and bad road, I would like to move to another place like Masaki but I can’t because of circumstances.”

The sense of belonging was also capture by asking the resident during the walking interview what and where they like most about their neighbourhood most frequently mentioned was the beach and shopping plaza. The question reveals sense of belonging and attachment to their street environment by the residents.

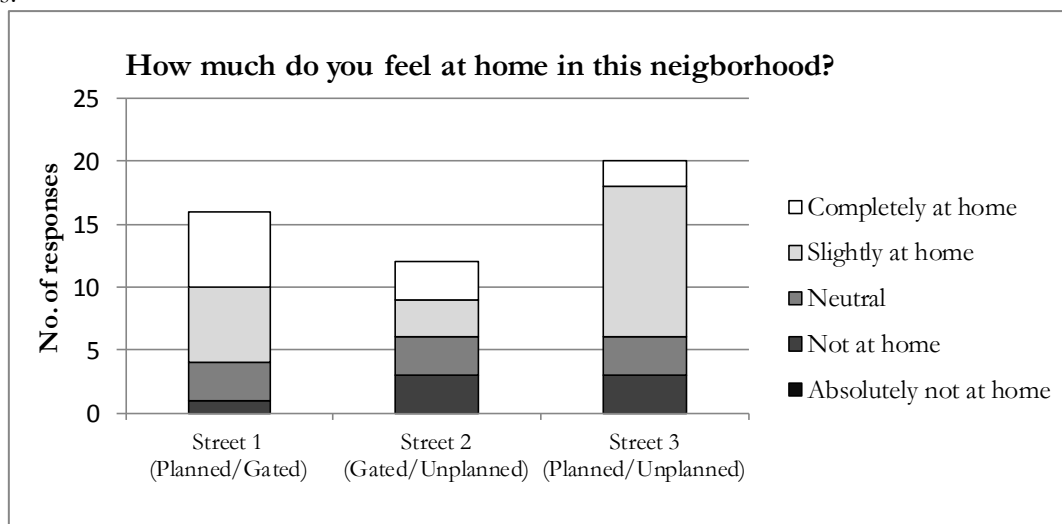


Figure 5-18: Perception of sense of belonging

5.3.4. Social interaction

The questionnaire survey revealed a higher social interaction within neighbourhoods and lower interaction between neighbourhoods. The graph indicated on (Figure 5-19) reflects an overwhelming level of social interaction in which for instance on Street 3(planned/unplanned) fourteen out of twenty respondents interact with most people within their neighbourhood. However, a contrary opinion was noticed between neighbourhoods as indicate see graph in (Figure 5-20). The social interaction on Street 2(gated/unplanned) shows a low level of interaction six interact with just a few while more than half of respondent interact with no one. To buttress the level of interaction, Interviewee 5 stated.

“This area use to be friendly at first until the foreigner came and create gap between the have and they have not. They fenced themselves inside they do not encourage friend ship” commented (Interviewee reside in unplanned neighbourhood)



Figure 5-19: Perception on interaction within neighbourhood

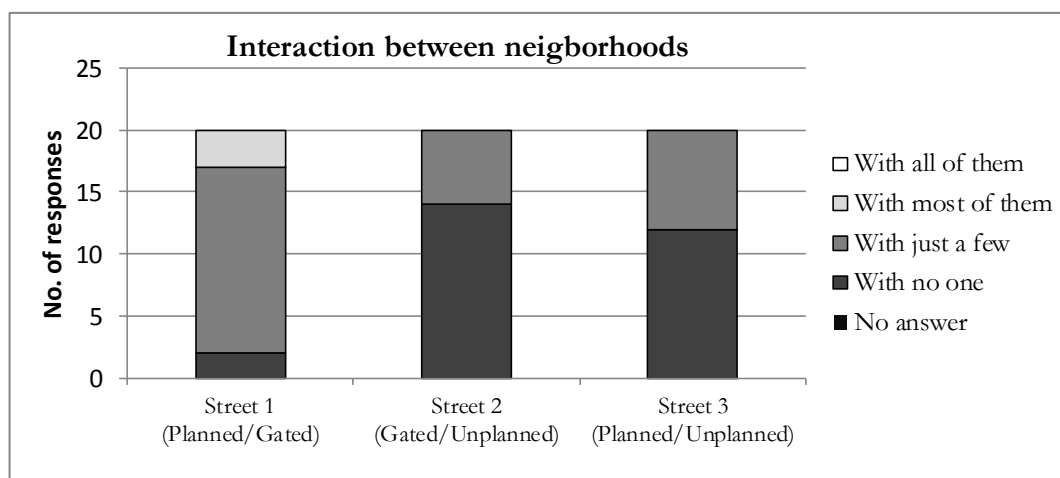


Figure 5-20: Perception on interaction between neighbourhoods

Interaction between the planned and unplanned neighbourhoods' on Street 3 is slightly higher with eight respondents interacting with just a few and twelve with no one. However, the survey suggests a higher social interaction exist between residents in the neighbourhood of Street 1(gated /planned), reason might be due to the socio-economic characteristics of the neighbourhoods. The survey also probes further to find out the type of interaction, in which respondents were, ask to specify the type of relationship that exists between the different urban fragments. Figure 5-21 revealed mixed perception, more than half of respondents on Street 2 (gated/unplanned) indicate no relationship between them and the residents of neighbourhood across the street. This was followed by business/professional relationship according to (Interviewee 2 from the gated community) admitted that they employ residents from the unplanned neighbourhoods for menial jobs such as nannies, gardeners etc.

“Hmmm I don't really know much people outside this villa, but I know some of my neighbour house help lives in the place, I remember the man that came to fix our dog cage said he lives there.”

While according to (Interviewee 4 from the unplanned neighbourhood) *“Only business because there are many activities going on and so there are enough customers and even from Mayfair apartment (referring to gated community) they use to come and buy things from me even though they come few times.”*

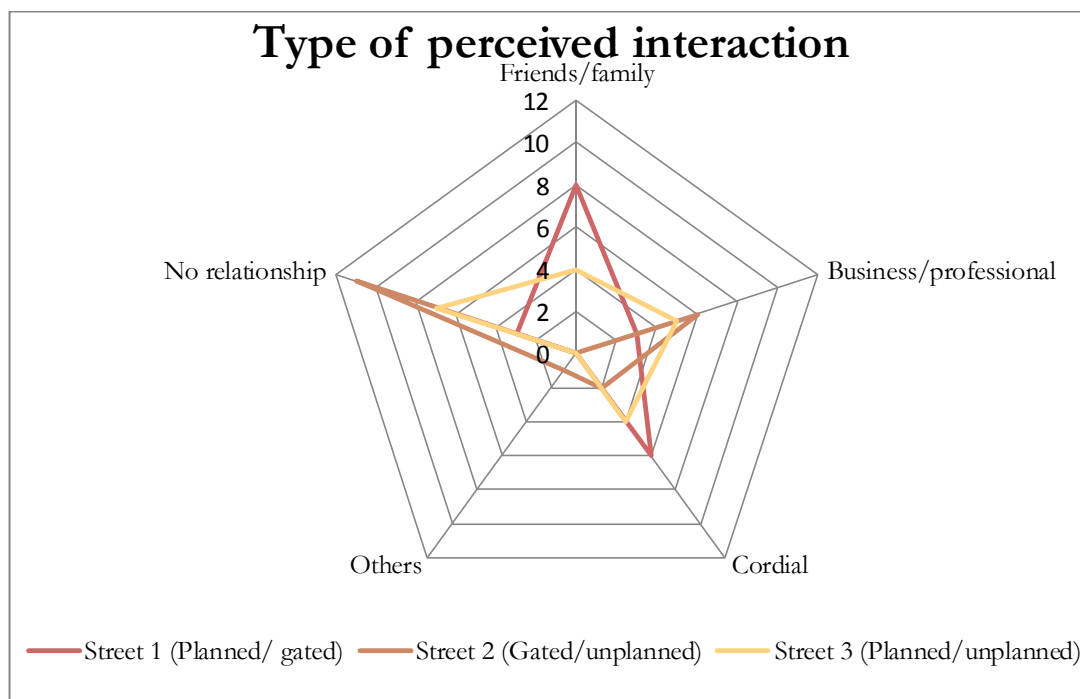


Figure 5-21: Perception on type of interaction

It can be gleaned that relationship between residents of the Street 1(planned/gated) neighbourhoods are more intimate than those between the Street 2 (gated/unplanned) and Street 3 (planned/unplanned) neighbourhoods, in which the level of interaction is minimal and weak as expressed by a respondents.

5.4. Impact of perceived street quality on residents usage

To measure the impact of perceived street quality on residents daily usage of the street, respondents were asked to give an overall perception of the street quality as shown in (Figure 5-22), also if the perceived quality affect their usage of their streets.

Interestingly, half of respondents from the three-selected street felt the overall quality is fair. During the walking interview the author probe further for explanation, some of the interviewee felt the street quality has improved greatly because of the construction of the culvert. Interviewee 4 from the Street 2(gated/unplanned) expressed it this way:

“Those days I used to hate this street because we never had drainage system (pointing at the newly constructed culvert) those days the place is always flooded especially during the rainy season but now the quality has improved though the drainage is not well maintained.”

Figure 5-23 further indicate perception of street usage by respondent, in which respondents were asked to respond to the statement *“I will not stay on the street unless it is necessary”*, responses shows that half of the resident survey will only stay on the street only when necessary. Interviewee 3 when asked if the quality of the street affect her usage of the street stated during the walking interview

“No because I have to stay on the street mostly because of the activities am doing (business) and so if I stay home I could never be able to support my family so it is compulsory for me to stay on the street”

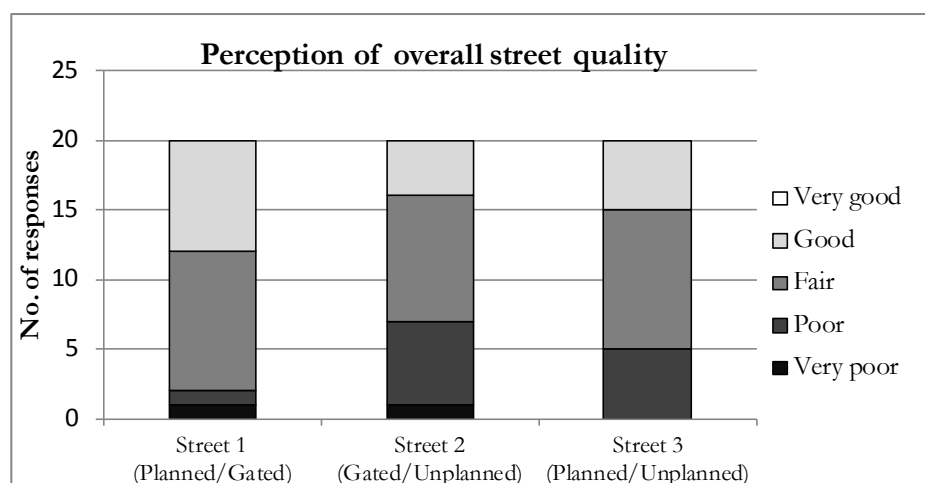


Figure 5-23: Perception of overall street quality

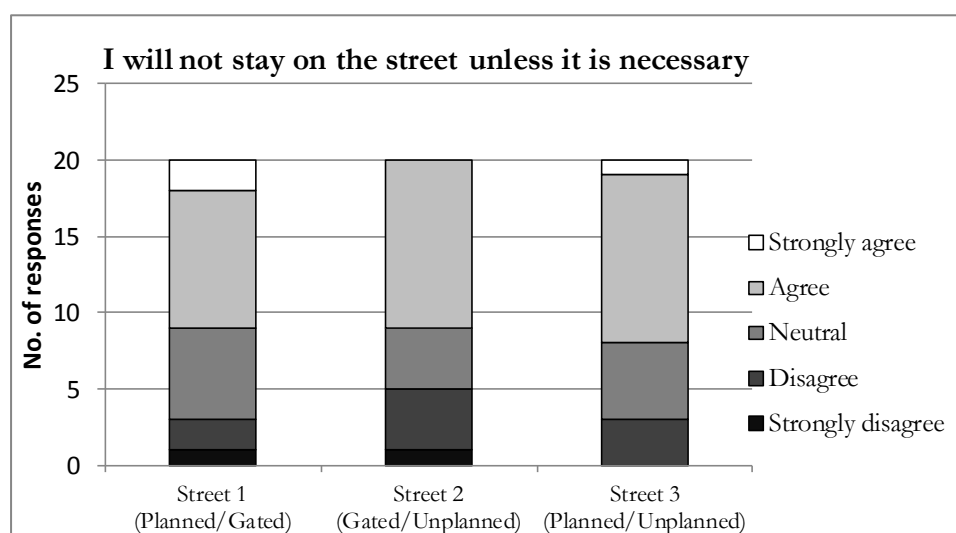


Figure 5-22: Perception of street usage

It was gleaned that the quality of the street is generally fair enough for the resident to carry out their necessary activities. Nevertheless the quality of street bothers them, for instance when asked if the traffic affects their usage of the street, one third of respondents agree that traffic affects their usage, however does not stop them from carrying out their necessary activities. The findings are consistent with the activity observation and mapping in which more than half of the observed activities were work-based.

5.5. Reflection on street qualities

The following reflection was based on the findings from field observations and results from the analysis of various quantitative (objective) and qualitative (subjective) indicators identified under each main concept of the conceptual framework of this research. It was further compared with indicators proposed and developed by UN-Habitat, (2013) based on results from the report pertaining to streets connectivity in Dar es Salaam.

The study by UN-Habitat (2013) on streets as public space a driver of urban prosperity as earlier stated was based on quantitative indicators (see Section 2.5 Chapter 2). This includes three major indicators among others (proportion of LAS, Street Density and Intersection Density), to measure the street connectivity in 100 cities around the world. Forty of these cities are in the developing countries, in which eighteen are African cities, DES inclusive.

Generally, in developing countries there are insufficient streets in both quantity and quality, 17 cities out of the 18 cities of Africa region that was analysed by UN-Habitat (2013) fall within the low to moderate LAS. DES falls within the cities that have less than 15 per cent of LAS precisely 10 per cent based on the report for core area and 5 per cent for sub urban area, giving an average of 7.5 per cent of LAS in DES⁸.

In contrast, findings from this study in MBLM a suburban area of DES show that (9.5 per cent of LAS). The percentage is slightly lower when compare to the aggregate for the core area and significantly higher when compare to the UN-Habitat (2013) figures for the suburban area of DES. This variation suggests that there might be hidden differences from one local area to another that are not revealed because of the aggregate which might leads to ecological fallacy (Martínez, 2009). Such fallacy might have major impact on area based policy intervention. In addition, the low-moderate proportion of LAS in the study area can be associated to the large portion of the land allocated to residential plots in planned area or literally built up in the unplanned neighbourhood.

The number of intersection within a street network is a key indicator that determines the street level of connectivity, findings from this study revealed an intersection density of (50 per square km of land). Though relatively low when compare to the 100 intersection desirable threshold of street connectivity (see Table 2-2, Chapter 2). The sitting of the gated community that pose as a barrier contribute to the level of connectivity, in which the disconnection affect accessibility to facilities such as shopping plaza due to increase in travel distance. In addition, the prevalence of dead ends in the unplanned neighbourhood not only reduces the intersection density but also the street density, findings revealed a street density of (12km per square km) in the study area. However, the result of intersection density is still higher than the aggregate from UN-Habitat (2013) report of 34 per cent for Dar es Salaam, thus confirming hidden variation within the aggregate for the city.

To investigate these variations, this study also measure street connectivity at a further disaggregated level of the different neighbourhoods of the urban fragment. Findings indicate a high level of variation in which the gated communities record a high connectivity when compare to the other fragments, in which the unplanned neighbourhood is least connected (see Section 5.2.1). Notably, the high street connectivity within the gated communities has no positive impact on public space because of its status as a privatized street.

Moreover, the UN-Habitat (2013) report also proposed other indicators (percentage of obstacles free sidewalks and paved sidewalks) that were not measured due to insufficient data from the cities of the global south. Nevertheless, this study attempt to investigate the presence of sidewalks in the study area, based on its role as an important street design quality to foster social interaction (see Section 2.4.3 Chapter 2). Findings revealed there are no provisions for sidewalk let alone paved sidewalk in the study area (see Table 5-1) in consistent with the data from UN Millennium Cities Database that 65 per cent of streets in Africa region have no sidewalk⁹.

Interestingly, the inclusion of footpaths as an indicator enables the capturing of existing situation within the study area as it relate to African context. In which, there exist a satisfactory level of pedestrian

⁸ See UN-Habitat (2013) report for more information

⁹ Data from UN Millennium Cities Database was cited in UN-Habitat (2013) report

connectivity due to the several footpaths that was observed from the fieldwork and validated by the residents perception when asked the level of accessibility 18 out of 20 within the neighbourhood of Street 3 (planned/unplanned) gave a positive response. Furthermore, according to the senior lecturer and key informant from the Ardhi University while reflecting on level of connectivity in the unplanned neighbourhood commented.

“Street as public space self-created by residents’ some were initial footpaths which were respected by the developers and then they build their houses along the footpath in which you get an irregular or curvilinear street because they were not originally calculated. What happen is that they build first and the street comes later in so doing they realized that the space is no longer divisible so they decide to have spaces between buildings which are not partitions creating lots of connectivity, they have what I call floating spaces they know each other children can play around. As such the pedestrian connectivity is perfect; again what we see here is like what is happening in the city centre we have building and space, building and square, building and streets.”

This suggests that pedestrian connectivity result from the provision of setbacks from buildings based on individual developers’ discretion because they are not planned result in curvilinear pattern and of varying width. Nevertheless, the widths are wide enough for pedestrian mobility increasing the level of pedestrian permeability and connectivity. The presence of these footpaths contribute to the level of pedestrian connectivity observed within the neighbourhoods of Street 2 (gated/unplanned) and Street 3 (planned/unplanned) might have significant effect on the level of walkability and social interaction.

Likewise, this study examine further from the UN-Habitat (2013) report to measure resident activity and perception, using quantitative and qualitative indicators for better understanding of the street quality as public space. Based on literature review (Chapter 2), findings from the study revealed Street 2 (gated/unplanned) recorded the highest number of pedestrian flow and account for the highest observed level of necessary activities. The result is consistent with literature that more activities are found where there are mix uses and therefore allows for different services and different people to occupy the street and feel comfortable at different time of the day (Gehl, 2008; Jacobs, 1961). The necessary activities are more frequent during the daytime and changes to social activities during the evening time. Again, activity observed are found at the entrance, street intersection and most of the activities observed are basically necessary activities while social activities observed occur during the evening and are located around restaurant and local bar parlours (see Section 5.2.2). The observation is consistent with literature in which the quality of public space determines the level of social interaction. For example at evening the need for soft landscape such as trees for shade is minimize, people are able stay on the street, also private businesses such as bars, and restaurant provides seats outside their business premises for their intending customers thereby fostering the public realm for social interaction.

Previous studies also suggested that perception of safety is influence by the physical characteristics of the environment such as (presence of street lights, open spaces etc.) and other factors such as period of stay, gender, and time of the day (Loewen, Steel, and Suedfeld, 1993; UN-Habitat, 2012a). From the observation, the three streets are mostly safe during the daytime though with some exceptional cases where respondent during the interview felt the street is not safe because of vehicular traffic. However, contrary to the general safety perceived during the daytime, there are variations during the nighttime in which findings revealed that Street 2 and 3 are not safe during the nighttime.

The physical characteristics of the street environment, affect the perception of safety includes lack of streetlights, and narrow footpaths were mention during the survey and interview (see Section 5.3.1, Chapter 5). Interviewees perceived the darkness of the streets at night contribute to the operation of illegal activities. The sense of safety was consider, an important factor that determines their stay on the street

during the nighttime. It can be gleaned that, places that are dark, narrow, and isolated during the night time for example the beach and footpaths are perceived unsafe.

Findings also revealed a mixed perception of the street comfort responses from the survey, interview and from field observation on availability of street facilities and effect of traffic (see Section 5.3.1). Reason was centred on first, improvement observed, for instance resident from the Street 2 felt the improvement of drainage currently on going makes them feel more comfortable as the street no longer get flooded during the rainy season. Second, it was observed that residents find a way to become comfortable on the street, for instance the use of improvise seats (see photos Figure 6-3b). Thirdly, respondents who has to stay on the street to make a livelihood such as street vendors were indifference to the other views because they have to conduct their necessary activities regardless of the street quality (Gehl, 1996).

Overall findings shows that there exist relationships between the three concepts as indicated earlier (see section 1.4 conceptual frameworks) for instance location where young men were observed and mapped drinking and smoking was also perceived by resident during walking interview as location of illegal activities such as selling of marijuana and therefore not safe. This help to relate where both quantitative and qualitative indicators merge for better understanding. Likewise, perception of street quality varies at different time of the day, some of the footpaths that contribute to the pedestrian connectivity experience during the day are perceive as unsafe therefore mostly avoided during the night. This was due to the darkness resulting from lack of street light, narrow width as well as reduce visibility resulting from the curvilinear pattern of the footpaths see photos in (Figure 6-3a).

In summary, the used of other indicators such as qualitative indicators has assisted in better analytical measurement of street as public space. The use of mixed approach has assisted in better understanding and interpretation of results. It is argue here that quality of street goes beyond measuring it connectivity but rather a combination of the connectivity and its physical characteristics, activity and the way the street is perceived by the users.

6. COMPARISON OF STREETS QUALITY: A DISCUSSION TOWARDS SOCIAL INTEGRATION

This chapter discusses the outcomes of the study, as it relates to street quality towards social integration of the fragmented settlement of Msasani Bonde La Mpunga. The chapter highlights the relationship that exists between the three different concepts activity, connectivity, and perception, in which a comparison was made across and within selected streets. Furthermore, identified binding factors, within the neighbourhoods of three selected streets was illuminated with earlier study on social integration. The chapter concludes by discussing the impact of streets physical qualities on social interaction towards social integration of the settlement, and the contribution of key findings to planning policy intervention.

6.1. Relation between activity, connectivity and perception across and within selected streets

Table 6-1 is a comparative framework to understand the relationship that exists between street concepts of activity; connectivity and perception (see Section 1.4 Conceptual frameworks, Chapter 1). The within and across street comparison was based on the cumulative findings from observation, mapping, survey and in-depth interviews of the study area. Findings suggest that the activity, connectivity, and perception inter-relate to encourage intermingling towards social integration of the urban fragments.

6.1.1. Reflection on variation of binding factors towards social integration

As indicated on (Table 6-1), factors that act as a binding factor within the neighbourhood of the selected streets towards the social integration varies based on observed activity, connectivity and perception. Likewise, the physical quality of the environment to accommodate social interaction and level homogeneity of the neighbourhoods in terms of the socio-economic status of the residents varies. The following discussion on identified binding factors was based on the findings from the walking interview, observation, and survey. This was illuminated in line with the three dimension of social integration identified by Sabatini and Salcedo (2007) in an earlier study.

Community integration of Street 1 (planned/gated): Findings revealed a social and business tie in terms of friends, family, as well as business associate. Established from the survey carried out (see Section 5.3.3 Chapter 5), two third of respondents interact with at least a few while more than half of resident surveyed, interaction was based on friendship, families and business relationship. This type of factor can be related to the community integration describe by Sabatini and Salcedo (2007) also (see Section 2.3.2 Chapter 2) in which such relationship is express in terms of friendship, family and business associate, where people are recognize as equal. Respondents from both the planned and the gated community feel a sense of equality with one another. Findings also suggest that the socio – economic similarities between the two neighbourhoods might contribute to the community integration, as communication is easier to achieve.

Furthermore, resident of the planned neighbourhood do not perceived the fencing of the gated community as a problem, the fact that most private building observed within the planned neighbourhood are also fenced with security provision might be reason for such perception. In addition, findings revealed that the two neighbourhoods rarely interact on the shared street observed but rather outside the street. As and illustration when asked places of interest, resident preferred to visit, the beach as well as the shopping plaza (see Figure 6-3d). Interviewee 2 (from the gated community) commented.

“Sometimes we meet at that swimming pool area to chat especially when I take my niece to play at the playing ground by the pool or at the beach. When you move outside so much dust, we hope the government will upgrade the road just like what we have within the villa”.

Interviewee from the gated community preferred to interact with people around the swimming pool, gymnasium, and other public space provided within the Highland villa (gated community) rather than outside the villa where the street quality perceived as poor. Other reason for rare occurrence of social interaction along the street as observed reflect the car orientation of the neighbourhoods as seen from the vehicular flow count (see Table 5-4 Chapter 5). This is consistent with other studies in African context (UN-Habitat, 2013) where walking is associated to poverty and so most trip within the neighbourhoods of Street 1 are car based.

In sum, within the neighbourhoods of Street 1 there exists community integration. In which, such integration rarely occur along the street but in other specific public spaces such as the beach, shopping plaza etc. reason suggested for the low interaction along the street is due to the poor quality of the street to facilitate such interaction as well as the motorized life style of most residents.

Functional integration of Street 2 (gated/unplanned neighbourhood): Functional integration is most conspicuous in terms of economic factor on Street 2, where there is an exchange of power and money as discussed by Sabatini and Salcedo (2007). Indicated in Table 6-1, economic activities that encourage social interaction was most prominent, because of the high volume of business transaction both formal and informal such as local restaurant, pharmacy, street vending etc. and shopping plaza. According to respondent interviewed, residents within the unplanned neighbourhood perceived a sense of integration in terms of patronage of their businesses, especially businesses along the street, by resident of the gated community. Although there is other negative perception of GC, the arrival of the GC has increased economic opportunity. Interviewee 3 from the unplanned neighbourhoods during the walking interview explains

“I think it’s all because of influx of foreigners even renting a home is also expensive. There is positive and negative impact of their coming and that is why the activity I tried to engage in is business because I know it will be good in the end there are some indigenous people who have benefited by doing business.”

Others also commented on the type of interaction is specifically money exchange in form of buying and selling of goods. Furthermore, there exists employments opportunity especially the menial jobs such as nannies, house cleaners etc. (see other comments Section 5.3.4, Chapter 5). This functional integration allows for the interaction between two extreme social classes, as commented by an academia a key informant during in-depth interview.

“At the shop area there is now a lot of mingling between the two social class it is however not a gentrification because the shops are owned by the locals who know what the rich people wants and provide it at their shops. Therefore, economically they are co-existing”.

However, residents of the gated community and unplanned neighbourhood still express resentment towards each other. Resulting from a generalization of perception that might hindered or encourage further social integration. The network views in (Figure 6-1 and 6-2) indicate interviewee’s perception of the gated community and unplanned neighbourhoods.

Symbolic integration of Street 3 (planned/unplanned neighbourhood): Most noticeable dimension of integration is the symbolic (Section 2.3.2, Chapter 2) that occur under unequal relationship and to some extent functional integration. In which residents of the unplanned neighbourhood commented that they have casual and some level of friendship relationship with resident of the planned neighbourhood. Interviewee 6 from the unplanned neighbourhood commented that

“Yes I do have a relation with them a friendly one since I have many friends and most of the time I we meet here and chat”.

This was further evident from the survey in which respondent indicate having a friends within the planned neighbourhood and vice visa. Though relatively low but however remarkable based on the heterogeneity of the two neighbourhood that is characterized by the high class and the low class.

Still, such level of symbolic integration might be due to the level of connectivity within the neighbourhood in which there are no barriers to the use of the streets as public space when compared with the situation on Street 2 (gated/unplanned). Consequently, the residents of the unplanned neighbourhood felt a sense of belonging and attachment to the place (see Section 5.3.3 and 5.3.4 Chapter 5) in which the poor do not feel, stigmatized.

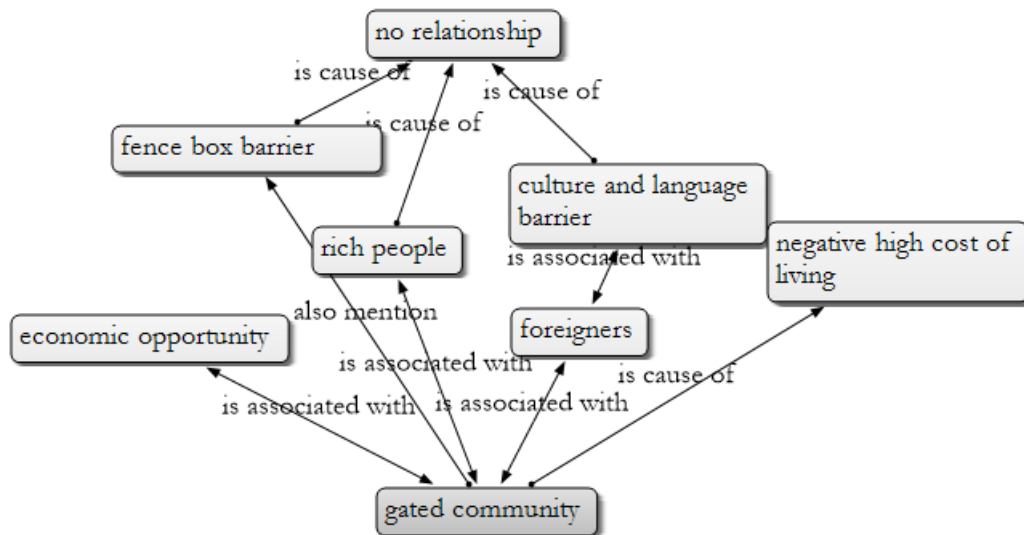


Figure 6-1: Network view of perception of gated community

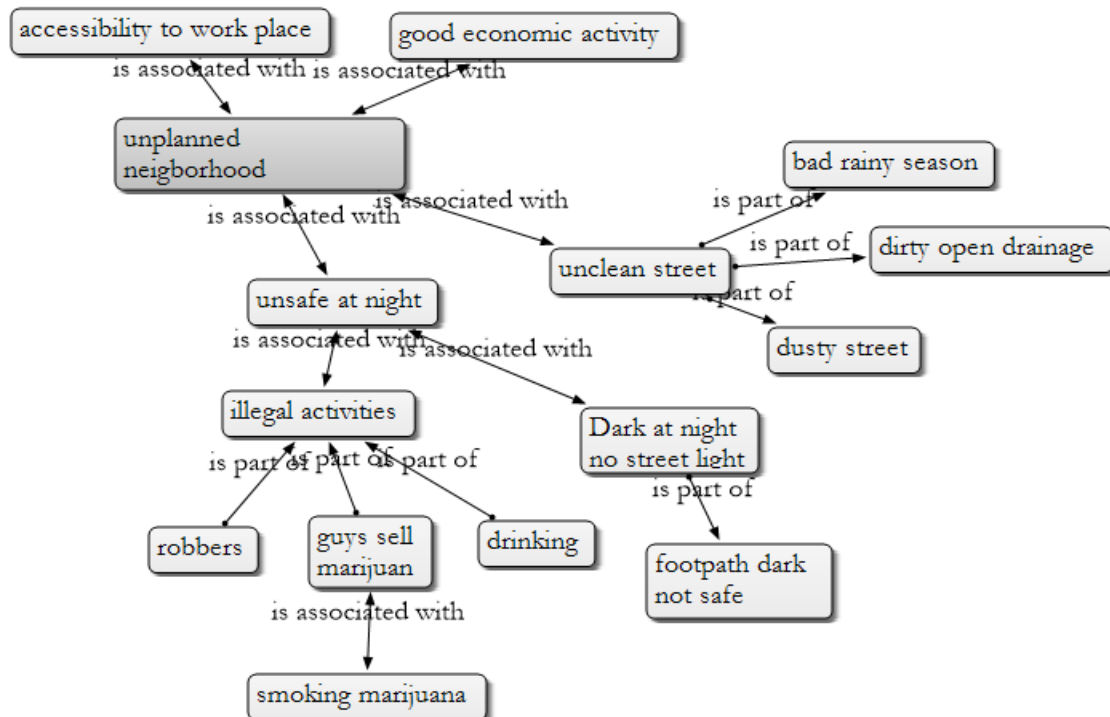


Figure 6-2: Network view of perception of unplanned neighbourhood

Table 6-1: Across and within streets comparison

COMPARATIVE CONTEXT	STREET 1 (planned / gated)	STREET 2 (gated / unplanned)	STREET 3 (planned / unplanned)	RELATIONSHIP (across streets)
ACTIVITY Flow of people	Moderate pedestrian flow High vehicular (cars) flow	High pedestrian flow High vehicular (commercial motorcycle and tricycle) flow	Moderate pedestrian flow Moderate vehicular flow	Highest vehicular and pedestrian flow observed on Street 1 and 2 respectively
Level of mix uses and activity	Low level of activity Moderate social activity observed at evening time	High level of activity Presence of mixed uses High necessary activities observed in the daytime	Moderate level of activity High optional and social activity	High level of activities observed on Street 2 can be attributed to mixed uses
CONNECTIVITY Physical qualities	Lacks street sidewalks Street not defined Absence of footpaths Soft landscape (trees) achieved to a large extent Public street light not visible. Private security light illuminate street More than five connections	Lacks street sidewalks Street defined to some extent with drainage Footpath presence to a large extent No soft landscape Public street light not visible One connection	Lacks street sidewalks Street defined to some extent with drainage Footpath presence Soft landscape achieved to a minimal extent Public street light not visible Four to five connections	Overall street quality across the selected street is poor to encourage more social activities
Level of connectivity				Street 1 and 3 have more connection because of the planned neighbourhoods. More connection reflect more integration of the urban fragments
PERCEPTION Safety and security	Day and night time safety	Daytime safety, unsafe at night	Daytime safety, unsafe at night	Private security and street lighting account for safety perceived on (Street 1) Absence of street light, have contributed to perceive lack of safety especially in isolated open spaces, dark and narrow

Comfort	Street not comfortable	Street not comfortable	Street not comfortable	footpaths on (Street 2 & 3) Perceived level comfort experience by residents across streets is attributed to absence of street furniture There exist across street considerable level of attachment and pride. Perception affect social interaction Level of connectivity is reflected in the level of social interaction
Sense of belonging	High sense of belonging	High sense of belonging	High sense of belonging	
Social interaction	High level of social interaction	Low level of social interaction	Minimal level of social interaction	
BINDING FACTOR	Social (friends/family) and business (people of similar interest)	Economic (street vending , business /employment opportunity)	Economic (business /employment opportunity) and social (cordial/friends)	A cross the different street other public space such as the beach and shopping plaza was also identified as binding factor
RELATIONSHIP (within streets)	<ul style="list-style-type: none"> Private security and street lighting account for the perceived safety High vehicular flow on the street might account for low level of activities Lack of perceived street comfort is reflection of poor street physical qualities The more connection shows street is more integrated. Also reflect in perceived high level of social interaction 	<ul style="list-style-type: none"> Absence of street light, dark and narrow footpath contribute perceived lack of safety Observed footpaths contribute to pedestrian connectivity High level of activities observed can be attributed to mixed uses Social activities was observed outside business buildings that provides street furniture such as benches Lack of connectivity (one connection) implies less integration and poor street physical character as a result of fence (GC) connote distrust hence low level of social interaction 	<ul style="list-style-type: none"> Absence of street light, dark and narrow footpath contribute perceived lack of safety Observed footpaths contribute to pedestrian connectivity Minimal level of friendship was observed on Street 3 can be attributed to the level of connection in street network no barrier street is more integrated and accessible to all 	

6.2. Impact of physical characteristics of streets on social integration

Findings from the case study area in Mvasani Bonde la Mpunga suggest that street physical qualities (Section 5.1 and 5.2 Chapter 5) might have an influence on the social interaction observed in the study area. Therefore, indicators quantified relating to the physical characteristics of the street that suggest social interaction towards social integration of the settlement were discussed under the following:

- Street design
- Level of connectivity
- Street furniture
- Landscape element
- Land uses

Street design: The design of the street affects how the street performs its function as a public space. Such design can determine if people stay, interact, or hastily move along the street. For instance, the absence of defined sidewalk has a negative effect on street interaction, hence residents are not willing to stay too long on the street to interact with others to avoid accidents, and other related traffic issues (see Section 5.3.2 Chapter 5). Furthermore, on Street 3 (planned/unplanned) the street width affect the level of social integration positively, Street 3 has the narrowest width (6 metre) it can be observed that despite the heterogeneity of the neighbourhoods, there exist a minimal level of social interaction, in consistent with literature that narrower streets are more integrated than wider street (Appleyard and Lintell, 1972). Findings from observation suggest that the closely together of buildings because of the street width might have contributed to the level of social interaction. In addition, studies have shown that traffic normally slow down on narrow streets, therefore the street is less prone to accident, results from this study also shows fewer vehicular flow on the Street 3 (see Section 5.2.3 and 5.3.4 Chapter 5). The street paving materials as observed in the three selected streets are murram and gravel of low quality. These streets are characterised by dust and mud during dry and rainy season respectively thus has negative influence on the level of comfort experienced by residents. This explains reasons for more work-based activities in the study area (see comment by Interviewee 3 Section 5.3.2, Chapter 5)

Level of connectivity: The level of street connectivity measured in the study area (see Section 5.1.1. and 5.5 Chapter 5) also suggest an effect on social integration experience in the study area. It was observed that gated communities influenced negatively on the level of social integration experience impinge by the perimeter fencing (see Figure 6-3c) that covers the entire neighbourhood extent (10hectres). Street within the GC are disconnected from the entire study area street network even though result from this study show a high street connectivity, it does not have any positive impact on level of social integration because such street are privatised. Interviewee 4 (from the unplanned neighbourhood) explains

“The whole area Highland villa (gated community) where there are many houses and streets which are not coming out because they are fenced, I would like if there will be streets like Masaki (planned non-gated) which allow movements of people, cars etc. but here they just create something like a box with only two gates. Because those people are rich they just do anything they like, is not good because of their fence if there is trouble in case of fire outbreak, there is no way to assist them as they only have two gate and have fenced the whole place”.

In addition, observation from the fieldwork suggest that the presence of footpaths on Street 2(gated/unplanned) and Street 3 (planned /unplanned) support pedestrian connectivity (see Figure 6-3a) that might allow social interaction. However, in some cases footpaths that are characterised by narrow width does not encourage longer duration of interaction. This is evident from the activity mapping that revealed that 58 per cent of activities observed are work-based activity (necessary). However, social activity such as children playing, women chatting were observed at some locations on Street 3 (see Figure 5.8 and 5.9 Chapter 5).



Figure 6-3 a, b, c and d: Observed physical qualities that influence social integration

Street furniture: Street furniture such as public benches, streetlights is integral elements to foster social integration. The presence of public sitting furniture such as benches has an influence on the character of social interaction as it support postures and activities. According to the famous quotes by Whyte, (1980) “people will tend to sit where there are places to sit”. However, it was observed that there are no public seating furnitures in the study area, though in few cases where there are businesses especially on (Street 2) there exist private sitting arrangement that are mostly provided for only intending customer. Based on that premise, observed, and mapped activities such as, people playing draught etc. were observed near businesses that have provided seating furnitures (see Section 5.2.2 Chapter 5). Others however use improvised seating arrangement in the absence of public furniture such as blocks, wood logs etc. (Figure 6-3b) in order to stay on the street. The uses of improvised sitting arrangement also buttress the argument that more people will stay on the street to intermingle if the street physical quality is good (Gehl, 1996).

The presence or absence of streetlights has a major implication on the level of social interaction experience at night. According to literature the sense of perceived safety is affected by the physical quality of the environment, absence of street light most especially on Street 2 and 3 was attributed to lack of safety and security of the street (see Section 5.3.1 Chapter 5). This has affected the duration of stay on the street as people avoid staying late at night to escape being a victim of such perceived criminal activities. It was narrated by interviewees that people with questionable character such as robber, drug addict, and hard drug sellers operate along the narrow street while taking advantage of the darkness experience because of no public street light.

Landscape elements: Soft landscape play a major role to foster social integration, for instance trees often function as a social gathering point due to its place making quality (UN-Habitat, 2012a). As such, people tend to gather where there exist such soft landscape to provide shade and shelter from environmental condition such as the sun. Thus, plays a significant impact on the level of social interaction, Street 1(planned/gated community) has achieved largely the presence of soft landscaping such as trees that provides shading during the daytime, therefore suggest positive effect on the social interaction. People were observed chatting under the trees mostly along Street 1 when compared with Street 2 (see Figure 6-3b).

Land uses: The presence of land uses that support variety of business, attract more people to the street which in turn encourage more social interaction (Jacobs, 1961) also discussed in the literature review on (Section 2.4 Chapter 2). It can be observed that the diversity of mixed uses encourage vitality that propel more people on the street at different time of the day. This was observed on Street 2 despite the length of the street as being the shortest the selected streets, more activities was mapped indicating a positive influence on social integration. Interviewee 3 commented

“As you can see the street isn’t having a good quality but I like it here because business is going well and life has to go on and if I get a land I will build a shop so as to enjoy all the opportunities presence as a result of these foreigners (referring to residents of the gated community)”.

In sum, the overall physical qualities of the street might influence largely on the level of social interaction in the study area. As shown on comparative matrix on (Table 5.1 Chapter 5), the physical characteristics was minimally achieved or absence, therefore qualities identified as achievable should be encourage to foster social integration of the settlement.

6.3. Contribution of key findings to urban planning policy intervention

Figure 6-4 gives an overview of key findings, of this study contribution towards planning policy intervention. (Also, see more explanation in Appendix 6). This was based on the three dimension of measuring the quality of streets as public space, in the neighbourhoods of the three selected streets (see conceptual framework Figure 1-1, Chapter 1).

Knowledge gain and documented in this findings can provide contribution in attaining a holistic planning policy intervention based on African context that embrace both physical and social function of the street. Findings from this study have shown that streets as a public space in MBLM have failed in its role (see section 2.2, Chapter 2) to support the multiple uses, users, and activities on the streets, resulting in activities competing for space or absence of such activities. Planning street design and improvement intervention programme should focus on integration of the neighbourhoods and be flexible to accommodate all users and uses. For instance, the demarcation of sidewalks and lanes for pedestrian, motorcycles and tricycles commercial transport and implementation of streetlights, public seats, and landscapes to increase safety, comfort, and social interaction.

In addition, which is a departure from streets as public space in the cities of the global north, planning policy should encourage and formalise street vending activities by provision of space and other amenities such as tables/ vending stands. Rather than common practice of displacement, this is strategic to improve livelihoods and enhance the streets as public space towards social integration. Furthermore, improvement and recognition of identified pedestrian informal connectivity (footpaths) might increase access, sense of belonging and integration, particularly residents of the unplanned neighbourhoods.

Therefore, planning authorities in Dar es Salaam can be better inform and efficient in service delivery when focus is shift from spatial form and appearance to processes and plans that are strategic, flexible and involves participation of all stakeholders ¹⁰. For instance, planning layout and subdivision plans should focus on design that integrate rather than disintegrate neighbourhoods such as reducing number of super blocks intended for GC developments¹¹ and increase percentage ratio of complimentary mixed uses. Therefore, an enabling environment will created that improves connectivity and increase activity, towards integration of settlements. These plans and processes allow for standards and functions to co-exist in order to improve the quality of life and wellbeing of the people.

¹⁰ According to key informant from the Kinondoni municipality and evident in the study area (see Appendix 5) contract has been awarded and some ongoing to upgrade the roads in the neighborhood of Street 1 and drainage on Street 2. However, such project might not be strategic and flexible to consider the three dimension of street quality through citizen participation. Therefore this study is informative to planning policy intervention

¹¹ This suggestion should complement other Government policies committed to increase safety and security, since studies have shown that major reason people prefers to live in GC is that such developments offers security against crime (Asiedu and Arku, 2009; Landman, 2011a)

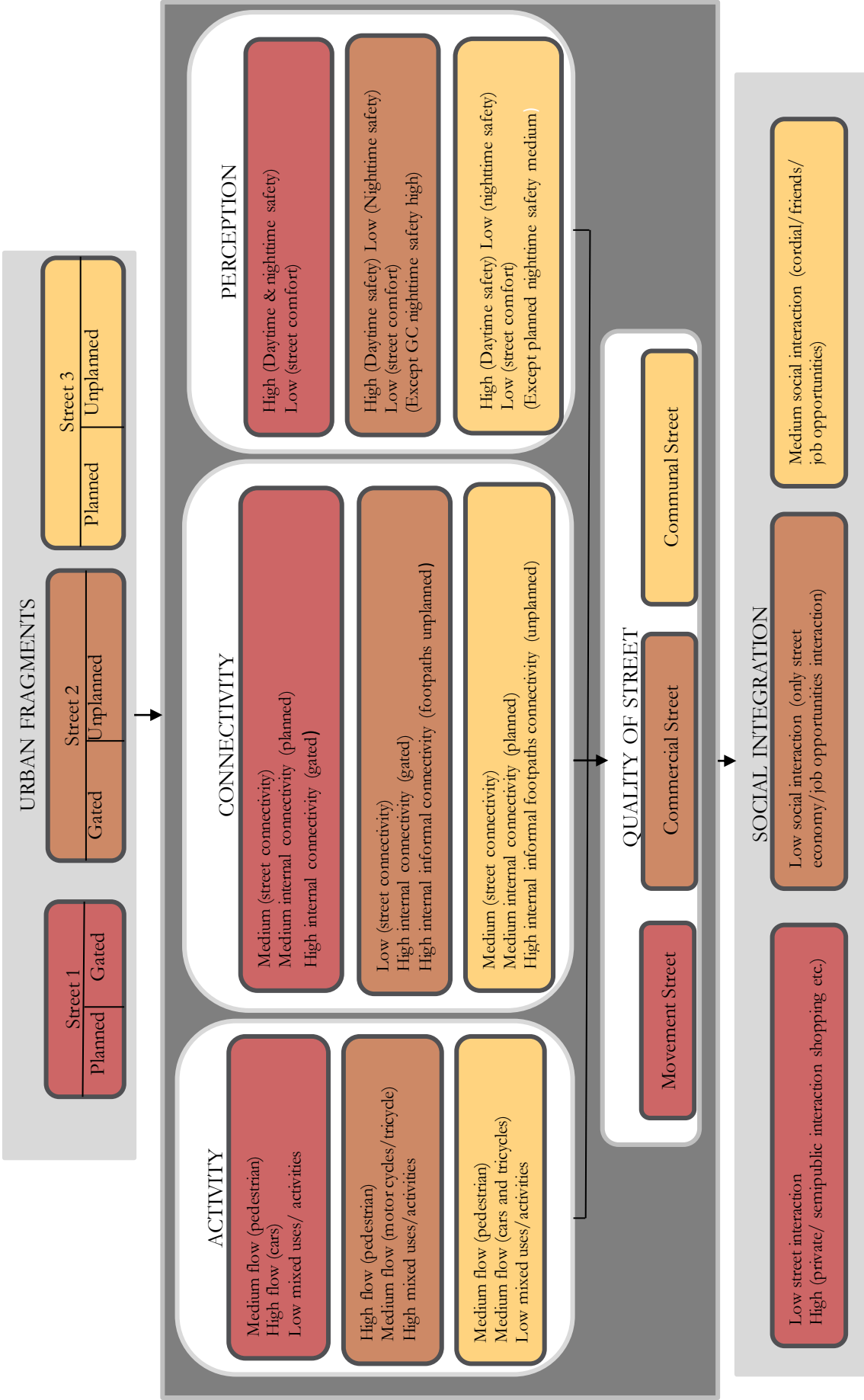


Figure 6-4: An overview of key findings measuring streets qualities based on activity, connectivity, and perception

7. CONCLUSION AND RECOMMENDATION

This chapter gives a concluding and recommendation remarks that includes a summary of the results as it pertain the research objectives set out in chapter one as well as recognize research limitations and provides possible recommendation for further studies direction.

7.1. Conclusion

This study measured the quality of street as public space and explored its role to facilitate the binding together of a fragmented city, through a case study of MBLM a fragmented settlement in the city of DES. Quantitative (objective) and qualitative (subjective) indicators based on the three main concepts of connectivity, activity, and perception were used to observe, measure, and map behavioural activity on three selected shared streets, between different urban fragments. In addition, walking interviews and survey method were used to capture resident perception.

The first objective was to measure the physical qualities of the street. A low- moderate level of street connectivity was measured within the settlement; the level of connectivity was also disaggregated at neighbourhood scale, which revealed that the gated community is more connected, than the other neighbourhoods. However, such internal connectivity does not have any implication to the overall connectivity of the settlement because of its status as a private street. Furthermore a comparison of the physical qualities of the selected streets were made, no considerable difference in the physical qualities between the selected street was found, except for the footpaths observed on Street 2 (gated/unplanned) and 3 (planned/unplanned).

In the second objective, through observation and mapping of activities, results revealed a higher amount of necessary /work based activities both permanent and temporary activities such as street vending. In addition, such activities are located mostly at street entrance, corners and at business location of mixed uses. How residents perceived the quality of their streets was realized in the third objective through the collection of data (questionnaire and interview) which was later analysed using (descriptive statistics and coding) respectively. Results revealed variation between the three selected streets and at different time of the day. For instance the majority of respondent perceived Street 1(planned/gated) as relatively safe all through the day and night while Street 2 (gated/unplanned) is safe only during the day and not safe during the night. The perceived quality also affects their usage of the streets in which residents preferred to stay on the street only when necessary to perform work based activities.

The last objective was a comparison of streets qualities between the urban fragments towards social integration. From the observation, collection and analyses of the indicators, it was found that, several physical characteristics of the street have an impact both positively and negatively on social integration of the settlement. Such as the narrow street width of Street 3 (planned/unplanned) has a positive impact on social interaction, while the fencing and gating on Street 2 (gated/unplanned) has a negative impact on social interaction. Results also revealed a relationship between the three concepts that foster the social interaction towards social integration of the fragmented settlement. For instance, Street 1(planned/gated) and Street 3 (planned/unplanned) that connect more to other streets are socially integrated than street with less connection Street 2 (gated/unplanned). Likewise, the identified binding factor especially the street economy predominantly on Street 2 (gated/unplanned) also revealed a relationship and medium for social integration.

These identified binding factors can be further improved and investigated for policy intervention towards improving social integration of the fragmented city. Furthermore, identified relationship where connectivity, activities, and perception merge can be further investigated for area based policy intervention. In which the use of both quantitative and qualitative indicators, contribute to fuller interpretation and better understanding of the other. The use of both indicator types in this study was effective in gaining more insight into analysing streets in African city with the identification of street economy binding factor and footpaths connectivity. Therefore, findings from this study establishes a departure based on African city, from the large body of literatures that exists pertaining streets and integrating urban fragments in European and Latin American cities respectively.

This research encountered some challenges and limitation in terms of measurement, scale of analysis and context has enumerated below

- The scale of analysis was for a small sub urban fragmented settlement in the city of DES, therefore result could not be generalize for other urban fragment in DES or in Africa setting as a whole. However, there could be basis for comparison considering that the study area contained a rich combination of possible residential types.
- Due to limitation of time and resources, this research does not established through appraisal association test of the degree of correlation between quantitative and qualitative indicators identified and measured under the three main concepts of connectivity, activity and perception
- Despite the mentioned limitation, it was established in the study that the qualities of street as public space contribute to social interaction towards social integration of fragmented settlement.

7.2. Recommendation for further research

Based on the study findings and challenges, there exist windows of opportunities for further research direction. That includes

- A further establishment of the degree of association to which streets as public space is linked to social integration can be explored to give better insight into their relationship.
- Identified pedestrian connectivity in form of footpaths can be analysed further for policy intervention. Particularly, since the provision of streets that can accommodate all various mode of mobility especially for pedestrian mobility to encourage and restore streets as public space does not rank high in priorities for policy intervention in most African cities. There is need to draw more attention through research by mapping and documenting the role of footpaths to improve pedestrian connectivity.
- The research can be repeated on a larger scale using both quantitative and qualitative indicators to investigate other binding factors towards social integration in addition to the identified street economy, in other fragmented settlements in DES of different socio- economic class.

LIST OF REFERENCES

- Appleyard, D., & Lintell, M. (1972). The Environmental Quality of City Streets: The Residents' Viewpoint. *Journal of the American Institute of Planners*, 38(2), 84–101. doi:10.1080/01944367208977410
- Asiedu, A. B., & Arku, G. (2009). The Rise of Gated Housing Estates in Ghana: Empirical Insights from Three Communities in Metropolitan Accra. *Journal of Housing and the Built Environment*, 24(3), 227–247. doi:10.1007/s10901-009-9146-0
- Aultman-Hall, L., Roorda, M., & Baetz, B. (1997). Using GIS for Evaluation of Neighborhood Pedestrian Accessibility. *Journal of Urban Planning and Development*, 123(1), 10–17.
- Balbo, M. (1993). Urban Planning and the Fragmented City of Developing Countries. *Third World Planning Review*, 15, 23 – 35.
- Borsdorf, A., Hidalgo, R., & Sánchez, R. (2007). A New Model of Urban Development in Latin America: The Gated Communities and Fenced Cities in the Metropolitan Areas of Santiago de Chile and Valparaíso. *Cities*, 24(5), 365–378. doi:10.1016/j.cities.2007.04.002
- Brown, A. (2004). *Claiming Rights to the Street: The Role of Public Space and Diversity Governance of Street Economy*. Retrieved from <http://www.n-aerus.net/web/sat/workshops/2004/papers/Brown.pdf>
- Bryman, A. (2012). *Social Research Methods* (4th ed.). New York: Oxford University Press.
- Burgess, R. (2005). Technological Determinism and Urban Fragmentation: A Critical Analysis. In *9th International Conference of the ALFA-IBIS Network on Urban Peripheries, Pontificia Universidad Católica de Chile, Santiago de Chile, July 11th - 13th 2005*.
- Burke, M., & Sebaly, C. (2001). Locking in the Pedestrian? The Privatised Streets of Gated Communities. *World Transport Policy & Practice*, 7(4), 67–74.
- Carmona, M., Tiesdell, S., Heath, T., & Oc, T. (2010). *Public Places Urban Spaces: The Dimensions of Urban Design* (2nd ed.). London: Routledge Taylor & Francis Group.
- Casmiri, D. (2008). *Vulnerability of Dar es Salaam City to Impacts of Climate Change*. EMPS. Dar es Salaam.
- Cervero, R., & Kockelman, K. (1997). Travel Demand and the 3Ds: Density, Diversity, and Design. *Transportation Research Part D: Transport and Environment*, 2(3), 199–219. doi:10.1016/S1361-9209(97)00009-6
- Congress for the New Urbanism. (2001). *Charter of the New Urbanism*. Retrieved February 09, 2015, from <http://www.cnu.org/charter>
- Coy, M. (2006). Gated Communities and Urban Fragmentation in Latin America: The Brazilian Experience. *GeoJournal*, 66(1-2), 121–132. doi:10.1007/s10708-006-9011-6
- Deffner, V., & Hoerning, J. (2011). The Struggle to Belong. *International rc21*, 15. Retrieved from http://www.rc21.org/conferences/amsterdam2011/edocs2/Session_15/15-1-Deffner.pdf
- Dijkstra, L. W. (1999). Public Spaces: A Comparative Discussion of the Criteria for Public Space. In *Ray Hutchison (ed.) Constructions of Urban Space (Research in Urban Sociology, Volume 5)* (pp. 1 – 22). Emerald Group Publishing Limited.
- Dill, J. (2004). *Measuring Network Connectivity for Bicycling and Walking.* In *84th Annual Meeting of the Transportation Research Board. Paper 04-001550*. Washington, DC.
- Evans, J., & Jones, P. (2011). The walking Interview: Methodology, Mobility and Place. *Applied Geography*, 31(2), 849–858. doi:10.1016/j.apgeog.2010.09.005
- Francis, M. (1984). Mapping Downtown Activity. *Journal of Architectural and Planning Research*, 1, 21–35.
- Frank, L. D., Stone, B., & Bachman, W. (2000). Linking Land Use with Household Vehicle Emissions in the Central Puget Sound: Methodological Framework and Findings. *Transportation Research Part D: Transport and Environment*, 5(3), 173–196. doi:10.1016/S1361-9209(99)00032-2
- Frank, L., Sallis, J., Saelens, B. E., Leary, L., Cain, K., Conway, T. L., & Hess, P. M. (2010). The Development of a Walkability Index: Application to the Neighborhood Quality of Life Study. *British Journal of Sports ...*, 44(13), 924 – 933. doi:10.1136/bjsm.2009.058701

- Gehl, J. (1996). *Life Between Buildings: Using Public Space* (3rd ed.). Denmark: The Danish Architectural Press. Retrieved from <http://www.rudi.net/pages/8741>
- Gehl, J. (2008). *Life Between Buildings: Using Public Space* (6th ed.). Island Press.
- Graham, S. (2001). The Spectre of the Splintering Metropolis. *Cities*, 18(6), 365–368. doi:10.1016/S0264-2751(01)00028-2
- Graham, S., & Marvin, S. (2001). *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*. London: Routledge.
- Harrison, P. (2003). Fragmentation and Globalisation as the New Meta-Narrative. In Harrison Philip, Huchzermeyer Maria, Mayekiso Mzwanele *Confronting Fragmentation: Housing and Urban Development in a Democratising Society* (p. 15). Cape Town: University of Cape Town University Press.
- Harvey, D. (2006). The Political Economy of Space. In S.Low and N.Smith (Eds.), *The political economy of public space*. London: Routledge.
- Hass-Klau, C., Crampton, G., Dowland, C., & Nold, I. (1999). *Streets as Living Space: Helping Public Places Play their Proper Role; Good Practice Guidance with Examples from a Town Centre Study of European Pedestrian Behaviour*. London: Landor Publishing.
- Hernández Bonilla, M. (2013). The Significance and Meanings of Public Space Improvement in Low-Income Neighbourhoods “Colonias Populares” in Xalapa-Mexico. *Habitat International*, 38, 34–46. doi:10.1016/j.habitatint.2012.09.003
- Hess, P. M. (1997). Measures of Connectivity [Streets: Old Paradigm, New Investment]. *Places*, 11(2), 58. Retrieved from <https://escholarship.org/uc/item/9599t9f1>
- Hidding, M. C., & Teunissen, A. T. J. (2002). Beyond Fragmentation: New Concepts for Urban–Rural Development. *Landscape and Urban Planning*, 58(2-4), 297–308. doi:10.1016/S0169-2046(01)00228-6
- Howe, J. (2001). The Heading & Footpath Economy - Walking in Sub-Saharan Africa. *World Transport Policy & Practice*, 7(4), 8–12. Retrieved from <http://www.eco-logica.co.uk/worldtransport.html>
- Innes, J. E. (1990). *Knowledge and Public Policy: The Search of Meaningful Indicators*. New Brunswick, NJ: Transaction Publishers.
- Innes, J. E., & Booher, D. E. (2000). Indicators for Sustainable Communities: A Strategy Building on Complexity Theory and Distributed Intelligence. *Planning Theory and Practice*, 1(2), 173–186.
- Ittelson, W. H., Rivlin, L.G and Proshansky, H. . (1976). The Use of Behavioural Maps in Environmental Psychology. In Proshansky, H. M, Ittelson, W. T and Rivlin, L.G (Eds). *Environmental Psychology: Man and his Physical Setting* (pp. 658–668). New York: Holt, Rinehart & Winston.
- Jacobs, A. B. (1985). *Looking at Cities*. Cambridge: Harvard University Press.
- Jacobs, A. B. (1995). *Great Streets*. Cambridge, MA: The MIT Press.
- Jacobs, J. (1961). *The Death and Life of Great American Cities*. London: Penguin Books.
- Janches, F. (2011). *Significance of Public Space in the Fragmented City Designing Strategies for Urban Opportunities in Informal Settlements of Buenos Aires City* Flavio Janches * (No. 2011/13).
- Kombe, W. J. (2005). Land Use Dynamics in Peri-Urban Areas and their Implications on the Urban Growth and Form: The Case of Dar es Salaam, Tanzania. *Habitat International*, 29(1), 113–135. doi:10.1016/S0197-3975(03)00076-6
- Kumar, R. (2005). *Research Methodology: A Step - by - Step Guide for Beginners* (2 ed.). London: Sage.
- Landman, K. (2011a). *Gated Communities In South Africa : Comparison of Four Case Studies in Gauteng*.
- Landman, K. (2011b). Urban Fragmentation: Different Views on its Causes and Consequences. In Geyer, H.S , *International Handbook of Urban Policy* (pp. 39–60). Cheltenham: Edward Elgar Publishing.
- Leader, R. K., & Lupala, J. (2009). *Mainstreaming Disaster Risk Reduction in Urban Planning Practice in Tanzania*.
- Lekule, C. T., & Arkitektskole, K. (2004). *Place Dynamics: Meaning of Urban Space to Residents in Keko Magurumbasi Informal Settlement, Dar Es Salaam, Tanzania*. PhD Thesis. School of Architecture, Royal Danish Academy of Fine Arts.
- Lerise, F., & Malele, B. (2005). *Community Initiatives in Managing Urbanisation and Risk Accumulation Processes: Lesson from Dar Es Salaam, Tanzania*.

- Lipovska, B., & Stepankova, R. (2013). Assessing Observation Methods for Landscape Planning in Rural Villages. *Current Urban Studies*, 1, 102–109. doi:10.4236/cus.2013.14011
- Loewen, L. J., Steel, G. D., & Suedfeld, P. (1993). Perceived Safety from Crime in the Urban Environment. *Journal of Environmental Psychology*, 13(4), 323–331. doi:10.1016/S0272-4944(05)80254-3
- Loukaitou-Sideris, A., & Banerjee, T. (1998). *Urban Design Downtown : Poetics and Politics of Form* . Berkeley, CA: University of California Press.
- Lupala, J. M. (2002). *Urban Types in Rapidly Urbanising Cities: Analysis of Formal and Informal Settlements in Dar es Salaam, Tanzania*. Stockholm: Royal Institute of Technology. Retrieved from <http://www.diva-portal.org/smash/get/diva2:9224/FULLTEXT01.pdf>
- Madanipour, A. (1999). Why are the Design and Development of Public Spaces Significant for Cities? *Planning and Design*, 26(6), 879–891. doi:10.1068/b260879
- Madanipour, A. (2010). *Whose Public Space? : International Case Studies in Urban Design and Development*. Hoboken: Taylor and Francis.
- Madrazo, B., & van Kempen, R. (2012). Explaining Divided Cities in China. *Geoforum*, 43(1), 158–168. doi:10.1016/j.geoforum.2011.07.004
- Martinez, J. (2014). Mixed Methods Approach- Quality of Life [PowerPoint Slides]. Retrieved from <https://blackboard.utwente.nl>
- Martínez, J. (2009). The Use of GIS and Indicators to Monitor Intra-Urban Inequalities. A Case Study in Rosario, Argentina. *Habitat International*, 33(4), 387–396. doi:10.1016/j.habitatint.2008.12.003
- Mately, M., Goldman, L. M., & Fineman, B. J. (2001). Pedestrian Travel Potential in Northern New Jersey: A Metropolitan Planning Organization's Approach to Identifying Investment Priorities. *Transport Research Record*, (1705), 1–8.
- Mehta, V. (2013). *The Street : A Quintessential Social Public Space*. Hoboken: Taylor and Francis.
- Merriam-Webster Online Dictionary and Thesaurus. (2014). Retrieved July 24, 2014, from <http://www.merriam-webster.com/>
- Montgomery, J. (1998). Making a City: Urbanity, Vitality and Urban Design. *Journal of Urban Design*, 3(1), 93–116. doi:10.1080/13574809808724418
- Moudon, A. V. (1991). *Public Streets for Public Uses*. New York: Columbia University Press.
- Mrema, L. K. (2013). Creation and Control of Public Open Spaces: Case of Msasani Makangira Informal Settlement, Tanzania. *Online Journal of Social Science Research*, 2(7). Retrieved from http://onlineresearchjournals.org/JSS/pdf/2013/jul/Mrema_LR.pdf
- National Complete Streets Coalition | Smart Growth America. (2014). Retrieved June 02, 2014, from <http://www.smartgrowthamerica.org/complete-streets>
- NBS. (2013). *Tanzania Population and Housing Census 2012. United Republic of Tanzania*. Dar es Salaam.
- Nguluma, H. (2003). *Housing Themselves: Transformations, Modernisation and Spatial Qualities in Informal Settlements in Dar es Salaam, Tanzania*. PhD Thesis, Stockholm: The Royal Institute of Technology.
- Nguma, J. K., Rwebanira, T., & Mbella, A. Y. V. (1993). Problems and Prospects for Urban Non-motorised Transport in Sub-Saharan Africa, Part B: User Perspectives of Non-motorised Transport in Dar es Salaam. In *Proceedings 7th Velo- City Conference, Nottingham, 6-10 September*.
- O' Connor, A. (2013). The Africa City. Retrieved December 10, 2014, from <http://www.ebib.com>
- Online TDM Encyclopedia. (2014). Retrieved June 02, 2014, from <http://www.vtpi.org/tdm/tdm12.htm>
- Oranratmanee, R., & Sachakul, V. (2014). Streets as Public Spaces in Southeast Asia: Case Studies of Thai Pedestrian Streets. *Journal of Urban Design*, 19(2), 211–229. doi:10.1080/13574809.2013.870465
- Pacione, M. (2003). Urban Environmental Quality and Human Wellbeing—A Social Geographical Perspective. *Landscape and Urban Planning*, 65(1-2), 19–30. doi:10.1016/S0169-2046(02)00234-7
- Pacione, M. (2009). *Urban Geography : A Global Perspective* (3rd ed.). London: Routledge Taylor & Francis Group.
- Peter, M. (1989). Dual City: A Muddy Metaphor for a Quartered City. *International Journal of Urban and Regional Research*, 13(4), 697 – 708.

- Pirie, G. (2013). *Sustainable Urban Mobility in "Anglophone" Sub-Saharan Africa. Technical report*. Technical report, UN-Habitat, Nairobi, Kenya. Retrieved from <http://www.unhabitat.org/grhs/2013>
- Reilly, M., & Landis, J. (2002). *The Influence of Built Form and Land Use on Mode Choice - Evidence from the 1996 Bay Area Travel Survey. Presented at the Annual Meeting of the Transportation Research Board*. Washington, DC.
- Relph, E. C. (1976). *Place and Placelessness*. London: Pion.
- Sabatini, F., & Salcedo, R. (2007). Gated Communities and the Poor in Santiago, Chile: Functional and Symbolic Integration in a Context of Aggressive Capitalist Colonization of Lower Class Areas. *Housing Policy Debate*, 18(3), 577 – 606. doi:10.1080/10511482.2007.9521612
- Shumi, S. (2013). *Understanding the Relationship between Walkability and Quality of Life of Women Garments Workers in Dhaka, Bangladesh*. University of Twente Faculty of Geo-Information and Earth Observation (ITC). Retrieved from http://www.itc.nl/library/papers_2013/msc/upm/shumi.pdf
- Taylor, N. (1998). Paradigm Shifts, Modernism and Postmodernism. In *Urban Planning Theory since 1945* (pp. 157–169). London: Sage.
- Tiesdell, S and Oc, T. (1998). Beyond Fortress and Panoptic Cities- Towards a Safer Urban Public Realm. *Environment and Planning B: Planning and Design*, 25, 639–655.
- Trancik, R. (1986). *Finding Lost Space: The Theories of Urban Design*. New York: Van Nostrand Reinhold.
- UN-Habitat. (2002). *Expert Group Meeting on Slum Indicators: Secure Tenure, Slums and Global Sample of Cities*. Nairobi, Kenya.
- UN-Habitat. (2009). *Tanzania: Dar es Salaam City Profile*. Nairobi, Kenya.
- UN-Habitat. (2010). *Planning Sustainable Cities, Global Report on Human Settlements 2009*. Nairobi, Kenya.
- UN-Habitat. (2012a). *Korogocho Streetscapes : Documenting the Role and Potentials of Streets in Citywide Slum Upgrading*. Nairobi, Kenya.
- UN-Habitat. (2012b). *Streets as Tools for Urban Transformation in Slums: A Street-Led Approach to Citywide Slum Upgrading*. Nairobi, Kenya.
- UN-Habitat. (2013). *Streets as Public Spaces and Drivers of Urban Prosperity*. Nairobi, Kenya.
- Whyte, W. H. (1980). *Social Life of Small Urban Spaces*. Washington, DC: The Conservation Foundation.
- Wolf, P. (1986). Toward an Evaluation of Transportation: Potentials for the Urban Street. In *S. Anderson (Eds.) On Streets*. Cambridge, Massachusetts: The MIT Press.
- Wong, C. (2006). *Indicators for Urban and Regional Planning. The Interplay of Policy and Methods*. London: Routledge Taylor & Francis Group.
- Yin, R. K. (2014). *Case Study Research. Design and Methods* (Fifth Edit.). London: Sage Publications.
- Zhang, L., Hong, J., Nasri, A., & Shen, Q. (2012). How Built Environment Affects Travel Behavior: A Comparative Analysis of the Connections Between Land Use and Vehicle Miles Traveled in US Cities. *The Journal of Transport and Land Use*, 5(3), 40 – 52. doi:10.5198/jtlu.v5i3.266

APPENDICES

APPENDIX 1:

LIST OF OTHER INDICATORS USE CAPTURE STREETS PHYSICAL QUALITIES

Street width
Street pavement material
Presence and width of footpath
No of streets connections
Condition of footpath/path
Presence of street light
Presence of drainage
Condition of drainage
Presence of potholes
Presence of benches and shades
Presence of trees
Presence of obstruction(such as garbage, abandon cars shops extension to sidewalk)
Presence of police post

APPENDIX 2:

CHARACTERISTICS OF STUDY AREA POPULATION AND SAMPLE

Gender	*% of population	Number of respondent sampled %
Male	49	47
Female	51	53
Age		
18 to 24	29	30
25 to 44	54	50
45 to 64	14	17
65+	3	3
Total	100	100

*Data on population for Kinondoni district and Msasani ward from the NBS Tanzania online census data 2012

APPENDIX 3:

STRUCTURED AND SEMI STRUCTURE QUESTIONNAIRES FOR SURVEY AND WALKING INTERVIEW

Structured Questionnaire Interview

Introduction

My names are Bolatito Babatunde, a M.Sc. student from the University of Twente in the Netherlands. The purpose of this questionnaire is to gather resident's perception of their street quality and how it functions as public space to support social interaction. All information collected is for academic research purpose only therefore the information you give will remain confidential.

PART 1

Perception of street quality by resident (specify street name)

The following is a number of statements to describe the situation of this street. Please indicate to what extent you agree or disagree.

No	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	The street is safe to walk in at all time of the day	5	4	3	2	1
2.	The street is safe during the day	5	4	3	2	1
3.	The street is safe to walk in during the night time	5	4	3	2	1
4.	The street is easily physically accessible	5	4	3	2	1
5.	There are enough unobstructed path or sidewalk to walk through	5	4	3	2	1
6.	I am satisfied with the aesthetics quality of the street	5	4	3	2	1
7.	The street is lively	5	4	3	2	1
8.	The street is clean	5	4	3	2	1
9.	There are enough facilities for me to stay on the street (e.g. trees, other shades, benches, streetlight, etc.)	5	4	3	2	1
10.	I feel comfortable to stay on the street with the presence condition	5	4	3	2	1
11.	I will not stay on the street unless it is necessary	5	4	3	2	1
12.	Traffic does not affect my stay or movement on the street	5	4	3	2	1
13.	The overall quality of this street base on the above?	Very good	good	fair	poor	Very poor

PART 2

Perception on the nature of social interaction and sense of belonging

14. Do you think your street is friendly	Yes			No	
15. How much do you feel at home in this neighbourhood of this street	Completely at home	Slightly at home	A little at home/a little not at home	Not at home	Absolutely not at home
16. How would you describe your contact with people in the community across the street	Very good	good	fair	Not good	Bad
17. What type of relationship please specify	Friends/family	Business/professional	cordial	others	No relationship
18. How many of the people in this street do you chat with	With all of them	With most of them	With just a few	With no one	No answer
19. How many of the people in the community across the street do you chat with	With all of them	With most of them	With just a few	With no one	No answer
20. I stay on the street to interact with others in its presence condition	Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Part 3 Respondent Profile

Gender ☐ Male ☐ Female

Age (years) ☐ 18 - 24 ☐ 25 - 44 ☐ 45 - 64 ☐ 65+

Do you live or work in Msasani Yes / NO

If yes which neighbourhood? _____

How long have you lived or work in this neighbourhood?

Less than a year	1 - 5 years	6 - 10 years	11 - 15 years	16+
------------------	-------------	--------------	---------------	-----

Semi-structured questions for walking interview

Introduction

My names are Bolatito Babatunde, a M.Sc. student from the University of Twente in the Netherlands. The purpose of this walking interview is to gather in-depth information on how residents' perceived the quality of their street, its usage and how it support social interaction and integration. The interview will include a tour of the street and places of interest and concern. This interview is solely for academic purpose, therefore information you give will remain confidential. The interview will take about half an hour.

Respondent profile:

1. Name...
2. Gender: ☐ Male ☐ Female
3. Age Range: ☐ 18 - 24 ☐ 25 - 44 ☐ 45 - 64 ☐ 65+
4. Do you Live or work in Msasani ward? YES/NO
5. How long have you lived or work in the neighbourhood of this street? Please specify in years
.....

Part 1: Perception of physical street quality and safety

6. Do you feel safe walking and being on this street all the time? YES/NO, please specify reason.
7. If 'No' what time of the day does, the street feels unsafe to you. Why?
8. What makes the street unsafe?
9. Where are areas you feel unsafe? Please point out such places or indicate on the map.
10. Do you feel comfortable walking and staying on this street? YES/NO, please specify the reason.
11. In your opinion, is there an adequate street cleaning and street garbage collection? YES/NO
12. Do you use this street more often than other street in your neighbourhood? YES/NO, Please specify the reason.
13. How will you describe the quality of this street in terms of road condition, road pavement, availability of shades, benches, trees, streetlight, visual attraction, and street cleaning?
14. Does the street quality affect what your usage of the street?

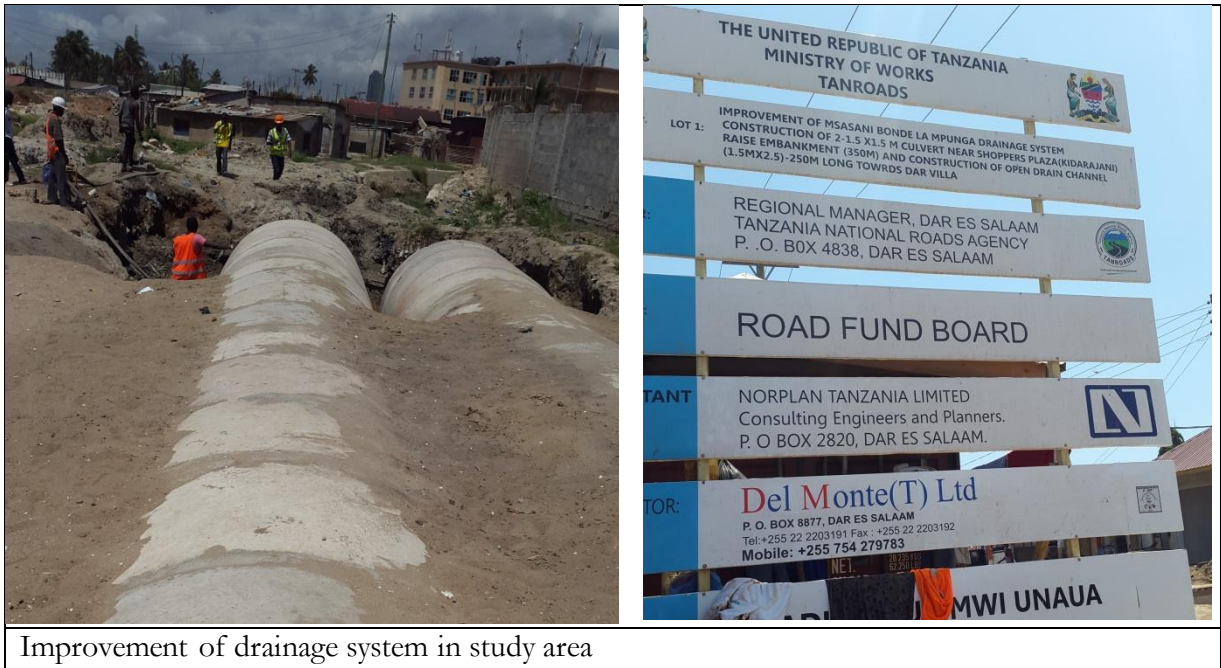
Part 2: Perception on the nature of social interaction and sense of belonging

15. Do you think this is a friendly street?
16. Do you feel at home in this neighbourhood? YES/NO please specify the reason
17. Can you describe the activities you like to engage in this street and why?
18. How many people do you know in this neighbourhood?
19. Do you have any relationship with some people in the neighbourhood across your street? YES/NO, Please specify the kind of relationship.
20. Where do you mostly meet and how often do you have a chat with them.
21. Do you have any favourite places that you visit on this street? Please specify what type of place (e.g. store, shop, religious place etc.) and reason for it being your favourites.
22. Do you engage in any form of interaction with people you meet at those places?
23. What do you like most about your street?
24. Can you mention what you do not like about this street?
25. If given the opportunity, mention important things you will want improved or change in this street.

APPENDIX 4:
WALKING INTERVIEW TRACKS



APPENDIX 5:
PHOTOS ON ROADS AND DRAINAGE IMPROVEMENT IN THE STUDY AREA



APPENDIX 6

MORE EXPLANATION ON KEY FINDINGS

	Activity	Connectivity	Perception	Integration
Street 1 (planned/gated)	Low level of activity More social activities High continuous flow of cars	More connection (due to the planned area) Street physical quality is fair	Residents perception of street physical quality is fair Street is relatively safe day and night	An appreciable level of perceived social integration. Interaction, occur in other public spaces such as beach shopping plaza and rarely on the street.
Street 2 (gated/unplanned)	High activity (Predominate work based such as local businesses and street vending) High continuous flow of pedestrian	No connection (except for footpaths to and within unplanned neighbourhood) Street physical quality is fair (improvement of drainage minimise seasonal flooding)	Street physical quality is perceive as fair (improvement of drainage minimise seasonal flooding) Quality does not deter work base activity The street is perceived as unsafe at night (due to darkness that facilitate criminal activities)	No connection suggest further fragmentation of the neighbourhoods No connection implies less spatial integration Improving the identified street economy and business opportunities (binding factor) towards social integration
Street 3 (planned/unplanned)	Moderate level of activity Moderate continuous flow of pedestrian	More connection (due to the planned area) Observed physical quality is poor	Street quality is perceived as fair Resident perceived neighbourhoods as relatively unsafe at night	More connection contributes to integration, and suggests less stigmatization and high sense of belonging. Further integration requires improvement of physical qualities to encourage the use of the street