

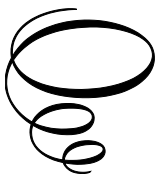
An Evolutionary
and Sustainability
Perspective on Public
Space in Nairobi

An Evolutionary and Sustainability Perspective on Public Space in Nairobi

By

Teckla Muhoro

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TABLE OF CONTENTS

List of Tables.....	vii
List of Figures.....	ix
List of Plates.....	xiii
List of Equations.....	xviii
List of Appendices.....	xix
List of Abbreviations.....	xx
Acknowledgements.....	xxi
Preface.....	xxii
Foreword.....	xxv
Chapter One.....	1
Introduction	
Chapter Two.....	12
Literature Review	
Chapter Three.....	51
Area of Study	
Chapter Four.....	66
Research Methodology	
Chapter Five.....	85
Data Analysis and Interpretation	
Chapter Six.....	210
Discussion	

Chapter Seven.....	224
Conclusions and Recommendations	
Appendices	232
References	241

LIST OF TABLES

- Table 4.1:** Research Sampling Frame
- Table 4.2:** Primary Data Collection Variables
- Table 5.1:** Changes in Space Size (1963-2015)
- Table 5.2:** Space Size Averages (1963-2015)
- Table 5.3:** Changes in Connectivity (1963-2015)
- Table 5.4:** Space Connectivity Averages (1963-2015)
- Table 5.5:** Changes in Densities (1963-2015)
- Table 5.6:** Surrounding Space Density Averages (1963-2015)
- Table 5.7:** Changes in Enclosure of All Spaces (1963-2015)
- Table 5.8:** Space Enclosure Averages (1963-2015)
- Table 5.9:** Changes in Commercial Use Indexes for All Spaces (1963-2015)
- Table 5.10:** Changes in Institutional Use Indexes for All Spaces (1963-2015)
- Table 5.11:** Changes of Residential Use Indexes for All Spaces (1963-2015)
- Table 5.12:** Changes in Industrial, Warehouse, & Workshop Use Indexes for All Spaces (1963-2015)
- Table 5.13:** Detailed Table of Use Changes for All Spaces (1963-2015)
- Table 5.14:** Changes in Tree Cover (1963-2015)
- Table 5.15:** Table of Tree Cover Averages (1963-2015)
- Table 5.16:** Social Sustainability Model Summary
- Table 5.17:** ANOVA for Social Sustainability
- Table 5.18:** Coefficients of Multiple Determinations of Variables for Social Sustainability
- Table 5.19:** Economic Sustainability Model Summary
- Table 5.20:** ANOVA for Economic Sustainability
- Table 5.21:** Coefficients of Multiple Determinations of Variables for Economic Sustainability
- Table 5.22:** Environmental Sustainability Model Summary
- Table 5.23:** ANOVA for Environmental Sustainability
- Table 5.24:** Coefficients of Multiple Determinations of Variables for Environmental Sustainability
- Table 5.25:** Governance Sustainability Model Summary

Table 5.26: ANOVA for Governance Sustainability

Table 5.27: Coefficients of Multiple Determinations of Variables for Governance Sustainability

Table 5.28: Averages and Percentage Change of Dependent Variables (1963-2015)

Table 5.29: Table of Correlation Coefficients for All Spaces (1963-2015)

Table 6.1: Table Showing Averages of Variables (1963-2015)

Table 7.1: Table of p-values for Sustainability from SPSS ANOVA Tables

Table 7.2: Sustainability of Environmental Variables (1963-2015)

LIST OF FIGURES

- Figure 2.1:** Summary of Key Elements of Darwinian Theory of Evolution
- Figure 2.2:** Sketch showing legibility of a public square
- Figure 2.3:** Sketch showing vehicular and pedestrian connectivity to space
- Figure 2.4:** Sketch showing effect of increased connectivity on block size and street grain
- Figure 2.5:** Sketch showing focal point in a public open space
- Figure 2.6:** Building Height to Width Ratio and Thoroughfare Enclosure
- Figure 2.7:** Research Conceptual Framework
- Figure 3.1:** Location Map of Kenya
- Figure 3.2:** Location and Boundaries Map of Nairobi City County
- Figure 3.3:** Nairobi c. 1900
- Figure 3.4:** Nairobi Morphology Map, 1900
- Figure 3.5:** Nairobi Morphology Map, 1920
- Figure 3.6:** Nairobi Morphology Map, 1940
- Figure 3.7:** Nairobi Morphology Map, 1960
- Figure 3.8:** Nairobi Morphology Map, 1970
- Figure 4.1:** Map of Nairobi CBD Study Spaces
- Figure 5.1:** Space Size Changes (1963-2015)
- Figure 5.2:** Average Space Size of All Spaces (1963-2015)
- Figure 5.3:** Central Park Size Maps (1963-2015)
- Figure 5.4:** Hilton Hotel Circle Size Maps (1963-2015)
- Figure 5.5:** KICC Parking Size Maps (1963-2015)
- Figure 5.6:** Aga Khan Walk Size Maps (1963-2015)
- Figure 5.7:** Graph of Connectivity Changes (1963-2015)
- Figure 5.8:** Average Connectivity of All Spaces
- Figure 5.9:** Central Park Connectivity Maps (1963-2015)
- Figure 5.10:** Jeevanjee Gardens Connectivity Map (1963-2015)
- Figure 5.11:** John Michuki Park Connectivity Maps (1963-2015)
- Figure 5.12:** Hilton Hotel Circle Connectivity Maps (1963-2015)
- Figure 5.13:** Fire Station Roundabout Connectivity Maps (1963-2015)
- Figure 5.14:** Globe Cinema Roundabout Connectivity Maps (1963-2015)
- Figure 5.15:** Sunken Car Park Connectivity Maps (1963-2015)
- Figure 5.16:** Supreme Court Parking Connectivity Maps (1963-2015)
- Figure 5.17:** KICC Connectivity Maps (1963-2015)

- Figure 5.18:** Railways Go-downs Parking Connectivity Maps (1963-2015)
- Figure 5.19:** Kenya Bus Services Terminus Connectivity Maps (1963-2015)
- Figure 5.20:** Railways Bus Terminus Connectivity (1963-2015)
- Figure 5.21:** Aga Khan Walk Connectivity (1963-2015)
- Figure 5.22:** National Housing Corporation Walk Connectivity (1963-2015)
- Figure 5.23:** Wakulima Market Connectivity (1963-2015)
- Figure 5.24:** Graph of Density Changes (1963-2015)
- Figure 5.25:** Average Densities All Spaces (1963-2015)
- Figure 5.26:** Central Park Area Density (1963-2015)
- Figure 5.27:** Jeevanjee Gardens Area Density (1963-2015)
- Figure 5.28:** John Michuki Park Area Density (1963-2015)
- Figure 5.29:** Hilton Hotel Circle Area Density (1963-2015)
- Figure 5.30:** Globe Cinema Roundabout Area Density (1963-2015)
- Figure 5.31:** Fire Station Roundabout Area Density (1963-2015)
- Figure 5.32:** Sunken Car Park Area Density (1963-2015)
- Figure 5.33:** Supreme Court Parking Area Density (1963-2015)
- Figure 5.34:** KICC Parking Area Density (1963-2015)
- Figure 5.35:** Kenya Bus Services Terminus Area Density (1963-2015)
- Figure 5.36:** Railway Bus Terminus & Godowns Parking Area Density (1963-2015)
- Figure 5.37:** Aga Khan Walk & National Housing Corporation Walk Areas Density (1963-2015)
- Figure 5.38:** Wakulima Market Area Density (1963-2015)
- Figure 5.39:** Graph of Enclosure Changes (1963-2015)
- Figure 5.40:** Average Enclosure All Spaces (1963-2015)
- Figure 5.41:** Central Park Enclosure (1963-2015)
- Figure 5.42:** Jeevanjee Gardens Enclosure (1963-2015)
- Figure 5.43:** John Michuki Park Enclosure (1963-2015)
- Figure 5.44:** Hilton Hotel Circle Enclosure (1963-2015)
- Figure 5.45:** Globe Cinema Roundabout Enclosure (1963-2015)
- Figure 5.46:** Fire Station Roundabout Enclosure (1963-2015)
- Figure 5.47:** Supreme Court Parking Enclosure (1963-2015)
- Figure 5.48:** Sunken Car Park Enclosure (1963-2015)
- Figure 5.49:** Railways Go-downs Parking Enclosure (1963-2015)
- Figure 5.50:** KICC Parking Enclosure (1963-2015)
- Figure 5.51:** Railways Bus Terminus Enclosure (1963-2015)
- Figure 5.52:** KBS Terminus Enclosure (1963-2015)
- Figure 5.53:** Aga Khan Walk Enclosure (1963-2015)

- Figure 5.54:** National Housing Corporation Enclosure (1963-2015)
- Figure 5.55:** Wakulima Market Enclosure (1963-2015)
- Figure 5.56:** Graph of Commercial Use Index Changes (1963-2015)
- Figure 5.57:** Graph of Commercial Use Indexes Average Change (1963-2015)
- Figure 5.58:** Graph of Institutional Use Index Changes (1963-2015)
- Figure 5.59:** Graph of Institutional Use Indexes Average Change (1963-2015)
- Figure 5.60:** Graph of Residential Use Index Changes (1963-2015)
- Figure 5.61:** Graph of Residential Use Indexes Average Change (1963-2015)
- Figure 5.62:** Graph of Industrial/Warehouse/Workshops Use Index Changes (1963-2015)
- Figure 5.63:** Graph of Industrial/Workshop Use Indexes Average Change (1963-2015)
- Figure 5.64:** Nairobi CBD Parking Areas Map 1962
- Figure 5.65:** Nairobi CBD Land Use Map 1964
- Figure 5.66:** Nairobi CBD Land Use Map 2011
- Figure 5.67:** Central Park Land Use (1963-2015)
- Figure 5.68:** Jeevanjee Gardens Land Use (1963-2015)
- Figure 5.69:** John Michuki Park Land Use (1963-2015)
- Figure 5.70:** Hilton Hotel Circle Land Use (1963-2015)
- Figure 5.71:** Globe Cinema Roundabout Land Use (1963-2015)
- Figure 5.72:** Fire Station Roundabout Land Use (1963-2015)
- Figure 5.73:** Supreme Court Parking Land Use (1963-2015)
- Figure 5.74:** Sunken Car-park Land Use (1963-2015)
- Figure 5.75:** Railways Godowns Parking Land Use (1963-2015)
- Figure 5.76:** KICC Parking Land Use (1963-2015)
- Figure 5.77:** Railways Bus Terminus Land Use (1963-2015)
- Figure 5.78:** KBS Terminus Land Use (1963-2015)
- Figure 5.79:** Aga Khan Walk Land Use (1963-2015)
- Figure 5.80:** National Housing Corporation Walk Land Use (1963-2015)
- Figure 5.81:** Wakulima Market Land Use (1963-2015)
- Figure 5.82:** Graph of Tree Cover Changes (1963-2015)
- Figure 5.83:** Average Tree Cover (1963-2015)
- Figure 5.84:** Central Park Tree Cover (1963-2015)
- Figure 5.85:** John Michuki Park Tree Cover (1963-2015)
- Figure 5.86:** Jeevanjee Gardens Tree Cover (1963-2015)
- Figure 5.87:** Hilton Hotel Circle Tree Cover (1963-2015)
- Figure 5.88:** Globe Cinema Roundabout Tree Cover (1963-2015)
- Figure 5.89:** Fire Station Roundabout Tree Cover (1963-2015)

Figure 5.91: KICC Parking Tree Cover (1964-2015)

Figure 5.92: Railways Godowns Parking & Bus Terminus Tree Cover (1963-2015)

Figure 5.93: KBS Terminus Tree Cover (1963-2015)

Figure 5.94: Aga Khan & National Housing Corporation Walks (1963-2015)

Figure 5.95: Wakulima Market Tree Cover (1963-2015)

Figure 6.1: Summary of Factors Influencing Sustainability

LIST OF PLATES

- Plate 1.1:** Multi-land highway enclosing public open space at Globe Cinema Roundabout.
- Plate 1.2:** Seating facing away from park at Hilton Hotel Circle
- Plate 1.3:** Low visual and functional interaction between buildings and park at John Michuki Park.
- Plate 1.4:** Low park use at Hilton Hotel Circle.
- Plate 3.1:** Greenbelt below ‘the Hill’: Uhuru Highway and Uhuru Park, 1955
- Plate 3.2:** Containing Sprawl: Uhuru Highway and Uhuru Park, 1970s
- Plate 4.1:** Nairobi CBD Research Area Aerial Photograph
- Plate 5.1:** All Saints Cathedral, 1960s
- Plate 5.2:** Central Park, 2015
- Plate 5.3:** Hilton Hotel Area 1950s
- Plate 5.4:** Hilton Hotel Circle 2015
- Plate 5.5:** City Hall Building, 1955
- Plate 5.6:** KICC Plaza and Parking, 1970s
- Plate 5.7:** Aga Khan Walk, 2015
- Plate 5.8:** Aga Khan Walk, 2015
- Plate 5.9:** Valley Rd, 1960s
- Plate 5.10:** Nyerere Rd & Kenyatta Av Intersection, 1960s
- Plate 5.11:** Kenyatta Avenue, 2015
- Plate 5.12:** Nyerere Road 2015
- Plate 5.13:** Moi Avenue at Khoja Mosque, 1950s
- Plate 5.14:** Bazaar St from Khoja Mosque, 1970
- Plate 5.15:** Muindi Mbingu Rd, 2015
- Plate 5.16:** Moktar Daddah St., 2015
- Plate 5.17:** Street adjacent to John Michuki Park, 2015
- Plate 5.18:** Globe Cinema Roundabout, 2015
- Plate 5.19:** Hilton Hotel Circle Connectors 1960s
- Plate 5.20:** Hilton Hotel Circle Connectors 1960s
- Plate 5.21:** Connectors to Hilton Hotel 1970s
- Plate 5.22:** Connectors to Hilton Hotel 2015
- Plate 5.23:** Murang’a Road Connector 2015

- Plate 5.24:** Restrictive Wall and Ground Level Change at Murang'a Rd.
2015
- Plate 5.25:** Underground Connector Walkway 2015
- Plate 5.26:** Slip Road Connector at Roundabout 2015
- Plate 5.27:** Taifa Road towards Harambee Avenue 2015
- Plate 5.28:** Harambee Avenue towards NHC Walk 2015
- Plate 5.29:** City Hall Way, 1950s
- Plate 5.30:** Taifa Road, 2015
- Plate 5.31:** City Hall Way, 2015
- Plate 5.32:** Parliament Rd towards Harambee Ave.
- Plate 5.33:** City Hall Way towards Moi Ave. 2015
- Plate 5.34:** Moi Av. Connector, 1960s
- Plate 5.35:** Moi Av Connector, 2015
- Plate 5.36:** Bus Station Connector, 2015
- Plate 5.37:** Pedestrian Connector, 2015
- Plate 5.38:** Moi Ave., 1960s
- Plate 5.39:** Railway Bus Terminus Fencing, 2015
- Plate 5.40:** Connector Lane to Railway Station, 2015
- Plate 5.41:** Haile Selassie Ave., 2015
- Plate 5.42:** Aga Khan Walk, 2015
- Plate 5.43:** Harambee Ave., 2015
- Plate 5.44:** NHC Walk 1960s
- Plate 5.45:** NHC Walk Connector 2015
- Plate 5.46:** Haile Selassie Ave., 2015
- Plate 5.47:** Haile Selassie Ave junction with market access road, 2015
- Plate 5.48:** Densification along Nyerere Rd, 2015
- Plate 5.49:** Densification on Uhuru Highway, 2015
- Plate 5.50:** Jeevanjee Gardens Area Density, 1989
- Plate 5.51:** Moi Av., 2003
- Plate 5.52:** Moktar Daddah St, 2015
- Plate 5.53:** Kipande Road Buildings, 2015
- Plate 5.54:** Warehouses and residential buildings adjacent Michuki Park,
2015
- Plate 5.55:** Buildings on Moi Ave., 1950s
- Plate 5.56:** Kenya National Archives Moi Ave, 1950s
- Plate 5.57:** Buildings along Moi Avenue, 2015
- Plate 5.58:** Kijabe Street Buildings, 2015
- Plate 5.59:** Kipande Road Buildings, 2015
- Plate 5.60:** Muranga Rd Buildings, 2015
- Plate 5.61:** Fire Station Building, 2015
- Plate 5.62:** Old Nation House Building, 2015

- Plate 5.63:** Harambee Ave, 1970
- Plate 5.64:** Aga Khan Walk Density, 2015
- Plate 5.65:** Buildings at Taifa Road Junction, 2015
- Plate 5.66:** Buildings on City Hall Way, 2015
- Plate 5.67:** Low densities at Law Courts, 1950s
- Plate 5.68:** Density around KICC Plaza, 1970s
- Plate 5.69:** Low densities at Parliament Buildings 1970s
- Plate 5.70:** Densities around KICC, 2015
- Plate 5.71:** Densities around KBS Terminus (South), 2015
- Plate 5.72:** Densities around KBS Terminus (West), 2015
- Plate 5.73:** Density around Terminus, 2015
- Plate 5.74:** Railway Go-downs Buildings, 2015
- Plate 5.75:** Aga Khan Walk Density, 2015
- Plate 5.76:** National Housing Corporation Walk at Moi Avenue, 2015
- Plate 5.77:** National Housing Corporation Walk Density, 2015
- Plate 5.78:** Muthurwa Market, 2015
- Plate 5.79:** Aerial View Wakulima Market, 2015
- Plate 5.80:** Enclosing Buildings on Nyerere Rd., 2015
- Plate 5.81:** Enclosing Buildings on Uhuru Highway, 2015
- Plate 5.82:** Enclosing Buildings on Moktar Daddah St
- Plate 5.83:** Enclosing Buildings on Moi Avenue
- Plate 5.84:** Enclosing Buildings at John Michuki Park, 2015
- Plate 5.85:** Enclosing Buildings at John Michuki Park, 2015
- Plate 5.86:** Hilton Hotel Area 1960s
- Plate 5.87:** Enclosing Buildings Moi Ave. 2015
- Plate 5.88:** Kijabe Street Enclosing Buildings, 2015
- Plate 5.89:** Kipande Road Enclosing Buildings, 2015
- Plate 5.90:** Enclosing Buildings Tom Mboya Rd
- Plate 5.91:** Enclosing Building Old Nation House
- Plate 5.92:** Enclosing Building Fire Station
- Plate 5.93:** Enclosing Buildings Tom Mboya Rd
- Plate 5.94:** Buildings on City Hall Way
- Plate 5.95:** Reinsurance Plaza at Sunken Carpark,
- Plate 5.96:** National Bank Building, 2015
- Plate 5.97:** Enclosing buildings on Haile Selassie Ave., 2015
- Plate 5.98:** Uchumi Supermarket enclosing buildings, 2015
- Plate 5.99:** Parliament Building, 2015
- Plate 5.100:** Parliament Road and Car-park Edge, 2015
- Plate 5.101:** Minimal change in Railways Bus Terminus, enclosing building, 2015
- Plate 5.102:** Enclosing Buildings KBS Terminus

- Plate 5.103:** Stalls at KBS Terminus Perimetre
- Plate 5.104:** Sunken car-park and Reinsurance Plaza solid-void relationship, 2015
- Plate 5.105:** Reinsurance Plaza building enclosing Aga Khan Walk, 2015
- Plate 5.106:** National Housing Corporation Walk enclosing buildings
- Plate 5.107:** Pioneer House and Solar House as enclosing buildings, 2015
- Plate 5.108:** Wakulima Market Canopies, 2015
- Plate 5.109:** Haile Selassie Ave at Wakulima Market, 2015
- Plate 5.110:** Commercial Use Buildings on Nyerere Rd, 2015
- Plate 5.111:** Commercial Use Building on University Way/Nyerere Rd, 2001
- Plate 5.112:** Salvation Army Office on Monrovia St., 2005
- Plate 5.113:** Commercial Use on Muindi Mbingu Rd., 2015
- Plate 5.114:** Warehouses adjacent J. Michuki Park, 2015
- Plate 5.115:** Commercial Use Buildings on Kipande Rd, 2015
- Plate 5.116:** Commercial Use at Hilton Hotel 1960s
- Plate 5.117:** Commercial Use Moi Ave, 2015
- Plate 5.118:** Commercial Use at Globe Roundabout, 2015
- Plate 5.119:** Commercial Use off Globe Roundabout, 2015
- Plate 5.120:** Slip Rd. Commercial Activity, 2003
- Plate 5.121:** Vendors on Slip Rd, 2015
- Plate 5.122:** Fire Station Roundabout Transport Hub, 2015
- Plate 5.123:** Commercial Use at Fire Station Roundabout, 2015
- Plate 5.124:** Office Buildings on City Hall Way, 2015
- Plate 5.125:** Sunken Car-park Weekend Market, 2015
- Plate 5.126:** Offices blocks opposite Sunken Car-park, 2015
- Plate 5.127:** Kenya Railways Headquarters, 2015
- Plate 5.128:** Railways Warehouses, 2015
- Plate 5.129:** Parliament Buildings, 2015
- Plate 5.130:** Holy Family Basilica, 2015
- Plate 5.131:** Commercial Use on Haile Selassie Av.
- Plate 5.132:** Railway Station Buildings, 2015
- Plate 5.133:** Periphery Stalls at Bus Terminus, 2015
- Plate 5.134:** Commercial Buildings, KBS Terminus, 2015
- Plate 5.135:** Electricity House at Aga Khan Walk, 2015
- Plate 5.136:** Supermarket and offices at Aga Khan Walk, 2015
- Plate 5.137:** Bank on NHC Walk, 2015
- Plate 5.138:** Commercial and Institutional Use at NHC Walk, 2015
- Plate 5.139:** Surrounding institutional Buildings, 2015
- Plate 5.140:** Muthurwa Market, 2015
- Plate 5.141:** Trees along Paths in Central Park, 2015

- Plate 5.142:** Trees at John Michuki Park edge, 2015
- Plate 5.143:** Rehabilitated John Michuki Park, 2015
- Plate 5.144:** Jeevanjee Gardens Interior, 1956
- Plate 5.145:** Jeevanjee Gardens Aerial, 1989
- Plate 5.146:** Tree Cover along Moktar Daddah St., 2003
- Plate 5.147:** Trees in Park at Monrovia Rd., 2015
- Plate 5.148:** Moi Avenue, 1950s
- Plate 5.149:** Harding St. Bus Stage, 1967
- Plate 5.150:** Trees along Moi Ave, 2015
- Plate 5.151:** Trees in Hilton Hotel Circle, 2015
- Plate 5.152:** Bus parking in Globe Cinema Roundabout, 2015
- Plate 5.153:** Trees along riverbank at Globe Cinema Roundabout, 2015
- Plate 5.154:** Trees at Fire Station Roundabout, 2015
- Plate 5.155:** Trees along Tom Mboya St., 2015
- Plate 5.156:** Trees along Taifa Rd., 2015
- Plate 5.157:** Trees in Supreme Courts Parking, 2015
- Plate 5.158:** Trees in Sunken Car-park mid section, 2015
- Plate 5.159:** Tree Cover, weekend market at Sunken Car-park, 2015
- Plate 5.160:** Trees at KICC Grounds and Plaza, 1970s
- Plate 5.161:** Law Courts
- Plate 5.162:** Trees in KICC Car-park, 2015
- Plate 5.163:** Railway Station tree cover, pre-1963
- Plate 5.164:** Trees at Railways Bus Terminus, 2015
- Plate 5.165:** No Tree Cover KBS Terminus, 2015
- Plate 5.166:** Commuter Shelters at KBS Terminus, 2015
- Plate 5.167:** Trees in Aga Khan Walk 2015
- Plate 5.168:** Trees in National Housing Corporation Walk, 2015
- Plate 5.169:** Wakulima Market Canopies, 2015
- Plate 5.170:** Wakulima Market Access Road, 2015

LIST OF EQUATIONS

Equation 5.1: Social Sustainability Regression Model

Equation 5.2: Economic Sustainability Regression Model

Equation 5.3: Environmental Sustainability Regression Model

Equation 5.4: Governance Sustainability Regression Model

LIST OF APPENDICES

Appendix 1: Tables of Dependent and Independent Variables for All Spaces (1963-2015)

Appendix 2: Pearson Correlation Coefficients Table for All Spaces (1963-2015)

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CBD	Central Business District
COK	Constitution of Kenya
GOK	Government of Kenya
JICA	Japan International Co-operation Agency
KNSP	Kenya National Spatial Plan
NCC	Nairobi City County
NIUPLAN	Nairobi Integrated Urban Development Master-plan
NUDP	National Urban Development Policy
SDG	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences

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PREFACE

Public open spaces play a significant role in the life, form, and human experience of cities. Growth of towns and cities results in greater urbanization within countries. Urban growth means increased numbers of people in cities who require access to social amenities. These social amenities include public open spaces in cities such as Nairobi. In Nairobi's case, multiple public open spaces in its Central Business District (CBD) are under-utilized. These spaces do not fully perform their role as publicly accessible areas for commerce, transportation, transit, and recreation. There is therefore a dichotomy comprising an increased demand for public open spaces on one hand and a non-optimal use of such existing spaces on the other.

This research focused on elements of urban form and usage that entailed study of public open spaces and surrounding environments. Fifteen public open spaces in the Nairobi CBD were investigated. Six key variables were identified for analysis namely connectivity, density, enclosure, land use, space size, and tree cover. Through these, the research established the spatial evolution of public open spaces in the CBD from 1963-2015. It then established the social, economic, environmental, and governance factors that influence the sustainability of public open spaces. Thirdly it established the relationship between spatial evolution and sustainability of public open spaces in the CBD. The research hypothesized that the sustainability of public open spaces in Nairobi CBD is influenced by social, economic, environmental, and governance factors.

A descriptive and quantitative approach was employed in this research. Therein, social, economic, environmental, and governance variables were used to measure characteristics of public open spaces. Observation forms and interview schedules were the instruments used for data collection. Maximum variation sampling was used to determine sample size and selection of subjects of study. Photographs and maps were reviewed to pattern spatial changes over the 1963-2015 timeframe. From these, base maps, figure-ground maps, land use maps, and 3-Dimensional (3D) models were developed and analysed for each space. Research results indicate that from 1963-2015, CBD public open spaces have become more sustainable

with regards to connectivity, enclosure, density, mixed use, and tree cover. They have however become less sustainable in terms of space size. Results also indicate that social sustainability is influenced by spatial and economic factors. The specific predictors of sustainability are the number of services in ground floors of buildings facing space, number of connectors to the space, and number of users of sidewalks surrounding the space. Results further indicate that environmental sustainability and governance sustainability are influenced by spatial factors. The former predictors are the area of the space and the longest distance of the space, while the latter predictors are proximity of space to the public transport hub, the number of parking spaces in the space, and area of paved pathways in the space. Lastly, results indicate that economic sustainability is influenced by social and economic factors. The number of users of the space, number of service businesses in the space, and number of retail shops in ground floors of buildings facing the space are its predictors.

Research conclusions indicate that the social, economic, and environmental sustainability are not necessarily concurrent but that one aspect of sustainability can be dominant at a time. In addition, improvement in social sustainability means economic, environmental, and social improvement of public open spaces in Nairobi CBD. Also concluded was that achievement of socially sustainable spaces is the most complex and comprehensive of the four aspects of sustainability. Research recommendations are that more mixture and diversity of uses be encouraged around public open spaces. In addition, in order to enhance social sustainability, creation of environments that enhance economic activities are recommended. Also recommended is that efforts to enhance sustainability of spaces can be undertaken in phases. Lastly, as spatial factors are significant predictors of three aspects of sustainability, spatial interventions should be prioritized in improvement of the sustainability of public open spaces.

The aforementioned research abstract is organized into seven chapters in this publication. Chapter 1 contains the background to the research problem and the problem statement. It indicates the study objectives, research questions and study hypothesis. In addition, it articulates the study's assumptions, significance, justification, scope, and limitations. Chapter 2 deals with urban theories, concepts, and paradigms. It contains the theoretical and conceptual framework that has guided this research and explains the research variables, key concepts and operational definition of terms.

Chapter 3 is focused on the area of study. Therein national and city physical, social, and economic conditions are highlighted as is demographic information. The development of Nairobi from a historic and spatial perspective is captured and lastly the legal and institutional framework for urban development is outlined. Research Methodology is captured in Chapter 4. The research design, approach, area and research method are explained. Also herein is explanation on matters of sampling namely its method, frame, and size. Data collection and data processing are discussed and ethical considerations highlighted.

Chapter 5 is organized into three sections as informed by the research objectives. The first section deals with determinants of evolution, presenting space size, connectivity, tree cover, enclosure, densities, and space use as measurements for spatial evolution. The second section deals with determinants of sustainability, in particular the social, economic, environmental, and governance models of sustainability. The third section handles the relationship between spatial evolution and sustainability by analysing correlations between selected variables. Chapter 6 thereafter presents systematic discussion of the data presented in the preceding chapter.

Chapter 7 is focused on conclusions and recommendations based on information presented from chapters one to six. It outlines general conclusions and reiterates key elements from preceding chapters. It tests the research hypothesis, indicates implications of the research, and identifies areas for further research.

FOREWORD

From Africa to Asia, from Europe to Oceania and to the Americas, public space serves as an integral part of the form and function of the city. Urbanization continues to happen in African cities as with many other developing country cities of the world. In some instances, quality public spaces are few and far-between. In other instances, design and management of public space is wanting and influences the use of social amenities such as parks, gardens, and playgrounds. Under-utilization of public space can be problematic, and more so in cities where demand for social amenities is high and yet resources are constrained. This tension that captures the reality of many cities including Nairobi is why this research focused on analysis of the urban form and usage of public open space is important. By investigating the evolution of public space, and the built and natural environment factors contributing to their sustainability, it is a step in the right direction. Indeed, this research provides a useful frame with which to understand the present and with which to engage for the future in the pursuit of more sustainable public spaces for Nairobi and beyond.

Prof. Tom Anyamba
Department of Architecture
University of Nairobi.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Problem

This research investigates urban form in Nairobi with a particular focus on the public open spaces in its Central Business District (CBD). As a morphological study, it analyses the changes that these spaces have experienced over time. It reviews theories in urban development, urban design, urban planning, and evolutionary biology that guide the establishment of factors that contribute to making public open spaces in the CBD sustainable.

The theoretical and conceptual framework for the research references the natural sciences, and comprises one theory and two concepts. The first is the Theory of Evolution by Natural Selection developed by Charles Darwin (1809–1882) which states that change comes through the production of variation in each generation (Darwin, 1859). Like an organism, urban space evolves over time and can retain advantageous variations and characteristics. The second is the concept of atrophy that recognizes that organs atrophy with disuse (Mill, 1865). This refers to a cellular wasting away or gradual decline in effectiveness or vigour due to neglect or underuse. Spaces that are neglected or underused likewise degrade and decrease in their vitality, functionality and attractiveness. The third framing concept of sustainability guides analysis of the city's public open spaces from social, economic, environmental, and governance perspectives. These four interconnected issues have been considered imperative for achieving sustainable development in Africa (UNECA, 2012).

The research posits that because a space has survived over a period of time does not necessarily mean that it is sustainable. A public open space can survive or be retained within the urban fabric as an unused, abandoned or environmentally polluting space. The research provides a better understanding of the configurations of open spaces in Nairobi today and makes recommendations concerning public open spaces for the future.

The population of the East Africa subregion was estimated at 292.7 million in 2011, of which 63.5 million lived in urban areas. Nairobi is Kenya's capital and largest city, accommodating more than one-third of the country's urban dwellers (UN Habitat, 2014). Popular discourse on urbanization has created the impression that cities are currently growing too fast and that growth should be limited or somehow diverted (Cohen, 2006). Kenya's National Urban Development Policy (NUDP) notes that, given the rapid growth of urban populations, existing public open spaces are inadequate (GOK, 2015). The policy also recognizes that public open spaces play a central role in the formation and consolidation of urban culture. The urban advisory component of the NUDP highlights the importance of education, health, and open spaces in national urban development (UMDD, 2016). Open spaces are critical because they provide the opportunity for people from diverse socio-economic, age, gender, and cultural groups to engage equitably with the city. Despite government efforts at national and local levels, Nairobi's development plans have not adequately met the needs created by rapid urban growth. This has in part resulted in the misuse of public open spaces or their misallocation away from public use. This presents an immediate concern because 60% of Africa's and Kenya's populations will be urban by 2050 (UN Habitat, 2010), demanding shelter, and basic services.

Unplanned urban growth has multiple consequences. Among them is the depletion of natural vegetation cover as human settlements increase. In Nairobi, increments in the size and density of settlement footprints are influenced by increased housing supply and unregulated urban sprawl. The unregulated growth of settlements has occurred on riverbanks and other public land resulting in less open space being available for public recreational use. Tree coverage and the availability of social amenities such as parks and playgrounds thus become insufficient.

In Kenya, public land has been privatized, particularly since the 1980s (GOK, 2012). In some city neighbourhoods, open spaces for public use have been acquired illegally for private commercial development. In some cases, the public has adapted public open spaces to suit their own social and economic needs in ways that do not match those envisioned by urban planning authorities. These realities illustrate the decrease in the number and size of public open spaces that has been experienced in Nairobi for more than three decades.

Public space includes parks, playgrounds, riverbanks, squares, and streets. According to UN Habitat (2012), urban areas should ideally allocate 45%–

50% of land to public space, including streets. Nairobi presently has about 20% of its land allocated to public space. This means that public space allocation in the city is below recommended United Nations (UN) global standards. Beyond the quantity of public open space, the quality, function, and access to public space by citizens is important. According to Jacobs (1961), open spaces should be created with multiple, relevant, and complementary functions in mind. If not, they become redundant spaces and bleak vacuums between buildings as opposed to spaces for ordinary people to use and enjoy.

The problem of inadequate public open spaces in cities has been tackled in diverse and innovative ways throughout urban history. In the mid-19th Century, for instance, the centre of Paris was overcrowded, dark, unhealthy, and with poor circulation of traffic. During that period, civic planner Baron Eugene Hausmann was charged by Emperor Napoleon III to give Paris air, open space, and improved road connectivity and networks. In response, Hausmann created a network of public open spaces comprising boulevards, parks, and gardens that significantly improved the appearance and function of the city. Key to this massive spatial urban reconfiguration was political goodwill, enabling legislation, and innovative financing models. Its negative consequences, however, included social disruption and displacement due to increased rents and speculation in real estate markets. Hausmann's interventions illustrate the role that parks, boulevards, and other public open spaces can play in the greening and connectivity of cities. It also highlights the unintended consequences of plan implementation that can have negative social and economic impacts, particularly on the most vulnerable groups.

In Osaka, Japan, public open spaces have been created by innovative means. Osaka took the closure of a baseball stadium as an opportunity for redevelopment of a commercial district that included a park. Namba Parks was completed in 2003 as a natural park in Osaka's dense urban environment; it features a commercial centre and tower with a multi-level rooftop park. The park connected to the street promotes the natural environment, comprising trees, waterfalls, ponds, and outdoor terraces. Namba Parks exemplifies innovative intervention in a high-density neighbourhood and design strategies to increase public open space. It also indicates the impact of public-private partnership, highlighting the role that governance can play in the enhancement of environmental sustainability.

Legislatively, there have been laws to guide urban development that have had limited success. Before the enactment of the Constitution of Kenya (COK) in 2010, the country's urban development was conducted in the

absence of a comprehensive legislative framework. The Local Government Act (CAP 265) and the Physical Planning Act (CAP 286) of 1996 were the main legislative instruments guiding development in urban areas. According to the NUDP, as of 2012, only 30% of urban areas were planned settlements. Most of the planned urban areas employed out-dated physical development plans (GOK, 2012). The lack of a well-coordinated framework before the key legislation and policy of 2010 and 2012 meant that public open spaces were among the spaces for which insufficient planning was done overall. This has proved disadvantageous because good public open spaces contribute to the spatial, social, and economic excellence of cities. In addition, their protection and sound management enable them to perform their functions as places of gathering, movement, and recreation.

1.2 Problem Statement

The rate of urbanization in Kenya continues to challenge national and county governments to meet the needs of the country's growing urban population. Such needs include the development of infrastructure and services, protection of the natural environment, and provision of suitable public open spaces. The pressures of urbanization, such as encroachment on land for informal settlement, increased formal property development, and the construction of infrastructure have adversely affected public open space in Nairobi. This has resulted in a decrease in the number of open spaces, a reduction in the size of existing open spaces, and a change in the function of open spaces in the city. This means that, as Nairobi's population has increased, social amenities such as public open spaces have become insufficient for its citizens.

In the city's CBD, several public open spaces are neither well-suited nor attractive for use. These spaces do not allow for free and easy movement of pedestrians into, within, and around them. Circulation and access are made difficult by chain barriers, dead-ends in the space, and roads enclosing the spaces (Plate 1.1). As shown in Plate 1.2, the orientation, location, and design of seating areas lessen the level of activity of the space. In several instances, there is low visual and functional interaction between buildings and the surrounding environment (Plate 1.3). Some places also have conflicting land uses within the space. Many public open spaces in the CBD are not well maintained; they feature litter, broken pavements, and non-functional streetlights. Some public open spaces in the city are under used, not intentionally, but rather as a result of poor spatial design and inappropriate activities within the spaces (Plate 1.4).