

Successful cities are based on successful neighbourhoods – A strategic and modelling approach to sustainable integrated neighbourhood development

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Declaration

I, Tseliso Patrick Moroke, hereby declare that the thesis with the title: *Successful cities are based on successful neighbourhoods – A strategic and modelling approach to sustainable integrated neighbourhood development* is my own work and has not been submitted at any university either in whole or in part.

Signed at Potchefstroom on the day of September 2016

T. P. Moroke

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Opsomming

Die Suid-Afrikaanse stedelike ruimtelike stelsel en struktuur weerspieël die gevolge van 'n gefragmenteerde ruimtelike stelsel. Die evaluering van die veranderlikes tussen die stadskern se woonbuurtes en woonbuurtes in dorpsgebiede toon dat beperkte voorsiening gemaak word vir toeganklikheid en integrasie, plaaslike fasiliteite en ruimtelike komponente wat die pilare van volhoubare stedelike vorm verteenwoordig en dat hierdie aspekte ook nie in woonbuurtes in stedelike omgewings in berekening gebring word nie. Beide die tegniese en etiese perspektief met betrekking tot plaaslike fasiliteite en funksionele toeganklikheid genereer parallelle ekonomiese en sosiale voordele wat huishoudings en gemeenskappe in staat stel om hulle lewenskwaliteit te verbeter.

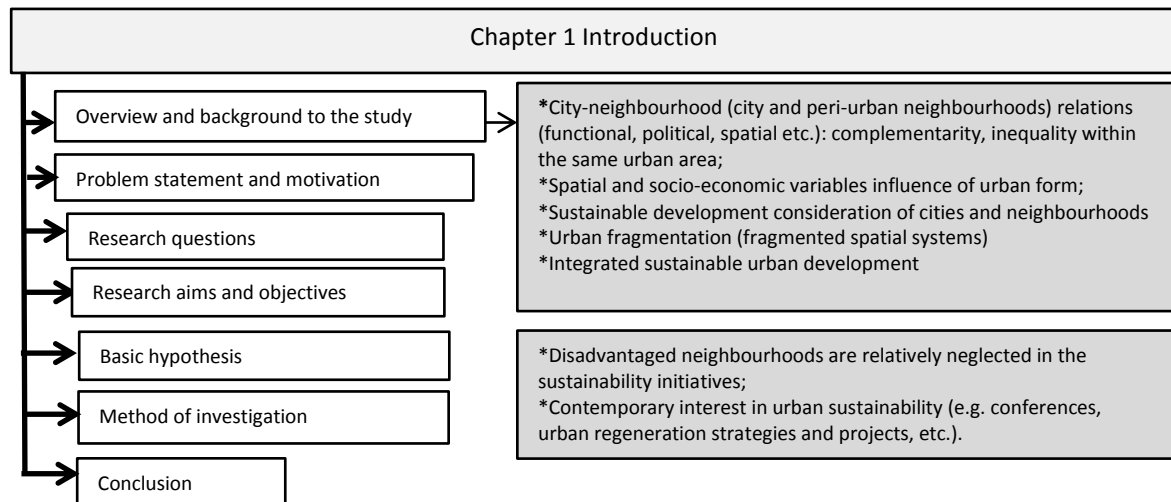
Vanuit 'n tegniese evalueringsperspektief, kan dienstevoorsieningstrategieë, toeganklikheid en volhoubare wyses van bestaan gekoppel word aan ruimtelike beplanningsprosesse. Om gelykheid in stedelike gebiede te verseker, het die ruimtelike koppelvlak 'n direkte invloed op die effektiwiteit en normaliteit van stedelike gebiede en ruimtelike transformasie. Op die woonbuurt vlak neig effektiewe grondgebruik om by te dra tot volhoubare ontwikkelingsvereistes. Daar is 'n betekenisvolle verwantskap tussen grondgebruik en volhoubaarheid wat betekenisvolle woonbuurt strukture en vorm as resultaat het. In realiteit bestaan hierdie ruimtelike samestelling uit ingewikkelde netwerke van hoërorde padnetwerke, grondgebruike, aspekte van ekonomiese groei en ontwikkeling, menslike aktiwiteite en vervoer kwessies. Hierdie stedelike stelsels vereis volhoubare maatreëls wat die aanvanklike stap in die vergelyking tussen bevoorregte en agtergeblewe woonbuurtes verteenwoordig. Waar sosiale dienste aangewend word om die basis te vorm op grond waarvan die volhoubaarheid van woonbuurtes bepaal kan word, is dit uit verskillende ontledings duidelik dat stedelike volhoubaarheid nie bereik kan word sonder toereikende sosiale fasiliteite wat varieer volgens verskillende digthede, groottes van gemeenskappe, mobiliteitsvlakke, sosio-ekonomiese variasie en werklikhede nie. Die volhoubaarheidsvlak van woonbuurtleefruimtesbeïnvloed oorkoepelende volhoubare stedelike ontwikkeling aangesien dit bewys is om 'n hoofkomponent van stedelike grondgebruik te wees.

Ruimtelike beplanning vereis volhoubare lewenswyses, sosiale dienste en ekonomiese geleenthede wat ruimtelik sodanig voorsien word dat dit rasioneel afgestem is op menslike behoeftes en toeganklikheid, afstandsnorme en standaarde. 'n Volhoubare woonbuurtstruktuur tesame met die belangrikheid om meetbare stelsels toe te pas, moet beklemtoon word. Dit is ingewikkeld om woonbuurtvolhoubaarheid te bereik sonder om die graad van volhoubaarheidsinisiatiewe vooraf te bepaal. Die gebruik van woonbuurt volhoubaarheidsindikatore as hoofraamwerk in die analise en metode om *die suksesvolle*

woonburtmodel (SWM of SNM) te ontwikkel en toe te pas, moes dus oorweeg word. Die SWM is in hierdie navorsing ontwikkel as 'n omvattende volhoubaarheidsassesseringsinstrument.

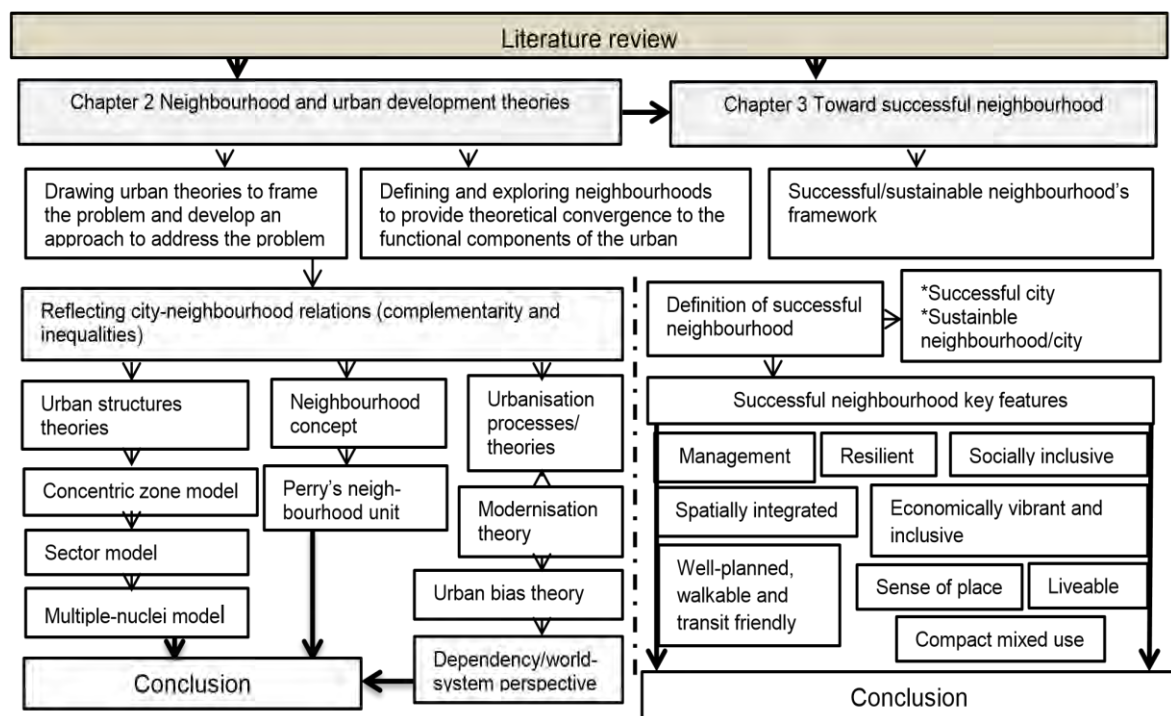
Multi-kriteria-analise (MKA) word gebruik as 'n metode om volhoubaarheidsevaluering en/of prestasie-evaluering te onderneem aangesien die toepassing van die SWM daardeur meer effektief aangewend kan word om die vlakke van volhoubaarheidsinisiatiewe te meet. Die sistematiese benadering van MKA sluit in aspekte van kriteriaseleksie, gewigte en rangorde, ten einde die ongebalanseerde aard daarvan te bepaal. Hieruit was dit moontlik om regstellende stappe of intervensies te identifiseer waardeur woonbuurtgevallestudies geselekteer kon word. Die woonbuurtgevallestudies is op grond hiervan deur die toepassing van die MKA instrumente vir elke geval op grond van die volhoubaarheidsmaatstaf en rangorde evalueer. Die MKA volhoubaarheidstoepassing sluit die uitlig van gebiede van lae en hoë prestasie asook 'n vergelyking van die gevallestudies asook rangorde, in. Aanbevelings voortspruitend uit hierdie gevolgtrekkings is deur die toepassing van die voorgestelde instrumente gemaak.

ROAD MAPS



Roadmap template 1: Introduction

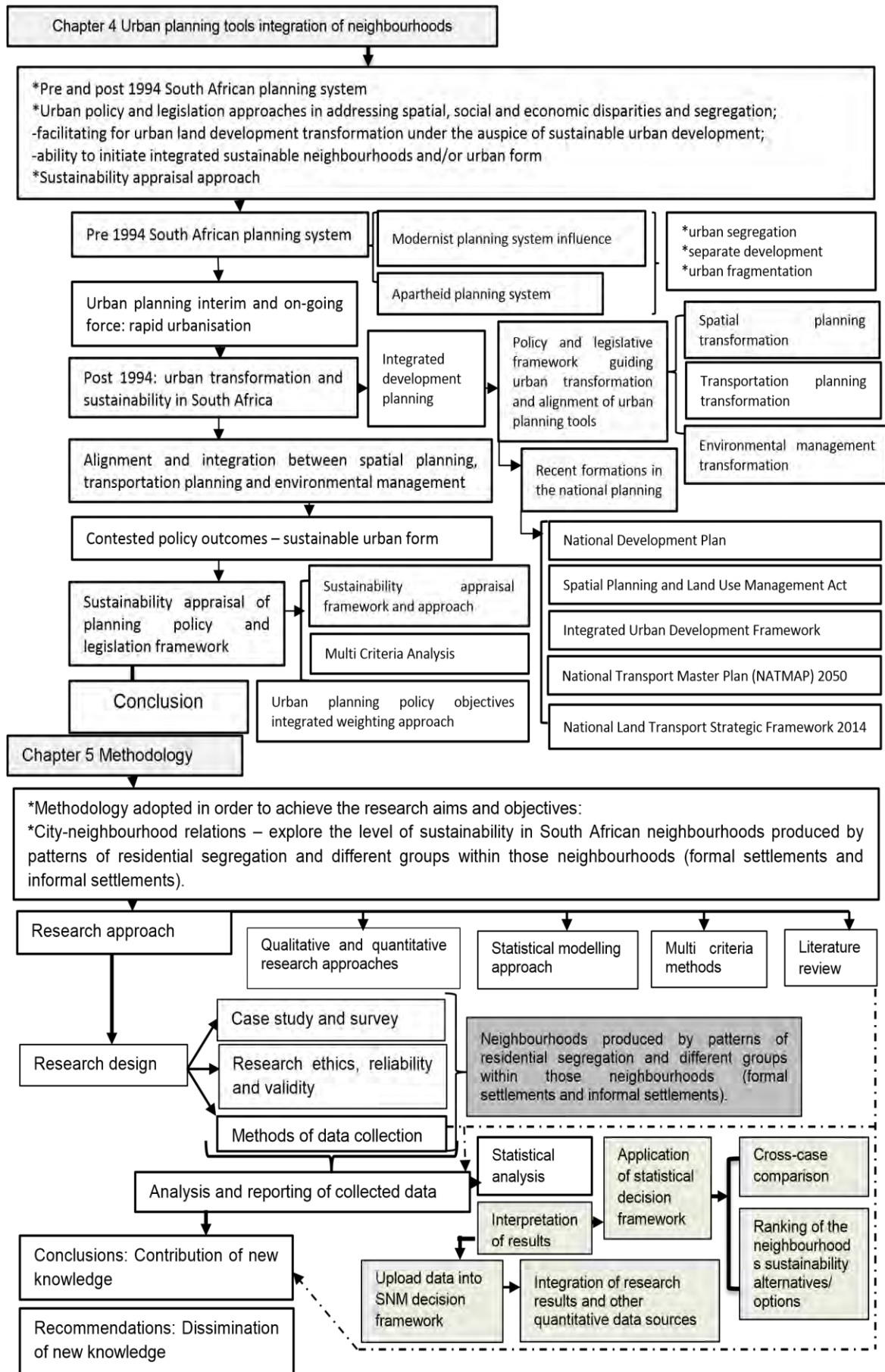
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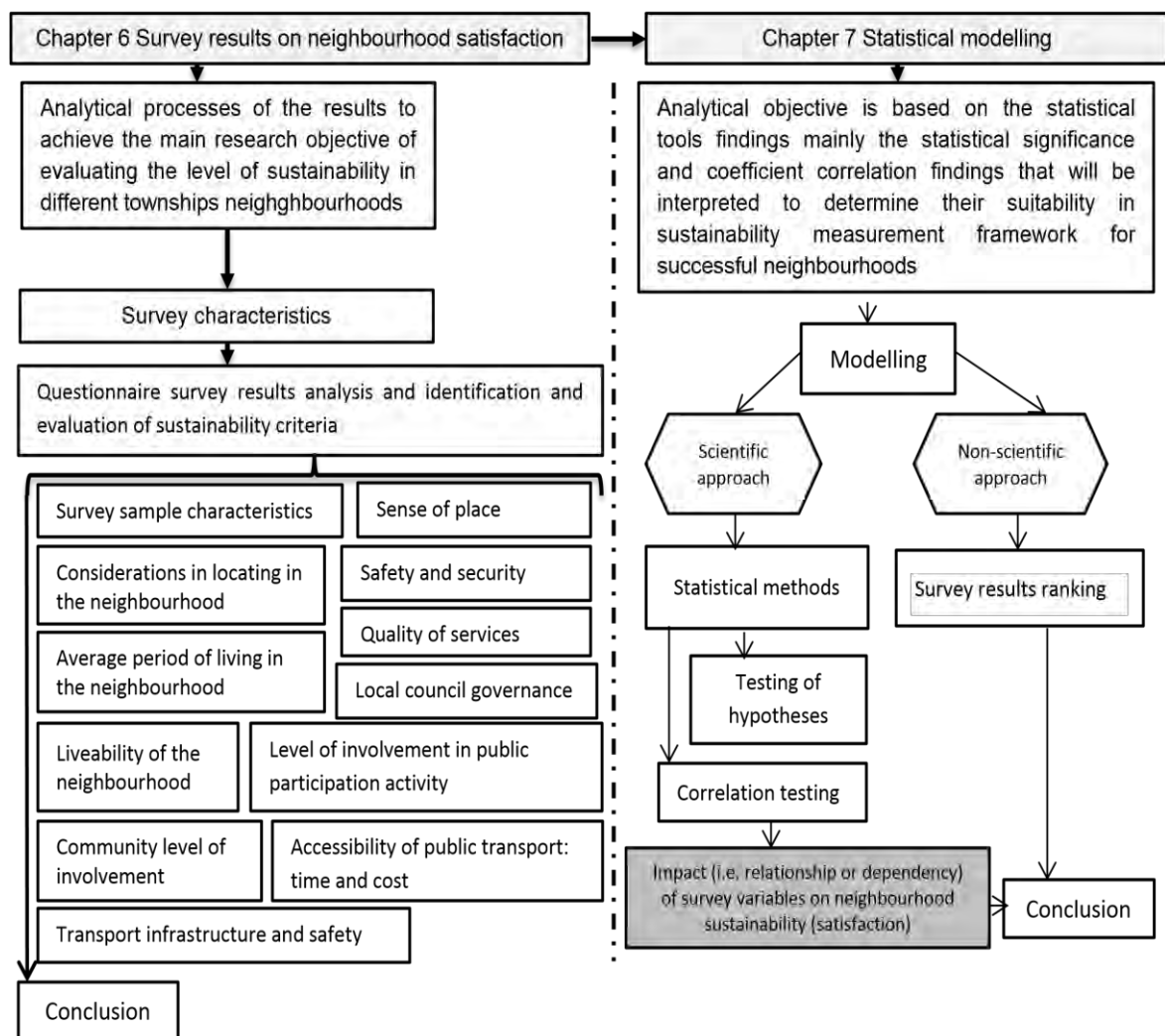


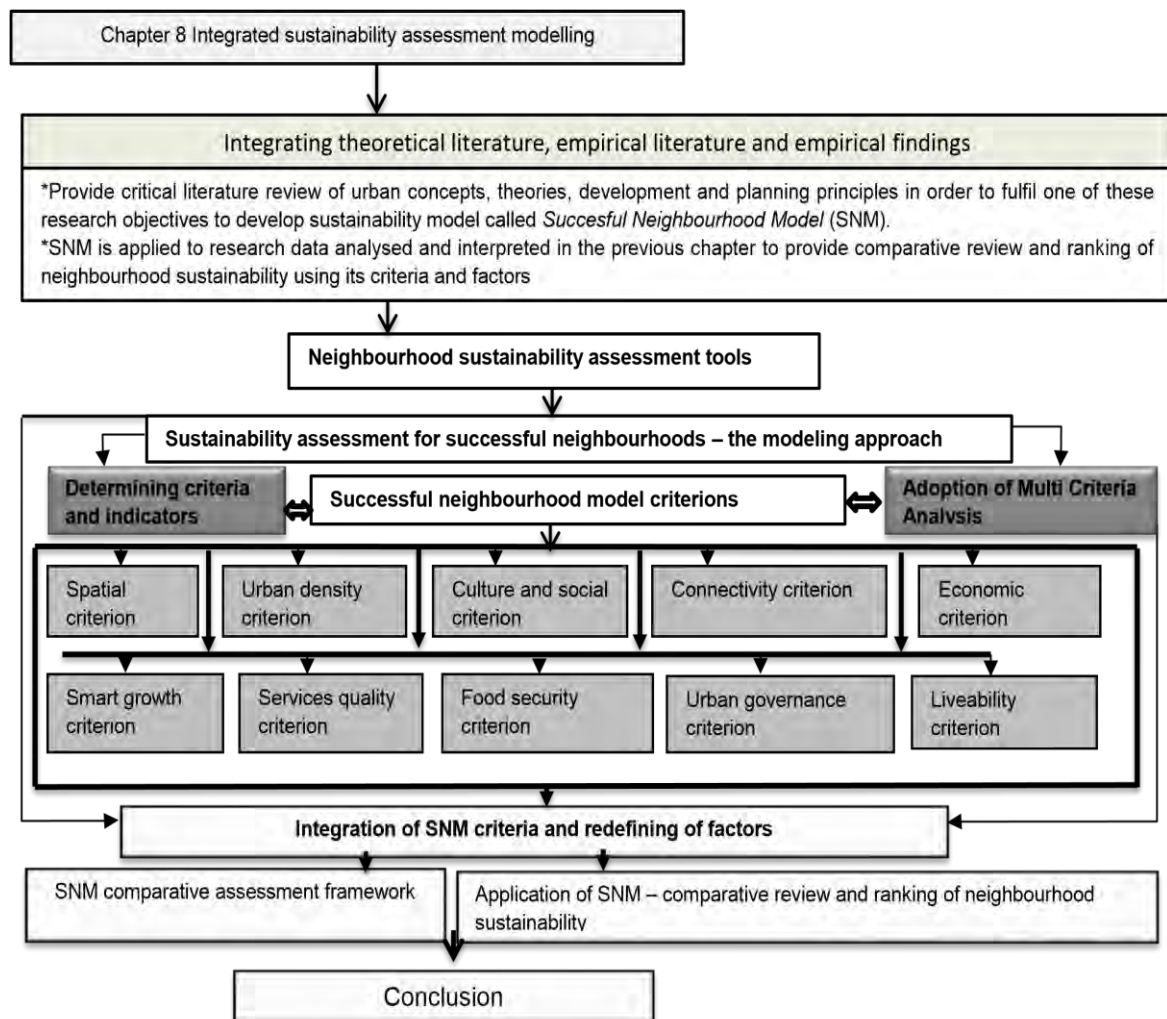
Roadmap template 2: Literature review

Source: Own construction (2015)

Empirical research

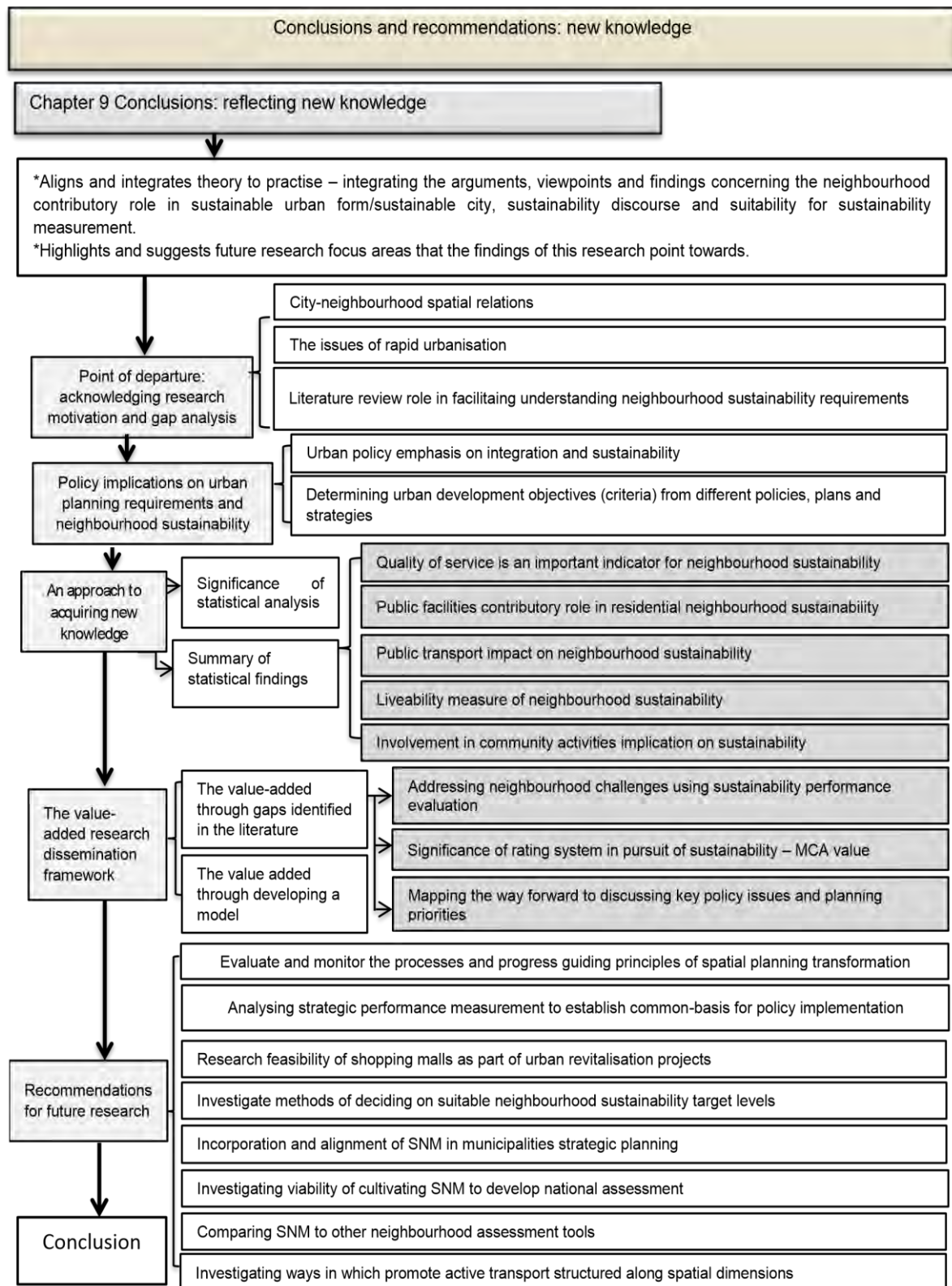


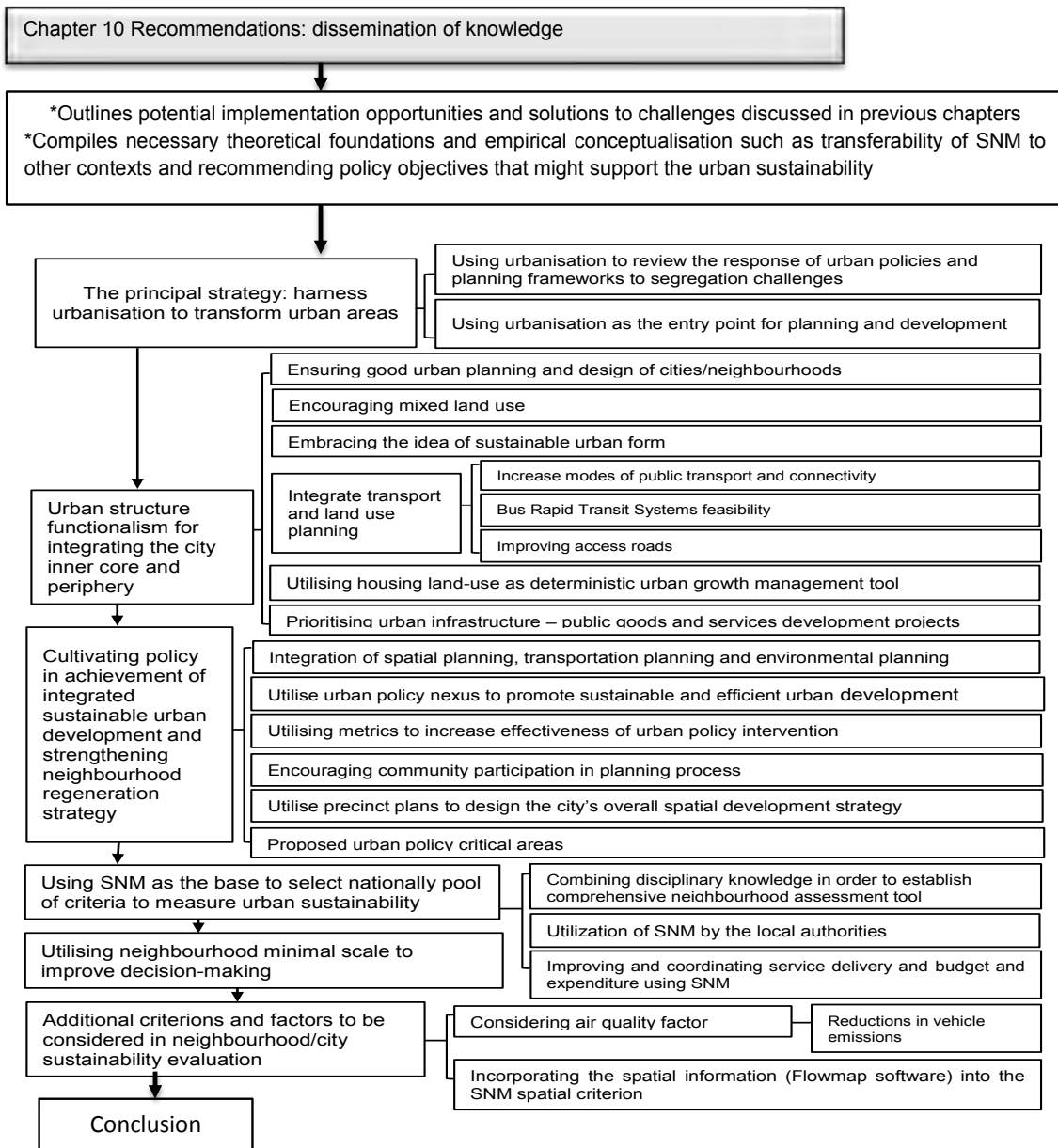




Roadmap template 3: Empirical research

Source: Own construction (2015).





Roadmap template 4: New knowledge

Source: Own construction (2015).

Abstract

South Africa's urban areas' spatial setting and fabric reflects the consequences of fragmented spatial systems. The evaluation of spatial variables between the city core neighbourhoods and township neighbourhoods reveals that very little space is afforded for connectivity and integration, local facilities and spatial components which are themselves pillars of sustainable urban form and which are not preferentially factored into township neighbourhoods. Both from the technical and ethical perspectives – local facilities and functional connectivity generate parallel economic and social benefits enabling households and communities to improve their quality of living.

From the technical assessment perspective (service) delivery strategies, accessibility and sustainable modes of living are linked to spatial planning processes. To achieve equity within urban areas, spatial planning interface has a direct influence towards effectiveness and normality of urban areas and spatial transformation. At the neighbourhood level, effective land use tends to contribute to sustainable development requirements. There is a significant relationship between land use and sustainability that could yield significant neighbourhood structural form. In reality these existing spatial compositions consist of intricate networks of high order roads, land uses, aspects of economic growth and development, human activities and transportation issues. These urban systems claim sustainability measures and form the initial step for comparison between advantaged and disadvantaged neighbourhoods. When drawing up social services to act as the basis from which sustainability in urban areas could be determined – in various reviews it is reflected that urban sustainability cannot be achieved without adequate social facilities that are differentiated by neighbourhoods varying development densities, community size, mobility levels and socio-economic variations. The sustainability level of neighbourhood living spaces has proved to influence the overall sustainable urban development as it constitutes a major component of urban land use.

Spatial planning requires that sustainability modes of living, social services and economic opportunities be provided spatially in a manner that is rationally based on people's needs and the access distance norms and standards. Both a sustainable neighbourhood structure form and the importance of adopting a measuring system are emphasized. It is difficult to achieve neighbourhood sustainability without determining the degree of sustainability initiatives. Making neighbourhood sustainability indicators the main framework in the analysis and the way of implementing *successful neighbourhood model* (SNM). The SNM is developed as the comprehensive sustainability assessment tool.

The multi-criteria analysis (MCA) is used as a means of sustainability assessment and/or performance evaluation as it makes it easy and more efficient for SNM to measure the level of sustainability initiatives. The systematic approach of MCA includes careful consideration of criteria selection, weighting and ranking. In order to unearth unbalanced nature and then to identify rectification steps or interventions the neighbourhoods case studies are selected. The neighbourhood case studies are assessed using the MCA tools allowing each case to be compared by area of sustainability measure and ranking. The MCA sustainability assessment applications include highlighting areas of low or high performance and case studies comparisons and ranking. The recommendations are presented based on the conclusions as well as proposed tools.

Keywords: Strategic planning, modelling, spatial planning, core/peripheral neighbourhoods, relationships, urban integration, sustainability, sustainable neighbourhoods/cities, sustainability assessment, multi-criteria analysis, successful neighbourhood model.

As part of a summary of the contents of this research – roadmap templates of various phases of this research are outlined below.

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List of abbreviations

ANC	African National Congress
Ala	Alabama
APA	American Planning Association
ASGISA	Accelerated and Shared Growth Initiative for South Africa
BNG	Breaking New Ground
BREEAM	Building Research Establishment's Environment Assessment Method
BRT	Bus Rapid Transit System
CASBEE-UD	Comprehensive Assessment System for Built Environment Efficiency
CBD	Central Business District
CHP	Comprehensive Housing Plan
CLARA	Community Land Reform Act 28 of 1996
CMLM	City of Matlosana Local Municipality
CMTRS	City of Matlosana Township Regeneration Strategy
CoM	City of Matlosana
CoGTA	Co-operative Governance and Traditional Affairs
CONNEPP	Consultative National Environmental Policy Process
CRDP	Comprehensive Rural Development Programme
CRU	Community Residential Units Programme
DEAT	Department of Environmental Affairs and Tourism
DLA	Department of Land Affairs
DPLG	Department of Provincial and Local Government
DFA	Development Facilitation Act 67 of 1995
DR KKDM	DR Kenneth Kaunda District Municipality
DRDLR	Department of Rural Development and Land Reform
DWAF	Department of Water Affairs and Forestry
EEDBS	Enhanced Extended Discount Benefit Scheme
EAs	Environmental Authorizations
EIA	Environmental Impact Assessment
EIM	Environment Impact Management
EIS	Environment Impact System
EIPs	Environmental Implementation Plans
EMB	Environmental Management Branch
EMFs	Environment Management Frameworks

EMS	Environment Management System
EMP's	Environment Management Plans
EPWP	Expanded Public Works Programme
EU	European Union
FAO	Food and Agriculture Organisation
FTP	Freight Transport Plans
GEAR	Growth Employment Accelerated Redistribution
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GVA	Gross Value Added
HAD	Human Development Agency
HDI	Human Development Index
HSPs	House Sector Plans
ICLEI	International Council for Local Environment Initiatives
IDA	Infrastructure Development Act 2014
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IISD	International Institute for Sustainable Development
iiSBE	International Initiative for a Sustainable Built Environment
IRDP	Integrated Residential Development Programme
ITPs	Integrated Transport Plans
IUDF	Integrated Urban Development Framework
Jou	Jouberton
Kan	Kanana
Khu	Khuma
KOSH	Klerksdorp-Orkney-Stilfontein-Hartebeestfontein
LA21	Local Agenda 21
LED	Local Economic Development Strategy
LEFTEA	Less Formal Township Establishment Act 113 of 1991
LDOs	Land Development Objectives
LGTA	Local Government Transition Act 209 of 1993
LSPs	Local Strategic Partnerships
LUM	Land Use Management
LUMS	Land Use Management Systems

MCA	Multi-Criteria Analysis
MDB	Municipal Demarcation Board
MEM	Mine Environment Management
METF	Medium Term Expenditure Framework
MGD	Millennium Development Goal
MIG	Municipal Infrastructure Grant
MIIU	Municipal Infrastructure Investment Unit
MTSF	Medium Term Strategic Framework
MSA	Moving South Africa (1998)
MSDF	Municipal Spatial Development Framework
NATMAP	National Transport Master Plan
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NEMPAA	National Environmental Management: Protected Areas Act 57 of 2003
NFSD	National Framework for Sustainable Development
NGO	Non-Government Organisation
NMBM	Nelson Mandela Bay Municipality
NHRA	National Heritage Resources Act 25 of 1999
NLTSF	National Land Transport Strategic Framework
NSDF	National Spatial Development Framework
NSDP	National Spatial Development Perspective
NIRDS	National Integrated Rural Development Strategy
NDPG	National Development Partnership Grant
NP	National Party
OECD	Organisation for Economic Co-operation and Development
PGDS	Provincial Development Growth Strategy
PLTF	Provincial Land Transport Frameworks
PSDF	Provincial Spatial Development Frameworks
PSS	Provincial Spatial Systems
PTSAP	Public Transport Strategy and Action Plan
RDP	Reconstruction and Development Program
RDF	Rural Development Framework
RSA	Republic South Africa
RSDF	Regional Development Framework

SACN	South African Cities Network
SALA	Sub-division of Agricultural Land Act 70 of 1970
SALGA	South African Local Government Association
SEF/P	Strategic Environmental Framework/ Plan
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessments
SLP	Sustainable Livelihoods Programme
SNM	Successful Neighbourhood Model
SPLUMA	Spatial Planning and Land Use Management Act 2013
SWOT	Strengths, Weaknesses, Opportunities and Threats
Tig	Tigane
TOD	Transit Oriented Development
UDF	Urban Development Framework
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCHS	United Nations Centre for Human Settlements
UNPD	United Nations Population Division
UN-DESA	United Nations Department Economic and Social Affairs
UNDP	United Nations Development Program
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNEP	United Nations Environment Program
UNFPA	United Nations Fund for Population Activities
US	United States
WHO	World Health Organisation

Glossary of terms

Accessibility

Accessibility in this research is defined as the ability to access in terms of spatial and functional connectivity. Using this definition, *accessibility* relates to the optimal path in the light of one criterion at any given moment (in this case between the neighbourhood and central place and/or place of work linked to the group of optimal paths to that centre). It also involves qualities of the transport system such as travel time and the extent to which neighbourhood residents can obtain quality services at the time they are needed.

Alternative hypothesis

Alternative hypothesis is the hypothesis accepted when the null hypothesis is rejected (Johnson & Christensen, 2013:560).

Apartheid

Apartheid is a policy or system implemented and enforced by South Africa white regime – 1948 to 1990 to strategically and legally demand the racial segregation of the nation's whites and blacks as means to cement control over the spatial, economic and social systems in order to continue white domination and separate development.

Assessment

Assessment in this research refers to the ongoing process of gathering, analysing and documenting information in measurable terms in order to make informed and consistent decisions (Castanheira & Braganca, 2014:4).

Evaluation

See: Assessment

Buffer Zone

Buffer zone in this research is defined as vacant area which has restrictions placed on its use and was used to segregate city proper and township(s) in South Africa.

City

City as a special case in this research is defined to reflect comparison and concerns of neighbourhoods. It could be understood as a relatively large, high dense inner city with lower

density neighbourhoods' adjacent combined [combination of neighbourhood settlements] supported by variety of shops, public services and amenities, transport and infrastructure networks spatially arranged to facilitate the performance of relevant functions in an integrated manner to ensure integration with economic and social systems that form a city.

Ideopolis

Ideopolis is defined as a city whose economic success is driven by knowledge and that has a high quality of life (Jones *et al.*, 2006:6).

Community development

Community development refers to a socio-economic process involving residents in activities designed to improve their quality of life and provides the means to integrate the functions of the neighbourhoods and its communities.

Compact city

Compact city concept aims at a high-density mixed-use and intensified urban form. The idea emphasizes that urban activities should be located closer together to ensure better access to services and facilities via public transport, walking, and cycling and more efficient utility and infrastructure provision (Kii & Doi, 2005:486).

Connectivity

Connectivity in this research refers to spatial analysis that determines the interaction, adjacency and transport network structure between neighbourhoods and the city (place of work).

Corridor

Corridor is defined on the basis of geographic area that accommodates travel or potential travel. It is characterised high volumes of traffic flows and/or cluster of travelling activities highways, feeder routes (streets), non-motorised travel and public transport links (CSIR, 2005:8).

Concentration ratio

Concentration ratio is the area enclosed between 45 degrees line and the actual Lorenz curve divided by the area between the 45 degrees line and the Lorenz curve that yields the maximum possible value that value that the index can have (Foldvary, 1995:1).

Decentralisation

Decentralisation is the spread of power away from nation government to regional and local government and/or from a major centre to other cities and regions (UN-Habitat, 2012c:5).

Differential urbanisation

Differential urbanisation is a dynamic model representing the collective outcome of individual migration decisions, based upon a mixture of social and economic factors impacting different population groups in different ways at different points in time, resulting in complex and contradictory regional migrations patterns (Geyer Jr *et al.*, 2012:2943)

Dependent variables

Dependent variable is expressed as a function of one or more explanatory variables.

Disadvantaged neighbourhoods

Disadvantaged neighbourhoods in this research refers to the underrepresentation and omission of a particular neighbourhoods on the basis of race, poverty and ethnic status conjoined to give spatial expression that in turn qualifies exclusion and/or undermining.

Economic concept

Economic concept in this research refers to the economic concept of sustainability which implies achieving economic development to secure higher standards of living, now and for future generations (Raj & Musgrave, 2009:57).

Economies of scale

Economies of scale refer to when units of a good or service can be produced on a larger scale, yet with (on average) less input costs.

Eco-efficiency

Eco-efficiency is defined as the delivery of competitively priced goods and services to satisfy human needs and improve quality of life whilst reducing resource intensity and negative environmental impacts wherever possible (UN-Habitat, 2014c:11).

Efficiency

Efficiency is using fewer inputs to achieve an equal or better outcome (UN-Habitat, 2014c:10).

Environment protection

Environment protection refers to policies and procedures aimed at protecting and preserving the natural environment on residential neighbourhoods and in turn improvement of human welfare.

Environment degradation

Environment degradation is environmental problem that arises when the physical characteristics have exceeded the threshold level and/or level of tolerance.

Explanatory variable

Explanatory variable is a variable which is used in a relationship to explain or to predict changes in the values of another variable (Woolley, 1997:1).

Exploratory research

Exploratory research is a type of research conducted for a problem that has not been clearly defined. It determines the best research design, data collection method and selection of subjects (Creswell, 2013:26).

Externality

Externality is the side effect or consequence of an industrial or commercial activity that affects other parties without this being reflected in the cost (UN-Habitat, 2012c:5).

Food security

Food security in this research refers to small scale agricultural activity (e.g. crop yielding, irrigation schemes etc.) undertaken by urban communities to produce food in organised communities projects or urban families food production systems in backyards to produce a lowcost, sustainable strategy for increasing household food security by direct access to a reliable food supply (UN-Habitat, 2013b:19).

Fragmentation

Fragmentation refers to two dimensions with competing mechanisms or served unequally with information/services or might differ in opportunities or method of participation within the same city boundaries (Lo, 2008:277).

Gini coefficient

See: Concentration ratio

Globalization

Globalization is defined as a form of response to technological, economic, political and cultural exchanges made possible largely by advances in communication, transportation and

infrastructure that facilitates integration of economics and societies all over the world (UN-Habitat, 2012a:3).

Gross Domestic Product

GDP in this research will be all final goods and services produced in within a given period of time by factors of production located within CMLM (based on the comparison approach of this research other GDPs be it national, provincial and local government could be considered (UN-Habitat, 2013b:3).

Household

Household refer to housing units that is occupied if a person or group of persons is living in the unit at the time of interview or if the occupants are only temporarily absent, as for example, on vacation, working away from home. The persons living in the unit must consider it their usual place of residence (Harple & Savage, 1990:106).

Household Infrastructure Index

Household Infrastructure Index (HII) is a measure of the total access to services that communities are experiencing it could be national, provincial and local government (UN, 2010:10).

Housing unit

Housing unit is defined as a single room or group of rooms intended as separate living quarters by a family, by a group of unrelated persons living together, or by a person living alone (Harple & Savage, 1990:106).

Human Development Index

HDI is a measure of the overall development (it could be national, provincial and local government) through the set of composite statistics which are used to rank level of development (UN, 2010:10).

Hypothesis test

Hypothesis test is a statistical instrument that proceeds by making an assumption about the truth, the null hypothesis, H_0 . In turn set up a specific alternative hypothesis, the alternative hypothesis, H_A . The test consists of calculating the probability that the observed value of the statistic could have arisen purely by chance, assuming that the null hypothesis is true. This probability is then compared with a predetermined value, which is called the significance level or

alpha (α) of the test. If the p-value is less than α (1-sided test), the null hypothesis is rejected in favour of the alternative and vice versa (Mayo, 2003:92-93).

Increased density

Increased density refers to building of residential units, shops and more and closer services that caused to make walking easy, in order to enhance resources and services and to create convenient, desired and satisfied place for living (Rahnama, 2012:198).

Independent variable

See: Explanatory variable

Informal settlements/slums

Informal settlements refer to a cluster of housing units erected on land illegally without permission.

Infrastructure

Infrastructure is the physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function; this includes transport infrastructure, schools, healthcare infrastructure, etc. (UN-Habitat, 2012c:5).

Infrastructure service

Infrastructure service refers to beneficial service provided to humans by infrastructure, for example hydration and cleansing (from piped water), warmth and light (from the electricity grid), and hygiene (from sewage and solid waste management systems) (UN-Habitat, 2004c:10).

Institutional framework

Institutional framework in this research refers to administrative organisation with a clear set of responsibilities on policy implementation for the public entities involved to achieve urban neighbourhood sustainability objectives in this regard.

Integration

Integration refers to considering in relation to one another principles of urban transport policy, human settlement policy, environmental policy and spatial planning policy as key process of the criteria of integrated urban development (see integrated urban development).

Integrated Development Plan

Integrated Development Plan (IDP) is a five-year strategic developmental plan which local government is required to compile to determine the development needs of the municipality. The plan incorporates public participation which gives citizens opportunity to influence decision making by highlighting and prioritising their development needs.

Integrated Transport Plan

ITP is an overarching strategic document which provides comprehensive and integrated plans for transport systems (e.g. land use, infrastructure, transport etc.) over the five years period.

Integrated Urban Development Framework (2014)

IUDF is the policy framework that aims to guide the development of inclusive, resilient and liveable urban settlements, while squarely addressing the unique conditions and challenges facing South Africa's cities and towns. It provides a new approach to urban investment by the developmental state, which in turn guides the private sector and households (South Africa, 2014b:6).

Integrated urban planning

Integrated urban planning in this research refers to the process of integrating specific and relevant urban policies, projects and proposals as a tool for sustainable urban development such as improving access to employment and housing (see integration) (COGTA, 2014:2).

Intermediate cities

Intermediate cities denote middle sized cities that constitute nodes in the territorial network which forms the global urban system, strongly shaped by the dynamics of economic globalization (UNESCO, 1999). They are defined on the basis of their population size and ability to facilitate the absorption and distribution of activities between big intermediate cities and metropolitans

Land use

Land use in this research refers to the function of land determined by land use classification (e.g. housing, transport, commercial, parks and open space etc.).

Land use management

Land use management in this research is defined as land use regulations and/or a tool that exercises control over the use of land in a residential neighbourhood in this context (See land

use) within main focus on management practices in order to ensure effective spatial distribution and use of land thereby being consistent with neighbourhood sustainability requirements.

Land use morphology

Land use morphology relates to a general increase in urban and built-up area reflecting changes in the size, shape and functions of buildings and is linked with changes in transport infrastructure (Stillwell & Scholten, 2001:257).

Liveability

Liveability in this research is defined as means to derive neighbourhoods' liveability index in order to cultivate neighbourhood liveability indicators to measure progress towards achieving urban planning policies such as integrated sustainable urban development and sustainable modes of living. Some of the identified indicators likely to contribute to neighbourhood liveability include: education; health and social services; parks and open spaces, infrastructure, crime and safety, leisure and culture etc. (The Economist Intelligence Unit, 2013:1).

Liveability index

Liveability index assesses which locations around the world provide the best or the worst living conditions. Assessing liveability has a broad range of uses, from benchmarking perceptions of development levels to assigning a hardship allowance as part of expatriate relocation packages (The Economist Intelligence Unit, 2013:2).

Local Agenda 21

Local Agenda 21 is an action plan of the UN as a deliberate effort to address global environment concerns made at UNCED held in Rio de Janeiro, Brazil, in 1992. It is a comprehensive blueprint of action to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which humans directly affect the environment (UN, 2015:1).

Marginalised neighbourhoods

See: Disadvantaged neighbourhoods

Metropolitan area

Metropolitan area is a formal local government area comprising the urban area as a whole and its primary commuter areas, typically formed around a city with a large concentration of people (i.e., a population of at least 100, 000). It includes both the surrounding territory with urban

levels of residential density and some additional lower density areas that are adjacent to and linked to the city (e.g. through frequent transport, road linkages or commuting facilities), (UNICEF, 1998:4).

Mixed-use development

Mixed-Use Development in this research is defined as an approach that encourages urban neighbourhood spatial arrangements to aim for variety of uses that enable people to live, work, play and shop in one place – this includes sharing infrastructure, utilities and public amenities.

Mixed use and diversity

Mix of shops, offices, apartments and houses around design, mix use in quarters. Diversity of people from different ages, classes, cultures and races (Rahnama, 2012:198)

Mobility

Mobility refers to convenient and accessible multimodal travel (ensuring safety and operating at suitable speeds) of people and freight (while enhancing economic, environmental, and human resources) (Smart City Mobility, 2010:2).

Modelling

Modelling in this research refers to the methodology that can be used to describe, analyse and solve problems in a mathematical framework.

Mode of travel

Mode of travel in this research denotes to various forms of travel such as walking, cycling, travelling by taxi, bus or car from home to work vice versa.

Multi-criteria analysis

Multi-criteria analysis is a type of decision analysis tools that is particularly applicable to cases where a single-criterion approach falls short (Dodgson *et al.*, 2009:20). In this research MCA describes a structured approach used to allow sustainability decision making and measurement to include specified and corresponding factors to the criteria. The actual measurements are based on the quantitative analysis (through scoring, ranking and weighting) of a wide-ranging impact of qualitative impact factors and criteria. MCA provides techniques for comparing and ranking different outcomes in order to inform policy decisions.

National Development Plan

The NDP is a strategic document that offers a long-term perspective. It aims to eliminate poverty and reduce inequality by 2030 through growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society (National Planning Commission, 2012:2).

Neighbourhood

A neighbourhood is a geographically localised community located within a larger city or suburb or a separately identifiable area within a community retaining some quality or character which distinguishes it from other areas or an area where the residents are drawn and held together by common and beneficial interests.

Neighbourhood planning

Neighbourhood planning is an aggregate plan of the neighbourhood that gives out an overall development of the neighbourhood guided by policies and land use characteristics (Department for Communities and Local Government, 2012:5).

Neighbourhood revitalization

Neighbourhood revitalization in this research refers to revitalisation strategies aimed at the scale of a neighbourhood (low-income neighbourhoods) to enhance neighbourhood economic growth and investment climate and creation of equal opportunities and to enable a high level of integration into the existing economic network of cities.

Neighbourhood satisfaction

Neighbourhood satisfaction denotes satisfaction with respect to neighbourhood situations (e.g. quality of services, socio-economic characteristics etc.) as means of deriving a composite index of neighbourhood sustainability.

Neighbourhood unit

A neighbourhood unit refers to Clarence Perry planning model for residential development with the objective of encouraging neighbourhood formation through collection of units and physical planning to reduce distance between residential units and strategic location of communal facilities (Brody, 2009:29).

New urbanism

New urbanism is an approach to urban planning and design that can be applied at a variety of scales, moving from a single block in an urban neighbourhood/area to a large metropolitan region (Rahnama *et al.*, 2012:197).

Nominal variable

For a nominal variable the values of the variable only indicate classes or categories. This means that numbers are only used to distinguish between the colours and have no further interpretation.

Null hypothesis

The null hypothesis is the hypothesis to be tested.

Ordinal variable

For an ordinal variable the values it can be take on are the same as those in the nominal scale, but also have an order associated with categories. For example, in this research respondents level of involvement in public participation activity can be classified as “poor”, “fairly poor”, “good” and excellent. The numbers 1, 2, 3 and 4 can be used to denote each of these degrees of satisfaction respectively.

Peri-urban

Peri-urban in this research refers to areas surrounding cities – encompassing both characteristics of the urban and rural form. According to Hartel (2005) peri-urban is the transition zone, or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, induced by anthropogenic activity.

Peri-urban neighbourhood

Peri-urban neighbourhood in this research refers to marginalised neighbourhoods located somewhere between the urban core and the rural landscape. From urban planning perspective these neighbourhoods are ground for urban sprawl and are vulnerable to poor spatial and socioeconomic characteristics.

Polycentric city

Polycentric city refers to the principle of developing multiple centres within a region to be complementary in role through city specialization (UN-Habitat, 2012c:5).

Precinct plans

Precinct plan refers to a proactive planning work, defining desirable directions and indicating a localized system of actions designed to foster new relationships between the private and public sector (Albonico Sack Mzumara Architects and Urban Designers, 2005:15).

Public participation

Public participation refers to processes that afford the community (those who have an interest or stake in neighbourhood sustainability issues) an opportunity to influence decision making and gives full consideration to public input in making that decision.

Public Private Partnership

Public Private Partnership is the reciprocal obligation that intertwines citizens, businesses and governments in service delivery.

Public transport network

Public transport network encompasses infrastructure and the service level of transportation network.

P-value

P-value is the lowest level at which H_0 can be accepted.

Quality of life

Quality of life is individuals' perception of their position in life in the context of the culture and value systems. These include their location in relation to goals, expectations, and concerns (WHO, 1997:12).

Quality of services

Quality of services in this research refers to the key criterion for the assessment of service quality through neighbourhood satisfaction and available standards for measuring services quality.

Ratio

Ratio (x/y) in this research is expressed in percentage ($\% = x/y * 100$).

Resilience

Resilience is the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such as the system remains within the same regime, essentially maintaining its

structure and functions. It describes the degree to which the system is capable of self-organisation, learning and adaptation (Walker *et al.*, 2004:12).

Resilient cities

Resilient cities are cities designed to systematically respond to and cope with human, natural and other stresses. The aim is to withstand shocks such as natural disasters, absorb them and even grow after such events (Hawley, 2014:2).

Segregated townships

Segregated townships in this research are defined as peripheral residential areas (far away from jobs and city centre) separated from city centre by unoccupied buffer zone where urban non-whites were forced to reside in South Africa (Rospabe & Selod, 2006) enforced by the apartheid system.

Smart city

Smart city is a modern city built on intelligent broadband infrastructure to provide enhanced security, create economic prosperity, distribute opportunity, and improve quality of life (Sigh in Smart City Online, 2014:1).

Smart growth

Smart growth in this research entails concentrating a mix of higher-density residential development together with shops, public services and amenities around public transportation nodes and encouraging walking and transit use, while protecting open space and natural resource (Wallsjaper, 2008:33).

Social inclusiveness

Social inclusiveness entails incorporating the views of a broad range of interest groups in city decision-making - in particular those whose interests are typically side-lined by economic agendas - with the aim of reaching mutually beneficial solutions (UN-Habitat, 2004c:11).

Spatial equity

Spatial equity in this research refers to an approach to reduce spatial incompatibilities and disparities of living levels between the less privileged and the privileged in the sense that the changes are anticipated to create equal opportunities.

Spatial norms

Spatial norms refer to practices and regulations that have a spatial component.

Spatial relation

A spatial relation in this research refers to interaction between two or more areas (in this case it could be between township and city and other areas) in terms of distance, size and functional connectivity or the ability to measure specific urban situational conditions.

Standard deviation

Standard deviation measures the spread of distribution from the mean of a group of measurements (Urdan, 2005:16).

Standard error

Standard error is the standard deviation of the sampling distribution of some statistics (Urdan, 2005:52).

Strategic planning

Strategic planning in this research is defined as the continual process characterized by intersectoral coordination to facilitate interface of a set of interrelated strategies for land, infrastructure, financial and institutional development to better aid urban policy decisions regarding sustainability (UN-Habitat, 2014b:59).

Spatial

Spatial is defined in this study as the flow of products, people, services, or information among places, in response to localized supply and demand pertaining to or involving or having the nature of space and the where of things, whether static or in movement; the protection of special places and sites; the interrelations between different activities and networks in an area; and significant intersections and nodes within an area which are physically co-located (Healey, 2007:32).

Spatial Development Framework

SDF provides a comprehensive and detailed framework for spatial development of a municipality and it is a legally binding document having regulatory and financial instruments to achieve its policy objectives. This spatial strategy express the aims, processes, proposes and indicates best practices and highlight areas that need urgent attention of spatial development. In urban areas it considers a number of variables such as land use patterns, economic, social,

environmental, climate change and infrastructure and other urban system variables which will contribute towards urban sustainable development.

Spatial scale

Spatial scale refers to the approximation and classification of an area in terms of scale and size of an area described.

Spatial segregation

Spatial segregation denotes unequal formation of spatial and socioeconomic characteristic and networks that took effect of race and class segregation in the experience of South Africa.

Spatial Planning and Land Use Management Act 2013

SPLUMA 2013 is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency and uniformity in procedures and decision-making in this field. The biggest point of departure from older planning legislation is that municipalities will be solely responsible for processing and dealing with land use applications and the appeals relating thereto. All municipalities must establish Municipal Planning Tribunals to decide on cases, with the Municipal Council dealing with appeals on decisions made by the Municipal Planning Tribunal (South African Planning Institute, 2015:1).

Spatial transformation

Spatial transformation describes cultivating and harmonising processes and policies that reflect spatially distributable patterns and systems such as globalization, regionalisation and urbanisation to transform spatial structures and forge spatial interaction.

Statistical significance testing

Statistical significance testing is statistical tool that aims to draw conclusions or inferences about a population by studying samples of that population (Ugwuegbu & Onwumere, 1987:47).

Suburb

Suburb in this research denotes a mixed-use area that is a predominantly residential area which exists as part of an urban area with employment, commerce, recreation (cultural and social attractions and amenities).

Successful cities

Successful cities in this research refer to the cities that are in line and/or adhere to urban sustainability requirements and meet challenges through integrated solutions (inclusive of all its neighbourhoods) and offers the criteria and indicators to achieve sustainability.

Sustainable cities

Sustainable city in this research is defined as a city where achievements in social, economic, and physical development are made to last (UN-Habitat & UNEP, 2001:3).

Sustainability criteria

Sustainability criteria in this research refer to the framework that consists of groups of factors/indicators which serve as guidelines for the planning, implementation and evaluation of neighbourhood sustainability.

Sustainable development

Sustainable development is a development which meets the needs of the present without compromising the ability of future generations to meet their own needs and aspirations (WCED, 1987).

Sustainable transportation

Sustainable transportation is a system that allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations; – affordable, operates efficiently, offers a choice of transport mode, supports a vibrant economy; and limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, reuses and recycles its components, and minimizes the use of land and production of noise (Centre for Sustainable Transportation, 2008:4-5).

Sustainable urban neighbourhood

Sustainable urban neighbourhood in this research is defined as having the following characteristics: wide enough choice of housing and facilities; well connected to jobs and services by foot, cycling and public transport; increased integration of economic prosperity; social equity and cohesion; protecting the environment, highlighting good practice in design, local governance, retail services and stressing the importance of spatial planning framework.

Sustainable urban form

Sustainable urban form refers to certain basic characteristics that a neighbourhood/city should possess that would enable it to function within its natural and man-made carrying capacities – this includes issues of urban size, shape, density and compactness, mixed use, urban layout and size, housing type and quality, green space distribution, and various growth options such as intensification and decentralisation (Burton *et al.*, 2013:7).

Sustainability

Sustainability is the endurance of systems and/or processes to maintain the quality of the sustainable development requirements such as balancing the social, economic and environment requirements (UN-Habitat, 2013c:12).

Sustainability evaluation

Sustainability evaluation refers to a review of policy strategies and/or systems (urban system) to assess their sustainability or test the extent to which sustainability criteria are acceptable and implementable (Rubik & Von Raggamby, 2012:18).

Sustainability index

The Sustainability index is defined as the decision-making procedure comprising several steps in order to obtain mathematical tool for the assessment of the rating among options under consideration (Chandrasekharam, 2002:17).

Social capital

Social capital is defined as networks together with shared norms, values and understandings that facilitate co-operation within or among groups (OECD, 2008:7).

Theory

Theory in this research refers to conceptualisation and provision of comprehensive interpretation of the neighbourhood concept by systems of interrelated definitions, ideas and assumptions underlying each major theoretical perspective of neighbourhood theories. The theories incorporated form the middle range axioms of this research as they meet the task of efficient formulation and used as building blocks for the wider scope, evidence which supports and conveniently delineating the research problem (Schwirian & Prehn, 1962:815).

Township

Townships are spatially segregated neighbourhood (often underdeveloped) urban living areas that, from the late 19th century until the end of apartheid were reserved for non-white (black

Africans, Coloureds and Indians). Townships were usually built on the periphery of towns and cities (see segregated townships).

Traffic impact assessment

A traffic impact assessment is the process that enables assessing the effects that a particular development's traffic will have on the transportation network in the community (Litman, 2014a:4).

Transit Oriented Development

Transit-oriented development is often defined as higher-density mixed-use development within walking distance –or a half mile –of transit stations creating attractive, walkable, sustainable communities that allow residents to have housing and transportation choices and to live convenient, affordable, pleasant lives --with places for children to play and parents to grow old comfortably (Center for Transit-Oriented Development, 2010:2).

Transportation planning

Transportation planning is defined as improving coordination between land use and transportation system planning; providing cooperative interaction between planning design and operation of transportation services, maintaining a balance between transportation-related energy use, clean air and water, and encouraging alternative modes of transportation that will enhance efficiency while providing high levels of mobility and safety (USA Institute of Transportation Engineers, 2014:1).

Unsustainable urban development

Unsustainable urban development refers to the continuing concerns about the negative aspects of urban areas such as poverty, spatial and socio-economic inequality and rapid urbanisation that outpace basic services delivery.

Urban

Definitions of urban vary among countries and often are specific to the political, social, and economic context in which they are utilized (Berkowitz *et al.*, 2006:39).

Urban agenda

The new urban agenda will be the outcome document agreed upon at the Habitat III Cities Conference in October 2016. This thesis is based on key principles, themes and consensus documents that establish essential paths for building a new urban agenda in particular *The City*

We Need that advocates for sustainable and harmonious development tomorrow through well-planned cities that can afford all residents the opportunity to lead safe, healthy, and productive lives; well-designed cities that present nations with major opportunities to promote social inclusion, resilience, and prosperity (UH-Habitat, 2013e:3).

Urban areas (international definition)

Urban areas can be defined by one or more of the following: administrative criteria or political boundaries (e.g. area within the jurisdiction of the municipality) a threshold population size, population density, economic function (e.g. where majority of population is not engaged in agriculture, or where there is surplus employment) or presence of urban characteristics (e.g. paved streets, electric lighting, sewerage) (UNICEF, 1998:10).

Urban areas (South African definition)

Urban areas are defined as built-up areas, including vacant space, within a proclaimed municipal or local authority boundary, with various structures – houses, flats, hotels, boarding houses, old age homes, caravan parks, school and university hotels – built according to municipal bylaws (Stats SA, 2001:6).

Urbanisation

Urbanisation denotes a process of urban growth. In a demographic sense, is defined as a process of growing population concentration whereby the proportion the total population which is classified as urban is increasing. Within the reality of spatial economic transformation it stimulates policies aimed at the decentralisation of economic growth and other far reaching economic transformation issues (Drakakis-Smith, 2012:8).

Urbanisation rate

Urbanisation rate is the increase in the proportion of urban population over time, calculated as the rate of growth of the urban population minus that of the total population (UNICEF, 1998:10).

Urban agglomeration

Urban agglomeration refers to the continuous urban spread constituting a city/town plus suburban areas and/or outgrowths lying outside of but being adjacent to the city boundaries (United Nations Population Division, 2012:2).

Urban density

Urban density in this research refers to the measure of the urban unit of population and housing per unit area (neighbourhood/city). The population density is measured as population per unit area while for built-up area density is measured as buildings or urban land cover per unit area (Banai & Depriest, 2014:7).

Urban development

Urban development in this research is defined as a planned and developed area within an urban area characterised by physical, socio-economic and institutional classifications (UNHabitat, 2012a:3).

Urban form

Urban form in this research implies physical elements within a city. It refers to the arrangement, function and aesthetic qualities of design of buildings and streets, which overlay the land use and transport system (Mead *et al.*, 2006:110)

Urban fragmentation

Urban fragmentation implies an organisation of space – understood as both a process and a resulting spatial state – in which impermeable boundaries and enclosures have central roles. It is a state of disjointing and separation which is often coupled with socio-economic and/or ethnic divisions. A **fragmented city** is one in which the ability to use and traverse space is dominated by the principle of exclusivity (Kozak, 2008:256).

Urban fragmentation is closely related to the notion of spatial segregation, spatial separation, spatial polarisation, social exclusion and disconnected cities.

Urban segregation

Urban segregation refers to how people (or selections of population) are distributed geographically according to where they live using categorisation principles such as demographic, socio-economic and ethnic ones – these determinants fall into two categories: economic and racial characteristics related to the potential for living in underserved areas and spatial segregation characteristics (Andersson, 2007:57).

Urban sprawl

Urban sprawl is the spatial expansion of urban area in response to urbanisation distinguished by leapfrog patterns of development (e.g. commercial strips, low density, separated land uses etc.) taking advantage of transport and road infrastructure as well as rising income levels (Ewing *et al.*, 2000:2).

Urban structures

Urban structures relate to models, analogies and/or simulations that present spatial arrangements in urban areas like settlements, transport and infrastructure networks, among others (Wray, 2013:1).

Urban system

Urban system is a comprehensive collection of cities which are interdependent through economic fluctuations, diffusion and exchange of information, and flow of goods, capital and people – spatial and functional connectivity (Murayama, 2013:9).

Urban fringe

Urban fringe is the term that describes the built environment on the outskirts of the formal city boundaries (UNICEF, 1998:10).

Urban governance/management

Urban governance refers to a significant degree through which institutions of the local government implement and research for processes and mechanisms through which significant and resource-full actors coordinate their actions and resources in the pursuit of collectively defined objectives (Pierre, 2005:35).

Urban growth

Urban growth is the rate of growth of an urban population depending on the natural increase of the urban population and the population gained by urban areas through both net rural-urban migration and the reclassification of rural settlements into cities or towns (UNICEF, 1998:10).

Urban management

Urban management in this research refers to institutional mechanisms and procedures for participation guiding urban development processes (e.g. urban land management, infrastructure improvement, environmental management, poverty alleviation etc.) and assuming an active role in mobilisation, management and coordination of resources to support the objectives of sustainable urban neighbourhoods (Momeni, 2011:65).

Urban periphery

Urban periphery in this research implies any occupation on the fringes of the city which has neither a fully urban nor fully rural character – it is intimately connected with the city (UNICEF, 1998:10)

Chapter 1: Introduction

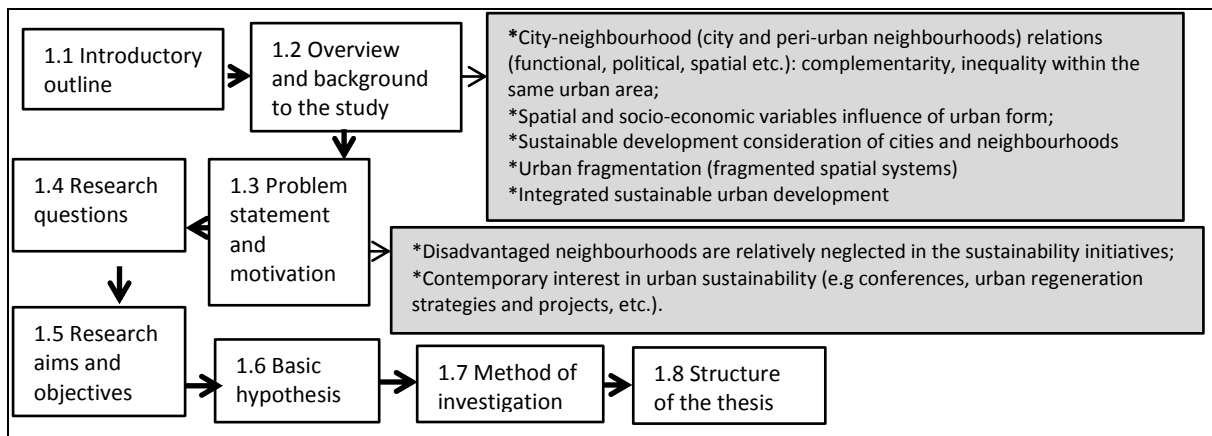


Figure 1: Structural component of chapter 1

Source: Own construction (2015).

1.1 Introductory outline

This chapter introduces the problem and motivation for the research. Firstly, it presents an overview of what is known about the problem – this is sufficient to establish the need for the research. Then the purpose and specific objectives are outlined as they are linked to solving objectives the problems or filling the knowledge gap identified (Hicks, 2013:1). The entire structure for this chapter and roadmap for this research is presented above.

1.2 Overview and background to the study

In every neighbourhood urban development; attention is directed towards overcoming the spatial and socio-economic challenges that influence the urban form. At the core of development is the concept of sustainability – its importance and significance in the planning of urban areas are consistently highlighted by international and local debates. Articulated in this manner, sustainability is definitely worth utmost consideration in urban areas-based

developments for the creation of a better future that encompasses all dimensions of sustainable developments (namely economic, social and environment). Choguill (2008:41) points out that although sustainable development is central in the consideration of cities, for some reason it has received less attention in the development of neighbourhoods – especially the spatial factor and its contribution to sustainability.

According to Ramamurthy and Devadas (2012:31) many communities have neighbourhoods that are in decline while other parts prosper in the context of the spatial system within which it exists. These patterns and processes entrenching inequality within the same urban area are well documented. A more precise spatial outcome is the environmental quality that differs significantly at the intra-urban scale, bringing multiple and multifaceted adverse impacts on poor people such as living in the least unsafe and healthy areas (UN-Habitat, 2014b:251). Strictly linked to spatial contexts, this reflects inadequate urban planning (UN-Habitat, 2013b:159). Taking a broader perspective, the low-income residents are restricted by higher land values from living in urban centres and desired well-located areas (UN-Habitat, 2014d:20). In essence, land and housing affordability is a high multiplier factor of urban spatial segregation and socioeconomic marginalization by income group (UN-Habitat, 2012g:5).

For example, in China, income gaps lead to inequality in housing consumption pushing the urban poor to less desirable neighbourhoods. According to Yang and Chen (2014:32) housing privatization is a root cause of urban inequality in China. The state-owned housing sector was privatised under the housing reform – poor households that had been privileged under the old housing system and could not move to public housing were even worse off after privatization (Yang & Chen, 2014:32). In general, alienation within urban environment has become the lot of an increasing proportion of the urban population – disadvantaged not just in city centres but even in their own neighbourhoods (Haughton & Hunter, 2004:96).

In the light of this, it is clear that well-to-do urban residents benefit enormously disproportionately to the poor. A key issue underlying the dynamic aspects of urban spatial fabric and urban setting is that well planned and designed urban areas provide all residents major opportunities to attain decent living standards such as creating equal economic opportunities, promoting social inclusion, resilience and sustainable development (UN-Habitat,

2014c:6-9). This emphasises the point that inadequate urban planning coupled with factors such as unregulated urban density, inadequate infrastructure and basic services, poor local capacities and systemic economic marginalization all contribute to high inequality levels central to spatial feature of urban areas development patterns (UN-Habitat, 2013b:159).

In absolute terms, more than 62 per cent of urban inhabitants in sub-Saharan Africa live in slums without access to basic services, such as housing, clean water and sanitation compared to Asia where it varies between 24 per cent and 43 per cent, and Latin America and the Caribbean where slums make up 27 per cent of the urban population (UN-Habitat, 2012e:5). The overall picture is that over a large geographical area – urban form and systems are not equal as shown in Figure 1.2.

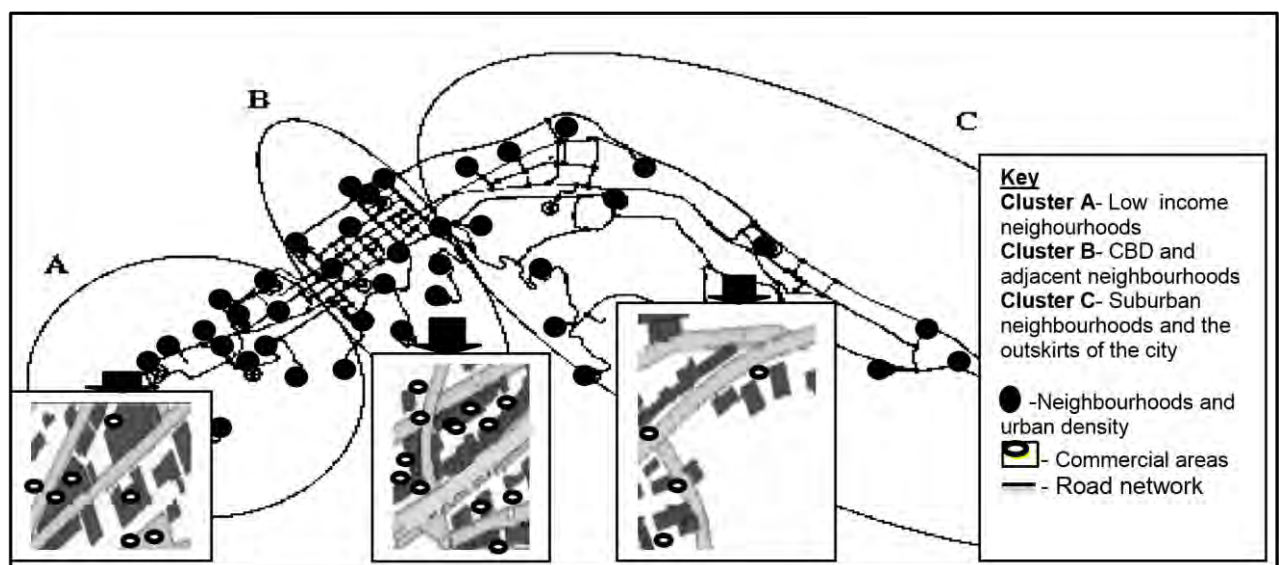


Figure 1.2: Partitioning of urban area neighbourhoods and road network

Source: Adapted from Briganti et al. (2014:960).

It is probably in contexts such as Figure 1.2 illustration urban inequalities manifest – indeed one of the leading causes of unsustainable urban development when taking into consideration urban agenda theoretical conceptualisations of sustainable urban development. The relationship between different urban areas structural issues and/or diverse spatial uses is one that propels

the apparent daunting challenge to achieve sustainable cities. However, urban spatial segregation has to be understood for what it is. There have always been efforts to arrange human settlements and cities – the role of good neighbourhood pertaining design and welfare has been understood for as long as there have been cities (Sheppard & McMaster, 2004:285). On the other hand there seems to be some consensus that within cities – neighbourhoods/settlements are segregated by the political and economic systems, leading to a lack of social cohesion, undesirable spatially segregated patterns and urban fragmentation (UNHabitat, 2014b:195).

It is clear that urban segregation crystallises in spatial configurations. This spatial configuration is concretized through zoning, land use planning, or the design of the physical form of cities or regions (Caves, 2005:426). As put by Tonkiss (2005:3) the first and most obvious sense in which space is produced is an effect of spatial practice. The new forces of gravitation put forth by sustainable urban development move away spatial planning from partial solutions to deal with the challenges and opportunities of the city region comprehensively – this includes cultivating the spatial relationship of activities such as housing, access to basic services and economic opportunities (UN-Habitat, 2012f:7). Although it appears that space is not interpretable only through representations of maps, plans, of systems and projects – they are instrumental in rationalizing the spaces of the urban development such as identify suitable areas for new, denser developments within and outside existing built-up areas (UN-Habitat, 2013b:21). This leverages the issue of spatial form in urban sustainability issues.

The implications of spatial practices in sustainable urban development demand that the link be forged between places and their contexts, seeing the design and management of every area reflecting its locale in terms of landscape, ecology, water and energy (Barton, 2013:10). Over the larger geographical area, the picture is that of a sustainable neighbourhood: emphatically not an inward-looking claustrophobic enclave but rather a local, homely part of the global village (Barton, 2013:11). From the wider spatial configuration, whilst not negating the issue of neighbourhood under-representation – city-neighbourhood relations are complementarity of the urban areas. It turns out that both the city and the peri-urban neighbourhood to some considerable degree cluster around the same issues. Despite the argument that functional, political and spatial relationships vary between the core urban areas (central city) and suburban areas/precincts/peri-urban neighbourhoods shaped by their respective agendas.

Clapson and Hutchison (2010:118) bring to our attention that there are also occurring commonalities among different types of neighbourhoods within the city. A practical example is that cities and neighbourhoods within the same jurisdiction of the local government jointly attend to such deep-seated cross-sectoral and system wide land issues through land policies or other all-encompassing reform frameworks, or both (UN-Habitat, 2013b:56). Therefore, the city neighbourhood relationships of activities draw attention to cognizant of regional distinctiveness. An understanding of the nature and workings of the spatial economy is that regional distinctiveness is necessary for economic developments that drive agendas that serve the sustainability of the whole city system (UN-Habitat, 2012c:6). The core of this argument is that there are linkages across categories of urban areas where interests collide and complement each other as shown in Figure 1.3 below:

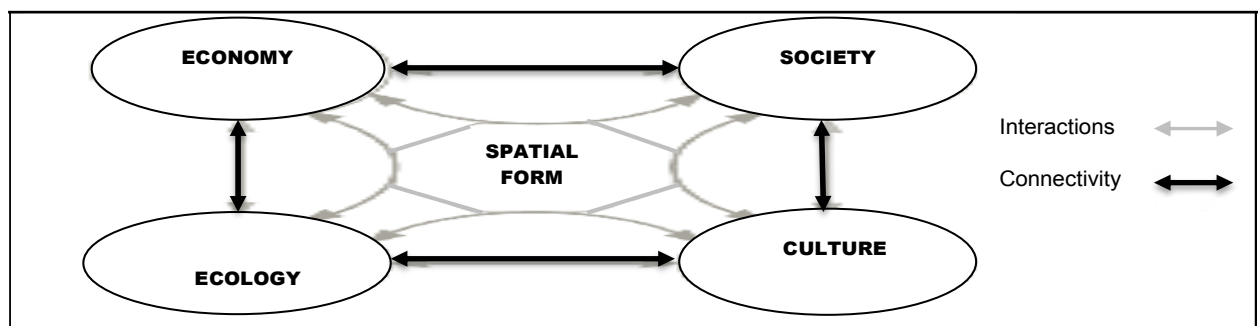


Figure 1.3: Linkages of sustainability related tendencies in urban area

Source: Barelkowski (2014:673).

This supports Clapson and Hutchison (2010:118) assertion that relationships, arrangements and practices may overlap and intersect, reaching from sub-local, neighbourhood-based concerns and policy objectives. The city-region-wide linkages may contribute to competitive advantage and to marketing city-regions to wider national or international audience (UN-Habitat, 2012c:14) This is understood to mean that there are urban dynamics that cannot be interpreted on grounds of spatial scale unit analysis but collectively over a large geographical area. This supports Tonkiss' (2005:3) argument that space is always and only produced as a complex of relationships and separations, presences and absences.

The bottom line here is that space is a place of transfer to undertake sustainable urban planning – as a result transfer must be represented in sustainability interpretations and framework. This urban area exhibits some of the characteristics of sustainability. This is supported by the statement that “cities are the world’s greatest assets for pursuing sustainable development” (UN-Habitat, 2012b:6). In the various reviews and reflections offered, the social, the economic and the environmental dimension are critically important in moving towards a more sustainable urban development. However, Barton (2013:6) contends that sustainable development is a phrase more honoured in the breach than in the observance. One of the arguments put forward is that the reality suggests more the demise of local neighbourhoods than their formation, inevitably leading to increasingly mobile, and privatised and commodified society (UN-Habitat, 2012e:5) nullifying efforts to strengthen the sustainable development of disadvantaged neighbourhoods.

Rudlin and Falk (2010:239) point out that the challenge of sustainable urban neighbourhoods is greatest in social housing and inner city areas where the process of marginalisation and stigmatisation has corroded these community values. Taking South Africa as an example to emphasise the seriousness of housing issues perpetuating urban inequality – Napier (1993:22) indicates that urban sprawl coupled with low-density housing in elite neighbourhoods and lack of affordable housing opportunities downgrades the poor to the urban periphery, ensuing exclusion of the urban poor from economic opportunities. In addition, Dawson and McLaren (2014:22) point out that the houses built for the poor are poorly located and in particular far from work opportunities.

The very significant peripherally excluded location problem seems to adversely impact on convenient access to workplaces, places of basic services (such as health care services and schools amongst others) and markets attributable to poor public transport and transport systems inadequacy to facilitate viable services (UN-Habitat, 2014b:109). Due to physical separation of the poor residential areas, equally pernicious are increasingly amounts of time and a very high fraction of income spent on public transport (UN-Habitat, 2013g:1). Generally, relationships between locations influenced by barriers and conveniences play a critical role in determining the level of convenient access (UN-Habitat, 2014c:13). In segregated urban neighbourhoods, the reality is that public transport infrastructure is inadequate and in poor

condition, consequently impacting negatively on the quality of service attributes such as reliability, time, health and safety of passengers amongst others (GTZ, 2012:12).

In addition, modes of transport feasible for urban areas such as cycling, buses and trains are not available and viable in most of poor neighbourhoods (McManners, 2012:187). Although there is enough density to support modes of transport such as buses and trains they are not offered and/or discontinued for the reason that infrastructure is inadequate and dilapidated – sustainable transport choices such as walking and cycling are discouraged on the account of road patterns and safety (UN-habitat, 2013g:24). Comparatively in elite segments of cities (suburban neighbourhoods/precincts), opposite mechanism is at work – relationships between the urban form and mobility provide a framework for sustainable mobility.

Overall, sustainable mobility in cities remains a remote prospect – taking into consideration that transportation systems directly or indirectly impact on cities' sustainability. In essence, urban transport is great source of greenhouse gas emissions that in turn profoundly exacerbates ill-health, environment and climate change which in turn lower the ecological footprint necessary for food production (UN-Habitat, 2014e:1). While the magnitude of these overlapping challenges poses serious challenges to urban areas – the marginalized neighbourhoods are the ones severely affected and vulnerable to these increasingly pressing unsustainable transportation system issues (UN-Habitat, 2013b:23). In this case the proposed mitigation measures intended or undertaken to restore environment to its previous condition or to a new equilibrium pay more attention on affluent segments of the city (UN-Habitat, 2012c:12).

As aforementioned, the challenges emerging from these urban areas burden the poorest of the poor most – this aggravates inequalities and marks the increasing segregation of both low and high income families within the same city. The urban poor are excluded and denied access to inter-city networks – continuously increasing the vulnerabilities of the already deprived livelihood benefits in the cities (UN-Habitat, 2012g:5). In essence, the urban poor's access to political networks and decision making is handicapped (Herrschel, 2010:8) and is obviously a failure in the effort to create the right policy-making network. On this basis, the marginal urban poor have the least social and economic support networks compared to the wealthy elites' city counterparts.

In the line of argument which has parallels with this point of view, Brazil *et al.* (2013:405) point out that these conditions may be labelled as unsustainable, as they do not promote inclusion, prosperity, creativity, education, health, democracy, a good quality of life, and do not allow the participation of the society in all the aspects associated with public issues. This renders city policies and action plans on urban planning biased – pursuing the interests and benefits of wealthy neighbourhoods. Contextually, this makes urban planning directly responsible for exclusion of low-income and poor people from well-planned and serviced neighbourhoods of the city in turn advancing social and spatial marginalization as well as exclusion from the mainstream economy fabric (UN-Habitat, 2014b:11).

On paper elsewhere in the world where there are policy frameworks and/or regulations on urban planning – the aim at local level, cities, through participatory mechanisms is to promote and articulate urban planning comprehensively such as undertaking land development and stimulating economy at the city region scale (UN-Habitat, 2013b:56). However, city authorities, faced with and challenged by rapid urbanization that bring about additional demand for urban services and infrastructure – deliberately undertake excessive zoning to tactically limit low-income urban dwellers to least-desirable urban areas (UN-Habitat, 2013d:9). Inevitably, the quality of infrastructure and service in poor neighbourhoods is compromised by these predetermined patterns of urban segregation (UN-Habitat, 2013c:55).

Consequently, the unserved and underserved populations out of frustration protest over service delivery, corroding social stability (with xenophobic attacks, distraction of public property, etc.). Social stability, food security and economic growth are all reliant on upon city/neighbourhood liveability (UN-Habitat, 2014b:9). Therefore, sustainable service provision becomes pivotal in ensuring that cities maintain social stability and boost liveability for all its inhabitants. Thus, urban land policy anchored in a sustainable urban development framework will strategically ensure that synergies between cities and neighbourhoods are planned for, as key mechanism for achieving sustainable integrated urban development (UN-Habitat, 2012c:1).

Robert (2014:63) positing the example of many European countries (France, Italy, Poland etc.) alludes that polarization in urban areas will remain a long-lasting issue to be addressed by public policies. Robert's central contention is that the underlying pressure in countries such as Poland is that attempts to strengthen the sustainable development of neighbourhoods, where the former economic and social functions have gradually become eroded have not been successful. Giving an example of Italy, Robert indicates that significant efforts are also being made to promote urban restructuring and it is now widely accepted that this is not just an issue limited to architectural and urban planning, but must also take into account the complexity of social dynamics in the context of integrated policy models. This corroborates Soja's (2009:2) assertion that concentrated urban populations have significant implications in the spatial sense.

The implications of urbanisation are quite important to qualify to some extent the existence of this phenomenon claimed. Beyond the definitional boundaries, Jordan and Infante (2012:535) argue that urban dynamics such as massive urbanisation exert more pressure on cities to deliver integrated urban service. The wealthier neighbourhoods have preferential access to integrated services and infrastructure provision while in the poor urban neighbourhoods' provision has been slow to take meaningful effect (UN-Habitat, 2013f:15).

The view expressed by Kurian and McCarney (2010:39) is that the root cause for poor living conditions coupled with unsatisfactory services in segregated neighbourhoods stems from conventional urban planning prejudices of urban over non-urban. It turns out that, under this conventional approach the urban planning preference is based on relative balance between urban and suburban aspirations. Overall, this tendency defines a broad spatial distinction between urban and peri-urban communities' piecemeal development and inequality (Francis & Chadwick, 2013:47). Some concepts coined to describe the consequence of urbanisation and inequality of urban areas such as poverty are concentrated on urban edge than inner urban areas. This shows that, within the urban area, there are differences between neighbourhoods located close to the core and urban edge neighbourhoods – for example the latter is challenged by sanitation services, mostly where informal settlements are concerned (Revi & Dube, 1999:227).

Based on a broad spectrum of peri-urban areas problems the expectation would be that basic services provision and maintenance in poor neighbourhoods are prioritised to offset the problems and cascading adverse impacts on sustainable urban development perspective. However, the opposite is usually the case – poor neighbourhoods' infrastructure is intentionally left to deteriorate, and is not upgraded or maintained (Francis & Chadwick, 2013:45). In turn this reflects poor urban governance and failure to reach poor urban majorities (UN-Habitat, 2013f:63). On the other hand, the most striking result that emerges is that municipal intervention is neither effective nor transparent because the poor are unable to (or intentionally do not) pay for services (UN-Habitat, 2014d:22). In basic terms, collection of revenues in poor neighbourhoods to finance services is understood to challenge municipalities immensely (UN-Habitat, 2014b:12).

Under this scenario, improving sustainability of poor neighbourhoods – their diverse characteristics - has to be considered. In addition, the tendency to under-represent or converge less attention while dealing with issues of integrated sustainable cities appears to locally and internationally contribute to a wide range and numerous pressing global issues that are facing urban environments that need to be addressed. Therefore, the urban spatial systems which profoundly aggravate the vast complexity of these challenges recognize urban areas obscured discrimination to be entrenched on size distribution and geographical location. From a narrow point of view the large scale is privileged over the small scale and not on the basis of the different patterns of functionality. Thus, Querejeta *et al.* (2008:4) emphasize the importance of understanding relations between actors at different and changing territorial scales, including city regions multi-scale dynamics inherent in these processes.

The discrimination against poor neighbourhoods and unequal access to services undermines the coherence and contiguity of urban spaces in their broader sense. A community-based initiative policy to influence municipal delivery network is being underplayed, in turn compromising proficiency of the entire system to improve sustainability of cities (Mumtaz & Wegelin, 2001:78). The reality is that cities cannot be considered sustainable if their component parts do not meet sustainability criteria (Choguill, 2008:41). The central point is that cities are composed of neighbourhoods and communities (Dushenko *et al.*, 2012:108).

Newman and Waldron (2012:1) suggest that any serious attempt at building sustainable societies needs to focus on creating sustainable urban areas and sustainable urban centres. In the light of this, it is pivotal to link and integrate distinctive various spaces within the same urban boundary to a larger space as a strategic pillar for a more operational, competitive economic and authoritative policy-making entity, such as city region (Herrschel, 2010:6). From an urban connectivity perspective, Gruis *et al.* (2006:99) point out that an urban area consists of overlapping networks of connections concerning different spatial scales, functions and use. What is important about this line of reasoning is that it appears to solidify the overall position of neighbourhoods or perhaps how a neighbourhood can provide all-inclusive understanding of the nature and workings of urban areas.

The premise behind the manifestation is straightforward: if considerable direct attention is not paid to neighbourhood issues – for example, the environment will continue to be negatively impacted and enormous traffic congestions will cause heavy burdens in the urban areas. The urban scale arguments that are seen to dominate sustainable city debates will continue to develop urban inequalities. The bottom line here is that a neighbourhood works only if contrasting nodes are placed so as to provide active links between like nodes (Gruis *et al.*, 2006:99).

The deduced understanding is that the city and neighbourhood should strive for integration. The integration concept is understood to lay claim to sustainability of urban area. Integration deals with a diversity of spatial scales (block-district-city-region) (Gruis *et al.*, 2006:99). The key issue underlying integration is that it provides a comprehensive and integrated vision and action which lead to resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environmental condition of an area that has been subject to change (Roberts *et al.*, 2000:17). From a sustainable development perspective, the neglect of neighbourhoods and poor management of their informal settlements does not present privileged urban areas with real solutions. McGranahan and Satterthwaite (2006:1) argue that they rather present a temporary synthetic easy way out, diverting attention from real problems that the poor are confronted with and possibly sustainable solutions. The initiatives to make city spatial features of higher quality development than its counterparts then emerge as a partial solution.

Given the preceding views, this phenomenon raises questions on the status of the South Africa city-neighbourhood relations and/or spatial scale issues. Much of the literature on spatial dynamics of South Africa city-neighbourhood landscape legacy delves into a discussion of the concept of under-representation and urban segregation. The reality is that the city is/was indeed divided in South Africa – African townships clearly demarcated, often distant from the city centre, inaccessible, even surrounded by walls, fences, or other impassable obstacles like rivers, railways, or major roads (Lees, 2004:167). Interestingly, this spatial feature has remained the character of city-neighbourhood or, more precisely, a township.

From this disconnect it can be argued that the symbolic spatial variables display the reality that very little space was afforded for connectivity. However, it is argued that these divisions are permeable and ambiguous (Obenbrugge, 2003:7). The empirical literature reveals that flows and movements regularly connected divided parts of the city: workers travelling into the city centre day after day; goods and services flowing back; images, adverts, radio, and later television; armed police and military personnel (Lees, 2004:167). These spatial mismatches are adjudicated differently and different perspectives manifest than the originally intended – forging integration and solving the growth path of cities.

In this case the cause-effect relation that stimulated this underrepresentation is a rebound effect of technical and political cause. The racial segregation laws meant that nearly all industrial workers, their families and others who came in search of employment were housed in segregated townships outside white cities (Whitehouse, 2006:10). This is internationally the case, within group factor shares, over large geographic areas where there are common denominators presenting challenges for spatial and integration programmes that were politically influenced in its formation. In Brazil, like South Africa, industrial triangle – Sao Paulo, Rio de Janeiro, and Belo Horizonte – working class communities grew up near industrial sites, far from the wealthier city centre; reflecting this segregation, poor areas are called the ‘periphery’ (Seidman, 1994:38).

In addition, the inequality in the United States amplified by geographical fragmentation is evident in the experience of Atlanta, in the state of Georgia – which occupies a significant position in the struggle of Blacks (or African-Americans) for social justice (Harrison *et al.*,

2003:23). The separation took place in the form of restricting poor blacks to the inner city and more affluent whites would live in suburbia (Whitehouse, 2006:10). These fragmented spatial systems were conceptualised. Historically, the main concern was with separating and ordering land uses but in recent years the focus has shifted to integrating spatially separated areas (Harrison *et al.*, 2003:22).

Therefore, from the lack of spatial norms – spatial inequity took effect and consequently the issue of underrepresentation emerged around the discrepancy. South Africa's townships and Brazil's urban peripheries are distinctive for their lack of basic urban services (Harrison *et al.*, 2003:22). In South Africa there was a well-known policy of providing inferior quality services for black – standards of social and physical infrastructure were intentionally set lower than they were for whites (Beall *et al.*, 2002:152). Based on the empirical literature, tangible and practical expressions such as public education, health, housing and transport amongst others shed light on and bear empirical evidence to how black were deprived of quality infrastructure and basic services during apartheid. The urban environment contrasts in the quality of services and infrastructure and housing amongst others prevented households and communities from improving their quality of living. These factors explain why the living conditions remain uncomfortable in most black township neighbourhoods.

The observable spatial mismatch is good proof for the spatial imbalance between the townships and the city in the perspective of sustainability. There is a vast difference between fragmentation and integration. Therefore, within the same urban boundary better access to social services of one segment will not do away with fragmentation – it would be undermining urban sustainability as the entire urban system is not balanced. However, there are attempts undertaken to make accessible better quality social services to the poor (disadvantaged urban areas). There have been impressive levels of coverage, especially of basic health and education (UN, 2010:121). A complex understanding implies that whilst investment in facilities by sector departments like Health and Education in capital projects by municipalities in the last ten years have made significant impacts, for the larger part they focused on backlogs and have not been strategically focused to have had significant transformational impact on the form of settlements and the current plans to implement sustainability are not achieving the scale and speed of change required (Gibberd, 2013:225).

Although there is progress, the systems tend to be fragmented and have not eliminated inequalities based on geographic location or income level (UN, 2010:121). Clearly, with outlined spatial arenas, offsetting socio-economic inequalities and manifest of spatial segregation that aggravate the vulnerability of the urban remains undeniable. These special cases create a platform to debate whether or not the spatial size distribution of neighbourhoods and geographic location is the basic tenet for exclusion. In general terms, township neighbourhoods are arguably still marginalised in sustainability issues and integration in urban textures – particularly mainstream economic networks of cities are not optimally realised.

In an effort to highlight the continuity of unsustainable spatial development dimension Tshikotshi (2010:1) indicates that the post-apartheid government's resettlement programme still locates the urban poor households on the peripheries of the cities, a pattern similar to the one used during the apartheid era. According to Pieterse (2004:82) South African cities may be as segregated, fragmented and unequal as they were at the dawn of political liberation. Thus, Harrison *et al.* (2007:242) put it bluntly that the promise of post-apartheid planning to address the spatial fragmentations and inefficiencies of apartheid has been largely unfulfilled.

Due to the persistence of these spatial inequalities, efforts to escalate spatial transformation need to be addressed in parallel with physical interventions. The failure cannot be laid only at the feet of planning as space is produced at the intersection of multiple rationalities, and there are considerable limits to the power that planning has to shape spatial outcomes (Harrison *et al.*, 2007:243). This includes amongst others the diverse spatial rationalities of government policies and programmes outside the realm of planning have made it very difficult for planners to achieve spatial objectives. By and large, land-use planning authorities in many jurisdictions across the globe are challenged by a rising need to formulate and implement effective policies that forecast, plan for, and deliver urban growth (or shrinkage) plans that alleviate the social, environmental, and economic pressures which will be critical in sustaining residential and employment populations (Kirnbauer & Baetz, 2012:1).

Reality displays spatial necessities and the basis of mutual interconnectedness in large geographical areas. There is natural functional connectivity of wide-area spatial scale that is normally ignored and/or undermined. One way to dilute this potential popular control of space is

with reality that human activities are spatially separated hence the need to consider mobility, accessibility and movement of goods in a bid to attain balanced growth. The highlighted importance of transport in this case is that it plays a coordination role within an individual city and between different sizes and forms of cities. Transport infrastructure, for example, is one of the drivers shaping cities and determining the urban landscape (Jordan & Infante, 2012:536).

The transport strategy for the Madrid region, in Spain, is one step in the direction of a wider regional perspective which strives to promote sustainable urban forms through linking spatial and economic development (OECD, 2007:224). This includes transforming Madrid into an urban continuum with green areas linking different districts and with a grid of highways connecting the core with the rest of the metropolitan region, especially with the south and south west, the most densely populated areas (OECD, 2007:224). This reflects on Capello and Njikamp's (2004:2) viewpoint that the urban scale called for attention when dealing with location theory, or land use and mobility patterns.

As mentioned earlier the transportation issues are very relevant to the city-neighbourhood spatial scale relations. The patterns of land use influence the pattern of travelling and transportation planning (Harumain & Morimoto, 2013:316). The spatial scale affects such things as sprawling development patterns in cities and neighbourhoods which translate to longer travel distances and triggering more auto dependency verifies the degree of correspondence between spatial and transportation planning. The bottom line is that the city's neighbourhood is habitually considered an outlier (Wright & Rossi-Hansberg, 2006:597) signifying the need to sufficiently underpin the transportation issues.

Having the aforesaid knowledge, one key deduction is to consider addressing sustainability in a more coherent manner in urban areas. The basic rationale behind this point of view is a growing consensus to articulate planning dynamics in a more comprehensive and local manner. Therefore, the neighbourhood must be considered an important component of urban sustainability. Aspects of urban planning and design (most importantly the spatial-functional structure of an area and its spatial functional position in the urbanised areas) should include neighbourhoods in the problem definition from the start (Gruis *et al.*, 2006:107) to the end.

Based on the outlined discussion it might be tempting to argue that city-neighbourhood challenges are related to each other. Despite this, it is still important to note that no two neighbourhoods are the same (Ogunsakin, 2012:18) and no two cities are the same, so there can be no 'one size fits all' approach to how services are delivered and attaining desirable sustainability in urban areas. However, there appears to be strong theoretical support and at least some empirical evidence to suggest or make an assumption that successful cities are based on successful neighbourhoods.

1.3 Problem statement and motivation

In many of reviews and reflections offered of residential neighbourhoods most disadvantaged neighbourhoods are relatively neglected in the sustainability initiatives. The concept of sustainable development cannot exist without the existence of balanced growth. Having briefly discussed the strategic importance and shortcomings of residential neighbourhoods in the previous section – it is deduced that neighbourhoods are by proxy the best practice examples for sustainability modes of living and sustainable urban form. Despite the contested nature of sustainability as a concept, it is understood that a neighbourhood is a level with significant implications for sustainable development. Sustainability principles suggest that a neighbourhood is a level at which socio-economic impacts can be better analysed and citizen involvement can be easier and more meaningfully facilitated.

Furthermore, the influence of sustainability discourse emerges at meetings such as UNEP Sustainable Cities Earth Summits; UN-Habitat Conferences, World Urban Campaign Meetings; Wessex Institute Sustainable City Conferences; URBAN21 Conferences, Australia, New Zealand and Pacific Island Nations – Thriving Neighbourhoods Conferences and South African Planning Institute Conferences among many other initiatives. From a narrow point of view these conferences tackle the multi-disciplinary aspects of urban planning ranging from wide and numerous issues such as urban planning, sustainability issues, sprawling urban development, the amount of resources and services needed, transportation issues, spatial systems and the complexity of modern society, to the few discussed in UN-Habitat and other reports.

The international organisations, continental, regional, national and local governments as well as the private sector, research institutions, professionals and academia continuing work indicate that urban sustainability is a global priority. Consequently, a consistent upsurge of interest is basically present to convey a message that urban settings are still unbalanced and outstandingly conjoined to urbanisation effects which manifest in socio-economic and spatial segregation, poverty and environmental degradation.

This means that the research is motivated by the contemporary interest in urban sustainability and some theoretical and empirical evidence that suggest that within the same urban boundary the quality of living is biased. This deficiency creates a gap that this research attempts to fill. The problem to be solved is to militate against undermining the significance of different types of neighbourhoods as well as across different scales (region, country and global). In addition, the degrees of sustainability initiatives in both the city and township neighbourhoods are descriptive indicators. There is a lack of numerical applications that can provide a range in terms of sustainable development maturity levels. In an attempt to claim sustainability measures the neighbourhood becomes a good fit for this research as it is small enough as a means of assessment to permit comparisons to the situations and large enough to display meaningful impacts.

It is understood that neighbourhoods could provide linkages across different urban scales and bridge the gap that exists between the urban and rural areas. However, these sustainability initiatives lack a systematic approach as there is a planning implementation gap faced by many local municipalities. This motivated this research to fill the knowledge gap of planning and developing effective measure of sustainability at the neighbourhood level that could evaluate the extent of success of the policies, strategies, plans and programmes in achieving the aims of sustainable urban development or successful city. The neighbourhood sustainability evaluation crystallises in the urban environments such as the live-work-play environment – access and proximity of these places from each other are based on a set of planning and design principles, norms and standards that can be used to determine the level of integration of the places.

With a focus on sustainable urban development, one of the most robust pressing issues globally is how synergies between city and its neighbourhoods are planned to achieve a coherent configuration of urban areas. The motive and the main pathway are based and/or grounded in the perspective of government policies related to integrated sustainable city, spatial planning and numerous city-neighbourhood relations that need to be addressed.

1.4 Research questions

The research questions for this research are the following:

1. Are the low-income and poor neighbourhoods the priority areas of weakness that need addressing in order to improve the sustainability of the city? In such circumstance(s), is this the cause of social and spatial marginalisation as well as economic exclusion from the planned city and sustainable urban development initiatives?
2. How can one improve the linkage between marginalised neighbourhoods, precincts and affluent neighbourhoods?
3. Which are critical issues exacerbating marginalisation of low-income neighbourhoods and presenting challenges for spatial re-development and integration programmes?
4. Does the existing knowledge within the context of urban planning and sustainable urban development provide sufficient understanding about marginalised neighbourhoods and their planned city problems that the research will focus on?
5. How will the existing knowledge identified to be relevant to this research be disseminated to instil new perspectives, enhance learning and enlightenment as well as develop practical instruments (models/frameworks) to improve urban planning?
6. What are/is the model(s) (strategies, frameworks and processes) adopted and developed to disseminate knowledge and communicate the results to academics, policymakers, urban practitioners, and all those working in the cities?
7. Which criteria and factors should be used in order to evaluate sustainability levels in neighbourhoods to be measured?

8. How can neighbourhood nexuses serve as an intermediary strategy to pull knowledge to suffice understanding to various challenges cities are grappling with and facilitate integrated sustainable urban development?
9. What are the mechanisms that can encourage and integrate the synergy between city and neighbourhood to actualise integrated urban sustainability?

1.5 Research aims and objectives

In responding to the research questions the research aims to:

- i. Identify economic, social, spatial (environmental) and institutional (political) factors which can be used to evaluate neighbourhoods sustainability levels and the extent to which these sustainability can be integrated.
- ii. Examine the manner in which urban planning instruments can promote integration between city and its neighbourhoods/precincts through spatial planning, transportation planning and environmental management conjoined to institutional capacity or competencies required in the implementation and by co-ordinating actions across sectors and spheres of government.
- iii. Contrive high-quality research and contribute knowledge on different types of city/neighbourhood relationships of the impact of activities on sustainable urban development through adopting methodologies for research.
- iv. Develop a comprehensive neighbourhood sustainability-oriented performance measurement framework (Successful Neighbourhood Model (SNM)) to integrate strategies; build the information, data and knowledge base from which the trajectories of different types of neighbourhoods can be assessed and integrated.
- v. Apply the model to different types of neighbourhood in order to determine their level of sustainability.
- vi. Contribute new knowledge on ways to incorporate SNM within the urban planning frameworks. In part, examine ways in which neighbourhood level criteria and factors as well as good practices can be replicated and scaled up in the creation of planning frameworks for sustainable, equitable urban areas at national level.

In an attempt to address the aim of the research, this thesis intends to accomplish the following objectives:

- i. Identify key challenges facing marginalised neighbourhoods and city regions.
- ii. Explore the level of sustainability in South African neighbourhoods produced by patterns of residential segregation and different groups within those neighbourhoods (formal settlements and informal settlements).
- iii. Identify and critically evaluate characteristics of urbanization promising liveable and competitive cities.
- iv. Identify the linkages between a city and marginalized neighbourhoods and precincts, with a view to determining the essential conditions for improving access to services and infrastructure and enhancing urban mobility and access to opportunities.
- v. Determine ways in which low-income neighbourhoods' demographic dividend should be taken advantage of to generate economic growth.
- vi. Determine whether relationships exist between urban form and mobility, and calls for more compact, resilient and efficient cities.
- vii. Identify ways to challenge the dualistic nature of the economy and spatial settings.
- viii. Identify policies and strategies that promote inclusive and equitable economic development; enhance urban governance; and support the creation of decent jobs and livelihoods.
- ix. Identify specific spatial interventions that can ensure sustainable integrated development and/or sustainable urban form.
- x. Identify appropriate strategies and associated interventions required at local level in response to the on-going urban spatial planning transformations.
- xi. Determine ways in which marginalized neighbourhoods can be incorporated into broader urban planning and strategies.
- xii. Identify how various land uses can increase city-neighbourhood integration.
- xiii. Identify whether integrated strategies; integration through partnerships, participatory mechanisms and processes improve urban planning and management.
- xiv. Formulate criteria and factors to measure different neighbourhoods' sustainability in a manner befitting the realities of their unique context.
- xv. Examine whether SNM can offer knowledge that guides and delivers support to capacitate local and national governments in the development and implementation of urban strategies and policies.

1.6 Basic hypothesis

It is hypothesized that neighbourhood satisfaction is associated with self-rated enjoyment of high quality of life or components of perceived neighbourhood quality.

The neighbourhood satisfaction hypothesis investigated involves varied perceptual variables and/or evaluation of specific neighbourhood attributes such as physical environment, effect of attachment, socio-economic conditions, access to services, proximity to facilities, safety and effects of racial/ethnic composition for objective measurement of neighbourhoods sustainability. From the sustainable development perspective, perceived neighbourhood quality denotes wellbeing which is environmental human rights that emanates from habitable good physical environmental outcomes.

Therefore, in an attempt to answer the research questions, neighbourhoods' residents (respondents) subjective assessments play a vital role – they establish public participation which is important dimension of sustainable development. The participation and cooperation of community in local activities are consistent with efforts to promote urban sustainability has its roots in Local Agenda 21 which incorporates local authorities as determining factor in fulfilling its objectives. As the level of governance closest to the people, local municipalities play a vital role in educating, mobilizing, and responding to the public to promote sustainable development (UNEP, 2000:12).

Lastly, it is difficult to achieve neighbourhood sustainability objectives/initiatives without evaluating their performance. Measuring the sustainability level of the residential neighbourhood would highlight areas of low or high performance.

1.7 Method of investigation

The main pathway for the framework of this research is grounded in the perspective of integrated sustainable communities, integrated strategies/approaches and sustainability related performance measurement framework. To understand what shapes neighbourhood sustainability and extend the understanding of sustainable development requirements in neighbourhood planning – the research point of departure is prompted by undertaking a wide-ranging literature review (adequately captured in the list of references) relative to the research aims, objectives and questions to enable making analytical statements and developing analytical framework analysis to determine the degree of sustainability initiatives and verify the degree of spatial necessities to shortcomings identified.

The relevant information, experiences, viewpoints and insights gathered from extensive literatures primary sources are used to conceptualise the term *successful neighbourhood* putting in perspective all the pillars of sustainable development that promote sustainable modes of living and spatial, transportation and environmental management transformation. Based on the outlined discussions the input parameters from these various and numerous sources of information will be used to evaluate research questions, objectives and hypothesis formulation in order to support or disprove the theoretical and empirical findings of this research. In achieving the research objectives the primary information will be produced through a comprehensive data-set and range of empirical methodologies such as research surveys and case studies. A questionnaire was also used to generate and stimulate formation of new information that will allow solving the research problems and measuring the sustainability levels. The case studies enabled the collection, evaluation and reporting of data. This was achieved through adopting a combination of qualitative and quantitative research methods as the sustainability performance can be either outcome or descriptive indicators.

The mixed-method research strategy (qualitative and quantitative) was used to generate the important output for analysis to improve knowledge base necessary to fill the gaps identified and prepare detailed neighbourhoods sustainability evaluation. Assembling the results and

testing the hypothesis the sequential stages involved will begin with the interpretation of results (positioned within the relevant literature) – quantified and subjected to inferential statistics to draw conclusions. The research results were uploaded into a decision framework developed as the main contribution of new knowledge – the decision framework integrates research results with other case study quantitative data sources (performance ratios, indices and percentages) relevant to the framework criteria.

These measures can be used to provide a range in terms of sustainability initiatives; however, they are measured on many different metric systems for example. As a result, the multi-criteria analysis (MCA) is used as it can handle mixed data types. The MCA converts data to standardized quantitative data to allow some type of weighted analysis and comparison between criteria and between neighbourhoods. This MCA numerical application was used to provide an effective measure to complement the measure of sustainability level (such as highlighting areas of low or high performance). Therefore, the MCA was used as a systematic approach for integrating enhancing the assessment methodology and practice.

Finally, the decision framework integrates the strategies; evaluate criteria and factors sustainability as well as neighbourhoods sustainability performances. This allows comparative judgement of criteria and neighbourhoods and provides a ranking of alternatives/options and synthesis of local priorities to the alternative ranking. Therefore, as a way of determining the framework results implications in decision making the results are transposed into neighbourhood/city/urban integrated strategies. Integrating a full sustainability perspective – the framework results which is new knowledge will be connected to the existing knowledge (literature) providing a way of determining new knowledge contribution. This includes verifying literature, reviewing arguments, concepts, theories and findings. The research will then use the new knowledge to draw conclusions and make recommendations on how the decision framework can be positioned within urban planning and development strategic imperatives for sustainable development. The details of each method to be used are presented in the chapter five of this thesis.

1.8 Structure of the thesis

This section presents the structure and content of the subsequent chapters of this research. In this chapter [chapter 1: introduction] the topic of research is introduced, motives, driving forces and guiding objectives are discussed. This is to facilitate the reading process for the reader in terms of the various ways in which the topic of discussion and/or investigation is conceived. Chapter 2 discusses the various theoretical and conceptual perspectives deemed appropriate to provide a brief overview of urban structures in a quest to understand the relationship between the city core neighbourhoods and peri urban neighbourhoods (or between advantaged and disadvantaged neighbourhoods).

Chapter 3 extends the discussion by exploring the conceptual lineage sustainable neighbourhoods from sustainability and sustainable development. It provides functional components of sustainable neighbourhood and vast functioning of neighbourhood strategic planning and management and other related urban setting activities to determine dynamic relationships of successful neighbourhoods and cities. Chapter 4 focuses on the objectives of policies, programmes, strategies and plans that are linked to meeting socioeconomic development goals; institutional frameworks, spatial planning; accessibility; land use and housing; social facilities; land use and transportation and sustainable modes of living.

Chapter 5 presents and explains the methodology of research in more detail as the basis of the empirical investigation. It develops and emphasizes the importance of applying performance assessment tools for achieving sustainable neighbourhoods. Chapter 6 reports, discusses and interprets the results of the research survey impact on achieving neighbourhood sustainability (from neighbourhood population viewpoints). Chapter 7 extends the empirical evidence trajectory – optimizing statistical tools – this entails determining correlations between the residents and neighbourhood satisfaction as determined by set of neighbourhood quality measures as revealed by questionnaire survey. It further offers comparative review and ranking of neighbourhood sustainability. Chapter 8 introduces and formulates a model for evaluating the effectiveness of neighbourhood sustainability. It reviews neighbourhood sustainability

assessment tools to stimulate formation of knowledge to provide indication of successful neighbourhoods.

Chapter 9 concludes this thesis by drawing together the main findings of the research. In addition, conclusion are drawn from the main implications of both theory and practice, arguing for the significance of integrating neighbourhoods in sustainability initiatives and the necessity of measuring the level of sustainability across different urban scales. These approaches to drawing conclusions should provide the new knowledge. Chapter 10 disseminates new knowledge and good practice, guided by neighbourhood strategic and modelling initiative.

Finally, present some ideas for future research.

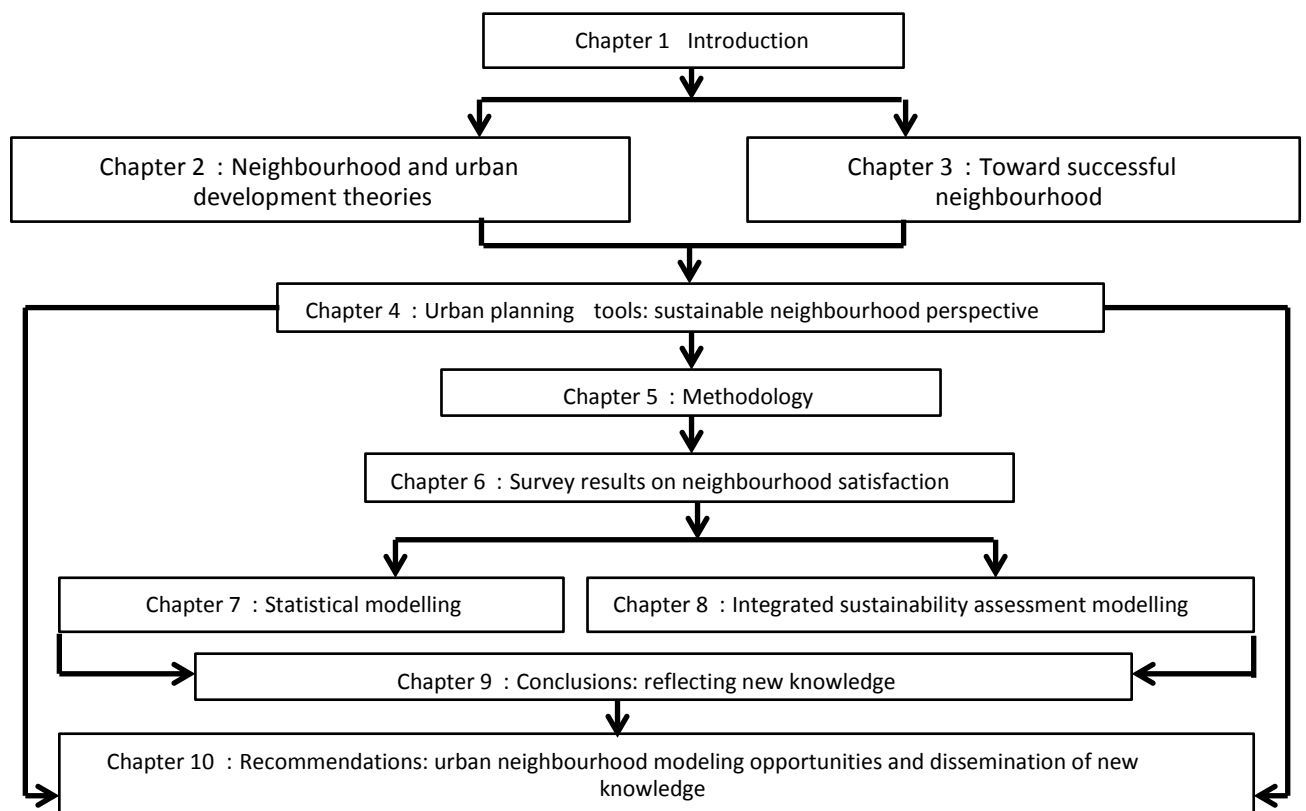


Figure 1.4: Structure of thesis

Source: Own construction (2015).

Chapter 2: Neighbourhood and urban development theories

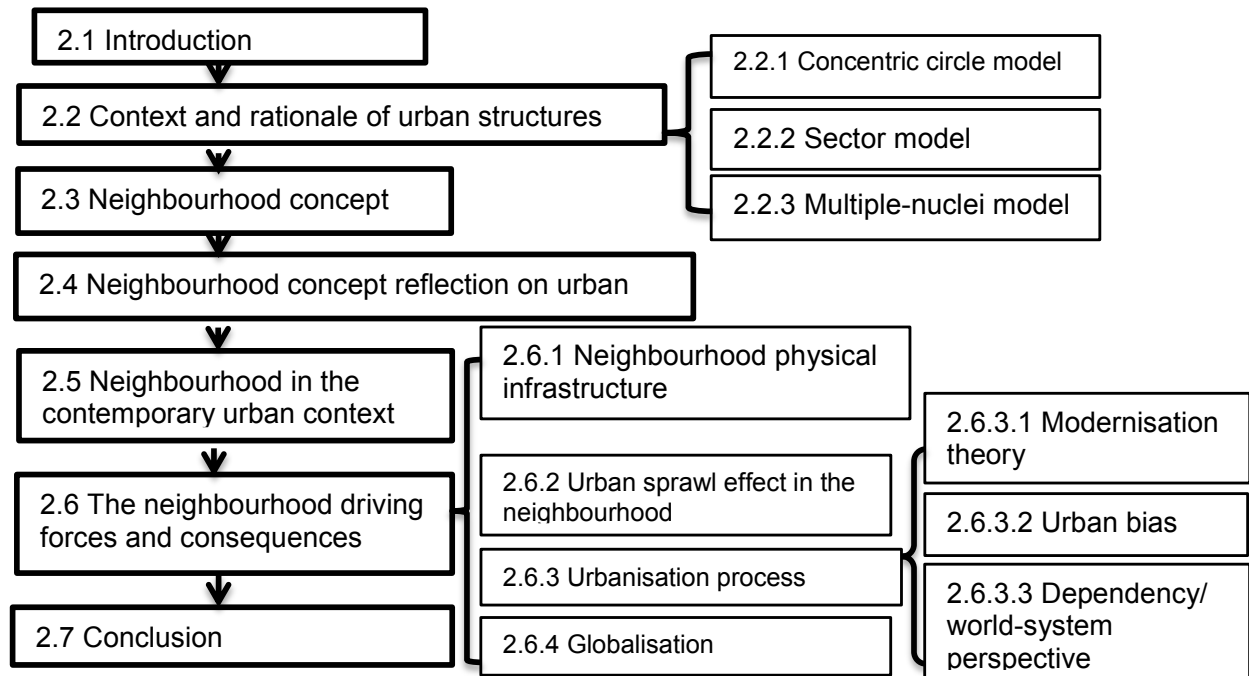


Figure 2.1: Structural component of chapter 2

Source: Own construction (2015).

2.1 Introduction

This chapter draws on urban theories in order to frame the problem and develop an approach to address the problem. For example, a viable urban theory should enable one to distinguish between the dynamics of social life that are intrinsically urban from those that are more properly seen as lying outside the strict sphere of the urban (Scott & Stopper, 2013:28). The basis is that the urban theory serves as a platform in order to understand the processes of urban growth and inequalities thereof. The models of urban structure have been adapted to give effect of the urban systems functions, locality and sphere of influence to contextual factors. This includes defining and exploring neighbourhoods to provide theoretical convergence to the functional components of the urban systems.

The focus includes issues of core and peripheral neighbourhoods, built environment, extension and possible interactions between urban areas, urban spatial systems and socio-economic dynamics that are interrelated to the existence of cities and dispersal of human activities in space in order to determine how the urban systems react to spatial opportunities and socioeconomic development.

2.2 Context and rationale of urban structures

The urban areas visual spatial features – land-use distributions, are to some extent consistent with the models and simulation of urban areas land-uses that continue to provide a novel theory of urban structures. The physical setting of urban areas gives a good reference of neighbourhoods' existence and evolution. The spatial configuration of an urban structure is one decisive factor to examine in order to increase knowledge about a society (Adolphson, 2011:6), as well as the economic and political organisation of a city. This implies that the standard models of urban growth and expansion of human activities in space are determined by various land-uses.

From the economic perspective, the accumulated evidence supports the importance of some form of urban structure. This is accentuated by the fact of urban centres' prominence in regional economies (McGee, 1999:228). These spatial measures are associated with the success of cities as manifested by their continuing ability to attract labour and capital and to spawn ideas that create new businesses and industries (Lee & Gordon, 2011:138). From a broader perspective, urban structures present interaction of infrastructure, people and economic activities (Bessus *et al.*, 2010:14). Making an example of spatial interactions, Rodrigues *et al.* (2013:113) illustrate the three core relationships and the impedance (friction) they are subject to as shown below in Figure 2.2.

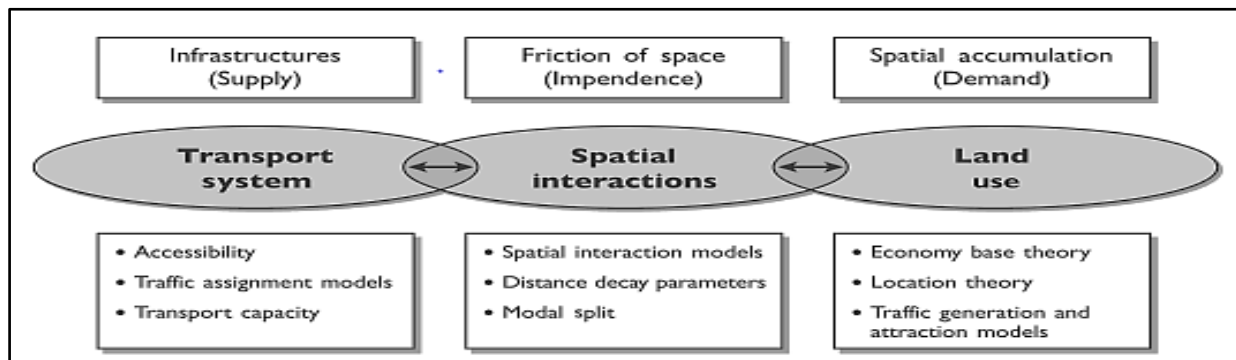


Figure 2.2: The transport/land use system

Source: Rodrigue *et al.* (2013:113).

In many of the reviews and reflections offered, urban structure models continue to be useful generalisations of the ways in which land is devoted to different uses within the city (Harrison & Campbell, 2001:2). However, there are some criticisms that models are more applicable to cities in the United States of America than to cities of other nations (Schrenk *et al.*, 2011:213). The contemporary debate is that the urban structure models cannot be applied universally, and even within the USA have become dated (Pacione, 2005:141). It is argued that these models are weak in their theoretical justifications, outmoded in their capacity to describe today's cities, and limited in their predictive powers (Torrens, 2000:11). Ottensmann (2005:3) takes note that these models have become a useful urban environment upon which contemporary urban patterns are grounded. On these bases the urban structures serve as a good opportunity to understand the urban spatial systems and socio-economic dynamic that are interrelated to different types of neighbourhoods.

In order to depict the possible importance of urban structure in this research attempt to investigate the spatial and socio-economic relations between the city and the neighbourhood, the selection of models has been limited to the three generalised models (concentric-circle model, the sector model and the multiply-nuclei model) of urban structure. Of importance here is that models draw attention to social and economic aspects that relate to spatial configuration of the urban structure. As such the understanding of networks and the reciprocal relationships of the city-neighbourhood forms a critical point of view.

The focus here is grounded in the perspective of urban structure delineation of the city/neighbourhood relations within the urban system. The basic dimension comprises an inclination to discuss city's internal structure in order to be acquainted with urban systems concepts and reaffirming whether these models are the fundamental feature of the settings of the modern city.

2.2.1 Concentric zone model

The widespread sense of spatial organisation set a concentric zone model as a point of departure into urban structure discussions. This model has set fundamental base from which to study the relationship between different segments of cities and spatial manifestations. Originated by Earnest Burgess in the 1920s, the concentric zone model depicts the use of urban land as a set of concentric rings with each ring devoted to a different land use (Harrison & Campbell, 2001:22) as shown in Figure 2.3 below.

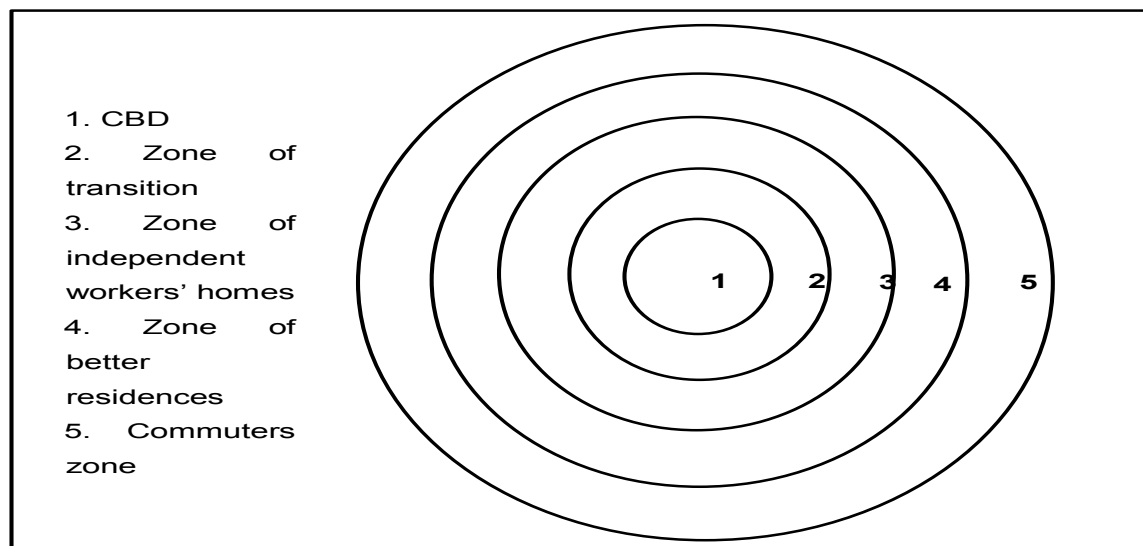


Figure 2.3: Concentric zone model

Source: Rubenstein (cited in Gonzales and Spector, 2014:2).

The monocentric model provides a convenient starting point for studying the locational behaviour of households (Rouwendaal & Van der Straaten, 2004:270). The essence of this model is that all the production and/or economic forces are centred singularly at the given point commonly referred to as the central business district (CBD). The model demonstrates the CBD as the most accessible location in the city and hence major routes of transportation emanated from the city's core (Schrenk *et al.*, 2011:212). In the words of Ratcliffe *et al.* (2009:249) concentric zone theory recognises the importance of the position of greatest accessibility – development along transport corridors, with accessibility considered in time-cost terms so that changes in transportation lead to changes in land use and land value. Therefore, in the prime years of monocentric city, most jobs were close to the centre (O'Sullivan, 2007:99).

On this basis, transitional zone neighbourhoods qualify as the most desired neighbourhood. This stems from the assumption that every agent who works at the CBD must reside in the neighbourhood area surrounding the city – making the locations closer to the CBD more desirable because they involve a shorter commute to work (Wright & RossiHansberg, 2006:601). According to Waugh (1995:141) early in the history of the city zone in transition – suburban fringe was formed that housed many of the merchants and affluent citizens. In many ways, the CBD has been a centre of attraction – businesses desiring and/or locating in it in order to be easily accessible. The main backbone of the entire model is that the high-rent and wealthy neighbourhoods relate to the influence of the CBD. When acting in concert over its intended practice – if more businesses desire a space in the CBD it would translate to competition for space that in turn triggers high (rental/sale) prices.

Transforming the core principle of the model, the growth of the city, in specific industries encroached into this zone from the inner zone, and the quality of the residential environment deteriorated (Pacione, 2005:141). The households' that are more affluent exhibit these outward changes that prompt moving further from the CBD. The premise behind the notion of the model as shown in Figure 2.3 above is that further out from the inner city is the commuter belt – essentially a suburban dormitory zone characterised by single family dwellings.

It is understood that the transition of the concentric rings represents locational preferences and spatial interaction mechanisms, including push and pull forces and agglomeration and competition effects (Timmermans, 2003:99). In context with neighbourhood considerations, the

basic rationale is that various rings of the model provide a good opportunity to identify different neighbourhoods and possible interactions between the neighbourhoods. The unique spatial arrangements within urban areas (Lee & Gordon, 2011:138) can be expected to form in ways of different neighbourhoods. The spatial analysis of neighbourhood and locational attributes revealed that a great number of transition rings around the centre cell will give the coefficients equal to zero, due to the fact that not all interactions take place over the full radius of the neighbourhood (for example, the effect of railway on industry) or because some spatial agents will be indifferent to the location of others (Timmermans, 2003:99).

Although the concentric zone model has been strongly criticised for largely ignoring land use other than residential – outlines primary issues that give effect in marginalisation of poor neighbourhoods in urban areas. The core of this statement is that the concentric zone model is one of the earliest theoretical models to explain urban social structures, which in turn explain the distribution of social groups in an urban area (Waugh, 1995:141). On this basis, the value of concentric zone model is highlighting the encroachment of one area of segregation upon another (Burgess cited in Young, 2013:360). In essence, the movement of the high rent district is in a certain sense privileged – the high rent locations receive the highest utility and those of moderate means live as close as possible to them, and so on down the ladder of wealth.

The concentric model's physical separation by income group of neighbourhoods renders low-income neighbourhoods less important to economic, social and spatial benefits and interactions within cities. The income inequality promotes the spatial segregation of different socio-economic groups. These planned urban spaces in terms of concentric circles – CBD and different types of residential neighbourhoods as well as transport corridors reduce the complementary relationship that is expected to exist between the city and its neighbourhoods as wealthier neighbourhoods are privileged. In essence, both poor and affluent neighbourhoods are critical to unlocking the comprehensive nature of urban development.

Nonetheless, the formation of the concentric circles from the CBD lay down the foundation on how neighbourhoods can support their respective cities to become successful if specific spatial, economic and social attributes that promote integration are considered.

2.2.2 Sector model

Interestingly, throughout much of the literature, the concentric zone model discussion is succeeded by the sector model. Thus, while it could be argued that discussion is accorded in relation to which model was developed first. In essence, Hoyt's model proposed in 1939 critically evaluated the burgess model. One of the principal criticisms came about Hoyt's examination of 142 American cities that revealed that increasing levels of rent did not form in concentric rings as Burgess' model suggests, but rather different levels of rent occupied different sectors of the city (Hanlon, 2007:15). Hoyt theorised urban growth as a star-shaped pattern of development with land use radiating out from the urban centre along transportation corridors (Hutchison, 2010:872) following railroads, highways and other transport arteries (Squires, 2012:172).

Hoyt central contention is that these sectors running out like ribbons from the CBD at the centre are the result of commercial, industrial and housing districts pushing outward from the CBD along major transportation routes (APA *et al.*, 2012:405) that propel growth as shown in Figure 2.4 below. The basis of the CBD as the nucleus for neighbourhood is suitable for possible interaction between the different types of neighbourhoods (UN-Habitat, 2014a:5).

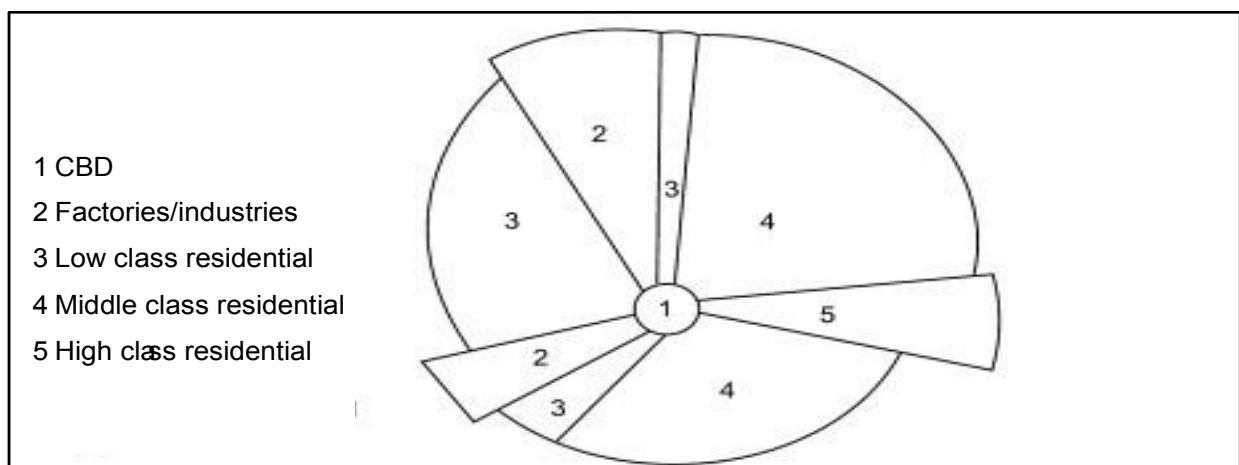


Figure 2.4: Hoyt sector model

Source: Rubenstein (cited in Gonzales & Spector, 2014:2)

The model offers forecasts of changing economic, social, and business characteristics of the neighbourhood. This corroborates Tatam (2010:17) assertion that settlements are shaped by the needs of the people who inhabit them, which mean that the livelihood strategies affect the actual form and structure of, as well as the types of facilities within settlements. Meaning that neighbourhoods are assuming the manner in which urban land is configured present competition among economic activities and social groups (Liu, 2008:11). As put by Squires (2012:172) the interactions of individuals, communities, areas, services and wider socio economic structures (at the regional, national and global scales) all work together to blur the picture.

The model considers the neighbourhood planning in the light of socio-economic grounds and depicts an understanding of a particular relationship between people and place. Thus, Castells and Mollenkopf (1991:406) refer to the sector model as the model of socio-spatial differentiation. In essence, Homer Hoyt's sector model of urban growth and form emphasis that the social and economic status of the households define neighbourhoods' physical structure. In the words of Koopman (2012:115) the sector model is simply a sorting of neighbourhoods – which makes a certain kind of sense. In research conducted by Jayapalan (2002:335) on social organisation in the cities, it was found that people of the same socio-economic background prefer to mix with one another. From the economic perspective and workings of markets, it is perhaps understandable that low-income consumers prefer to live in relatively lower-cost and lower-quality housing that is situated close together (Powell & Holcombe, 2011:1). Ward (2009:115), on the other hand, argues that although this sorting makes a certain kind of sense – it appears that it restricts disadvantaged areas from social connections and a wide range of services.

The central contention is that social isolation within physically defined areas creates poorer job prospects and reduces levels of access to various services for lower status households (Ward, 2009:115). A practical concern is that the economic and social functions will gradually erode relationships between parts of a neighbourhood, the neighbourhood as a whole and the surrounding neighbourhoods. According to Hanlon (2012:15) Hoyt suggests that high-status households move into sectors located along transportation routes or in hilly areas away from industrial districts. It can certainly be argued that people are disadvantaged (and advantaged), socially and economically by where they live (Price-Robertson, 2011:3).

The mention of repulsion both between high and low status residential neighbourhoods and between high rental housing areas and industry, and the attraction of prestige business locations for good housing, supports the view that locational interdependence is important (Richardson 2013:14). This sets the parameters for further marginalisation of poor neighbourhoods. For instance, low levels of some kind of social connections are not only compounded but exacerbated for those who live in such neighbourhoods – people become more isolated, confined to their estates and find it more difficult to access the corridors of power (Gordon & Turok, 2005:2).

As mentioned before, a social exclusion on the part of lower status households is itself closely associated with concentrations of poverty, poor service delivery and lack of economic opportunities. It is a spatial determinism – technically excluding the poor through urban land patterns characterised as sectors running out like ribbons from the CBD. Surprisingly, the sector theory recognises the importance of limited transportation in urban areas, but suggests that specialization of land use takes place according to direction rather than just distance from the position of greatest accessibility (Tank, 1987:37). This means that it pulls out from the limiting emphasis on accessibility as a key determinant of residential location choices. However, emphasis on social status of neighbourhoods as a key element in house prices and rentals offers insights for understating the residential spatial structure of modern cities (Richardson, 2013:14).

Therefore, the city and its different types of neighbourhoods' relationships in the urban system as defined and outlined by the sector model indicate that the inner core is designed to serve the economic activities of the middle and upper-income groups. This categorisation elicits urban fragmentation – poor neighbourhoods are separated from the rest of the urban population based on social and economic status. Therefore, exclusion (or lack of integration) of poor neighbourhoods will suppress integration initiatives aimed at promoting comprehensive urban planning because well-planned and designed cities embrace the role of different types of neighbourhoods in order to balance social, economic and environment aspirations of the city.

2.2.3 Multi-nucleic model

There appears to be strong theoretical support to suggest that the sector model was later challenged by the pressure to accommodate the increased urban automobile and population growth (Romanos, 1976:40). It follows that the multi-nucleic development concept was introduced by Harris and Ullman in 1945. The model represented a metropolitan area that no longer was defined by distances from the CBD but instead consisted of multiple land centres (Torrens, 2000:15). The special feature of this model is that it has more than one centre – dispersing and separating commercial activities. Cities of greater size were developing substantial suburban areas and some suburbs, having reached significant size, were functioning like smaller business districts (Schrenk *et al.*, 2011:213). This demonstrates that similar industries with common land use and financial requirements are established near each other and are located around several centres or nuclei (Squires, 2012:172) as shown in Figure 2.5 below.

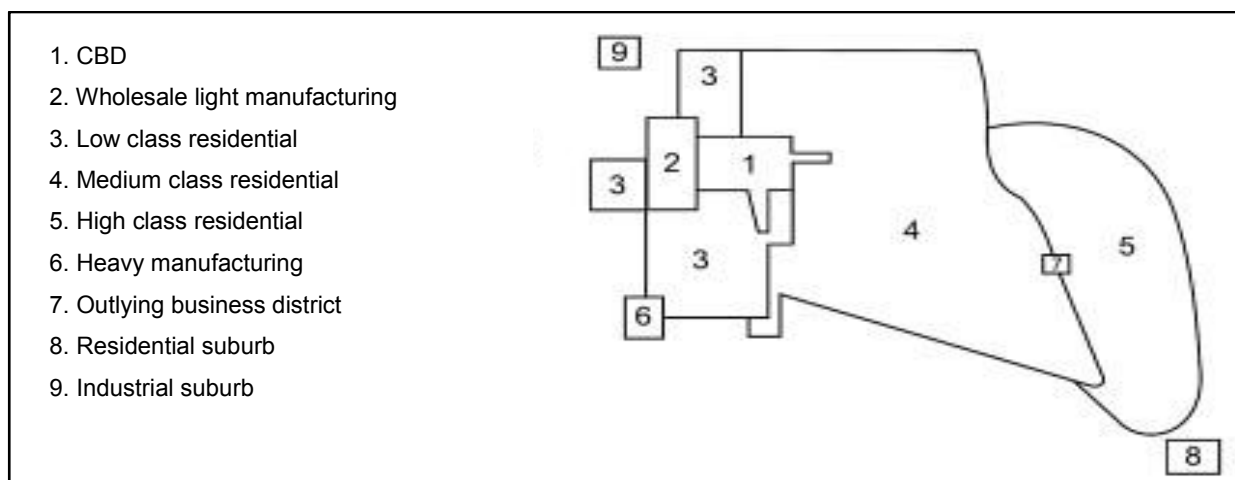


Figure 2.5: Multiple nuclei model

Source: Rubenstein (cited in Gonzales & Spector, 2014:2).

Applied to the urban phenomena, multi nucleic theory influences the spatial distribution of urban activity. A major advantage of the model is the ability to capture more detailed intra-city (geographical neighbourhood) spatial variation (Netzband *et al.*, 2007:264) through observing that urban areas may have more than one focal point (Harris & Ullman cited in Goodall,

2013:113). This means that each urban area then influences the location of certain land uses. Therefore, each land use requires specialized facilities – for instance, retail facilities are needed to be provided near neighbourhood development (Chan, 2007:14). This can be interpreted as fragmentation which emphasises the decentralisation and land-use differentiation allowed by increasing auto-mobility (Hutchison, 2009:872). However, it is argued that this reflects the reality of modern cities – jobs are divided between CBDs, sub-centres and everywhere else (O’Sullivan, 2007:99).

While not underestimating the supremacy of the automobile, retailers have learned that effective shopping environments have to be pedestrian-oriented, whether they are in a city or a suburb (Hack, 2013:4). On the basis of this it is understood that certain neighbourhoods are likely to become disadvantaging to others. In essence, most desirable neighbourhoods attract the broader range of businesses in their location. In support, Brunn *et al.* (2003:196) indicate that the multiple nucleic model fits the pattern of ethnic differentiation – different ethnic groups are concentrated either in the nodes within the inner city or high rise public housing at the periphery. These are multiple factors, and each node/centre is different. Thus, certain commercial activities are likely to find the low-class neighbourhoods desirable sites to invest, one of the reasons being low rent, no restriction of business expansion (Yelling, 2006:150) and high population density that evokes an extraordinary commercial market flourishing against all odds (Polak, 2009:14).

In various reviews and reflections offered, the neighbourhoods are urban phenomena. As much as is the case in concentric circle and sector model, the physical separation of neighbourhoods on the basis of socio-economic status exists in a multi-nucleic model alongside well-planned urban spaces (industries, business centres and transport corridors). According to these models, cities will remain largely piecemeal as the urban planning generally favours affluent neighbourhoods and the city centre. This generates urban fragmentation characterised by poor service delivery and lack of integrated infrastructure as well as numerous social and economic problems in low-income neighbourhoods. With the aim of actualizing integrated development in urban areas fragmentation means successful and vibrant cities remains a far prospect.

Overall, the argument that poor neighbourhoods are marginalised in mainstream urban development issues is reflected. The value of urban structure theories is highlighted although

there are criticisms that assumptions and theories about city structure tend to be culture-bound and hence not especially applicable outside that culture (Dutt *et al.*, 2008:293). For example, South Asian city patterns are not easily explained or satisfactorily elucidated by modern morphology models, such as concentric zone, sectoral and multi-nucleic (Noble, 1998:24). However, to this day, urban geographers texts often initiate discussions of urban form, growth and neighbourhood change by reference to sociologist Ernest Burgess's concentric zone model and land economist Homer Hoyt's sector model (Hutchison, 2009:872).

2.3 The neighbourhood concept

Many scholars provide a wide range set of very useful definitions that are given to define neighbourhoods. Some scholars define neighbourhood as geographically localised communities located within a larger city or suburb or a separately identifiable area within a community retaining some quality or character which distinguishes it from other areas or an area where the residents are drawn and held together by common and beneficial interests (Choguill, 2008:42; Mason & Frederickson, 2009:7). The term neighbourhood is often used to describe the subdivisions of urban or rural locations such as cities, villages, and towns (Berk, 2005:1). In the light of this, a neighbourhood could be regarded as a residential enclave which is part of larger entity such as a city. In its simplest definition a neighbourhood relates to an elaborate collaboration between an understanding of community and localism (Moroke, 2009:22).

These basic dimensions of the neighbourhood concept from the early modern period constrict the definition of neighbourhood to physical settings in urban and regional planning. In line with this conceptualisation, Shambharkar (2008:31) indicates that Clarence Perry is the first one to specify the physical form of the neighbourhood unit (1872-1944). However, Brody (2009:1) disputes that Clarence Perry's neighbourhood unit concept was either revolutionary or wholly original. Brody's argument is that Perry's neighbourhood unit concept was published after six years of extensive research as part of the Regional Survey of New York and its environs. In-depth criticism is that Perry's neighbourhood unit is the synthesis of concepts from sociology, architecture, urban planning, and real estate development.

In the words of Barton (2013:21), Perry's formula was a synthesis of several ideas and experiences – influenced by the ideas of the prominent planners of his day (for example Ebenezer Howard's *garden cities*, Clarence Stein and Henry Wright use of neighbourhood as a basic unit of organisation in planning communities). According to Shambharkar (2008:31) the Settlement House Movement which began in London about 1885 was the first conscious recognition of the neighbourhood as a basic unit in the urban structure or planning.

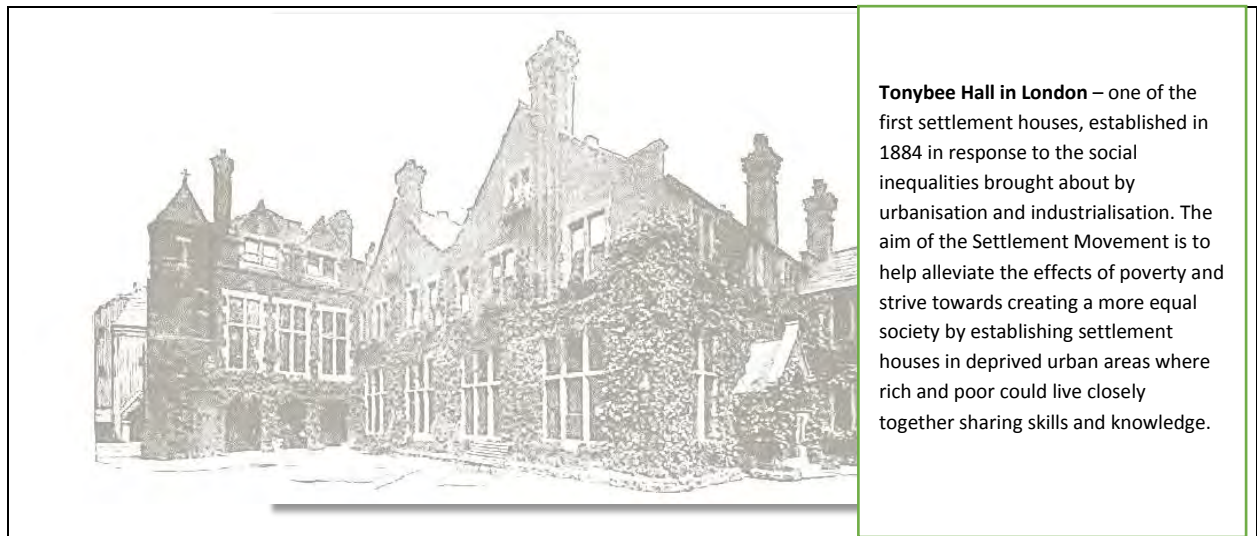


Figure 2.6: Settlement House Movement – Tonybee Hall in London

Source: University of Glasgow Settlement (s.a).

Nevertheless, it appears that Perry's conception of the neighbourhood unit was a very early prime example. Perhaps the most appropriate first step to understand the neighbourhood concept within the urban and regional planning scope is to understand Perry's neighbourhood concept. The neighbourhood unit is described as an integrated and planned urban area related to the larger community of which it is a part, and consisting of residential districts, a school or schools, shopping facilities, religious buildings, open spaces, and perhaps a degree of service industry (Whittick, 1974:20). Perry defined an ideal neighbourhood as the one that would embrace all the public facilities and conditions required by the average family for its comfort and proper development within the vicinity of its dwelling (Perry cited in Brody, 2009:22) as shown in Figure 2.7 below.



Figure 2.7: Original Perry's neighbourhood unit

Source: Perry (cited in Whittick, 1974:22).

Perry's neighbourhood unit comprised the following principles:

- Each neighbourhood should be large enough to support an elementary school;
- Neighbourhood boundaries should be composed of arterial streets to discourage cut through traffic;
- Each neighbourhood should have central gathering place and small scattered parks;
- Schools and other institutions serving the neighbourhood should be located at the centre of the neighbourhood;
- Local shops should be located at the periphery of the neighbourhood;

- The internal neighbourhood street system should be designed to discourage through traffic.

These principles of neighbourhood planning are said to have achieved good physical designs. Substantiating this statement McConnell (1981:208) argues that the neighbourhood unit is bounded by arterial roads or other boundaries, with open spaces, school, community centre and local shops, the latter bring on the circumference. In this context, the neighbourhood unit put forth various types of urban spaces and its ability of having relatively self-sufficient urban structures. In other words, a neighbourhood unit concept positions itself as the fundamental increment of urban structure – laying foundation how urban spaces can exist in all types of urban patterns (Du & Li, 2010:12). Mehaffy *et al.* (2010:4) add that these services could be provided within the neighbourhood level such as parks, libraries, variety of shops, playgrounds, stadiums, different level of schools and other amenities – there is not one that could not be relocated to city level.

In the light of this, the underlying notion of a neighbourhood's ability to self-sustain in urban planning is expressed. Although, it cannot be approached programmatically in isolation, it presents pillars for viable spatial, social and economic structures.

Therefore, the neighbourhood concept gives the effect of urban spaces which are required for various basic needs to perform in it (Shambharkar, 2008:31). In very small settlements the town and the neighbourhood are almost identical – the neighbourhood tends to increase in area in an inverse ratio to the size of the city (Jayapalan, 2002:337). For example, in Mumbai, India due to incremental development of neighbourhoods, the neighbourhoods have networked and connected, forming towns, villages, and cities (Shrivastava & Echanova, 2012:1). This echoes Perry's (1929) expanded demonstration of neighbourhood units created by connecting the neighbourhoods together to create towns.

This reflects that Perry's classical work was carried forward to explore the importance of neighbourhood unit contribution to urban form. For example, Engelhardt Jr. presented a comprehensive pattern of the neighbourhood units grouped in relation to the various levels of school facilities – proposing a radius of half a mile as the maximum walking distance to the

elementary school. Playgrounds and nursery schools are proposed within a radius of one quarter mile walking distance for the families in the neighbourhood as shown in Figure 2.8 below.

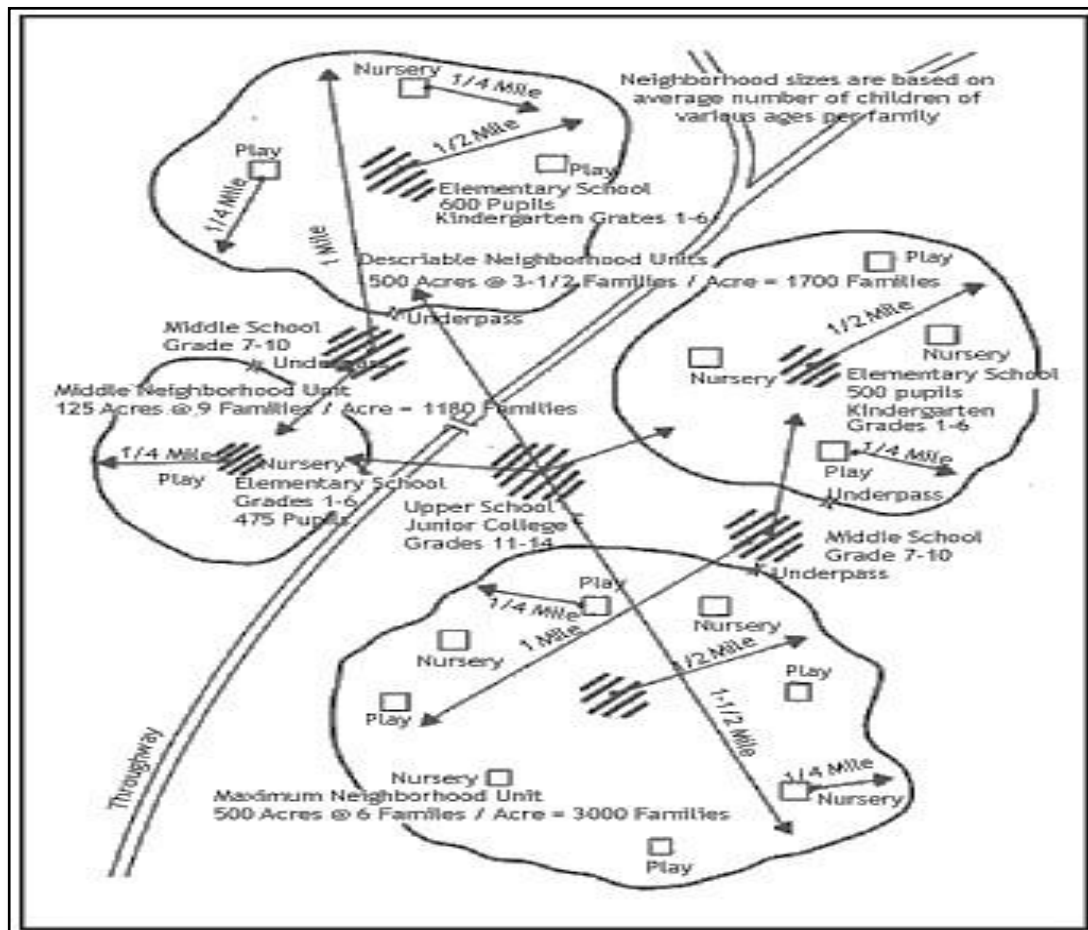


Figure: 2.8: Creating towns by connecting neighbourhoods together

Source: Engelhardt's (in Whittick, 1974:24).

It is not surprising that local schools played a prominent role in Engelhardt's works (Khalil & Ibrahim, 2012:372) – it builds on Perry's elementary schools as good sites because the centre could make use of existing facilities. The early work in the community centre movement has led to Perry's particular focus on the elementary school as the centre of the neighbourhood unit (Patricios, 2002:21). In line with this conceptualisation – in the contemporary urban form - the community centre movement merits democratic initiatives – encouraging and facilitating a balanced evolution of society (Berk, 2005:2).

Given the need to address cities' challenges in an integrated sustainable manner – the concept of neighbourhood unit plays a key role operationalizing urban planning as well as functionalising viability of cities. From urban planning and design perspective, this neighbourhood unit concept's ability to have a self-sufficient urban structure and variety of uses such as shopping, leisure and community facilities existing alongside housings units and transport corridors serves as a means to achieve a vision of successful city. This includes a city that embraces mixed uses, compact form, mixed housing types, walkability, defined centres and edges, varying transport options as well as facilities such as health, libraries, parks and other public and private services (UN-Habitat, 2013b:42).

2.4 Neighbourhood concept reflection on urban inequality

A neighbourhood unit was (and is) not without criticism. Generally, a neighbourhood concept has been the subject of considerable debate and many criticisms (Paddison *et al.*, 2001:15). The central contention in this discussion is that the physical form of cities, in their patterns of streets, blocks, and lots, has an obvious influence on association and community life (Brody, 2009:42). However, neighbourhood is faced with the claim that it perpetuates groupings of people that inevitably results in compulsory class distinctions (Goodchild, 2008:85). In this context the physical boundaries can be argued to be the source of spatial segregation and disservice of poor neighbourhoods. However, Jacobs (1961:29) contends that isolation and/or distinguishing between neighbourhoods was not due to formal boundaries but rather the level and character of their activity.

In addition, Friedrichs *et al.* (2013:60) assert that variation in economic status of the population characterises the neighbourhoods. The social and economic dynamics point out Clarence Perry's neighbourhood unit concept desire which was to protect affluent city residents from so-called incompatible social groups contrasting integration of urban development. The main bearing point here is that functional components of neighbourhood namely land, buildings, streets, and infrastructure – can affect community life: homes surrounded by factories, railroads and busy streets would likely be unhealthy in a social sense (Brody, 2009:13).

The two-faceted arguments by Goodchild (2008:85) are that the neighbourhood provided a spatial framework for the daily activities of the individual without, however, anticipating that individuals would come together in a community. Similar criticism has been raised by Webber (cited in Rau & Schonherr, 2013:162) in particular questioning the validity of notions of community based on local ties. For instance, the neighbourhood unit focal point as elementary school has come under severe criticism for being impractical and inadequate. The school is criticised as lacking characteristics of a centrally located magnet to that exerts its influence radially – one of the arguments being that this consideration is not important for people with no children and for those with older children that can cross main roads (American Society of Planning Officials, 1960:14). Given the diversity of individuals usually found in an urban area it is understood that the neighbourhood unit represents a fraction of the neighbourhood population with basic common needs for education and service facilities it offers. However, it is common to find people from different religions, socio-economic status, and occupations in similar neighbourhoods (Ortayli cited in Sokefeld, 2008:35).

It is imperative to mention that the neighbourhood milieu should, besides physical aspects, include the social and economic aspects as well. However, the basic physical variables have sufficiently engendered the reality that a neighbourhood is not a stationary urban phenomenon but rather a dynamic one. As put by one of the first critics of the neighbourhood unit, Reginald Isaacs, the neighbourhood unit is the panacea of urban ills often used as an instrument for segregation of racial, ethnic, religious and economic groups (American Society of Planning Officials, 1960:5). It appears that a lack of incorporation of social patterns in neighbourhood unit physical plan could be seen to cause segregation and fragmented spatial systems. According to Van Ham *et al.* (2012:229) there are more problems in neighbourhoods with a low average social economic status, which results in lower satisfaction rates among the people in the neighbourhood.

Remote activities and changed lifestyles of dwelling occupants thus become the basic factors that shape the social environment (Berk, 2005:3). On the issues of socio-economic mobility there is another distinct aspect linked to the isolation of networks in deprived neighbourhood as shown in Figure 2.9 below.

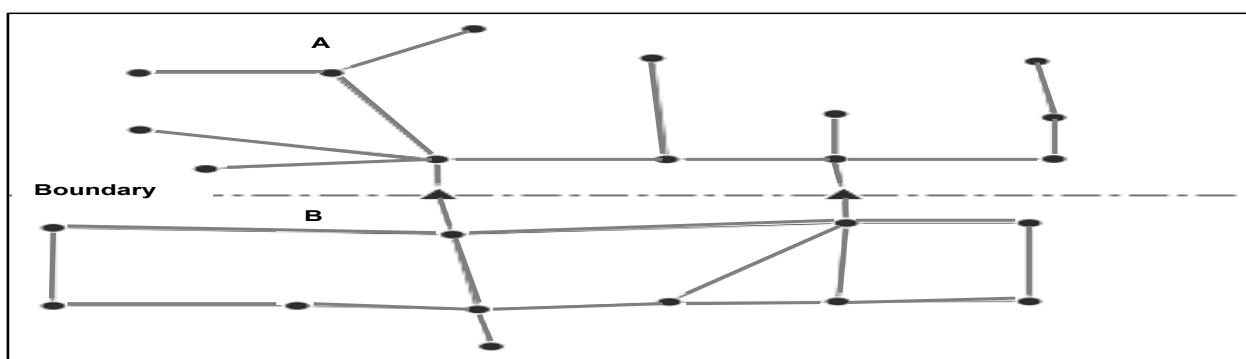


Figure 2.9: Effect of disintegrated networks and flows

Source: Rodrigue et al. (2013:35) – Application altered from illustrating the effects of borderline on transportation network fit this urban phenomenon explained in this context.

In Figure 2.9 above scenario A represents disadvantaged neighbourhoods characterised by low levels of connectivity and isolation of networks while scenario B can be interpreted as advantaged neighbourhoods characterised by high levels of connectivity and integrated network. An overall key issue is that a borderline between scenario A and B restricts interaction. In essence, a borderline is attuned to the relevance of marginalisation; according to Rodrigue *et al.* (2013:32) this borderline function is to ensure that no goods or people pass into other territories.

Apart from a physical boundary or demarcation, socio-economic status is also a boundary through which people contribute to formation of disintegrated networks and flows. As revealed by Schuman (1994:14) research the middle-income residents or residents who later attain middle-income status that would provide low-income residents with greater opportunities to connect with better off people move out of depriving neighbourhoods. In this perspective poor neighbourhoods were found to lack middle-class residents who provide conventional role models for poorer residents and their children (Harding & Blokland, 2014:97). In turn, this urban change phenomenon has hindered access of the poor neighbourhoods to the mainstream social order. Against this, Berk (2005:4) argues that increasing mobility and transportation facilities have opened up new possibilities, thereby disregarding the benefits expected of a neighbourhood.

Therefore, however large or small a city may be, there must be a workable unit of human scale with which to form the urban pattern into a workable whole (Institution of Engineers India, 1967:9). In essence, healthy neighbourhoods are those where people care for each other, engage in participation and community activities, take care of social control that keeps deviance within limits and socialises children in the right norms and values (Harding & Blokland, 2014:97).

2.5 Neighbourhood in the contemporary urban context

The concept of neighbourhood is a basic tenet of the built environment (Berk, 2005:8). Much of literature appears to suggest that it is the recurring concept in planning of urban areas. The neighbourhood unit has a long history – it has been centre of concern for city planning and urban theory since the late nineteen century (Rofe, 1995:108). Consequently, while there are vast variations in defining the neighbourhood concept – the principle of neighbourhood unit has become entrenched in social, physical and political organization of the city (Lakshmanan, 2012:8) as well as economic as illustrated in Figure 2.10.

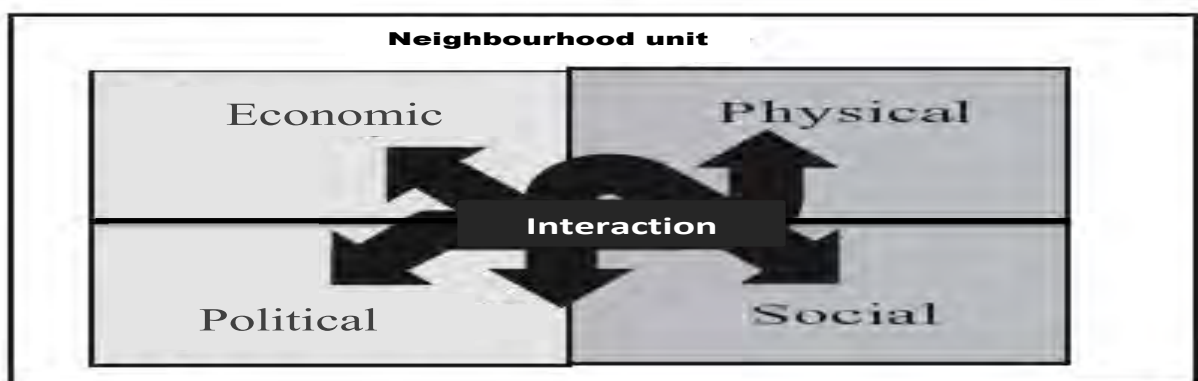


Figure 2.10: Neighbourhood unit interaction

Source: Own construction (2015) – deduced from theoretical construct interpretation.

It worth noting that Perry intended the neighbourhood unit to be a universal concept, applicable to all urban areas, old and new, dense and sprawling, wealthy and poor, with a particular focus

on the New York region (Newton, 2009:94). Hence, a neighbourhood concept is germane to an idea of neighbourhood revitalization. According to Katz (2004:8) dilapidated neighbourhoods have been revitalised on the principles of housing units clustered in proximity and connected to each other and allocating additional community. The services and businesses oriented in terms of proximity in turn facilitate social interactions among neighbours. Similarly, in the UK, the government established the Neighbourhood Renewal Unit in 2001 to find solutions to the problems of the most deprived communities in England, so that no one would be disadvantaged by where they lived (Barnes *et al.*, 2006:13).

The line of argument emphasised here is that in the built environment, a neighbourhood unit is consistent with the emerging practices of the real estate developers – whose real estate practices demanded homogenous neighbourhoods backed by strict land use controls (Brody 2009:13). According to Rofo (1995:108) large-scale residential development also continues to be guided by the concept of a neighbourhood unit – stripped of its social intent, but reinforced by legally constituted homeowners associations and/or by the physical boundaries of walls and armed guards in gated communities. It is claimable that neighbourhood concept appears to be a core of structural settings re-orientation and the design of settlements to address contemporary challenges. The concept of neighbourhood unit in traditional built environments and rural settlements constituted a strong sense of attachment, identity, admittance and belonging for inhabitants (Berk, 2005:3).

In the light of this, the neighbourhood concept can be regarded as a basis for cities and towns collective identity – this includes socio-cultural values and attributes of place for a city to express its identification. Place is clearly an important neighbourhood concept providing a discernible identity for cities and linkage to spatial planning. The governments and local authorities are evaluated according to their capacity to provide all citizens with dwellings of good quality, at an acceptable cost, in safe neighbourhoods, and in pleasant living environments (CSIR, 2009:1).

With an attempt to give an exhaustive account of the neighbourhood concept in a development of a modern city it appears to be fundamental in contemporary new urbanist neighbourhood planning practice. The emergence of *new urbanism* in the nineties carried further Perry's neighbourhood unit concept, so that it is now more popular than at any time since immediately

after World War II (Brody, 2009:3). The proponents of the *new urbanism* revived the idea that local community may be enhanced by the spatial design of the neighbourhood (Rofe, 1995:108). Therefore, notwithstanding practical and theoretical concerns and various criticisms the neighbourhood concept appears to be the basic unit of planning urban areas.

2.6 The neighbourhood driving forces and consequences

Each neighbourhood has its own characteristics and its own special mix of players and population. The demographic factors and spatial density are common denominators that shape neighbourhoods. Space viewed in relation to its function, locality and sphere of influence (such as the extent it influences the social and economic structure) inevitably becomes the prime factor for consideration. In essence, physical design and/or structure gives effect to space as it describes the processes by which the land is transformed, built and maintained to create settlements (Rofe, 1995:108). On the basis of the demographic factors' perspective the characteristics of the neighbourhood depend on the status, reputation and social and cultural features of its larger surrounding and on the social, cultural and economic opportunities that a city offers (Biesta *et al.*, 2013:78). Along these, a number of key structuring elements are identified as a complementarity of the neighbourhood structure.

2.6.1 Neighbourhood physical infrastructure

With respect to the physical structures of the neighbourhood, Biesta *et al.* (2013:78) highlight that neighbourhood as a physical space refers to the combination of recognisable physical elements (for example, houses and buildings) and public provisions (school, church, shops) that transform an abstract notion of neighbourhood into recognisable spatial unit that reflects a certain spatial coherence as shown in Figure 2.11 below..

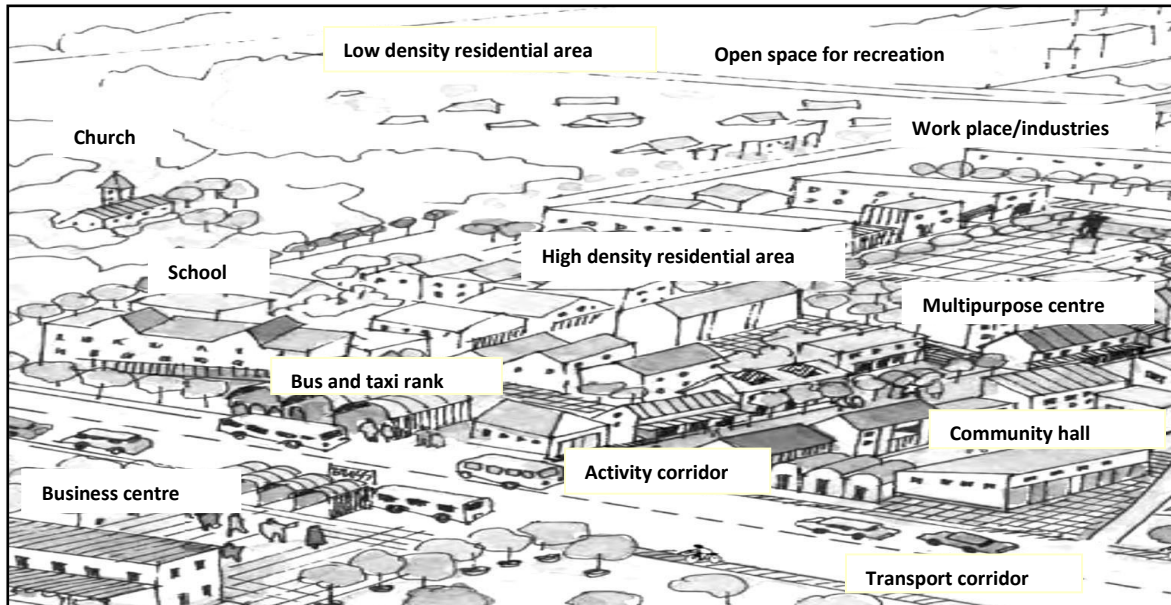


Figure 2.11: Characteristics of a sustainable neighbourhood

Source: NMBM (2007:18).

In the Netherlands, the neighbourhood physical characteristics are evaluated to check the proximity to food shops, general physical design of neighbourhoods, quality of green facilities, noise pollution from traffic and required police attention (Lenthe *et al.*, 2005:2). Of similar significance also, the neighbourhood physical elements serve as a platform for diverse spatial uses. This includes spatial analysis to determine the neighbourhood spatial variations and to explore the potential interface between neighbourhood physical infrastructure characteristics and the neighbourhood socioeconomic environment (Duncan *et al.*, 2012:418). In Perth, Australia, low-income areas had better access to recreational facilities compared to higher socio-economic status (Stock & Ellaway, 2013:118). The understanding of particular relationships between people and places serves as platform to probe further analysis into factors that have contributed to these neighbourhoods' statuses.

Further analysis posits that the spatial distribution of resources by deprivation may vary between types of resource, geographical location within a city, countries, and time periods (Macintyre *et al.*, 2008:95). With respect to Australia's findings, the most common rationale put forth in similar findings is residential mobility – where the advantaged residents move to new housing in the city but a different location entirely or to another city – and then the socio-

economically disadvantaged residents move into the old houses (Mankiw & Taylor, 2011:418) with a wide range of services.

Similarly, in Glasgow City, Scotland a study measuring network distances to nearest sources (physical infrastructure elements) revealed that twelve resources had higher density in, and/or were closer to or more common in more deprived neighbourhoods (sources) although affluent neighbourhoods had sixteen resources (Macintyre *et al.*, 2008:901). Thus, it appears that the difference comprised private resources – overall this does not diminish the location of a range of resources in deprived neighbourhoods. The main bearing point for advantaged areas is the general level of attractiveness compared to the proximity to neighbourhood facilities (Lenthe *et al.*, 2005:2).

However, the shortcoming is that a neighbourhood's physical infrastructure changes due to absence of affluent residents (active disinvestment) and decline due to age of infrastructure (Mankiw & Taylor, 2011:418). At the same time it is important to mention that socio-economic and public service attributes are normally much less predictable in the long term than the physical infrastructure (Andersson & Andersson, 2006:115) – a converse idea being that the neighbourhood might change focus on both residents and infrastructure, engendering renewed investment (as with urban renewal or gentrification). The above-mentioned relation between the neighbourhood socioeconomic environment and structural degradation (and therefore the attractiveness), has been demonstrated in some studies (Lenthe *et al.*, 2005:2).

The neighbourhood physical infrastructure is defined by a number of different researchers – for this reason there are large varieties of definitions. According to one definition, it is a built environment umbrella term that encompasses three integral urban planning concepts: urban design, land use, and transportation systems (APA *et al.*, 2012:7), with the others defining it as the built environment consisting of the following elements: land use patterns, the distribution across space of activities and the buildings that house them; the transportation system, the physical infrastructure of roads, sidewalk, bike paths and others as well as the service this system provides; and urban design, the arrangement and appearance of the physical elements in the neighbourhood (Saelens & Handy, 2008:2). For example, neighbourhood infrastructure characteristics that would need to capture transportation systems include the street network

within a region, the easiness to travel through a neighbourhood and get to places a person wants to go (APA *et al.*, 2012:7).

In Figure 2.12 the samples of relationship between neighbourhood's open space and pedestrian linkages is illustrated to encapsulate in the notion of neighbourhood physical environment.

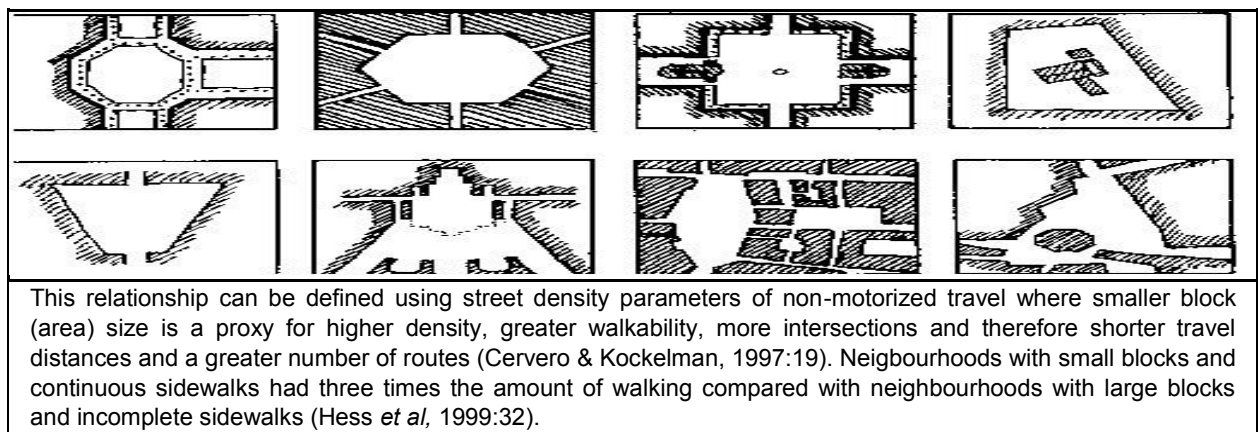


Figure 2.12: Relationship between neighbourhood open space and pedestrian linkages

Source: Tobias (cited in Chan, 2007:22).

The premise behind the notion of physical infrastructure in the neighbourhoods is important for a number of reasons – in this context: better street connectivity, influences pedestrian safety, access to and availability of recreational facilities (Carver *et al.*, 2008:281); proximity to neighbourhood facilities and safety (Sarkar *et al.*, 2014:107). In various reviews and reflections offered, clearly neighbourhood physical infrastructure can be related to a number of socioeconomic dynamics, residential locational variables and the transportation system.

Therefore, understanding the type of neighbourhood and potential intervening roles of neighbourhood characteristics in which physical environment takes place, it is important. The supportive role of built environment has offered researchers and practitioners an important platform to capture the characteristics of an area. For example, households whose members prefer to travel by public transit choose to reside for that very reason in a location providing easy access to transit infrastructure (Schwanen & MoKhtarian, 2005:84). Similarly, to create places

that facilitate and encourage walking, practitioners need an understanding of the specific characteristics of the built environment that correlate most strongly with walking (Saelens & Handy, 2008:2). The built environment concept overlaps in some respects with the nature and workings of the neighbourhood structural settings as it presents key issues underlying the dynamic aspects of urban system.

2.6.2 Urban sprawl effect in neighbourhood

Urban sprawl is defined as urban growth/development that is the result of forces that create low density development on the urban fringe of an urbanized area (Pence, 2008:2012). According to Morelli and Salvati (2010:2) this definition emphasises urban sprawl as a spatial pattern of urbanisation associated with design features that encourage car dependency. Having the aforesaid knowledge, it appears urban sprawl is impelled by urbanisation driving forces. One of the assertions put forward point out rapid industrialisation, urbanisation and transportation as centre forces that fuel urban sprawl (Walmsley, 2006:234). There are many characteristics and factors that describe the nature of urban sprawl as shown in Figure 2.13.

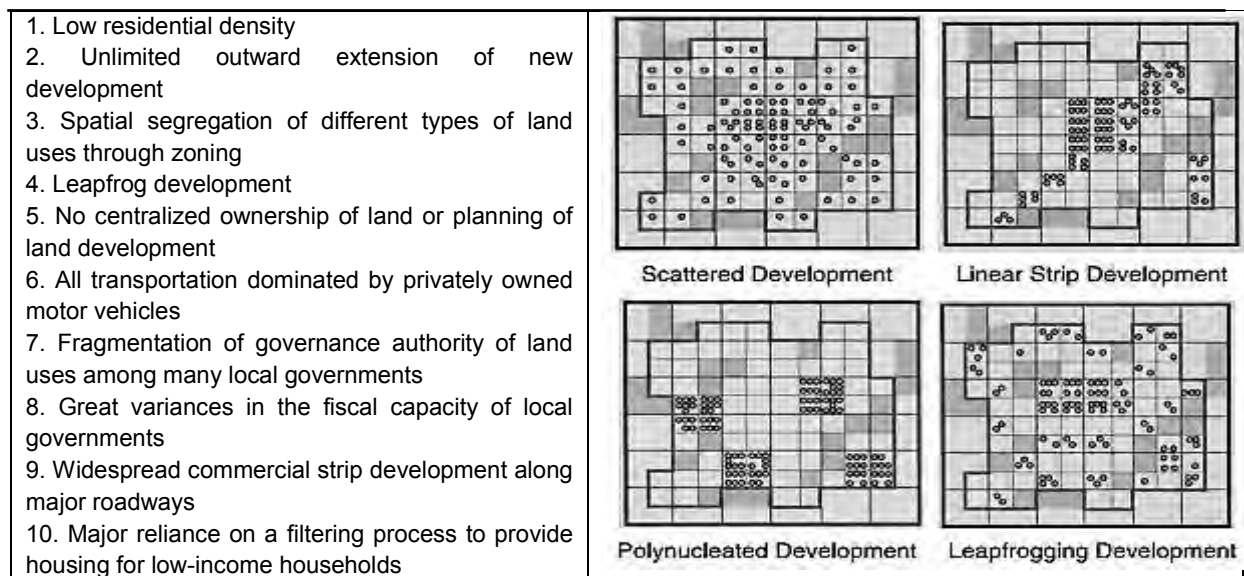


Figure 2.13: Urban sprawl characteristics and physical

Source: Neuman (2005); Besussi et al. (2010).

Implicit in urban sprawl characteristics – any type of development is designed to be accessible with automobiles, and is normally located outside of the CBD (Pence, 2008:2012). In this context, the reality is that motorised transport is increasing the speed of intra-urban mobility, and making it possible for higher income residents to prefer larger lot sizes on the periphery of cities while still commuting to work in the centre (Kilroy, 2009:2). These views are parallel to peri-urban poor whereby being without reliable transportation options, transit-dependent workers can easily be excluded from employment opportunities, as urban public transit systems, which operate most efficiently in concentrated, densely developed urban areas, are oriented toward downtowns and tend to under-serve dispersed origins and destinations (Sanchez *et al.*, 2003:18).

The strip malls, shopping centres and housing sub-divisions are the most common indicators of ribbon development (Banai, 2011:28). This is an inevitable outcome of rapid urbanization that leads to the agglomeration and densification of those with limited means. The much larger scale of urbanisation that occurs in poor neighbourhoods highlights the serious shortcomings of this process on the poor communities. Neighbourhood planning needs to show spatial vision and solutions that integrate land use and transportation planning.

2.6.3 The urbanisation process

The concept of urbanisation depends on the dominant ideology of the scope of work. Urbanisation as a process of socio-economic transition refers to a transition from the social, economic, cultural and political systems assumed to be characteristics of rural areas, to those associated with urban centres (Pelling & Blackburn, 2014:6). With respect to this socio-economic framework, Orum (2004:853) defines urbanisation as the process whereby large numbers of people congregate and settle in an area, eventually developing social institutions, such as businesses and government, to support themselves. According to Ramamurthy and Devadas (2012:31) this process of more and more people living in the urban areas is one of the most important transformations the world has witnessed in recent decades.

Urban areas expand for a variety of reasons though major contributing factor is natural population growth (UN-Habitat, 2014b:101). Despite natural population growth being primarily responsible for rapid expansion of cities, migration still plays a significant role as rural to urban movement of people is inevitable on the basis of labour pools, food security and sociocultural life attributes that attract people to cities. In essence, disparities exist between urban and rural areas in terms of access to basic services and quality of life resources. In various reviews and reflections offered urban areas are benefiting in huge disproportion to the rural areas. Given the impetus towards migration – the movement of people, goods, capital, ideas and information burdens urban areas in turn opening up space within them and at the urban fringe to development (UN-Habitat, 2013b:53). Based on this land readjustment, the line between an expanding city and its border (peri-urban) area, which often include former rural areas, has become blurred (UN-ESCAP, 2005:19).

In the light of this, one way to define this demographic urbanisation is through spatial process. The basis is the allocation of labour – human and physical capital services to the cities with the highest wages (Wright & Rossi-Hansberg, 2006:604). The parallel issues, according to Siddiqui (2011:10), include better educational opportunities, health facilities and a desire for a higher standard of living. The demographic parameters conceptualise spatial development dimension of urban and rural areas – the spatial redistribution of populations from rural to urban settlements. In view of this, urbanisation is equated to the spatial expansion of the built-up areas, or of land administratively designated as such, and the commensurate loss of rural land.

By and large, urbanization carries several important dimensions that collectively and individually produce macro and micro-impacts on society and everyday life (Peng *et al.*, 2000:13). The essence here is that cities are now analysed as multi-dimensional geographic sites in which, for instance, industrial production, local labour markets, infrastructural configurations, inter-firm relations, urban land use systems and consumption process are clustered together (Brenner, 2000:364). According to the standard model of urban spatial growth (concentric zone theory) urbanization reflects the relationship between different segments of urban areas and spatial manifestation. The effects of social and economic processes reflecting the strong effect of rural to-urban migration in regions with relatively small urban sectors resonates the pattern of concentric zones. The concentric zones rearticulated by Pacione (2013:453) are such that the predominant land use in the peri-urban zone is residential – this land use (residential) and other land uses (e.g commercial) follow each other through invasion and succession – and eventually

the invasion will take place in rural areas. It is important to mention that the fundamental principles of the concentric zones indicate that the outlying location is occupied by the rich and the middle-class population.

It is evident that throughout modern history, urbanisation has been a major driver in the process of development (UN-Habitat, 2013a:7) and spatial patterns. Throughout the world economy, urban regions are among the key geographical sites in and throughout which this multi-scalar reconfiguration of capitalist spatiality is currently unfolding (Brenner, 2000:362). Like concentric zone theory, similar theories but converse ideas to some extent are encapsulated in the notion of urbanisation. The central contention here is that theories on urbanization have been around for such a long time that they have blended into and intersect with theories that also pertain to cities, industrialization, and more recently, globalization (Peng *et al.*, 2000:15). Scholars like John Friedmann (1987:35) and Saskia Sassen (1992:187) have alerted students of the city to thinking about and appreciating the real impact of the global forces on the city – how it has evolved in a complex relation with other urban, economic and social environments.

From this perspective, the urban scale is not only a localised arena but also a global player. In various reviews and reflections offered, urbanisation has been successively influenced by four paradigms (modernisation theory, urban bias theory, dependency/world system theory and globalisation theory) with respect to urban growth and its impact on spatial-economic development – such as deep rooted realities of economic and spatial inequalities.

2.6.3.1 Modernisation theory

In the developed world, economic development and urbanisation were linked in a process of industrialisation and modernisation. Accordingly, in the immediate post-Second World War decades, Western theorists emphasised the necessity of urban industrialisation for the economic development of third-world countries (Knivila, 2005:299). The premise behind this notion in this context is that modernisation scholars assert that urban expansion is part of the natural transition from a traditional (agrarian) society to modern (industrial) nation (Gugler, 1997:12). The proponents of modernisation viewed it as a convergent and evolutionary process

in which diffusion of economic and cultural innovation from urbanised societies would move less developed societies towards the kind of advanced economic, social and political structures prevailing in developed societies (Pacione, 2013:453). In a demographic sense, this theory focuses on the rural-urban population shift as the foundation of urbanization but it identifies industrialization as the basic driver behind the movement of rural population to urban areas for factory jobs (Peng *et al.*, 2009:16).

In essence, modernisation theory has a wider set of assumptions with a scope of influence that extension of urban areas offers benefits. However, the reality is more complex than these sets of principles, comprising an inclination to criticise modernisation theory. A comprehensive critique of modernization is offered at various levels of identification. Modernisation theory asserts that industrial employment attracts people to urban areas, where they work in modern-sector employment that facilitates national economic expansion and spatial development dimension. This assumption is far too basic to incorporate into the world system as it postulates that the current social, political, ecological, technical and foremost economic conditions are the only attractions to urban areas societies aim for (Bichler & Gaderer, 2009:7).

Bichler and Gaderer point out that development in that sense starts at point A in time and ends at a clearly defined point B in the future – in essence, the whole development process is clearly structured and foreseen and derived from the lessons learned in the already developed world. This totally ignores the fact that society is always transforming, that preconditions of economic growth are established, political systems change instantly and the role of science and technology increases and updated frequently (such as in transport, communications etc.). As put by Kuran (2007:594) modernization theory ignores the political and economic diversity in any given society, which makes a comparative analysis of development along a single trajectory highly problematic. The well-known reaction to modernisation theory shortcomings is the theory of dependency (See 2.6.2.3).

However, looking at urbanization through the lens of modernization, cities have played a central role in development, functioning as key portals through which innovation would be transmitted to the rest of society (Pacione, 2013:453). This means that modernization theory sheds light in complex issues premised on what drives or (re)shapes urbanisation. In fact, Haferkamp and

Smelser (1992:4) argue that modernisation theory and contemporary theories of social change appear to be less important and preferred to technology in shaping urbanization. Kasarda and Crenshaw (cited in Peng *et al.*, 2009:10) assert that the path and pattern of urbanization within and between developed and developing countries are most likely to converge through cultural diffusion, despite breeding inevitable social disequilibria.

2.6.3.2 Urban bias theory

The urban bias theory as the name implies, describes ways in which the government favours residents in urban areas at the expense of rural residents (Lipton in Nijkamp *et al.*, 1999:1721). In essence, the theory of urban bias equates rural with poor and urban with rich. However, it is argued that there are many poor people in urban areas that are not rural (Mitlin, 2004:1). It is argued that urban bias exists because the rural areas are poorly organised and unable to articulate their demands in a way that will force urban elites to take note. Proposing that the solution to urban bias is for rural peoples to organise and demand a more equitable allocation of resources from urban areas (Manuh *et al.*, 2013:221). In various reviews offered, the outcome of urban-rural disparities against rural areas would be high unemployment, increased informal settlements, lack of access to health and education, lack of amenities and infrastructure.

According to Gugler (1997:9) a root source is that government policies are biased in favour of metropolitan areas, prompting migration from country to city and thereby increasing the size of the urban regions. This bias in favour of city areas has created a disparity between country and city with respect to consumption, wage, and productivity levels (Yeboah, 2008:61), as a result perpetuating economic inefficiency and inhibiting long term economic development in poor regions (Lipton in Yeboah, 2008:61). On these bases it can be claimed that the standard of living of urban people gradually improves however the urban biasness pulls more poor rural people into urban areas restraining available resources that reduce the desired high quality of life (Berry, 1972:16). The proponents of urban bias suggest that rural dwellers should remain in agricultural activities instead of migrating to urban areas – despite the claimed challenges they are faced with (Odularu & Fagbamila, 2013:16). The argument is that migrants from rural areas may be exposed to situations of failed labour migration such as sexual exploitation, substance abuse, begging or crime (Green, 2002:95).

This approach reflects intentions to restrict rural-urban migration. However, critics argue that the government's development policies and budget allocations, which favour urban residents over rural areas, tend to pull people into the urban areas (Yeboah, 2008:62). Conceptually, while not negating this criticism – urban bias theory within the framework of urbanisation provide analysis of urban poor neighbourhoods - peri-urban neighbourhoods (interface of urban and rural) and rural neighbourhoods structural adjustment, socio-economic inequalities and rural urban migration. As a result people will continue to move to cities as long as their expected urban wages exceed their current rural wages (Gugler, 1997:8) and pushed out by factors such as poverty and lack of services in urban areas (Yeboah, 2008:63).

2.6.3.3 Dependency/world-system perspective

World-system theory is the world economic system that can be understood properly only in the context of the world system – national units and class divisions (Packenham, 1998:113). In a simple economic perspective, this theory is premised on the notion of capitalism. The urban theorists' argument is that to understand capitalism requires approaching it from the outset as a global economic system programmed to promote development among a group of core states (where the pillaged economic surplus flows) and inhibit developments in its global periphery as an essential correlate of core development (Westra, 2009:124).

In this manner, the theory appears to provide the extent at which urbanisation occurs and at what speed, reflecting also the spatial outcome of global capitalism and spatial organization (Peng *et al.*, 2000:18). From this perspective, urbanization can be seen as an internal locational response to global economy. The relationship between world system theory and urbanisation is such that capitalism requires a certain social structure, which is characterized by unequal exchange, uneven development, individual social inequality, core-periphery hierarchies, and dominance structure (Onwuemele, 2014:214). Conceptualizing this economic phenomenon reveals exploitation and under-development of peripheral economies as a result of economic and political spheres in core areas (Westra, 2009:124). This reflects an inherently uneven

process that sets parameters for geographic inequalities between urban and rural areas and between cities and different types of neighbourhoods.

The world-system theory has come into existence as a compelling theoretical alternative on the grounds that modernization theory has been unable to account for poor areas based on the implications and consequences of urbanization in these areas. However, Chen and Parish (cited in Gugler, 1997:9) argue that from the world system perspective serious undesirable consequences of rapid urbanization such as rural-urban imbalance, housing segregation and income inequality came into effect. With respect to the value of world-system theory for domestic urbanisation – either negative or positive the theory does lay down the groundwork for highlighting the hierarchy of cities in order to have broad understanding of the trends and tendencies of urbanization – analysing multiple forms of geographical divisions (the basis of interaction between powerful core areas and peripheral economies). Gugler (1997:12) summarises the three urbanisation theories mentioned above by way of reflection on urban growth and disparities as presented in Table 2.1 below.

Table 2.1: Overall reflection on urban growth and disparities

Theory	Urban growth variables	Possible inter- and reflections on geographical unit	Preferred geographical unit	Possible inter action with peri-urban neighbourhood
Modernization	• Industrial employment • Economic expansion • Relative urbanisation	Rural to urban	Urbanised unit	Create interface between urban and rural
Urban bias	• Disparity in welfare between country and city • Economic expansion • Relative eservice/informal employment	Interaction restricted – rural residents discouraged to migrate to urban areas	Urbanised unit	Create interface between urban and rural
World-System	• Space relations • System of supply • Hegemonic powers • Corporate imperialism	Core development of peripheral economies	Urbanised unit	Manifest into more intense intercity competition
Globalisation	• Liberation of trade markets – economic expansion • Global city perspective • Network of cities of different sizes	Interaction in all directions	Urbanised unit	Comparative advantage

Source: Gugler (1997:12).

Based on the outlined discussion, urbanisation is one of the structural elements of cities. The changing structure of the city on the basis of urbanisation can offer both opportunities and challenges (UN-Habitat, 2013d:14). With a vision of creating a successful city and in line with growing emphasis on articulating urban planning in a holistic and integrated manner the process and theories of urbanisation are unable to determine disparities (between city core areas and peripheral neighbourhoods, and urban and rural areas), and to support and facilitate understanding of spatial configuration and city-neighbourhood linkages/relations. These forces of urbanisation can ensure that synergies between city neighbourhoods and peripheral neighbourhoods enhance overall urban competitiveness such as improving integrated urban service delivery.

2.6.4 Globalisation

Urbanisation coupled with globalisation has re-shaped and sequenced spatial activities. In a broad globalisation spectrum – urbanisation, industrialization, sustained economic growth and broad-based human development feed on each other and, under correct guidance, can become mutually reinforcing (UN-Habitat, 2014b:7). Globalisation is prompting fundamental shifts in economic terms – liberating trade markets and production caused by huge goods and services trade and flows of capital, knowledge and technology in global level. From the spatial-economic perspective – it is understood that the importance of location has actually increased with globalization (UN-Habitat, 2012c:6). Kilroy (2009:4) adds that this global economy is to a significant extent articulated through cities as nodes on its networks, giving rise to what have been termed ‘global cities’, but more realistically are the locations of globally connected elites and their workplaces.

On this basis, Giritati *et al.* (2013:181) takes a sceptical look at globalization claiming it suppresses the “low series” relationships (knowledge, services, goods) of small communities – homogenizing production and consumption habits by introducing a uniform, standard, often simpler thinking and behaviour pattern. In essence, although, globalisation is increasingly seen as the focus for increased wealth creation and world trade – contrarily it makes small towns and neighbourhoods locations less important (UN-Habitat, 2012c:6) thereby engendering spatial inequalities. Looking at issues of globalisation and urbanisation – urbanisation economies tend to dominate in larger cities and localisation economies tend to dominate in smaller cities but it

must still be remembered that large cities contain many disaggregated localisation economies (McCann, 2004:46).

Therefore, simply put urban areas units are nested and linked to form a larger geographical area due to globalization. Thus, reflecting the role and contribution of small scale locations (such as neighbourhoods) to regional and global level economic development. In line with this conceptualization Lorenzen and Frederiksen (2008:160) indicate that even more so it can be daunting challenge distinguishing between urbanisation economies and localisation economies. However, Ramamurthy and Devadas (2012:36) persist that with the progress of globalization, regional problems become complicated and far-reaching for one local government. Nevertheless, it is clear that globalization coupled with urbanization is the central spatial feature in cities' development patterns.

In addition, Abdel-Rahman and Anas (2004:18) argue that globalisation makes it increasingly convenient to view the world as a network of cities of different sizes and comparative advantages, trading with one another. Rather the challenge is to develop solutions to problems associated with globalization (UN-Habitat, 2012a:1) – identifying its strengths and opportunities in improving cities quality of life. Despite human settlements spatial differentiation on a metropolitan or regional level globalization can play a significant role in this process by fostering good governance and effective partnerships (UN-Habitat, 2012a:1). From this perspective globalization appears to be a very important mechanism that provides and promotes economic liberalization and shared policy framework leading to increasingly interconnected urban areas (Ramamurthy & Devadas, 2012:36).

In effect, these international concepts are not policy that can be optionally implemented or discarded at will. It is instead the reality that continues to alter spatial patterns – setting parameters to investigate inter-country, inter-territory, city-neighbourhood and urban-rural relationships. For each possible interaction various levels of identification for disparities within cities, globalisation reveals the manner in which they are generated and the characteristic features they have. The core theme of globalisation conceptual framework in this context views cities/neighbourhoods as agglomerations of urban regions drawing attention to long range public transport access. This is entrenched in the perspective that transport infrastructure and transport network shape urban areas (Jordan & Infante, 2012:537). In the light of this,

globalisation serves as a platform for functional connectivity that enable streamlining spatially separated human activities, urban regions (peri-urban neighbourhood to the core) and rural-urban by optimising land use management and transportation planning.

2.7 Conclusion

To varying degrees, the urban and regional planning theories discussed in this chapter exhibited spatial realities; provide opportunities to focus on the issues of geographical spread of activities and possible interaction between these geographical units. One way or another, these theories have contributed to creating inequalities within urban areas (city adjacent neighbourhoods and peripheral neighbourhoods) and between regions (rural and urban areas). The lack of corresponding commercial, infrastructure investment and social services like convenient shopping and good schools bears evidence of this.

Many urban growth debates revolve around urbanisation. In various reviews and reflections offered, urban theorists generally agree on the nature of urbanization; however, Orum (2004:854) points out that there is widespread disagreement in terms of its sources and consequences. But implicit in all urbanisation effects is the marginal living conditions of the poor. This spatial divide elicited by income inequality emerges as one of primary causes of intra-urban spatial inequality: poor areas are unlikely to have access to the local consumption spending of higher-income areas, and thereby cannot benefit from local multiplier effects (Kilroy, 2009:2). This basic urban economics factor highlights that households with higher incomes outbid the poor for the most central and convenient sites, and thus income declines markedly with distance from the centre.

While providing reflections that convey disparities in urban areas, in much of the world urbanisation is the functional imperative of urban growth. Urbanisation is a positive feature that should be encouraged to transform spatial arrangements and spatial governance. For example, the internal spatial structure of cities in developing countries shows some tendencies toward a convergence with North American and European patterns as industrialization and urbanization accelerate. In line with this conceptualization, the geographer John Friedmann in the early-mid 1980s researched and suggested that world cities are a small number of massive urban regions

at the apex of the global urban hierarchy that exercise worldwide control over production and market expansion. Finally, the theoretical construct interpretation in this chapter provides indications that formal spatial analysis is the only one way in which urban geographers investigate the city (Hutchison, 2009:873).

Chapter 3: Toward successful neighbourhoods

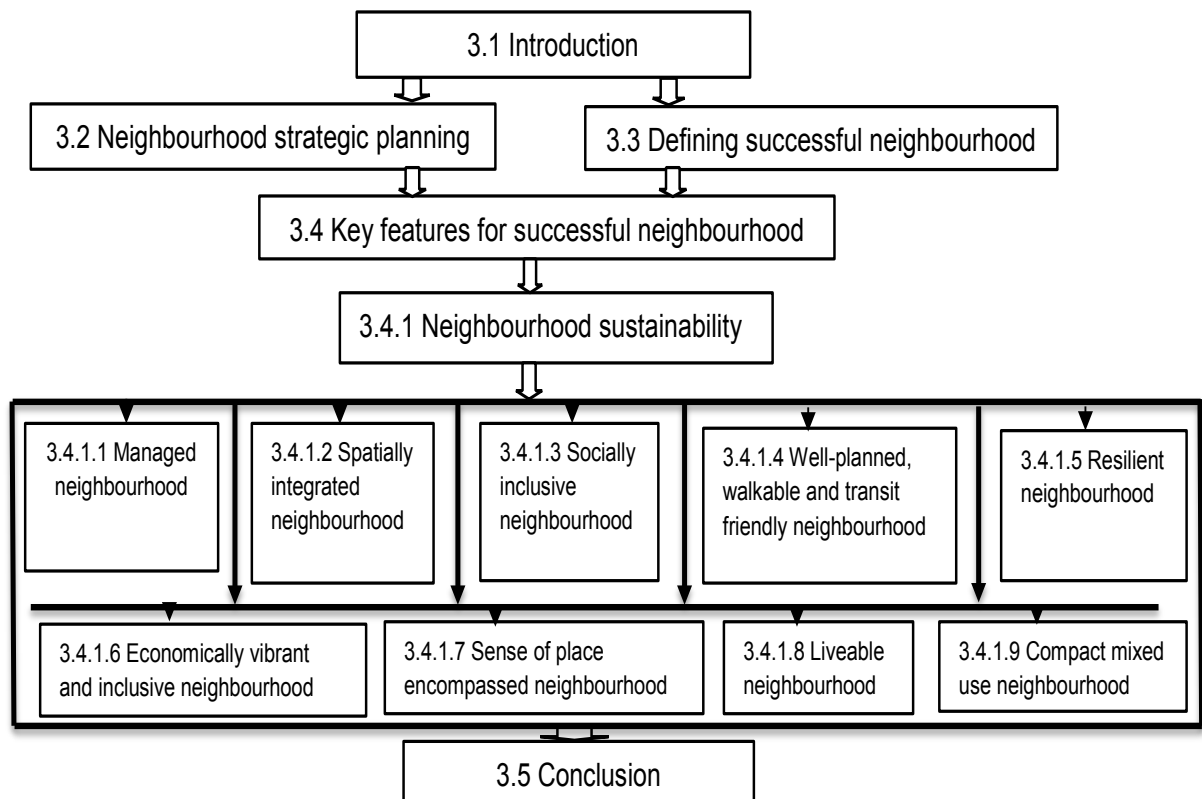


Figure 3.1: Components of chapters 3

Source: Own construction (2015).

3.1 Introduction

This chapter deals with a framework for planning successful neighbourhoods. The use value of neighbourhoods is to understand hindrances that handicap marginalised/low-income neighbourhoods' involvement in urban sustainability agendas. As part of a wider understanding the chapter aims to explore neighbourhood strategic planning, management and sustainability value in dealing with issues that amount to inequality emanating from some degree of sociospatial segregation from affluent urban centres. This includes focusing on issues of urban growth and development, transport systems and connectivity, dispersal of human activities in

space in order to understand how neighbourhood react to these other components of urban systems.

3.2 Neighbourhood strategic planning perspective

Neighbourhood planning is a centrepiece of the urban agenda aimed at giving neighbourhoods far more ability to determine the shape of the places in which their inhabitants live (Wates, 2010:193). The fundamental premise of a neighbourhood planning system is setting out a clear vision and strategy for the areas and that entails more detailed action plans that are site-specific (Barret, 2014:18). This stems from the interest to interpret the role of planning frameworks in linking spatial patterns to social and economic dynamics (Healey, 2007:1) in order to improve the quality of life. The interest spans notions of the design, constituent elements and development of the ideal urban (or suburban) community, and the role of the neighbourhood unit as a means of both physical and social organisation, through to its more recent articulation as a framework for improving local democracy and participation in a collaborative planning process (Pinnegar & Randolph, 2012:79). Neighbourhood planning is highlighted as a key mechanism through which cities will start to play a specialised role in integrated urban development (UN-Habitat, 2012c:1).

This makes neighbourhood planning a tier of the planning system and strategic context. In a broader planning system this entails setting objectives, generating strategies, evaluating strategies, monitoring results, and obtaining commitment (Armstrong, 1982:197) in order to actualise neighbourhood development plans. This act constitutes a strategy – a critical vehicle through which strategy formulation influences strategic change (Dutton & Duncan, 1987:106). This strategic approach can be used to identify, negotiate, and reconcile wider neighbourhood development plans with community interests and concerns (Pinnegar & Randolph, 2012:80). An outline of the strategic planning process is presented by Figure 3.2.

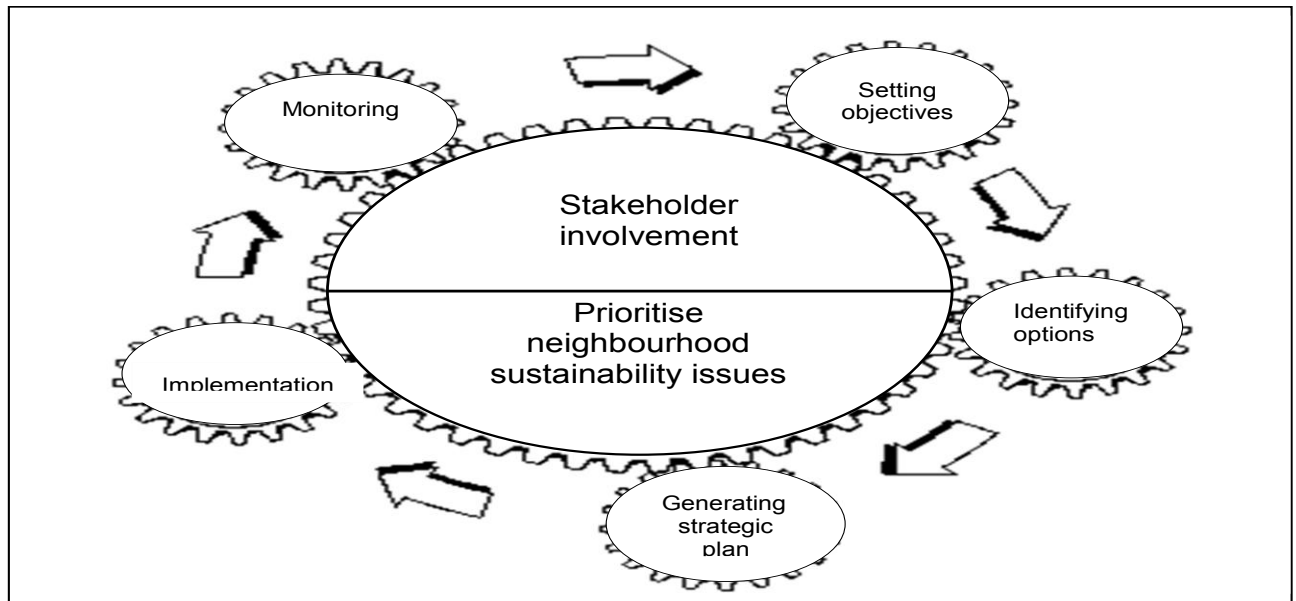


Figure 3.2: Neighbourhood strategic planning

Source: United Nations (2009:35).

The strategic framework can support the decision-making process at different stages of neighbourhood development processes. For example, European countries utilise strategic planning frameworks as assessment tools for the built environment – compiled to target any project under the full title “*Sustainable Renovation of Buildings for Sustainable Neighbourhoods*” (Blum & Grant, 2006:3). One element of the toolkit is the directory which is designed to give information on the different existing approaches and instruments for inventory, diagnosis, evaluation and monitoring purposes, together making up the understanding of the term “assessment” (Blum & Grant, 2006:3) and strategic planning. A fully functioning system of strategic planning based on the adopted assessment tool for sustainable neighbourhood is illustrated by Figure 3.3 below.

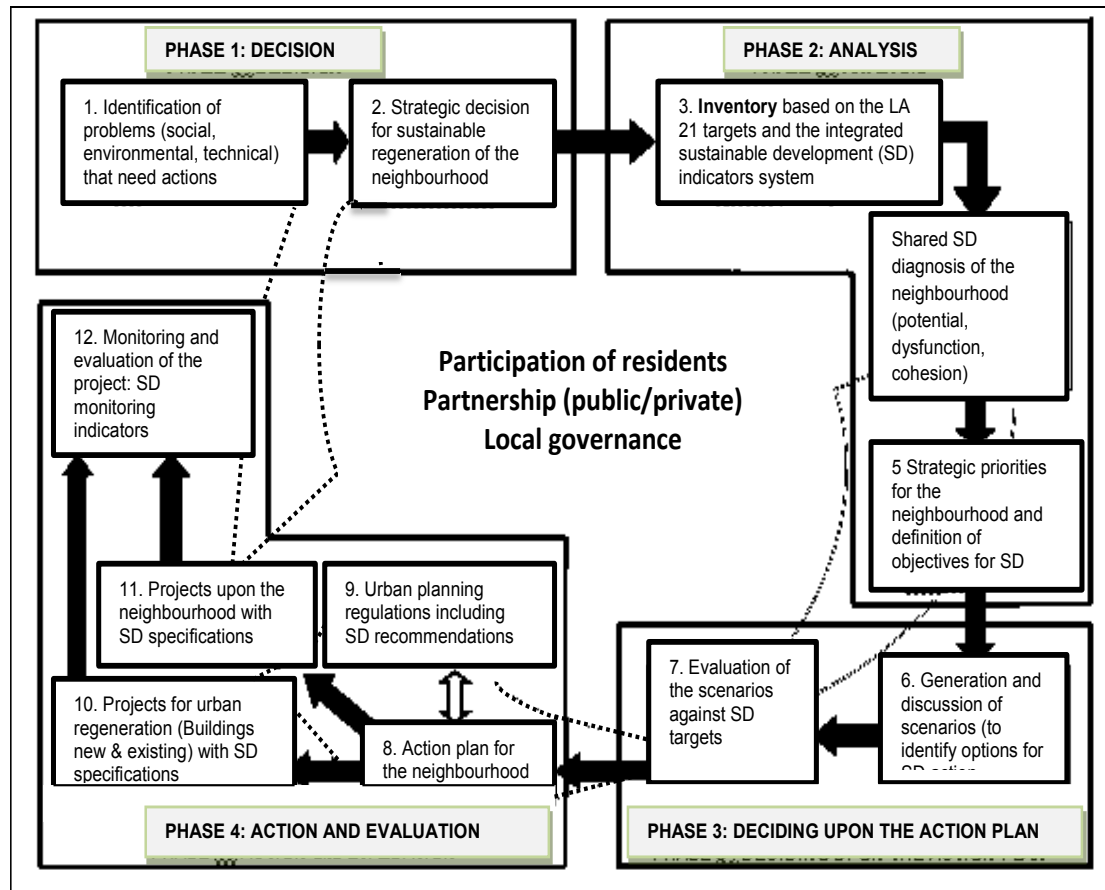


Figure 3.3: Strategic planning framework as assessment tool for sustainable neighbourhood

Source: Blum and Grant (2006:3).

The information and examples provided will support the choice and/or design of locally suitable approaches to the assessment of neighbourhood regeneration projects towards sustainability. One powerful overarching sustainable development strategy (as indicated in Figure 3.3) is to guide planning decisions through democratic and participatory planning process as it should be central tenet of neighbourhood planning (Beagle *et al.*, 2014:17; Wates, 2010:193). This sustainable development principle of good governance utilising democratic participation and discourse ensures that more localised decision-making can secure neighbourhood relevant stakeholders (both public and private) consent for necessary development. On this basis and level of neighbourhood – *assessment tool for sustainable neighbourhood* (Figure 3.3) provides the proof that strategic planning is a systematic decision-making process that prioritizes important issues and focuses on resolving them (UN-Habitat, 2012e:11). This strategic planning framework implies that neighbourhood planning has to be guided by knowledge and strategy

synergies – then translated into policy action areas tailored to local conditions (UN-Habitat, 2014c:1).

Given a rationale for a neighbourhood unit as a strategy it can be claimed that it provides cities with an opportunity to achieve sustainable integrated development. UN-Habitat and United Nations Environment Programme (UNEP) 2001 jointly attempt to recognize and reposition communities as agents of urban development and environment protection supports this assertion. As put by UN-Habitat and UNEP (2001:3) cities around the world are advancing new approaches to solving urban problems based on communities' experiences and adhering to a bottom-up, decentralised and broad-based partnership approach to urban environmental management.

Obviously, the encapsulated strategic position is that small clusters (in these cases neighbourhoods) are strategic guidelines through which cities can address sustainable urban development agendas. That is, neighbourhoods (neighbourhood units) can play a specialized role through which cities can for instance articulate strategic investment in physical infrastructure, in combination with the diversification of economies (UN-Habitat, 2012e:1) in an attempt to achieve successful cities. In the United Kingdom, as part of the move to a more integrated or holistic approach, strategic planning enabled the amalgamation of planning structures where land-use planning was brought together with other socio-economic planning imperatives (Shaw & Blackie, 2013:6).

The critical importance of more coordinated and strategic approach to planning is highlighted in these synergies. Given these synergies among plans, the imperative strategic planning component is to ensure that synergies are planned for because synergy must form part of an overarching neighbourhood plan (UN-Habitat, 2012c:13). As put by Marsh (2013:28), well-defined planning systems, particularly neighbourhood plans, relate to optimising opportunities to grasp the strategic agenda and get rid of the false choice (i.e. between the economy and the environment). More expressively, in the context of sustainability it means that strategic planning needs to be designed to fit range of social, economic and environment attributes that can significantly influence neighbourhood planning interactions. According to Scott (2013:12) this filtered information is then analysed and used to make policy and decisions that are inclusive of

community input. The fragmentation of planning system would undermine the very basis of neighbourhood strategic planning.

Given the strategic planning significance in neighbourhood/city planning, it is fundamental to be able to understand and predict the effects of failure to execute or deploy strategic plans. It is clear that fragmentation will bring multiple and multifaceted impacts that disintegrate plans, policies and decisions in neighbourhood planning inevitably engendering chaotic, complex and contradictory outcomes to understand or resolve (Scott, 2013:21). According to Shaw and Blackie (2013:6) the approaches to neighbourhood planning will suffer from internal and external inconsistencies, unaccounted changes of direction and a considerable gap between political rhetoric and reality. This resonates with Rumlet's (1978:198) assertion that the legitimacy of strategic planning by reviewing strategy-making processes is a critical challenge as an arena for political debate and bargaining. This is further exacerbated by top-down imposition of change through the active intervention of government and/or powerful stakeholders who are able to bypass institutional gatekeepers and systems through their power and influence (Cowell in Scott, 2013:21).

As the substance of the strategic planning mechanism is in turn characterised by uncertainty, conflict and contradictions, urban divide and authority dilemmas are inevitable (Scott, 2013:21). Failure to maximise strategic planning, the political nature of planning processes that have to adjudicate between a range of competing and often opposing interests (Shaw & Blackie, 2013:6) engender a democracy deficit and overall inadequate political debate about planning alternatives (Kalliomaki, 2014:115). In essence, the urban planning system will remain conservative and would produce non-cohesive arrangement of urban areas. To consider further shortfalls – in Slovenia the low-income neighbourhoods were severely affected by the strategic (spatial) planning in the 1990s and significantly influenced by the political and economic changes that were no longer aligned and integrated to spatial planning (Mashhadi & Lejeune, 2013:622).

Despite these shortcomings, the proponents argue that strategic planning ensures that the neighbourhood vision gets translated into objectives, which in turn provide criteria to select win-win policies (Jordan & Infante, 2012:539). In line with this conceptualisation, neighbourhood

strategic planning appears to align with futuristic scope – which translates to long-range planning in addressing neighbourhoods' uneven developments. For example, neighbourhood spatial planning entails bringing together different sectors in order to decide on land-use priorities in an integrated and cooperative way (Andreucci, 2013:417). Consequently, in the absence of neighbourhood strategic planning such as strategic spatial planning, it means that informal strategies will be used instead to accommodate population growth, migration will be causally viewed and there would not be careful investment and planning (Ash *et al.*, 2008:1). Therefore, neighbourhood strategic planning should set parameters to execute balanced growth.

In addition to neighbourhood strategic planning significance, Hanada *et al.* (2013:825) assert that it takes a variety of forms, including strategic plans, comprehensive plans, neighbourhood plans, regulatory and incentive strategies, and historic preservation plans. In retrospect, one way of interpreting this is that strategic (neighbourhood) planning sets up a broader scope in terms of neighbourhood challenges and policy analysis enabled by its broad planning context approach. This kind of approach will lead towards a commitment to the idea that, through collective action, it is possible to bring about improvements to the experience of neighbourhood life (Healey, 2007:1) and assist in developing an understanding of concepts and processes in an attempt to achieve successful neighbourhood.

3.3 Defining a successful neighbourhood

Neighbourhood as a theoretically significant construct provides comprehensive review and understanding of neighbourhood level operations. As a result, a review of literature reflects what Jacobs (1961) refers to as penetrating analysis of the functions and organisation of city neighbourhoods, the forces of deterioration and regeneration and the necessary planning innovations. It is clear that a successful neighbourhood has to be the opposite socially and spatially marginalised as well as economically excluded poor neighbourhoods from the planned city/mainstream planning and sustainable urban development initiatives. In an attempt to explore necessary planning intervention – parameters that prove successful in the neighbourhood and/or among neighbourhoods appear to be important in this context.

In the light of this, defining a successful neighbourhood has to be guided by knowledge that is consistent with the research premise that a successful city is based on successful neighbourhoods. Parallel to (or as a result of) this notion, a synthesis of successful neighbourhood is first explored through descriptive parameters to answer the question “What is a successful neighbourhood?” In a review of urban and regional literature, an apparently successful neighbourhood concept does not have a formal definition and content. Insufficient underpinning and/or description of successful neighbourhood has prompted exploration of closely related concepts – ‘successful city’ in a bid to attain a theoretically significant construct grounds to construe successful neighbourhood.

What is a successful city? According to Robson (1987:16) successful city can only be called successful in relative terms. A case in point for successful city is Bristol in the UK – argued by Robson (1987:16) as a success story that is very much relative, based on the city’s traditional manufacturing sector. In support Gotz (2011:8) points out that success is measured not only by economic growth and diversity but also by more subjective factors including social, economic and environmental resilience, and inclusiveness for all parts of the neighbourhood population and diversity--as well as remaining authentic during transition.

Various institutions and authors continue to use the concept *successful city*. In addition the countries are strategizing to produce successful cities and cities are endeavouring to become successful cities. The cases of Wales, Palma and Malmo are summarised in an effort to explain the strategies and capture the substance of the notion of a successful city as indicated below.

The case of Wales – in 2003, Wales Work Foundation’s presented the key characteristics of successful city regions which included good regional and international connectivity (Barry, 2011:11). The Work Foundation drew lessons from around the world – cities and city regions in its attempt to ascertain how a city becomes successful. As put by Barry (2011:11) the Work Foundation established that cities’ success is determined mainly on the basis of economic growth. However, the Work Foundation found that a successful economy relies on subtle interplay of many factors hence why it highlights the importance of transport to the economy and as a component of successful city.

In the case of Palma (which is the largest city in the Balearic Islands and the capital of the Archipelago), the region’s capital, neoliberal urban planning policies have been implemented in order to convert it into

a “successful city” within the global urban network competition (Miro, 2011:8). Palma aspires because it has become a “successful city” Miro ascribing this success to its consolidation as a tourist destination, so much so that the image that the city council sells is “Palma, a business city”. Miro reiterates that the success of Palma has come about through its integration in new global financial dynamics synonymous with neoliberalism, and this has acted as a means of achieving a place in the global urban network, consolidated through neoliberal urban policies.

Malmö, the third largest city in Sweden, has embarked on some ambitious urban and economic planning initiatives. Coupled with a dramatically changing social fabric of the city, this has resulted in Malmö being the subject of much praise and contention – as a result acknowledged as a successful sustainably developed and innovative city (Anderson, 2014:10). As briefly put by Anderson, Malmö transitioned from being a manufacturing hub into a knowledge city with a strong focus on sustainable planning. This has seen Malmö becoming a multicultural city with vibrant neighbourhood and successful new development – this includes building Oresund Bridge that has increased its linkages with Denmark and Europe, providing easy access for employment and residential opportunities (Anderson, 2014:10).

Based on these cases, it appears that the ingredients of success are product-oriented. A successful neighbourhood/city is a product of process or programme. The title of Miro’s (2011) work substantiates this viewpoint – “Producing a successful city: neoliberal urbanism and gentrification in the tourist city—the case of Palma (Majorca).” Successful in this context means achievement appreciably higher than in most other neighbourhoods/cities. Becker and Vanclay (2003:9) pose examples of environmental management and point out that the ingredients of success are oriented in politics, interest, responsibility and relationship. In neighbourhood projects, project success is positively correlated with the investment in requirements definition and development of technical specifications (Dvir *et al.*, 2003:89).

Given the theoretical reaction and practical city level operations – successful neighbourhood/city is describable from several points of view because urban dimensions are not similar and neighbourhoods undertake different development projects with varying outcomes expected. However, the parameters of success give a scope for optimism and the prospect of embracing and investing in opportunity, for example neighbourhood regeneration strategy expected benefits can be measured to ascertain success.

3.4 Key features for successful neighbourhoods

As mentioned in the preceding discussion, urban neighbourhoods are confronted with different development challenges. Therefore, it is clear that factors that determine neighbourhood success will to some extent vary significantly. There are factors that express a neighbourhood success these include but are not limited to: state of prosperity, health (UN-Habitat, 2013b:177), connectivity, transport infrastructure, leadership, governance, economic growth and urban environment (Barry, 2011:12). On the basis that strategies towards successful city are area specific – for example, the World Foundation Wale’s key features are intellectual enterprises and good transport connectivity as illustrated by Figure 3.4 below.

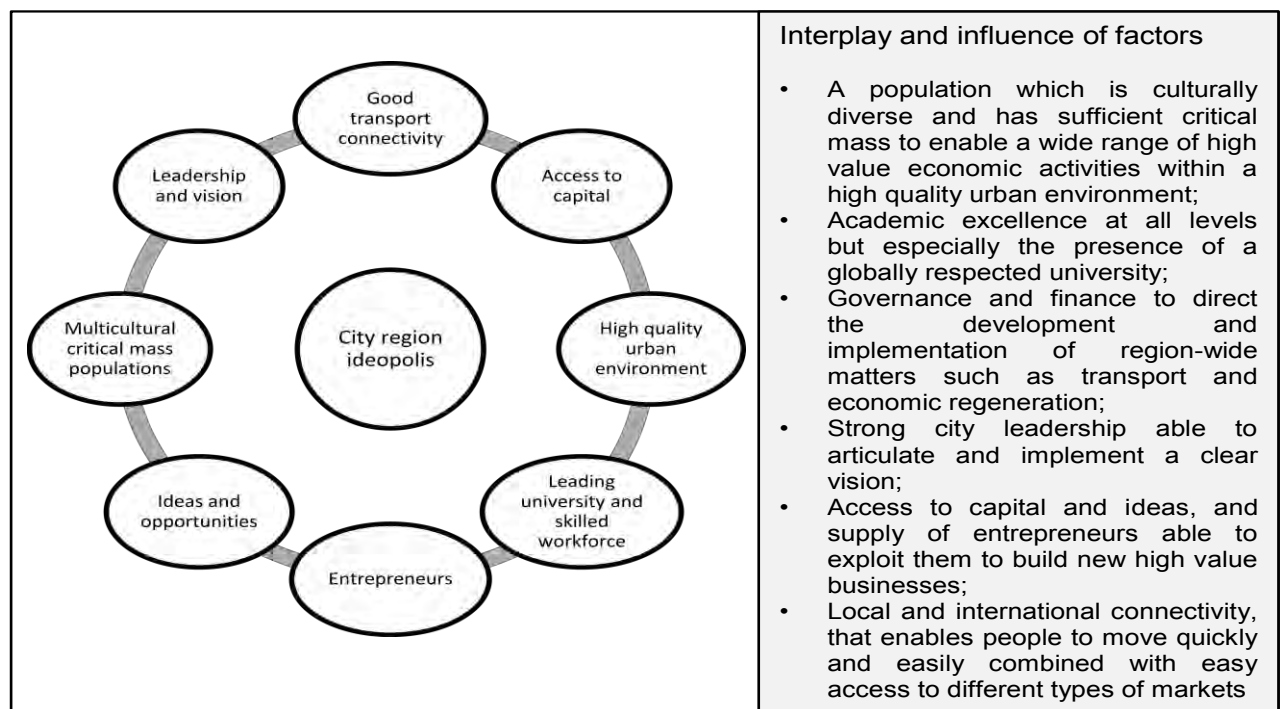


Figure 3.4: Successful city is determined by interplay of ideopolis factors

Source: World Foundation (in Barry, 2011:12).

There are many of the successful neighbourhood/city frameworks and constructs. Other strategies respond to urban dynamics and challenges such as urbanization, poverty, inequalities, poor access to basic services and adequate housing, and environmental pollution

(UN-Habitat, 2013b:177). In contemporary cities, even more pressingly, the direction of most urban strategic focus is on urban competitiveness and increased adaptive capacity (UNHabitat, 2014b:25) specifically at the level of neighbourhood in order to create resilient neighbourhoods for the cities' future – that can restrict unsustainable access to resources and cope with shocks and stresses to urban infrastructure systems. Core to this concept of the successful city is the realization that although a number of authors and organizations are offering different strategies premised on different key features, a similar urban dimension in all of them is actualizing urban sustainability.

Using sustainable development as an entry point to successful city, means enabling clustering successful neighbourhoods (being the groundwork in the context of this research) under the portfolio of sustainable urban development dimensions. Given that the world has entered an urban era where sustainable development has taken the centre stage and cities as the context for preferred lifestyles and stronger livelihood opportunities for inhabitants future wellbeing (UNHabitat, 2012b:7), cities play a critical role. Therefore, it is clear that sustainability is the central feature in successful neighbourhoods' development patterns. Ensuring that sustainable development is a key feature of a successful city and its neighbourhood is critical, since there simply cannot be a successful city without successful neighbourhoods and sustainable development.

3.4.1 Neighbourhood sustainability

Sustainability has increasingly become a central tenet and consideration in the planning of neighbourhoods. Given that many towns and cities are dealing with crises which are compounded by rapid population growth, particularly in peri-urban areas; lack of access to shelter, infrastructure and services by predominantly poor populations; weak local governments and serious environmental issues (Watson, 2009:151). Parallel (or as a result) to this a new field of science (sustainability) has emerged that seeks to understand the fundamental character of interactions between nature and society (Clifford *et al.*, 2008:395) and principal instruments for conveying sustainable neighbourhood development as illustrated in Figure 3.5 below.

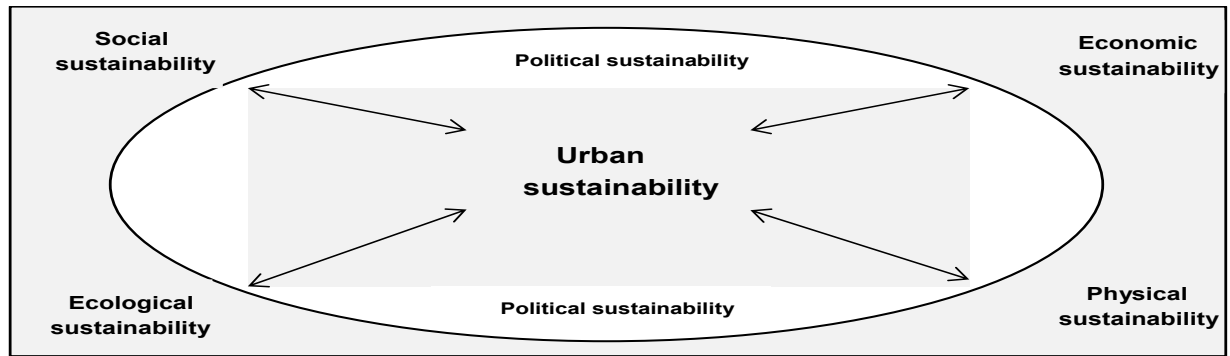


Figure 3.5: The five dimension of urban sustainability

Source: Allen (2009:2).

Ideas and thinking about sustainability and sustainable development have predominated in the last decades in most disciplines and sectors (Turcu, 2012:101). In the context of urban planning, the local level significance for achievement of sustainable development is the result of the Rio Earth Summit in 1992 (Royal Town Planning Institute, 2002:2). A review by Turcu (2012:101) reveals that an impressive body of literature, which aims to marry sustainability and urban development by grounding the many interpretations of sustainability in an urban setting, has been generated in the area of urban studies. However, there is still no consensus on how to define sustainability (Fisher *et al.*, 2013:51). Despite this, UN-Habitat and UNEP (2001:3) intertwined themes of sustainable development and defined sustainable city as a city where achievements in social, economic, and physical development are made to last.

Substance of this definition is premised on the basis that the city has enduring environmental resources that are a need for development (using them only at a level of maximum sustainable yield) and for regulating the level of environmental impact (UN-Habitat & UNEP, 2001:3). This definitional strategic approach echoes the research objective of achieving a view of a successful city as its parameters are set in terms of achievements – in turn the level of these dimensions success can be ascertained. Not diminishing this definition and its strategic approach – given the five dimensions of urban sustainability the need for comprehensive information is key in planning for sustainable development (UN-Habitat, 2014b:12). Sustainable urban neighbourhood is defined as having the following dimensions as outlined in Table 3.1 below.

Table 3.1: Sustainable urban neighbourhood dimensions

Sustainability dimensions	Definition	Principles and indicators
Economic sustainability	Refers to the capacity and ability to put local/regional resources to productive use for the long-term benefit of the community, without damaging or depleting the natural resources base on which it depends and without increasing the city's ecological footprint	• Economic efficiency; • Cost – include external costs whether social or environment
Social sustainability	Refers to the fairness, inclusiveness and cultural adequacy of an intervention to promote equal rights over the natural, physical and economic capital that supports the livelihoods and lives of local communities, with particular emphasis on the poor and traditionally marginalised groups.	• Social equity – e.g. employment and housing, fight against poverty and social exclusion; • Cultural adequacy – respect for cultural heritage and diversity
Ecological sustainability	Refers to the impact of urban production and consumption on the integrity and health of the city region and global carrying capacity. This demands the long term consideration of the relation between the state and dynamics of environmental resources and services and the demands exerted over them.	• Environmental caution; • Access to resources; • Pollution from different sources • Preservation of non-renewable resources overuse • Use of renewable resources
Physical sustainability	Refers to the sustainability of the built environment. Its capacity of an intervention to enhance the liveability for all city dwellers without damaging or disrupting the urban region environment. It also includes a concern for the efficiency of the built environment to support the local economy.	• Neighbourhood physical infrastructure; • Support the local economy; • Access to socio-economic opportunities
Political sustainability	Refers to the quality of governance systems guiding the relationship and actions of different actors among the previous four dimensions. Thereby, it implies the democratisation and participation of local civil society in all areas of decision-making.	• Relations of various territorial scales (e.g. city and neighbourhood); • Citizen participation; • Socio-economic actors

Source: Own construction – the sustainability dimensions and definitions adopted from Allan (2009:2) and principles and indicators deduced from UN-Habitat (2014b:12).

The point is made that sustainability has been variously construed (WCED, 1987), is ambiguous and complex in its meaning (Evans & Jones, 2008:141) and as a result prone to different conceptualisations and interpretations – is substantiated. Edigheji (2007:10) notes that each of these sustainability agenda interpretations might lead to distinctively different development paths and reform for the general framework of the planning system. Notwithstanding these postulated inconsistencies, there is extensive consensus in the literature that sustainability is a blanket term covering environmental, social, and economic dimensions – termed the three pillars of sustainability. Furthermore, the new version of ethics that is emerging in connection with the sustainability debate embraces diverse themes among which there are real, yet generally unremarked, tensions at both the practical and theoretical levels (Mebratu, 1998:497).

It has been noted earlier that the apparent consensus on the urgent need to promote sustainable neighbourhoods has been underlined by significant differences with regard to the

questions of what urban sustainability means, why and how to promote it and for whose benefit (Allen, 2009:1). As illustrated in Figure 3.5 above, the dimensions of urban sustainability are scale-dependent. Definitions of sustainability are also obviously dependent on the time and space scale (Costanza & Patten 1995:8; Knight & Bates, 1995:332). Through the lenses of three dimensions Mebratu (1998:495) highlights that the objective of sustainable development is, then, to maximize goal achievement across these three systems at one and the same time through an adaptive process of trade-offs. Therefore, the precedent is set; the five dimensions of neighbourhood sustainability will increase in interaction in order to achieve desired sustainability.

Furthermore, this has taken many forms and inspired a range of initiatives across the world including: healthy cities, urban villages, millennium communities, the mixed-communities' movement (Turcu, 2012:101) new urbanism and various urban regeneration projects. These initiatives are pivotal to an understanding of and contribution to sustainable practices – this includes pros and cons about the city future such as quality of life. For example, urban regeneration, albeit pivotal and germane to a sustainable urban development agenda, is criticised for being restrictive and not sufficiently underpinning issues such as poverty and uneven geographies of development (UN-Habitat, 2013b:42).

However, these frameworks and approaches have set parameters for generating new planning approaches and systems which can orient urban growth and related environment issues as well as socio-economic issues that are pro-poor neighbourhoods. To approach sustainability, consequent improvements are prerequisite in all identified levels of urban planning systems and the areas discussed (Sharifi & Murayama, 2013:73). The wave of interest in this regard is sustainability coverage and its ability to necessitate cross-cutting approach to actualise sustainability especially in disadvantaged neighbourhoods. For example, due to a rapid increase of urbanisation, the neighbourhoods, built environment, public transportation, and services should be considered simultaneously (Haapio, 2012:165).

Therefore, it is important to acknowledge the fact that neighbourhood is the locale where land development takes place and new buildings and facilities are proposed, debated, and constructed (UN-Habitat, 2012c:6). Neighbourhoods are building blocks of the cities (Power & Houghton, 2007:7). The neighbourhoods play a major role in assisting to change and/or

address unsustainable behaviour practices and norms (Sharifi & Murayama, 2014:243). As mentioned before, it is clear that no single city can contribute to overall sustainability if its own component parts are found not to be sustainable (Choguill, 2008:41). More importantly, no neighbourhood or city can be successful without encompassing sustainability dimensions and key components of urban sustainability. This reflects the need to entwine themes of urban sustainability into the urban neighbourhood setting.

Based on the preceding discussion, the sustainability principles are refined and translated into neighbourhood level to conceptualise the notion of successful neighbourhood. This is to set functional component of successful neighbourhood.

3.4.1.1 Managed neighbourhood

In various reviews and reflections offered, neighbourhood success is tied to the high level of sustainability implementation and processes. Neighbourhood requires management (Power, 2004:1) and alternatives to sustainable development. As put by Momeni *et al.* (2011:65) the development of urban management approaches based on sustainability has been growing recently as shown in Figure 3.6 below.

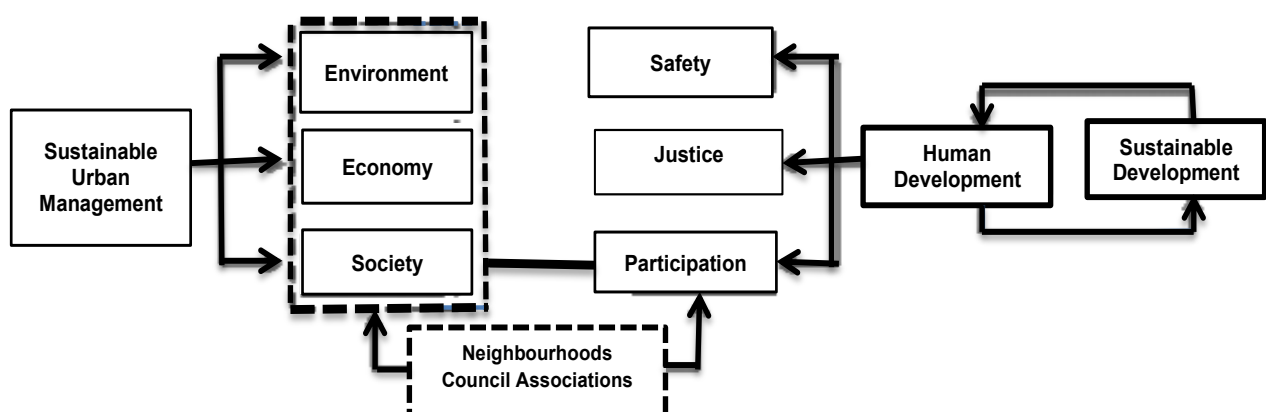


Figure 3.6: Relations between neighbourhood sustainability concepts

Source: Momeni (2011:65).

In Figure 3.6 it is illustrated that successful neighbourhoods will require management structures and operational frameworks such as local councils to coordinate sustainability activities. Having identified neighbourhood structural characteristics – human intervention in terms of neighbourhood residents' participatory role and local authority's become central tenets to execute management responsibility. One of the neighbourhood authority roles is to identify problems and propose interventions such as the development of social ties, social cohesion and trust, and attitudes favourable to the neighbourhood – related to the likelihood of residents engaging in formal participation (Warner, 2014:421).

The rationale for this neighbourhood management framework is that variation among neighbourhoods can be determined and analysed. For example, the wider understanding of low-income neighbourhoods' exclusion, unsustainability root sources and the need for sustainable neighbourhood management can be approached programmatically. As put by Dijk and Pieter (cited in Schrenk *et al.*, 2011:213) urban (neighbourhood) management is an effort aimed at coordinating and integrating public and private actions for overcoming problems that urban residents encounter, and creating more competitive, fairer and more stable cities. This makes it clear that the breakdown of these relations will disrupt the entire neighbourhood and disintegrate sustainability initiatives. The fundamental effects of disintegration will also impact on the city as cities are a build-up of neighbourhoods and their systems are interlocked (Power & Bergin, 1999:86).

The relevant contribution that also represents the hypothesis of this research is that sustainable neighbourhood management improvements or success transcend to cities as they depend on the success of neighbourhoods. The central contention is that if a city is to function properly, it has to embrace sustainable neighbourhood management as a basic level to coordinate diverse agendas related land use, energy, water, waste, mobility, health and education, economic development, and the promotion of cultural vitality and social inclusion (UN-Habitat, 2013e:9).

3.4.1.2 Spatially integrated neighbourhood

The spatial connectedness of a neighbourhood highlights a more particular form of diffusion of the sustainable neighbourhood (Bodart & Evrard, 2011:31). Given that segregation and integration create distinct physical forms for cities - individual neighbourhoods within the city highlight physical and spatial particularities that are contributing to the elicitation of unique socio-spatial configurations. In this vein, it is interesting how the urban form of the neighbourhood incubates spatial connectivity or segregation. Different neighbourhoods, regardless of their structural form and local context, acknowledge that key driving force behind physical and spatial layout in urban areas is produced by land use, transport system and infrastructure (Moroke, 2015:41).

Attuned to the relevance of sustainable urban form land, infrastructure, housing, and basic services, sustainability will require that they are affordable, equitable and their planning encompasses disadvantaged neighbourhoods (UN-Habitat, 2013e:9). Among various facets of urban activity, it is at the neighbourhood level that analytical and operational relevance of spatial changes taking place in urban areas can be described. However, the scale of urban operation is essential to consider – the interaction of spatial dynamics with social, economic, ecological and political dimensions exerts pressure that exceeds neighbourhood land use capacity explicitly reflected on the zone immediately surrounding it (UN-Habitat, 2013b:76).

This increasing neighbourhood spatial concentration hinges on the postulated trade-off between a neighbourhood and a city. In the light of this, a city becomes an appropriate scale of urban operation to interpret the role of sustainable urban form in linking spatial patterns to social and economic dynamics (Healey, 2007:32). According to Sarkar *et al.* (2014:327) concentration of activities in the spatial system turns into an urban structure with the result that interaction of spatial activities occurs such as in the form of movement of people and goods as shown in Figure 3.7 below.

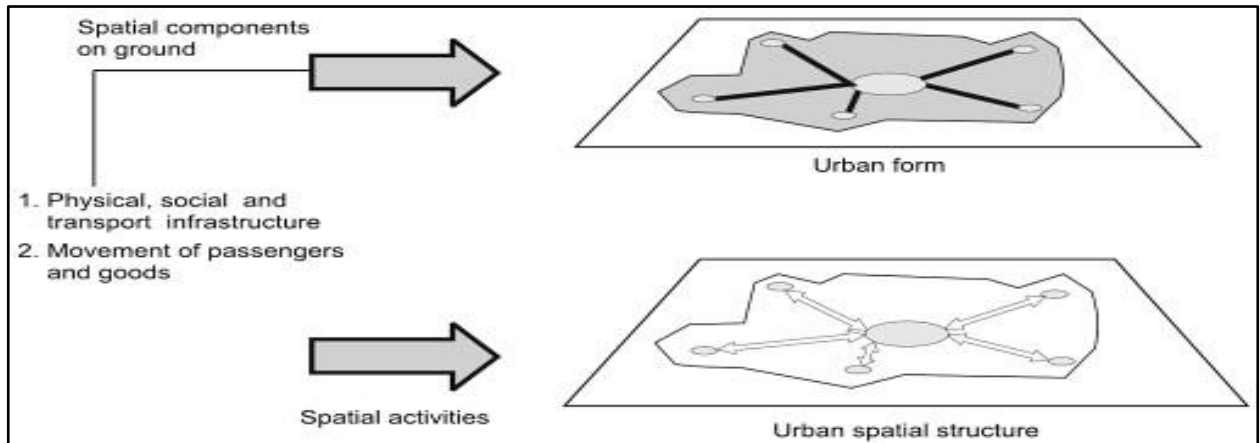


Figure 3.7: Interaction and concentration of spatial components

Source: Sarkar *et al.* (2014:327).

As indicated in Figure 3.7 above, these physical arrangements (urban form and urban spatial structure) provide indications of urban physical settings between the city and the neighbourhood comprising spatial organisation, activity distribution and transport connectivity.

Spatial connectivity between a city and its neighbourhood presents major opportunities to promote social inclusion, resilience, and prosperity (UN-Habitat, 2013e:6). Implicit here is that neighbourhood planning failure is resultant in form of social, political, and/or spatial exclusion (Miraftab *et al.*, 2015:77). The resulting exclusion and spatial segregation deprive the most disadvantaged population groups of their livelihoods (OECD, 2013:97). Therefore, generating social and spatial inclusion at the neighbourhood level enables the development of attractive cities which are reasonably compact, socially inclusive, economically productive, energy efficient, multifunctional and which allow mobility (UN-Habitat, 2013b:57).

3.4.1.3 Socially inclusive neighbourhoods

The significance of a socially inclusive neighbourhood is that it ensures equal access to opportunities and services (UN-DESA, 2009:8). It achieves this through providing space for all segments of the population to participate in social and cultural expressions (UN-Habitat,

2013e:10). Neighbourhoods can thus be seen to provide space for testing whether participation as a prerequisite of sustainability is necessary to create social cohesion in cities. One of the reasons put forth is that through socio-spatial transformation in neighbourhoods cities can eradicate all physical and spatial forms of segregation and exclusion (UN-Habitat, 2013b:10) as indicated in Figure 3.8 below.

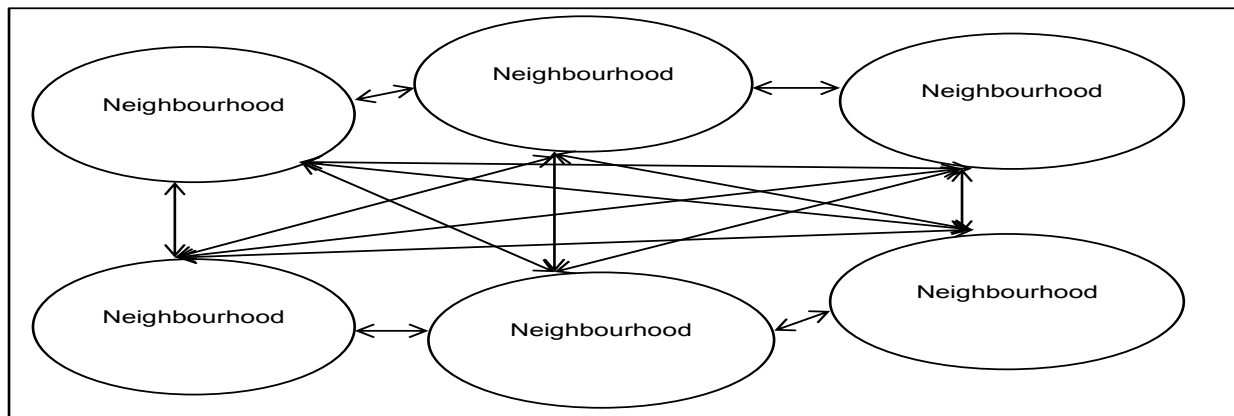


Figure 3.8: Neighbourhoods socio-spatial connectivity and relationships

Source: Own construction (2015).

Analytical relevance is that exclusion will threaten the social integration that cities need to link cultural, environmental and economic dimensions. It therefore needs to be strongly emphasised that a high level of a city social inclusiveness depends to a large extent on neighbourhoods' local conditions such as living conditions, poverty levels, infrastructure, functioning of economic markets and style of governance (Das & Pani, 2005:162).

3.4.1.4 Well-planned, walkable and transit-friendly neighbourhoods

Well-planned and designed neighbourhoods can generate higher levels of urban mobility, societal wellbeing, economic growth and foster sustainable development (UN-Habitat, 2013b:90). At the core of planning and design for sustainable access is that all important services and shopping needs of the community should be within walking or cycling distance

(UN-Habitat, 2013e:9) along with good access to public transport (Rodrigue *et al.*, 2013:18) as shown in Figure 3.9 below.

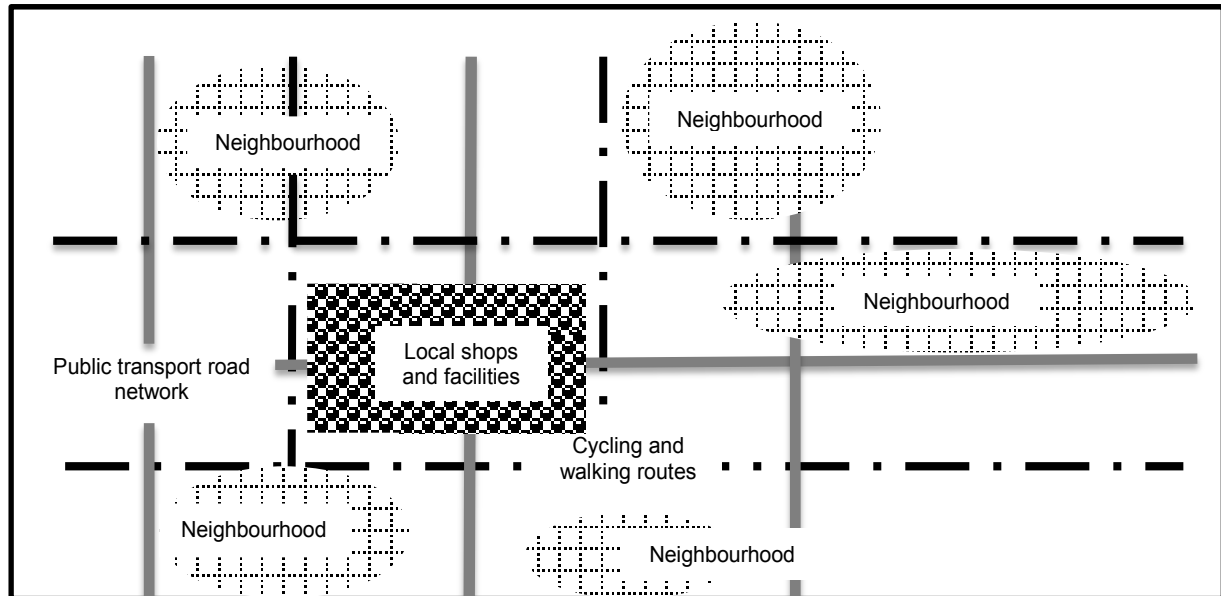


Figure 3.9: Planning and design role in land use and sustainable urban mobility

Source: Own construction (2015).

This means that layout and design not only represent a more efficient use of land but also influence travel patterns and behaviour – for example, mixed-use developments including local shops and facilities can reduce the need to travel (TFGM, 2013:19). Therefore, walking, cycling and public transport can be maximized to give cities insightful exploration of how connectivity, proximity and mobility impact on urban development. Sustainable transport within a larger scale (city) will improve quality of urban development as the size gives more opportunity for interaction of transport systems (UN-Habitat, 2014b:84). The transport system transforms the city as principles that promote interconnectedness and integration are derived from transportation efficiency (Rodrigue *et al.*, 2013:18). In addition, a sustainable transport core principle is to support a transition to low carbon future – considering the ways in which to reduce the carbon footprint (such as electrical vehicles, highway networks, etc.), the neighbourhoods will fail to consider a full potential of sustainable transport although it provides planning and transport links (TFGM, 2013:21).

3.4.1.5 Resilient neighbourhoods

The physical, social and economic vitality of successful cities and successful neighbourhoods are directly connected to neighbourhood's ability to maintain the effective functioning of its natural environment system and infrastructure system – especially after episodes of intense environmental stress (such as during severe, storms, floods or other weather related events) and/or economic downturn (Resilient City, 2012:1). To ensure some degree of success, neighbourhood specific resilience factors include ability to function well under stress, successful adaptation, self-reliance and social capacity (Walker *et al.*, 2004:5) as indicated in Figure 3.10 below.

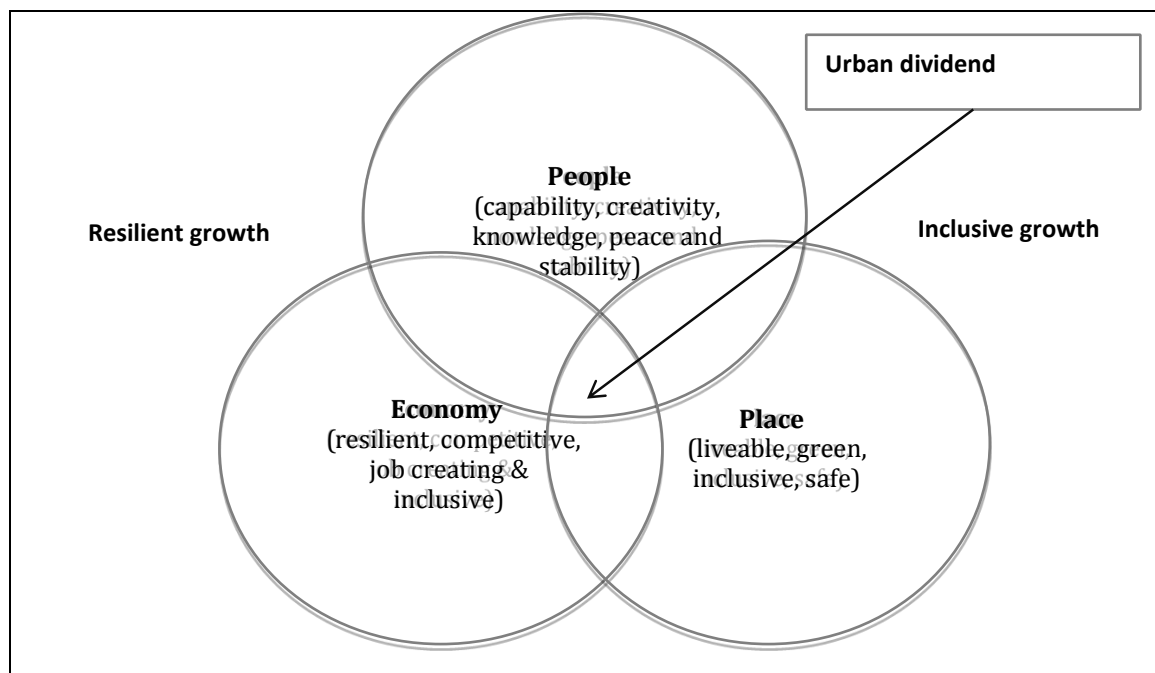


Figure 3.10: Coordinated investments in people and places to develop of resilient city system

Source: COGTA, (2015:10).

The cities and their neighbourhoods face and/or are vulnerable to economic shock or downturns. The greater the income gaps between city's neighbourhoods and its poor and rich inhabitants the more likely a city is to lose jobs during economic downturns (OECD, 2013:21). Therefore, insulating city and its neighbourhoods against downturns by creating a resilient,

competitive and inclusive economy is argued to be more effective than responding with economic policies after a shock (Wolf, 2011:1). Protecting cities neighbourhoods against the economic contradictions prove to be more sustainable and ensuring cities success over time. This protectionism takes hold in the employment downturn as a resilient economy leaves in place investments in human capital such as knowledge, skills, creativity, wealth and equally importantly, social stability (Wolf, 2011:1).

From the natural environment perspective, a resilient neighbourhood is designed to be resilient by being energy-efficient, low-carbon, and increasingly reliant on renewable energy sources (UN-Habitat, 2013e:12). It undertakes management of resources that can be replenished or reused (Walker *et al.*, 2004:5). However, climate and environment transcend neighbourhood boundaries – for example a neighbourhood can be pressured by regional and district floods in turn causing unexpected outcomes (Shaoping & Xi, 2015:54). Planning for climate change in neighbourhoods thus requires greater appreciation of how this phenomenon integrates with other factors (e.g. changes in the global economy, or specific local factors) to impact at local scales (UN-Habitat, 2014b:43).

However, building resilience at the neighbourhood level can increase the capacity of a city to cope with environmental and climatic elements that cause uncertainty and strengthen the local economy (Turnbull *et al.*, 2013:25). For example, cultivating different neighbourhoods' climate and environment changes can make a city more resilient and promote the sustainable development (Shaoping & Xi, 2015:61). In essence, each neighbourhood's most striking climatic or environmental feature will support the mainstreaming of climate change into the city's master plan for more effective and efficient comprehensive land administration (Santamouris & Cartalis, 2015:143). In making successful cities, resilient cities and neighbourhoods focus energy and resources on convening, enhancing and creating strong, vibrant places which are significant component of the neighbourhood's structure and of the community's identity (Resilient City, 2012:1).

3.4.1.6 Economically vibrant and inclusive neighbourhood

The successful neighbourhood is economically inclusive, vibrant and diverse (UN-Habitat, 2013e:10). Therefore, under the auspices of urban sustainability – successful neighbourhood economy has to generate investment, variety of quality jobs, neighbourhood serving businesses and stimulate further development (Inclusive City, 2007:1). To advance an inclusive and sustainable economy, a successful neighbourhood provides a way of objectifying a successful city. The neighbourhoods can make economic and social opportunities a reality for the greatest number of people given that urban neighbourhoods' involve high urban population densities (UNHabitat, 2014b:13). In basic terms, for economy to be sustainable it has to expand to create new jobs and livelihood opportunities. Aligned to the relevance of these scales of urban operations, the macro-trends of the global economy are linked to their micro-outcomes (segregation patterns within cities), through an understanding of the implications of cities' economic functions on local urban policies and housing (Ismail, 2014:2).

Clearly, a city's success is based on its integration with its neighbourhoods. The economic and spatial aggregations enable integration of neighbourhoods into city economic networks and activity spines. For instance, this economic infusion from trade and development perspective assumes that a city will be able to inspire and foster local economic development from the smallest entrepreneur to the largest corporations (UN-Habitat, 2013e:11). Under the auspices of inclusive economic development, sustainability will require that specific needs of the informal sector are integrated into the city's economic development strategies (UN-Habitat, 2014b:26).

A common point of reference of vibrant and thriving cities is the human development index relative to the socio-economic development such as reducing extreme poverty and infant mortality and increasing education levels and income per capita. Therefore, it can be argued that an economically sustainable city/neighbourhood is the one that provides residents with economic opportunities to thrive and reach full potential.

3.4.1.7 Sense of place

One of the key factors in the demographics of the neighbourhood is that most people want to live in a place where they know their neighbours, feel safe and there are clear economic and social benefits (employment, housing, education, etc.) (Bell & Morse, 2012:79). In the light of this, it can be claimed that sense of place stimulates neighbourhood sustainability taking into consideration that economic impact, environmental standards and social qualities that are embedded in it are dimensions and/or indicators of urban sustainability framework. Therefore, the extent to which neighbourhood can become successful depends on clear identification and integration of sense of place comprehensive expression of the ideals of sustainability.

In addition, neighbourhood as the smallest scale of operational urban planning will assume the responsibility of interpreting the meanings (based on experiences and feelings) that are assigned to them to city level based on the notion that sense of place can be established at different geographic scales (Caves, 2005:402). By and large, the sense of place is entrenched in the human interpretation of the place and reveals relevance to sustainability advocacy of the bottom-up approach – neighbourhood experiences and attitudes can then aspire to the city within the same urban boundary. Given that a city is made-up of different neighbourhoods – echoes mixed pattern as neighbourhoods differ in identity and sense of place. At the city level the mixed-pattern approach promotes social integration and diversity (Schrenk, 2010:397).

Sustainability emphasises the importance of diversity and in turn cities are embracing and competing on the basis of diversity (UN-Habitat, 2012c:9). Contemporary cities recognise cultural differences as essential marketing pillars that cities can utilise to stimulate tourism and business on the basis of their different aspects of social and economic development (UN-Habitat, 2012e:17). Similarly, diversity breeds creativity and innovation (UN-Habitat, 2013b:26). On the basis of these parameters the city can compete on the basis of being a leading higher technology and knowledge city fundamental for human development and sustainable urban development.

3.4.1.8 Liveable neighbourhoods

Within the framework of sustainability, health and safety mark a remit for a liveable neighbourhood (UN-Habitat, 2013e:11). The neighbourhood premised on the pillars of liveability promotes safety and accessibility, and well-being that includes but is not limited to access to sanitation, water, parks and enduring economic vitality (UN-Habitat, 2013b:112). These variables are essential in creating successful neighbourhoods as the liveability concept proactively focuses on the interconnected relationship among spatial, social, economic and environmental characteristics and engage at the city level sectors such as housing, transport, environment, health, education, water and sanitation and finances (WHO & UN-Habitat, 2010:100).

Neighbourhoods offer the best and worst health and safety determinants as negative or positive influences tend to cluster according to the specific neighbourhood within the city (WHO & UN-Habitat, 2010:12). In support, Sharkey (2013:92) indicates that lack of safety and security in neighbourhoods (especially poor) engender severe disinvestment, unabated segregation, declining economic opportunities and a growing link between poor neighbourhoods and informal economic markets, meaning that social stability, food security and economic growth are all dependent upon city/neighbourhood liveability (UN-Habitat, 2014b:9).

3.4.1.9 Compact mixed-use neighbourhoods

The compact mixed-use neighbourhood is a crucial feature of successful neighbourhood. The concept of mixed use is part of compact city idea regarded as a significant contribution to achieving sustainable urban form (Jenks *et al.*, 2003:3). The diverse mix of offices, commercial, recreational land use and destinations integrated with public transport lend great support to successful city. The compact mixed-use neighbourhood benefits have parallels to the context of sustainable urban form as it highlights the potential benefits for providing places to live, work and play in close proximity to each other.

In addition, compact mixed-use neighbourhoods encourage active and sustainable modes of transport as well as socio-economic integration by mixing variety of residential dwelling types. More to the point of this research, providing number of mixed use neighbourhoods dispersed across the city will create a successful city serviced by public transport that provides equitable access to facilities and workplace destinations. The synergies between the neighbouring activities allow for by-products to be re-circulated through the city, so that the value derived from public transport for example can be maximized (UN-Habitat, 2012e:7). Overall, the compact mixed-use urban forms present in some respects good opportunities to optimize the use of land and sharing of infrastructural services and amenities.

3.5 Conclusion

From the spatial perspective, the linkages of sustainability related trends serve as a platform to promote spatial necessities – enhancing spatial interaction between core neighbourhoods and peripheral neighbourhoods. The spatial-economic implications will be used to inform investment decisions for shared economic growth, improved capital investment in areas of greatest need and optimising resources to reaffirm sustainability commitment. It has been noted that spatial axis in urban systems are instrumental in the formation of robust economy and social cohesion by harnessing the interactions offered by different scales of urban operations and then providing a framework for spatial transformation.

In addition, successful city-neighbourhood relationships discussed in this chapter have presented useful portals for urban sustainability especially in terms of long-term spatial (environmental), economic and social viability of the urban areas. In this respect, given the significant gains that can result from social, economic, political and spatial interactions, the subsequent chapter explores and discusses the need to adopt or develop strategic interventions in order to achieve a successful city/neighbourhood.

Chapter 4: Urban planning tools for integration of neighbourhoods

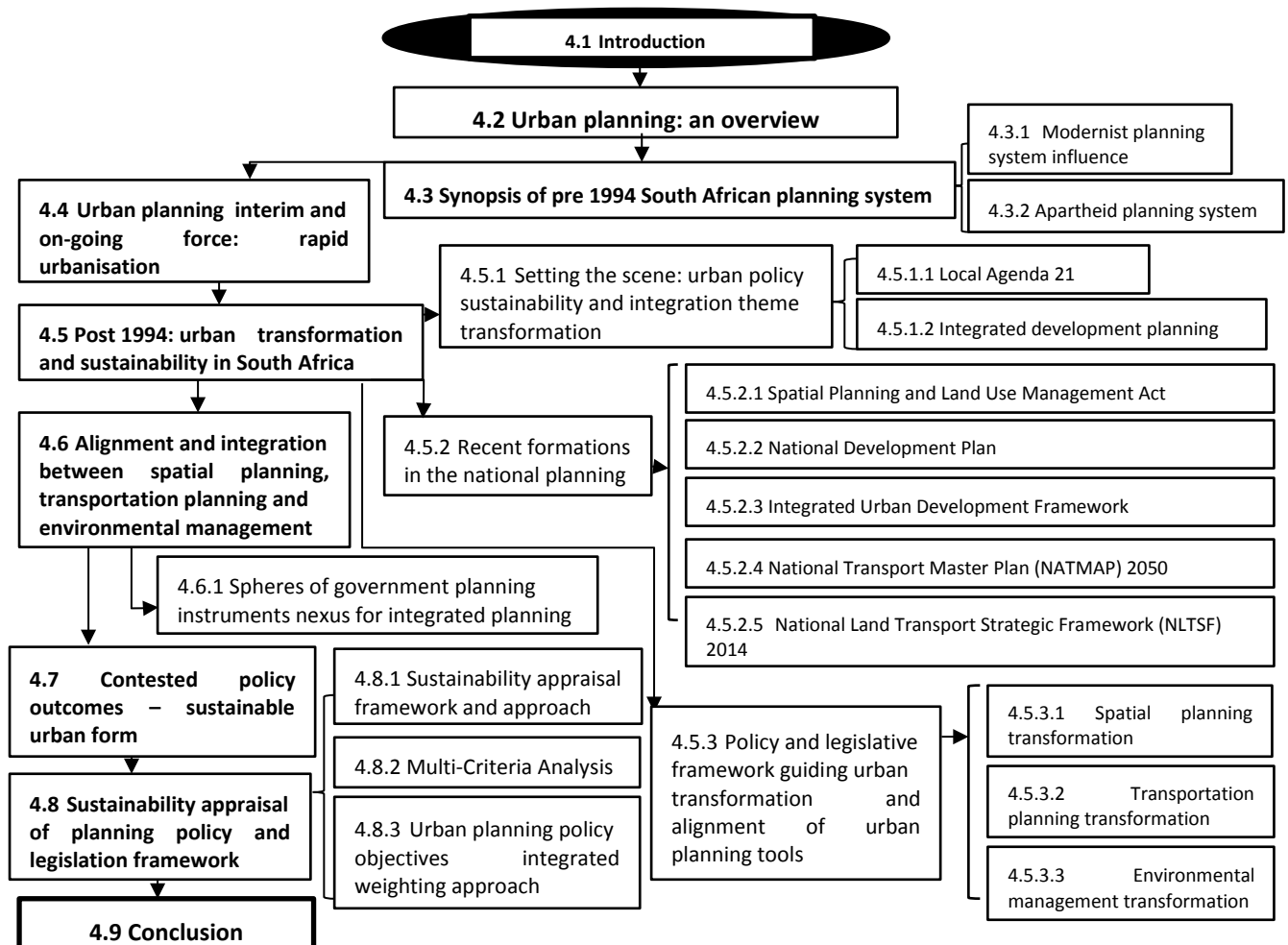


Figure 4.1: Structural components of chapter

Source: Own construction (2015).

4.1 Introduction

The chapter seeks to explore the role that the public policy processes and legislation play in facilitating urban land development transformation under the auspices of sustainable urban development. It unpacks the policy and legislation in an attempt to outline the interface between spatial planning, transportation planning and environment management from integrated

development planning perspective and the ability to initiate integrated sustainable neighbourhoods and/or urban form. The aim is to address spatial injustices, lack of spatial coherence and spatial segregation that emanate from the historical spatial imbalances that had a severely negative effect on the quality of life in the townships. Therefore, urban planning instruments formation, transformation and integration form are the thrust of this chapter.

4.2 Urban planning: an overview

The South African planning system both pre-1994 and post-1994 is dominated by statutory responsibilities. However, before plunging into a discussion of South African planning system as a way to regulate and order urban spaces, it is perhaps imperative to consider what planning is in the context of urban planning. Although urban planning is an established practice under the domain of urban and regional planning, a universal definition of what it really is seems to be rather elusive. According to Ward (2004:1), an approach to understanding urban planning is grounded in the continuing tradition of thought, policy and action. In various reviews and reflections offered urban planning is defined largely on the basis of spatial planning (Davoudi & Strange, 2008:19; Department of Labour, 2008:12).

The spatial planning augments the scope of urban planning, making it far wider and holistic. For example, in countries where urban planning and development are interpreted in terms of spatial planning (such as Japan, Denmark, Finland, Korea and Norway) – it (spatial planning) serves as a policy tool to address the distribution economic activity and social welfare in space or between regions (OECD, 2010:67). As put by Schoeman (2010:5) spatial planning encompassing urban and regional planning – entails the consideration of what can and should happen where in spatial systems.

Clearly in urban planning the pivotal focus is land-use. In basic terms, the object of urban planning becomes vividly clear - it is the physical environment which is taken to mean land and all its uses (Simmins, 2015:1). Schrenk (2007:1999) by way of arguing mentions that urban planning in most of definition is intertwined with regional planning. This highlights a component of spatial planning of having the power to construct the scales at which issues are addressed within the city or region – created through discourse, scalar relationships representing reality by

segmenting the social world into comprehensible spaces (Hagerman, 2008:32). It is therefore obvious that spatial planning operates at different scales: neighbourhood, city or region (Bevir, 2006:45).

By and large, this deduction fits Raco's (2007:172) assertion that spatial planning orders space and place so that they become more functional, cohesive and competitive, also drawing attention to the point that a variety of issues fall under the scope of urban and regional planning such that cities and neighbourhoods through their social, economic and political processes express and/or influence the structure and form of the environment (UN-Habitat, 2014b:19). In other words spatial structure is a function of economic development, social welfare, environmental quality and various land-uses (UN-Habitat, 2013c:14). In this way, the notion of space and physical dimension attributes sense and meaning to land use planning, transport planning, socio-economic planning and environmental planning.

A bounded conception is that urban planning actors are spatial (physical) and functional organizing principles such as structural land uses, distance decay effects (proximity and adjacency), processes of mobility and hierarchical nested urban areas (Davoudi & Strange, 2008:25).

4.3 Synopsis of the pre-1994 South African planning system

The planning system has evolved in many ways in respect of the urban structure of the city (Baross *et al.*, 2012:83) with the state of continual evolution owing mainly to unexpected conditions of contemporary societies (Scholl, 2012:168). The pre-1994 South African planning system in particular was dominated by a modernist planning system coupled with pieces of legislation that initiated and enforced discriminatory planning.

4.3.1 Modernist planning system influence

Pre -990s planning in South Africa was dominated by the typical modernist urban planning system (Coetzee, 2012:11). However, Todes (2011:3) cautions that modernist planning has several distinct strands and much of the past several decades it has been dominated by a functionalist stream, concerned with efficiency and order, and embedded in utilitarian philosophy, and to some extent by a social reformist reaction to a 'city awful' of the industrial revolution, which produced new visions of a city and urban settlements.

In South Africa, the modernist planning system developed around the 1880s (Harrison *et al.*, 2007:19) and carried on through functionalist tradition (Todes, 2011:3). This paradigm was more of a top down planning system with a focus on urban form and functional purity (Baross *et al.*, 2012:83). Modernism fundamentally altered human relationship to the world (Mumby, 2012:18). According to Holston (1989:51) this is a vital function, as it operationalizes cities as a structural order and organisation would allow cities to be broken down into essential functions of housing, work, recreation and traffic – tailored, standardized, rationalized and assembled as a totality. Mabin (2008:556) adds that modernist planning responded to challenges of cities demonstrating belief in the possibility of rationality.

With the foundation of modernist planning the contemporary urban planning took on shape and substance. Embracing the order and organization the modernist planning has instilled (or is instilling in cities. It is clear that in the absence of modernist planning cities could have been disorderly and chaotic. Such progressive discourse of modernist planning allows an understanding of the processes through which the present urban patterns have evolved. Thus, the modernist planning can be apprehended as optimistic and grand in scale but there is another feature of modernism that strike negatively – occurrences of dislocation (Mabin, 2008:556). In countries like Brazil, America, Yemeni, South Africa and Ghana (which is still dependent on modernist planning system – can be added on this list) – this instrument (modernist planning) has been (or is) used to divide and segregate communities (UN-Habitat, 2014a: 24).

This traditional form of spatial planning relied heavily on master planning (Klein *et al.*, 2012:19). The traditional master planning in essence is a form of spatial planning based on comprehensive land use and zoning maps as well as planning norms and standards (Mishra, 2012:31). The intended use of these spatial planning instruments is (has been) ordering cities by separating their functions in an attempt to solve cities' social ills and as a preferred structure of planning (Taylor, 2011:1). However, this modernist master planning has always been critiqued for demonstrating contrasting approaches. It suggested that the ideal city space is the function for ideal citizenry and democratization but the land use system failed to deliver anticipated vibrant and democratic urban spaces (Cohen, 2011:67).

Thus, the central concern of modernist planning system elsewhere in the world, by and large, is codified in the physical form of cities – land uses and zonings became accepted as the principal planning tools (Hall, 1988:317). The immediate effect of these tools of modernism was the manifestation of strict separation of work, home, marketplace and social life (Natrasony & Alexander, 2004:6) apparent in urban structure models such as concentric zone model, sector model and multi-nuclei model as discussed earlier in this thesis.

In Ghana for example, the prominent feature of modernist planning through the use of a master plan is the promotion of the land-use segregation concept. This planning system is still in use and intact based on four cardinal principles, namely unifunctional land-use; discrete zoning; regulation and consensus (Baffour-Awauh *et al*, 2011:130). Reflecting on Hungary, Baross *et al.* (2012:87) add that the modernist planning system is a sophisticated planning system with a strong focus on the complex regulation measures, mostly lacks guidance to policies to orient development along the established long term values and goals, not to mention sustainability considerations. Reflecting on the experience of South Africa this system is non-integrated and non-democratic in nature – does not support the developmental and democratic goals (Oranje & Van Huyssten, 2007:7).

In South Africa, modernism planning practice created areas specialized in their function such as gated housing developments, suburban shopping centres and recreational facilities and removed noxious land uses that conflict with dedicated specific purposes such as townships during its regime. Perhaps the most appropriate first step is to understand the activities underpinning this reality and its operating environment is to reflect on the historical events that

shaped the urban areas in South Africa. According to Coetzee (2012:11) the South African form of modernism was influenced deeply by the apartheid system. The apartheid system became a peculiar form of modernism that had turned the modernist planning system into an autocratic planning system taking advantage of planning structural to form rigid constructs to enforce and promote separate and fragmented development in urban areas (Harrison, 2001:179).

4.3.2 The apartheid planning system

South African history reveals that the prevailing imbalances in neighbourhoods and inherent spatial development can be traced through the spread of British planning influence in the period 1910 to 1930 and the Second World War, together with post-war reconstruction efforts in the 1930s to the 1940s (Moroke, 2009:35). The most important spatial segregation laws that were passed around this period were the Natives Land Act (Act 27 of 1913), the Natives (Urban Areas) Act of 1923, the Development Trust and Land Act (Act 18 of 1936) and the Black (Urban Areas) Consolidation Act (Act 25 of 1945). These pieces of legislation laid foundation for residential segregation in urban areas. In much of reviews offered it appears that the high impact spatial historical development dates to 1948 (May & Rogerson, 1995; Mabin, 1996; Beinart & Dubow, 1995).

1948 marked the institutionalisation of the racial strife that shaped South African spatial distribution and composition, making location and spatial planning political instruments (Beinart & Dubow, 1995:3). The laws that enforced racial spatial segregation and/or related to spatial planning and development are summarised in Table 4.1 below.

Table 4.1: Summary of planning and related laws that enforced racial spatial segregation

Legislation	Spatial impact
Group Areas Act (Act 41 of 1950)	Forced physical separation between races by creating different residential areas for different races
Prevention of Illegal Squatting Act (Act 52 of 1951)	Authorised removal of blacks from public or privately owned land and facilitated establishment of resettlement camps to house these displaced people
Bantu Authorities Act (Act 68 of 1951)	Provided for the establishment of black homelands and regional authorities and, with the aim of creating self-government in the homelands
Natives Laws Amendment Act of 1952	Narrowed the definition category of blacks who had the right of permanent residence in towns. Section 10 limited this to those who had been born in town and had lived there continuously for not less than 15 years, or who had been employed there continuously for at least 15 years, or who had worked continuously for the same employer for at least 10 years.
Reservation of Separate Amenities Act (Act 49 of 1953)	Forced segregation in public amenities, public buildings and public transport with the aim of eliminating contact between whites and other races. "European Only" and "Non-Europeans Only" signs were put up. The act stated that facilities provided for different races need not be equal.
Natives Resettlement Act (Act 19 of 1954)	Permitted the removal of blacks from any area within and next to the magisterial district of Johannesburg or any adjoining magisterial district and their settlement elsewhere.
Group Areas Development Act (Act 69 of 1955).	It was enacted to effect the purpose of the Group Areas Act of 1950 namely to exclude non-Whites from living in the most developed areas which are restricted to whites
Preservation of Coloured Areas Act (Act 31 of 1961)	It was enacted to enable racially based land separations entrenching Coloured areas in the law. It prevented land in Coloured areas from being taken without compensation.
Group Act (Act 36 of 1966)	Established separate areas for different race groups and controlled the use, occupation and acquisition of ownership of land in those areas. It prohibited persons from other race groups from using, occupying or acquiring ownership of land in areas designated for a particular group.
Removal of Restrictions Act (Act 84 of 1967)	Empowered the administrators of provinces to alter, suspend or remove certain restrictions and obligations in respect of land in the province; to repeal the Removal of Restrictions of Townships Act, 1946; to validate certain proclamations of administrators.
Physical Planning Act (Act 88 of 1967)	It contained provisions relating to controlled areas, for particular purpose of specified land. It regulated land that applied only in white South Africa.
Black Communities Development Act (Act 4 of 1984)	Intended to provide for the purposeful development of Black Communities outside national states.
Land Use Ordinance (Cape of Good Hope), Ordinance 15 of 1985; Orange Free State Townships Ordinance 9 of 1969; Transvaal Town Planning and Townships Ordinances 15 of 1986; Natal Town Planning Ordinance 27 of 1949 in the former black townships	They were formulated to ensure creation of urban environments in which the differing land uses could be arranged so as to provide the minimum conflict and maximum harmony achieved through a suitable pattern of use zones. They were designed to serve the former white areas.
Amendment of the Prevention of Illegal Squatting Act of 1988	It extended the powers of local authorities to remove squatters (amplified its application to include rural areas) and summarily demolish their homes, and it eroded judicial powers common law principles pertaining to the rights of accused.
Physical Planning Act 1991	It is the last of the legislation regulating land use that applied only in white South Africa. It put much emphasis on the orderly physical development and subdivisions that continue promoting rigidity and inflexibility of planning instruments to perpetuate further spatial imbalances.

Source: Muller (2013:1-10); Van Wyk (2012a:49-54, 277-280) and South Africa (2014c:1-20).

In addition, as part of national spatial planning instruments the National Physical Development Plan (NPDP) was published in 1975. The aim of the policy was balancing regions in South Africa and rationalising infrastructure, taking into consideration future physical development patterns (Jonker, 2014:35). As part of stringent land use controls NPDP aimed at discouraging and ending growing concentration of people and economic activities in the relatively small metropolitan area (Van Wyk, 2012a:37). It is therefore obvious that apartheid spatial planning did no longer base its legitimacy on rationality and conscious. As put by Drewes and Van Aswegen (2013:23) NPDP physical development was arranged on the basis of political ideals.

Provincially, various Land Use Planning Ordinances that were published as summarised in Table 4.1 above facilitated control rather than development and management of cities. At local level, the apartheid era provided municipalities with minimal planning and developmental roles, regulating minor sub-divisions and zoning provisions, much of which was subjected to appeals to provincial levels (Jonker, 2014:35).

Analytically, both colonial and apartheid approaches to spatial development were deeply rooted in racial segregation and more so promoting the notion of so-called separate development, which entailed a physical expression of legal and socio-economic discrimination in the apartheid era. Basically, the government legislated where people lived in accordance with their race. In essence, under colonialism and apartheid, black people were oppressed, dispossessed of their land and other means of livelihoods and systematically stripped of their basic human rights including the right to vote and freedom of movement and association (South Africa, 2014c:2).

In another vein, when apartheid got a real grip, the SOWETO uprising in 1976 that was started by a large crowd of schoolchildren in protest against education system marked the collective rejection of apartheid and political revolt (Mabin & Smit, 1997:209). However, the educational issues further escalated to total resistance of overly oppressive bureaucratic system and increasing social and economic needs (Coetzee, 2012:11). Obviously, the conditions and circumstances surrounding the uprising dictated a planning system underlain by a need to reform the then existing spatial and social structure.

The Conversion of Certain Rights into Leasehold or Ownership Act (Act 81 of 1988) was enacted as part of a range of legislative provisions to that started dismantling apartheid laws (Muller, 2013:4). The criticalness of the land reform agenda such as broadening access to land rights for the whole population intensified. Some of the laws that were passed included the Abolition of Racially Based Land Measures Act (Act 108 of 1991) which repealed the majority of the racially-based land laws, the Upgrading of Land Tenure Rights Act (Act 112 of 1991) and the Less Formal Township Establishment Act (Act 113 of 1991) (Van Wyk, 2012a:51).

As apartheid was approaching its demise a considerable shift from the extreme discriminatory paternalism was witnessed. These laws established around this period preserved the apartheid land-use rights patterns – obstructing socially-driven land development (Van Donk, 2008:383). The reforms' successful implementation became a remote prospect as they were still within the parameters of apartheid thinking although they occasioned a new phase of attempted urban reconstruction (Mabin & Smit, 1997:209) and preparation towards democratisation – post 1992 to 1994 (Schoeman, 2015a:5). During this period, the planning system was tasked with overhauling the social, political, economic and cultural institutions of South Africa to bring them in line with the imperatives of a new democratic order (Asmal, 2001:3).

Therefore, as early as the 1990s the main challenge had begun to focus on overcoming the legacy of apartheid. In essence, spatial discrimination translated to permanent or difficult to eradicate physical and social exclusion of black people from the cities (Turok, 2012:50). Employing the urban system concepts involved an unequal system of public infrastructure and community facilities within cities as well as lopsided urban opportunities (Turok & Parnell, 2008:158). The main point is that black communities were evicted from urban areas and pushed to poorly serviced townships on the peripheries of the city (Findley & Ogbu, 2011:1). Whites lived in low-density residential areas fairly close to work, the city centre and in its immediate suburbs (Moroke, 2009:35). A “buffer zone” of 15 to 40 km, with very low- intensity land use, further separated the races (World Bank Group, 2007:14).

The execution of these racially segregated suburbs has continued to be driven by the same systems of spatial planning and land use management. Mabin and Smit (1997:194) indicate that the key source of urban planning came from continual efforts to dictate (and often restrict) the

of the neighbourhood variations. In various reviews and reflections offered, different case studies enable better understanding and insight in the origins and current forms of urban polarisation. According to Schensul (2009:15) seeing inequality in Durban is the only way to comprehend neighbourhood disparities as the case study reveals below (also reflecting on Figure 4.2 above).

In Durban, the capital of the province of KwaZulu Natal and a city of three million people on the south-eastern coast of South Africa, inequality reigns supreme. This urban space when stratified into two classes: core/suburban neighbourhoods and township neighbourhoods review of spatial and socioeconomic characteristics reveal that – for residents in core and suburban areas of the city – employing urban system's concepts where life resembles that of a fully developed city: easy commutes to corporate, commercial, and manufacturing jobs, relatively low unemployment, full services and infrastructure, solid housing stock, and many of same concerns and comforts of urban living around the developed world. In these areas, there is a wide range of wealth, access, and quality of life, but that range is contained within an overall level of development more characteristic of cities in Europe or the United States than in Africa.

Within ostensibly the same urban boundaries, though up to fifteen miles away from the urban core, the majority of Durban's residents experience a completely different city. Durban's African townships house over 70 per cent of the city's residents. These communities have limited roads, vast numbers of informal shacks, substandard formal housing, and little access to services, extremely high crime rates, limited health and education facilities, and massive unemployment. For those lucky enough to have jobs – fewer than half the wage labour force in many communities – commuting times to the central city are as high as two hours, mainly through a crowded and unsafe network of weakly regulated mini-buses.

Aligning the Durban case study to Figure 4.2 (Donaldson's 2001:13 interpretation) a practical concern is that the former black only townships remain racially segregated from other residential areas despite the RDP zones of housing and infrastructure intervention. Having experienced some form of residential desegregation, the former whites-only suburbs are becoming the primary resegregated spaces because of an increasing social polarization in the form of walled suburbs and estates, and the centralization of decentralized areas (absolute decentralization nodes develop into edge cities) form the foci of socioeconomic resegregation.

These spatial separations systematically still dissect most of urban areas in South Africa, acting as a dividing line for an unequal society divided in space (Bobbins, 2013:1364). Compounding the effects of spatial separations, it is apparent that the planning system failed to shape urban areas in line with socio-spatial realities. Although apartheid had effectively exerted strict control

and regulated spatial development – the enforced race-based residential segregation became problematic and continues to challenge black people due to the inherited apartheid system and rapidly escalating societal needs (South Africa, 2014c:6).

With the demise of apartheid, the repressive controls have been withdrawn, causing recovery in the rate of urbanisation (Turok, 2012:1). Clearly, urbanisation became inevitable as more people gained access to the cities in search for better livelihood opportunities for their future wellbeing (UN-Habitat, 2014b:7). In short, the success of huge political transition has attracted attention and/or created a platform to comprehensively discuss many different issues relevant to the post-apartheid patterns of internal migration in South Africa (Choe, 2008:22). This is necessary given that urbanisation is driving the economic and spatial development of cities.

Another form of change in the nature of the planning system was a response to sustainable development. Aligned to the relevance of sustainability, this includes introduction of new urban design concepts to facilitate spatial transformation – both pro-active and reactive (Landman, 2003:8) and socio-economic changes in South African neighbourhoods (Todes *et al.*, 2010:415). Therefore, both urbanisation and sustainable development are critical to inform and guide urban planning, since there simply cannot be sustainable development without sustainable urbanisation (UN-Habitat, 2014b:25). Intricacies of urbanisation are such that sustainable urbanisation benefits cities and neighbourhoods' development while unsustainable urbanisation brings about significant problems. This signals the need to adopt appropriate planning approaches in order to address the rate and nature of rapid urbanisation. This necessitates probing further into circumstances grounded in urbanisation realities and influence of apartheid planning.

4.4 Urban planning interim and on-going force: rapid urbanisation

The issue of rapid urbanisation is said to have intensified towards the end of apartheid in South Africa. It is argued that the end of apartheid has made possible the massive rural to urban migration of black Africans hitherto confined to rural homelands (Lanegran, 2000:270).

Figure 4.3 below shows the realities of the grand apartheid era which was a period of rural-urban migration influx control to its removal in 1986 and early democratisation period. The trend on restricted movement and freer movement will give insight of rural-urban net migration under the circumstances thereof.

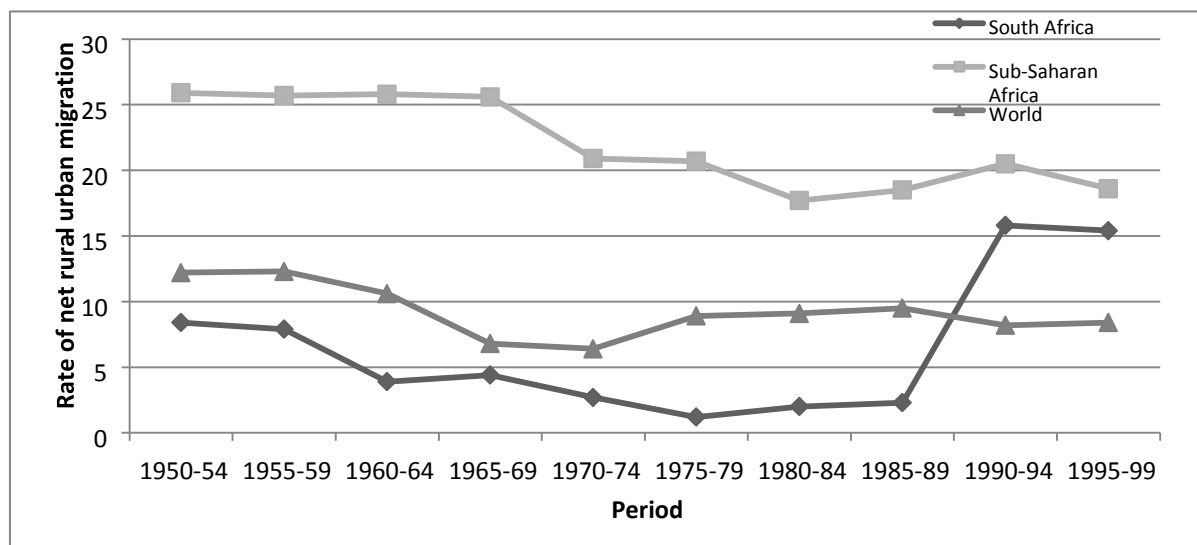


Figure 4.3: Grand apartheid and democratisation period estimated rates of net rural–urban migration

Source: United Nations (2001).

According to Figure 4.3 estimated rates of net rural- urban migration impacts are similar from the period 1950 to 1974 though smaller in magnitude in South Africa to those estimated by other groupings. Although the net rural-urban migration was already low level in the 1950s (though this could be pinned to the then low population of both rural and urban spaces) however, it shows that the rural-urban influx control effect was cascading as the net rural-urban migration rate fell to an even lower level in 1960 to 1989. The changing rural-urban migration echoes Hermanus Geyer differential urbanisation model. Defined:

Differential urbanisation is a dynamic model representing the collective outcome of individual migration decisions, based upon a mixture of social and economic factors impacting different population groups in different ways at different points in time, resulting in complex and contradictory regional migrations patterns (Geyer et al., 2012:2943)

Attuned to the relevance of Figure 4.3, differential urbanisation proposes that declining rural-urban migration might mean that counter-urbanisation has occurred while in reality a movement of black people to cities has been restricted and confined to rural and semi-urban areas in deeper periphery. A more balanced explanation is that augmentation of urbanisation can in turn be a major migration trend in the form of counter-urbanisation. In essence, the urbanisation reaches a phase of outward flow of people and economic activities from the city to sub-centres and satellite cities due to high concentration and/or the satellite city has started to assume the functions the city core used to fulfil (Geyer, 2003:91) – aligned to the patterns of Figure 4.3 would be from urban to rural.

However, in Figure 4.3 practical considerations suggest that counter-urbanisation has not occurred. By and large, mainstream counter-urbanisation has not taken place in South Africa (Geyer *et al.*, 2012:2943). Looking at the post-apartheid period, the signs that counter-urbanisation can occur are visible through heavy migration to cities. The implications of the last period are germane to the fact that rural-urban migration flux control was removed translating to free movement of black people and South Africa was moving towards democratisation. The reality underlying this change is that apartheid was a system designed to control movement and exclude dormitory townships from the mainstream economic network. However, conditions that inhibited moving permanently to urban settlements changed over time allowing free migration (Posel, 2003:1) and produced new opportunities for internal mobility (Crush *et al.*, 2005:1).

On the other hand, South Africa is experiencing rapid urbanisation, like most of Africa and other developing countries as revealed by Figure 4.4 below.

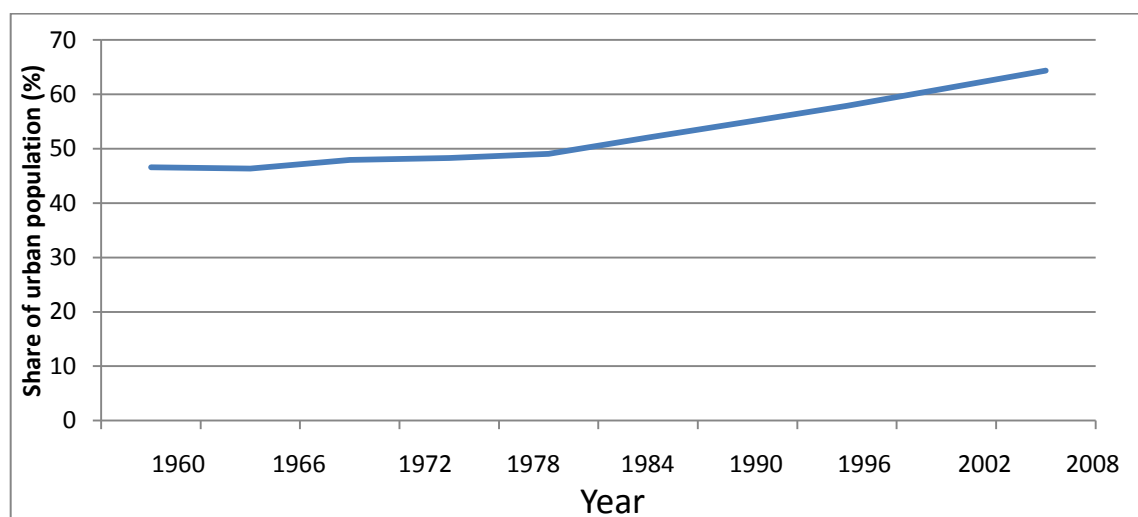


Figure 4.4: South African urban population (% of total)

Source: UN, World Urbanisation Prospects (2015).

According to Figure 4.4 the most rapid growth in South Africa started taking place around 1990. One of the major causes of this trend is the post-apartheid free migration of black people and urban areas higher economic growth and opportunities attracting job seekers. The UN-Habitat series of documents have noted that Africa's urbanisation is being driven to a larger extent by poverty, conflict and demographic change and has been led to a lesser extent by industrialisation and employment growth (UN-Habitat, 2012; UN-Habitat, 2013; UN-Habitat, 2014). These characteristics offer reflection of South Africa. Similarly, urbanisation is fuelled by the pursuit of employment and a better life, which are often lacking in rural areas (Okeke, 2014:24). This includes access to better facilities, higher standards of living, and perceptions of increased opportunities.

It is estimated that 71.3 per cent of the South African population will live in urban areas by 2030, reaching nearly 80 per cent by 2050 (UN, 2010:8). Interestingly, the individuals and households movement from rural areas tend to be high in poorly-developed dormitory townships along the city periphery compared with neighbourhoods in well-developed neighbourhoods. However, it is important to mention that these migrants' target is more into 'inner-core' cities where jobs are created and household incomes are higher (South Africa, 2014b:5) but are restricted by high residential rents (Yamauchi, 2010:35) and lack of informal housing markets (OECD, 2011:7). Urbanisation tends also to elicit gender and class-differentiated impacts (UN-Habitat, 2014d:1).

This kind of urbanisation is associated with disproportionate development, social exclusion, marginalisation, poverty and informality (UN-Habitat, 2014a:2).

The dominance of township in-migration is claimed to be responsible for many informal settlements growing around the townships. According to Lanegrn (2000:270) these new residents are reinforcing the apartheid landscape by creating squatter settlements on the urban edges of the old townships. Consequently, the available infrastructure is overburdened, creating tenuous living conditions for people who find themselves unable to secure affordable accommodation and livelihoods (Okeke, 2014:4). The central contention is that rapid population is outpacing even the most basic infrastructure needs in townships. This urbanisation of poverty (especially rise in poor settlements and decaying inner cities) is increasingly putting pressure on cities to deliver services (NASHO, 2013:18).

With respect to the issue of inner cities, in some cases the poor migrants have managed to gain access to the inner core cities. This is the case in Johannesburg; however, this has led to the evacuation of the central core of the city by affluent residents, businesses and professional practices (Cilliers, 2010:16). Analytically, this can be interpreted to mean the deterioration of the city CBD. From the spatial and economic perspective, planning system can optimise urbanisation to adjust the patterns of city clusters. The deduced understanding to the relevance of this research and reversing consequences such as in case of Johannesburg – the cities can achieve integrated development of urban and rural through economic and spatial dynamics – using small cities to lead big ones. This can gradually increase the comprehensive urban carrying capacity and improve the standard of their public services, including transportation, recreational facilities and resilience amongst others.

In general, most of Africa and other developing countries have similar characteristics that trigger urbanisation but the notion of separate development and apartheid policies in South Africa ushered in a unique pattern of migration unlike the familiar urban and rural differentiation. An important variable in understanding the consequences of apartheid with respect to urbanisation is that within the same urban boundary the migration is not the same between well-developed suburbs around the CBD to poorly developed dormitory townships along the periphery. Therefore, the urbanisation pattern ushers in empirical considerations to inform policy

frameworks in order to assist policy-makers in rethinking the various dimensions of urban sustainability and integration and their progressive realisation.

4.5 Post-1994: urban transformation and sustainability in South Africa

The first democratic elections, then took place in 1994, effecting the country's transition to democratic rule. In part, the problems of racial spatial segregation, socio-economic segregation and land-use development segregation kick-started democratization in South Africa and the transformation of urban planning. Both from the technical and ethnic perspective, broader sociopolitical transformation appeases the process and it is a mutually abetting activity. Therefore, the African National Congress (ANC), already prior to the transformation and during the transformation phase, realized that a new improved and more liberal form of planning was needed to provide an ideal framework for the new South Africa that could address the spatial and development flaws of the apartheid system, the new challenges (Coetzee, 2012:11) and re-integrate.

At this juncture, the most transformative urban policy (process/planning system/solution) the country has formulated in response to challenges of modernist apartheid planning system and rapid urbanisation amongst others had also to react to forces of sustainable urban development. The pre-1994 planning approach was in itself extensively criticized for being undemocratic and unsustainable (Mabin & Smit, 1997:213; Oranje & Merrifield, 2010:35; Coetzee, 2012:11; South Africa, 2014c:1-5). In essence, the world's local governments were urged to focus and set up long-term action plans for sustainable development – Local Agenda 21 (LA21). LA21, established at the 1992 United Nations Conference on Environment and Development or '*Earth Summit*' in Rio de Janeiro, Brazil (UNCED, 1992:1). Then, South Africa found itself at the crossroads – confronted with problems of lopsided urban form, increasing social and economic needs – and to align its urban policy to the LA21 blueprint for sustainable urban transformation.

On this basis, the inception of LA21 in the urban policy in South Africa becomes a point of entry into urban transformation and integration the research is dealing with.

4.5.1 Setting the scene: urban policy sustainability and integration theme transformation

The *United Nations Human Settlements Programme, UN-Habitat*, established in 1978 forms the basis for coordination of activities within the built environment. UN-Habitat strategy is to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter (Baltic University, 2015:1). The United Nations has various initiatives advocating for urban sustainability. Among the influence is the Millennium Development Goals (MDGs) in 2000 – MDGs derived ways to maximize its impact. With a vision of a world with reduced poverty and an intention to fight injustice the MDG incorporated an environmental sustainability goal. In 2005, the World Summit on Social Development introduced the concept of economic, social and environmental pillars of development (Hawley, 2014:2).

As the sustainability discourse, debates, thinking and research evolve the UN-Habitat strategic plan 2013 - 2016 vision is *knowledge and consensus building for new urban agenda* which its end will be marked by the conference with the theme '*The Future we Want: The City we Need*' that is to be held in 2016. In sum, demand for city forms envisions city that will ensure green, well-planned, inclusive, resilient, productive, safe and healthy attributes. Table 4.2 below presents a summary of the UN-Habitat strategic plan 2013-2016 that deals with sustainable urban transformation and integrative themes.

Table 4.2: Various UN-Habitat 2013-2014 sources advocacy on integration for urban sustainable development

Publication title	Year	Integration and sustainability perspective
The City We Need	2014	• The link between urban planning (design), building, and management of cities now will determine the outcome of efforts to achieve a sustainable and harmonious development tomorrow such as affording residents the opportunity to lead safe, healthy, and productive live. • The interface of land-use and design (well-designed cities) promote social inclusion, resilience, and prosperity. • It sets key principles and establishes essential paths for building a New Urban Agenda towards the Habitat III Conference.
Cities and Climate Change Initiative Newsletter (March 2014): Cities and Climate Change Initiative Newsletter	2014	• To integrate urban and peri-urban agriculture into city-level climate change strategies. • To contribute to climate change mitigation efforts by lowering the ecological footprint associated with food production.

City Changer Toolkit	2014	• To promote a positive vision of sustainable urbanization and to place the urban agenda at the highest level in development policies. • To build catalytic and transformative alliances by engaging the civil society, the business sector, the research community and governments in a global movement of converging interests, providing a knowledge and action-oriented platform to address urban challenges.
State of African Cities 2014: Re-imagining sustainable urban transitions, Regional State of the Cities Reports	2014	• It provides a framework for addressing urban challenges in Africa and the regional summaries identify regional demography and climate changes as the agents of change in African cities. • It argues for a radical re-imagination of African approaches to urbanism such as integrating urbanization and urban development in conjunction with supportive regional and continental economic and environmental dynamics.
Planning for Climate Change: Guide, A strategic, values-based approach for urban planners, Cities and Climate Change Initiative	2014	• Provides practical tools for addressing climate change through integration of different urban planning processes. • It raises awareness about the links to between urbanization and urban development challenges such as poverty and climate change.
Time to Think Urban: UN-Habitat Model Projects 2013/14	2014	• It argues for the identification of urban development priorities and possible interactions towards socially and economically equitable and environmentally friendly urban and national development. • It provides guidance on the future development of the national urban system and its spatial configuration concretized through national and regional spatial plans for territorial development.
State of China Cities 2010/2011: Better City Better Life	2014	• It provides information about policies and practices that have engendered sustainable urbanization in China. • It provides the experiences, lessons and challenges faced by China in sustaining its urban development in the context of rapid industrialization and urbanization with globalized world.
A New Strategy of Sustainable Neighbourhood Planning: Five principles - Urban Planning Discussion Note 3	2013	• Refines existing sustainable urban planning theories to build a new and sustainable relationship between urban dwellers and space based on five principles: adequate space for streets and efficient street network; high density, mixed land-use; social mix and limited land-use specialization. • It provides indication on how key features of sustainable neighbourhood and cities compact, integrated and collected through five principles mentioned above.
Time to think urban	2013	• Disseminate information to support governments at city, regional and national levels to improve policies, plans and designs for more compact, socially inclusive, better integrated and connected cities that foster sustainable urban development and are resilient to climate change.
Planning and Design for Sustainable Urban Mobility: Global Report on Human Settlements	2013	• Provides guidance on developing sustainable urban transportation systems. • Analyses the relationship between urban form and mobility, and calls for a future with more compact and efficient cities. • Highlights the role of urban planning in developing sustainable cities where non-motorized travel and public transport are the preferred modes of transport.
Transport and Mobility Snapshots: Report from UNACLA	2013	• Describes how cities have implemented creative solutions aimed at improved urban planning, traffic demand management, public transit, non-motorized transport, streetscape design, road planning, low-emission vehicles, and logistics planning. • Believes that dissemination of good practices and sharing of knowledge among cities are important tools in facilitating sustainable policies and solutions to practical issues.
The Competitiveness of Cities	2013	• It argues that competitiveness of cities is the outcome of (1) institutions; (2) policies and regulation of the business environment; (3) hard connectivity and (4) soft connectivity interaction and integration
Streets as Public Spaces and Drivers of Urban Prosperity	2013	• It argues that sustainability of cities is accompanied by the integration of the multi functionality of streets and recognizing the importance of public spaces interaction with proper streets layouts.
The relevance of street patterns and public space in urban areas	2013	• It focuses attention to the need for better spatial planning that gives due attention to the interface of streets and public spaces. • It contribute knowledge of well-designed street pattern contribution to urban connectedness.

Source: Own construction (2015) – sources retrieved from UN-Habitat website (publication and other materials) and summarized.

According to Schoeman (2015:2) the principle of sustainable development and the need for improved integration are not new debates, but rather an essential and continuous process that assists countries in mainstreaming their urban policies. In line with the integration theme dealt with in this research, UN-Habitat (2015:1) indicates that every new strategy is in continuity with the previous one, and this approach allows for a better response to emerging urban trends such as new demographic, environmental, economic, spatial and social developments.

Among the policy documents for local sustainability work, Chapter 28 in Agenda 21 forms the base (Baltic University, 2015:1). The municipal level is where integration and implementation of urban policy occur. The sustainable developmental role for local government is provided by the new South African Constitution. Since 1994, it appears the government has engaged extensively in legislative programmes that are designed to enable equal access to economic and social amenities. As a result the municipalities have formed the basis for this legislative mandate and port of entry for basic services delivery. The contemporary urban conditions invigorated municipalities as a driving force for the integration of communities and spatial form and the provision of basic services from the well off to the poor (Powell & Hendricks, 2009:9). Therefore, as an establishing mechanism (LA21) is believed to be capable of enabling the optimization of the entire urban planning system instead of single components fostering sustainable integrated development.

4.5.1.1 Local Agenda 21

Operationally, LA21 means that local authorities should construct, operate, and maintain economic, social, and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations to promote sustainable development (UNCED, 1992:1). In South Africa to place LA21 in the urban context, it has created platform and opportunity to promote integration on many levels (spatial, social and institutional) and in line with international trends. The strength of LA21 tackling neighbourhood inequalities has been its multi-stakeholder approach – bring together deprived urban neighbourhoods and affluent neighbourhoods to debate and reach local decision within the same urban boundaries. The case studies presented below demonstrate the transformative and integrative approach of LA21 in South Africa as well as its successes and failures.

In Johannesburg – the creation of Local Strategic Partnerships (LSPs) as the means by which the community and its key stakeholders would participate in the production of the Community Strategy was a further recognition of one of the best features of the LA21 experience in the 1990s: a new form of grassroots, participative community planning, facilitating for many councils a meaningful re-engagement with their local community (Williams, 2002:21).

Moreover, Durban at the local level under the auspice of LA21 achieved the establishment of Environmental Management Branch (EMB) that subsequently became the champion within the city – keeping LA21 and sustainable development on the local government's agenda (Roberts & Diederichs, 2002:10). However, the EMB in Durban has witnessed failures too, contributing to a situation where a strong and dedicated political champion has not yet emerged. This situation has been exacerbated by the perception that LA21 is a foreign concept largely concerned with green issues (Roberts & Diederichs, 2002:11).

Another example that highlights the failure of LA21 initiative is the Department of Environmental Affairs and Tourism (DEAT) that is responsible for promoting a consultative and participatory effort called Consultative National Environmental Policy Process (CONNEPP) aimed at creating a sustainable development strategy along the lines of promoting environmental protection and inclusive public participation (O'Riordan, 1998:99). In practice, CONNEPP failed to attract a wide cross-section of the many desperate poorer communities in South Africa partly due to its style of approach that welcomed the articulate and motivated, but tended to alienate those not used to public meetings to reading printed words (O'Riordan, 1998:99).

These shortcomings of LA21 application in some of the programmes in South Africa and other related municipalities components of strategic planning are dealt with in the Integrated Development Plans (IDPs). The IDP is the main strategic development plan that co-ordinates the physical, social, economic and institutional dimensions with the management and development structure (Van Schalkwyk & Schoeman, 2013:188-189). The IDP consists of several sectoral plans in the case of Durban to align the spatial planning and environmental issues instruments (sector plans) such as Spatial Development Framework (SDF), Environment Management Framework (EMF), Housing Sector Plans and the overarching principles of public participation (that is also applicable in the case of Johannesburg) will provide transformative solutions and interpret how implementation is to occur in space.

Overall, the on-going urban transformation and sustainability theme of promoting social inclusion, environment management and democratization in cities has its roots in LA21.

4.5.1.2 Integrated development planning

In basic terms the integrated approach is defined as being the coordination of multiple components into a single manageable system. With LA21 sustainability mobilisation and advocacy – the urban spectrum to be integrated and considered in the planning and development has broadened. Inevitably this leads to exceedingly complex planning systems exacerbating the inability to plan for the future and produce good plans. On the other hand in many empirical considerations sustainable solutions have been explicitly expressed as an important factor in urban planning and decision-making. A sustainability standard planning format is incorporation or consideration of social, economic and environmental dimensions when planning or developing plans for both urban and rural areas (UN-Habitat, 2014a:18).

In response to this sustainability pressure and the detailed legislated need for improved human settlements that will consolidate fragmented local service delivery and focus on spatial solutions in order to address socio-economic challenges (Mammon *et al.*, 2008:16) and reverse apartheid urban polarisation, the government of South Africa introduced integrated development planning as a strategic micro-level (local government) planning and development tool. In essence, municipalities in South Africa have undergone rigorous changes that have not only manifested in terms of structural adjustments, but included expansion of roles to respond to the changing policy and legislative frameworks (Malefane, 2010:18).

Therefore, integrated development planning is a statutory requirement for each municipality in South Africa – it binds municipalities to prepare a strategic development plan which extends over a five-year period. In strategic and legal terms there is the process or procedure to follow, adhere to and/or comply with to ensure the plan is produced within scientific proven methods. As a result a product of an integrated development planning process (inclusive of varying degrees of public participation) is an IDP document as illustrated in Figure 4.5 below.

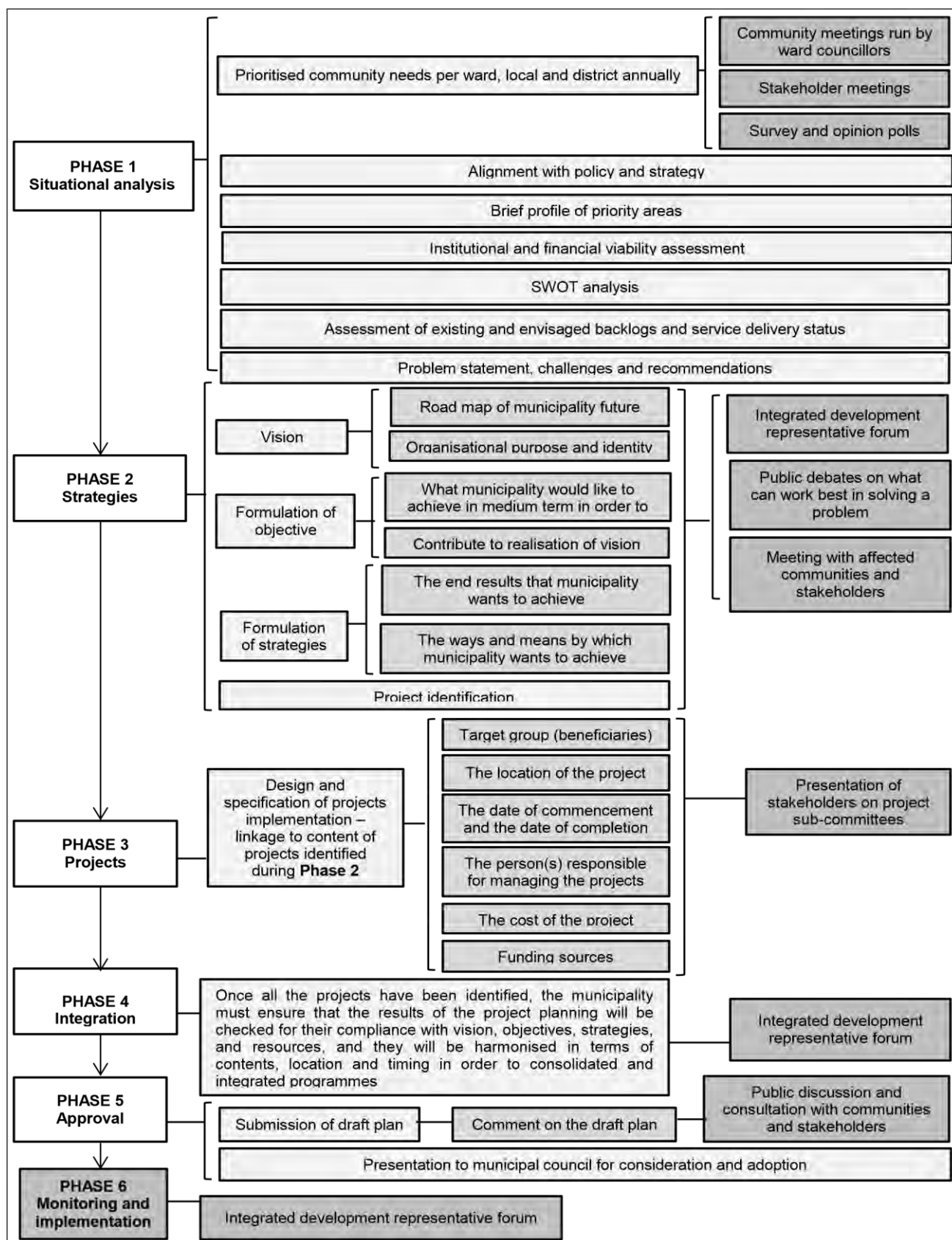


Figure 4.5: Integrated development planning process (phases) and planning participation

Source: Own construction (2015) from COGTA (2009:1); Venter et al. (2007:104-106)

From an assessment of the content of Figure 4.5 the integration is kick-started by objectives being converted into strategies, plans, projects and activities, with the ongoing monitoring effort to improve the process overtime. In basic terms, the IDP consolidates and integrates the communities' needs with local, provincial and national government programmes (COGTA, 2014:2). Although there is little concern for the national and provincial government level impact in the IDP process – both national and provincial levels determined priorities are devolved to local level by being incorporated into the IDP (SALGA, 2013:4). Identifying this primary strand of integration – the values of the IDP are enhanced as it reflects on the national and provincial level short-term, medium-term and long-term objectives to achieve functional and integrated urban areas.

The credibility of the IDP has been questioned in national high profile occasions/events and the role of national and provincial level in vertical integration has been highlighted and emphasized in order to arrive at a realistic/credible IDP. These events and their content relevance have been recorded, documented and discussed by various authors such as Donoghue (2013); Van Donk (2008); De Visser (2009) and government departments such as COGTA (2008-2014) (formerly known as Department of Provincial and Local Government (DPLG)) as summarised below.

The first documented event that the credibility or validity of the IDP was questioned is the '*South African Presidential Participation Programme (Presidential Izimbizo)*' in 2005. The Rustenburg Local Municipality IDP was singled out and its credibility was questioned by the leadership of the country (COGTA, 2014:2). It is in this light that the president in the 2006 '*State of the National Address*' called for social actor mobilization towards realistic IDPs and credible local economic development (Van Donk 2008:353).

In addition, COGTA (2014) documented a series of activities and efforts to produce a realistic plan that can be implemented since the inception of IDPs in 2000/1. The criticism that was levelled from various quarters is that the IDP is a 'wish-list' and therefore unrealistic. In response, the DPLG, the Presidency, the Provincial Local Government Departments and the Offices of Premiers, including many other organs of the state have initiated the IDP Hearing 2002, IDP Hearing 2005, Project Consolidate, IDP Engagements 2006/7, IDP Analysis, and the Alignment and Harmonisation Process, with the view to improving municipal, provincial and national planning and performance.

COGTA (2014), Donoghue (2013); Van Donk (2008) and De Visser (2009) in pursuing an understanding of necessary and sufficient conditions among others for the IDP to be authentic in order to have well-planned, well-served and functional cities, highlighted factors and issues

that impact on integrated development planning (inclusive of vertical integration) that need to be considered to produce a credible IDP as summarized below.

Table 4.3: Components of a credible IDP, issues that compromise it and actions to improving the credibility of the IDP

Components of credible IDP	Issues that compromise the credibility/quality of the IDP	Actions to improving the credibility/quality of the IDP
Enshrine constitutional mandate and cognizant of spheres of government competencies	General weakness in municipal institutions (overwhelmed by corruption, nepotism and inefficiency)	• Consciousness by a municipality of its constitutional and policy mandate for developmental local government, including its powers and function
Pro-poor comprehensive inclusive planning taking into consideration diversity	Participatory processes flawed, artificial and exclusionary of the poor	• Commitment by the municipal council to ensure community empowerment and participation in the crafting, budget choices, implementation of this plan and monitoring through sincere communication, participatory and decision making mechanisms • Recognition of informal settlements
Collaboration/partnership between government and non-government	Lack of collaboration between government and non-governmental	• Building broad based partnership with social partners
Effective forms of planning and land use management	Fragmented urban management.	• Insights into the trade-offs and commitments regarding economic choices, planning for sustainable human settlements, integrated service delivery, and a resources and financial plans that can enable the implementation of such plan • Comprehensive description of the area (environment and its spatial characteristics)
Integrated budget planning of all sectors development	Failure to filter and prioritize needs in with realistic budgetary and competency parameters	• The key deliverables for the next five years supported by measurable budget and translated into Service Delivery Budget Implementation Plan
Engagement of the national and provincial sector departments within the IDP	• The lack of intergovernmental action and alignment to government wide policies, plans, priorities and targets. • Local level not aligned with national and provincial priorities	• Awareness by the municipality of its role and place in the regional, provincial and national context and economy including its intrinsic characteristics and criteria of success
Capacity and capability of municipality	• Lack of capacity within many local authorities to implement the legislation and government policies.	• Determines the capacity and capability of the municipality to implement the plan and how capacity/capability would be improved through the Workplace Skills Plan. • Understanding market economy development trends

Source: Own construction (2015) from COGTA (2014); Donoghue (2013:164-170); Van Donk (2008:353-355); De Visser (2009:288-289).

As stated by Donogue (2013:166) the concept of IDP prompts a consideration of two approaches namely: vertical approach (cross-disciplinary activities) which combines various national sector plans at local scale and extreme complexity of operationalizing an urban planning (horizontal) approach has to integrate – in one place – all the dimensions of local government in order to achieve coherent urban growth and development. The IDP process considers sectoral interventions as the main approach to guide urban planning and development. Attention is drawn to the fundamental principle and/or the selling point of the IDP that rollout of national and provincial level should not be prevalent at cost of bottom-up developmental style of planning (De Visser, 2009:288).

A good, realistic IDP is therefore one that is guided by community participation throughout its design and review processes, is resourced by realistic budgets and adequately skilled workforce and can be implemented and monitored (COGTA, 2014:2). Active public participation enhances effectiveness and efficiency of local governance systems (HDA, 2013:35). Thus the idea of public participation arises to expand to urban democratic citizenship and urban management. From a spatial planning and urban management perspective it allows communities for an appropriate basis to reflect on their neighbourhood's spatial distortions and socio-economic challenges.

Based on the participatory principle of sustainable development the strategic urban development niche of the IDP attempts to reverse the apartheid regime exclusionary approach to urban and regional planning through collective action that orients the demands of the urban poor to the public goods. Thus an active role of communities is needed to ensure that the integration of economic, social and environment dimension is directly connected with the issues of infrastructure services/public services and goods accessibility and availability, poverty alleviation, housing, spatial transformation and creation of equal opportunities to transform fragmented South African cities into functional cities (South Africa, 2014a:14). This highlights a paradigm shift attributed to be concurrent in lieu of a sequential pursuit of diverse objectives (Mashamba, 2008:32). It can be claimed that it is in this light that to make cities work out sector plans had been introduced as a guide to integrated development planning. The organization and integration of various sector plans are demonstrated by Figure 4.6 below.

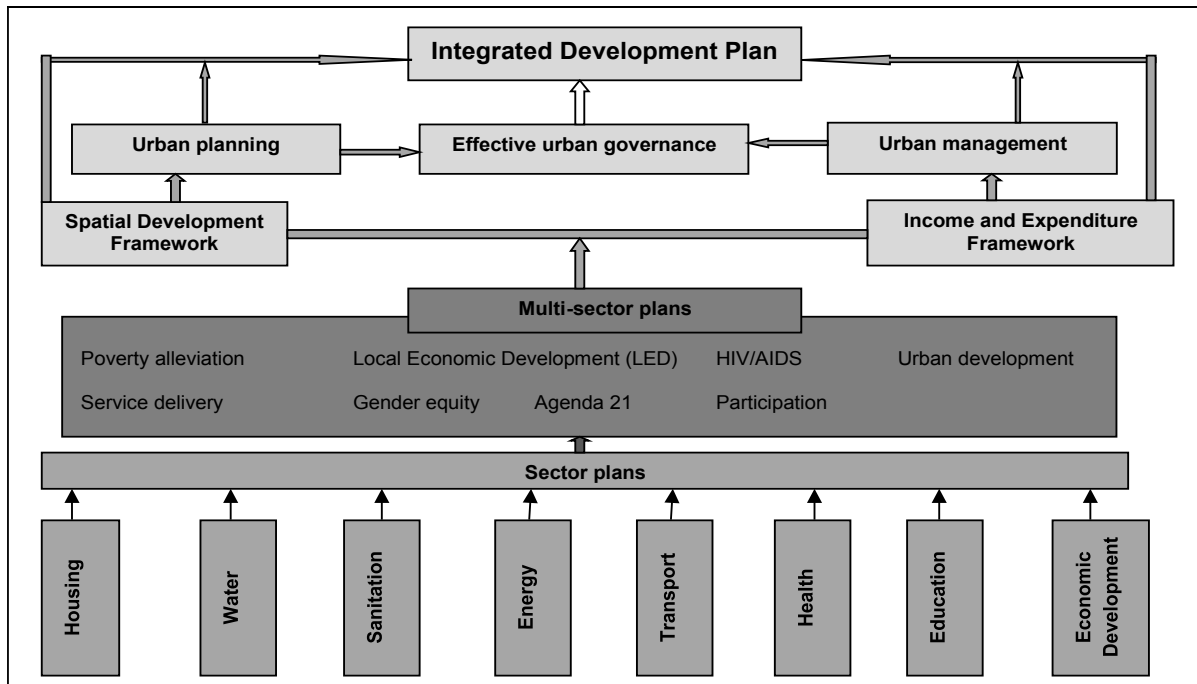


Figure 4.6: IDP synthesis of urban planning and urban management

Source: Own construction (2015) from the IDPs guidelines (2008).

They are all designed in such a manner that they provide a framework for integrated development planning to perform efficiently to guide urban land development. In essence, the IDP guides urban land development taking into consideration that SDF is a critical requirement of IDP (Donoghue, 2013:165). Either as an effort from all sectors plans (emphasized integration) or sole sector plan – the plan(s) are subsequently conveyed spatially in the form of an SDF (Etingoff, 2015:28). As to the niche of urban development the SDFs provide adequate parameters to aid in the development of the entire city.

The IDP as a single common strategic plan has one major critical stage to unlock for it to fulfil its successful developmental implementation. The integration of various sectoral plans – precisely perfect alignment and integration - does not, however, automatically translate to equitable urban development and give direction to urban land development – effective implementation becomes even more important. This includes drawing roadmaps of scales of urban intervention – how the smallest scale of urban planning and development (neighbourhood) needs to be a component of city-region plans, on the basis of its link with all other issues in the nexus. This is in line with a very important theme of this research which is

that city-region integration is most likely to be realised if neighbourhoods and precincts assume the lead in using their resources and power to shape the urban system as illustrated by Figure 4.7 below.

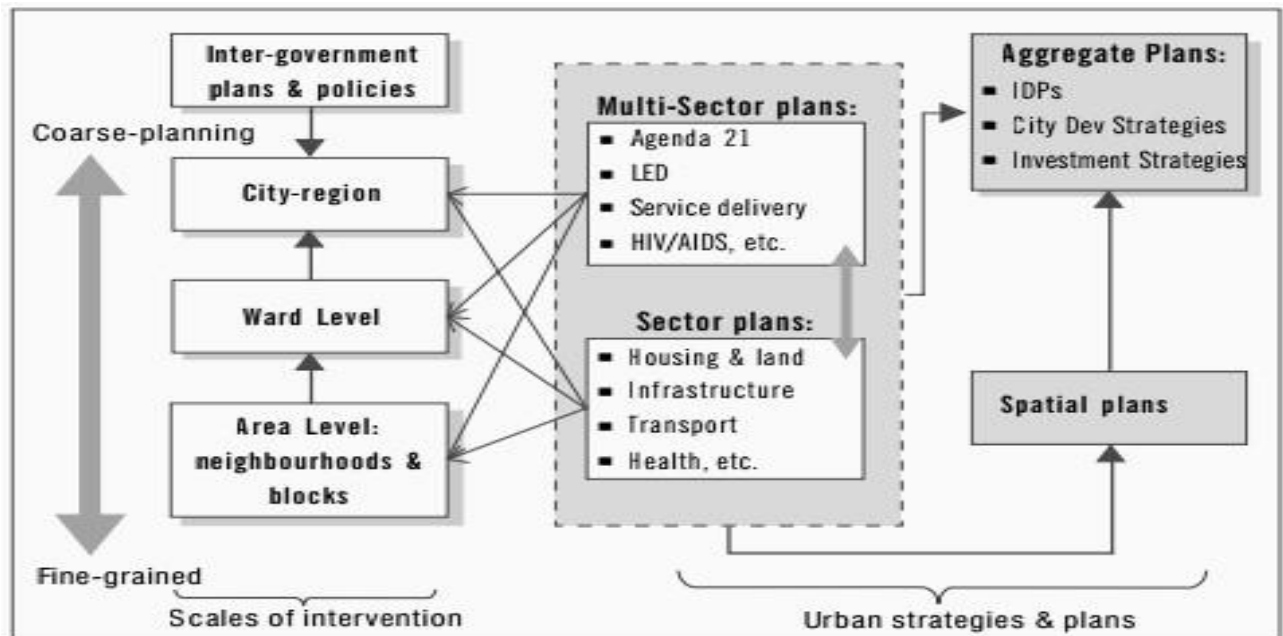


Figure 4.7: Tapestry of urban development plans and nested scales of intervention

Source: Pieterse (2004:93).

In order to have a better sector plan cross-cutting approach – based on the integrational reality of housing at different scales of urban intervention – housing must comply with the broad economic policy, land use options must provide for a safe and healthy environment as well as viable communities making a positive contribution to integrated neighbourhoods (Bogopa, 2005:28). For example, at the city-region level, inability or deficiency of the housing sector plan to align and integrate with spatial plans and local economic development (LED) initiatives is expressed spatially by neighbourhoods' peripheral housing developments located far from socio-economic opportunities. Obviously, there is some synergy between city-region and neighbourhoods – although detrimental in this case for neighbourhoods formed on the basis of government-subsidized housing development (programme) and land use development. The housing process and therefore the planning of housing must be aimed at economically sustainable housing solutions (Scheepers, 2000:22).

On the basis of this approach, it is clear that IDP implementation should be defined in the coordination of all scales of urban intervention and sector plans to enhance provision of basic services, environmental management, economic growth, transparency and public accountability, poverty eradication, land use management and equitable urban areas. Although from this perspective it appears that much can be gained from multi-sector good alignment and integrative cross-cutting effects of housing and land use will then leave less to be desired in South Africa.

Consequently, housing is one of the key organizing sectors of the IDP's coordinated action. The key outcomes of the IDPs sector plan integration are obtaining sustainable human settlements, robust and inclusive local economies (COGTA, 2014:2). Housing is over-represented in various high profile documents such as *Breaking New Ground* (BNG) – utilised as an instrument for the development of integrated sustainable human settlements (South Africa, 2004:5). This implies that ideas of urban planning and urban management are productively synthesised in the IDP. It is clear that without organized structures which can enable synchronized action, sector plans are more prone to poor implementation. However, breaking up of integrated place-specific plans into manageable components is critically important for implementation of urban land development.

Overall, the IDP as conceived within the parameters of practical reality, remains a key transformative mechanism in shaping urban growth and development of post-apartheid cities (Donoghue, 2013:164). In addition, a host of legislation and government policies makes it a statutory requirement for governments including local government to structure and manage their administration, budget and planning processes in order to promote the social, environmental and economic development for the community (Bogopa, 2005:16).

4.5.2 Recent formations in the national planning

As the country celebrated in 2014 a historic milestone of 20 years of freedom and democracy (South Africa, 2014c:2) the challenge remains to socially, economically and spatially grow, develop and normalise all components of national, provincial and local spatial systems within the context of a transformed policy and legislative framework (Schoeman, 2013a:4). This includes formulating progressive policies, sectoral programmes that need to be translated into focused city-level strategies that deliberately align housing, transport, land use and economic decisions to ensure sustainable integrated urban development, urban equality and improved quality of life (Turok, 2012:1). This outlines key principles of statutory and strategic planning on working through the complexities of the urban planning system in South Africa.

In response to this outlined challenge, the new policies that are gradually emerging are attuned to complexities of urban spatial transformation to facilitate more coherent urban development. Based on a mutual understanding and appreciation of the fact that urban transformation is a process the new policy is relative to new challenges and continues to build upon the existing policy of historical experience.

With the aim of actualizing sustainable integrated development (UN-Habitat, 2014a:4) and reacting to the concerns about the lingering spatial impact of apartheid on towns and cities (Drewes & van Aswegen, 2013:4) and attuned to the relevance of discussion above – the transformation of spatial planning and development sets the scene. These are the Spatial Planning and Land Use Management Act (SPLUMA) (2013) and the SPLUMA Regulations (2015); the National Development Plan (NDP) (2012) and Draft Integrated Urban Development Framework (DIUDF) (2014). In addition, several transport planning policy documents such as the National Transport Master Plan (NATMAP) (2011) and the Draft National Land Transport Strategic Framework (NLTSF) (2014) form the new compact of urban transformation instruments and recognize the need for strategic integration.

4.5.2.1 Spatial Planning and Land Use Management Act

The recent call for urban spatial transformation and integration has been given shape in the Spatial Planning and Land Use Management Act, 2013 [Act 16 of 2013] (SPLUMA). This Act provides a framework for spatial planning and land use management, specifies the relationship between the spatial planning and land use management system and other kinds of planning, provides for inclusive developmental, equitable and efficient spatial planning at the different spheres of government, and promotes greater consistency and uniformity in the application procedures and decision-making by authorities responsible for land use decisions and development applications (South Africa, 2013:10).

Highlighting the substance of the Act, Schoeman (2015a:1) asserts that within the approval of SPLUMA and later its Regulations on the 23rd March 2015, the last bastion of spatial and statutory planning legislation reform from the previous political dispensation within municipalities was transformed. According to Santo (2002:80) for the new law to be firmly established it is expected not only to respond to new circumstances, but also according to some historical pattern. In the same manner, SPLUMA is expected to encourage efficient and integrated land development by promoting the integration of social, economic, institutional and physical aspects of development that were previously disregarded.

Therefore, these forces of gravitation caused by the need to achieve integrated sustainable urban development particularly transformed spatial structures – the Act has reacted to it by setting new principles, norms and standards. This ensures uniform spatial planning procedures and conformity to the Act. On this basis, SPLUMA becomes not only an optional planning tool but mandatory for urban integration – municipalities must incorporate and adapt. The Act applies throughout the country and no legislation not repealed by this Act may prescribe an alternative or parallel mechanism, measure, institution or system on spatial planning, land use management and land development in a manner inconsistent with the provisions of this Act.

4.5.2.2 National Development Plan

The new channel of development in the RSA is the National Development Plan (NDP) which includes specific programmes to restructure the urban areas. The programme invokes earlier viewpoints on the criticalness of strategic planning as its horizon is expected to be reached by 2030 – it is clear that its guiding objectives are confined to long term strategic planning. The NDP defining factor is its ability to identify and acknowledge simultaneous trends and integrating them. It intersects government, community and business to address and focus their attention on education and skills, decent accommodation, nutrition, safe communities, social security, transport, faster economic growth and higher investment, job opportunities and good governance (National Planning Commission, 2012:2). Therefore, spontaneously moving towards much more practical problems in the townships, the NDP guiding objectives can be interpreted to mean:

- Upgrading- all informal settlements on suitable, well-located land by 2030;
- Having more people living closer to their places of work;
- Having better quality public transport;
- Having more jobs in or close to dense, urban townships;
- Encouraging and capacitating community participation;
- Facilitating channels of partnerships between government, the private sector and civil society.

Derived from these objectives, the plan identifies the task of improving the public services, quality of life attributes, land-use development and inclusive development critical to achieving urban transformation. In a case such as this where urban transformation is an objective, the context of integration allows alignment of NDP objectives to areas where policy change is required to ensure sustainable development.

4.5.2.3 Integrated Urban Development Framework

The Integrated Urban Development Framework (IUDF) is an on-going attempt in South Africa aimed at responding to apartheid patterns of segregation and mono-functional use. At the neighbourhood level – neighbourhoods' variations in terms of spatial, socio-economic characteristics among others have been a key policy issue in South Africa. The key steps towards integrated urban development are presented and documented by the South African Cities Network (SACN) in conjunction with the Presidency and the DPLG draft document that was produced in 2008 titled '*Towards a National Urban Development Framework*'. The latest draft document that is produced in September 2014 is titled '*Integrated Urban Development Framework*' (IUDF). These documents highlight that the need for integrated urban development is continuously embraced. Remarkably, has become the heart of the NDP vision for urban South Africa that states:

By 2030 South Africa should observe meaningful and measurable progress in reviving rural areas and in creating more functionally integrated, balanced and vibrant urban settlements. For this to happen, the country must: clarify and relentlessly pursue a national vision for spatial development; sharpen the instruments for achieving this vision; [and] build the required capabilities in the state and among citizens.

The IUDF 2014 is primarily formulated to respond to this vision and Chapter 8 of the NDP that aims to transform human settlements and the national space economy. Figure 4.8 below summarises and presents urban challenges Chapter 8 of the NDP attempts to address.

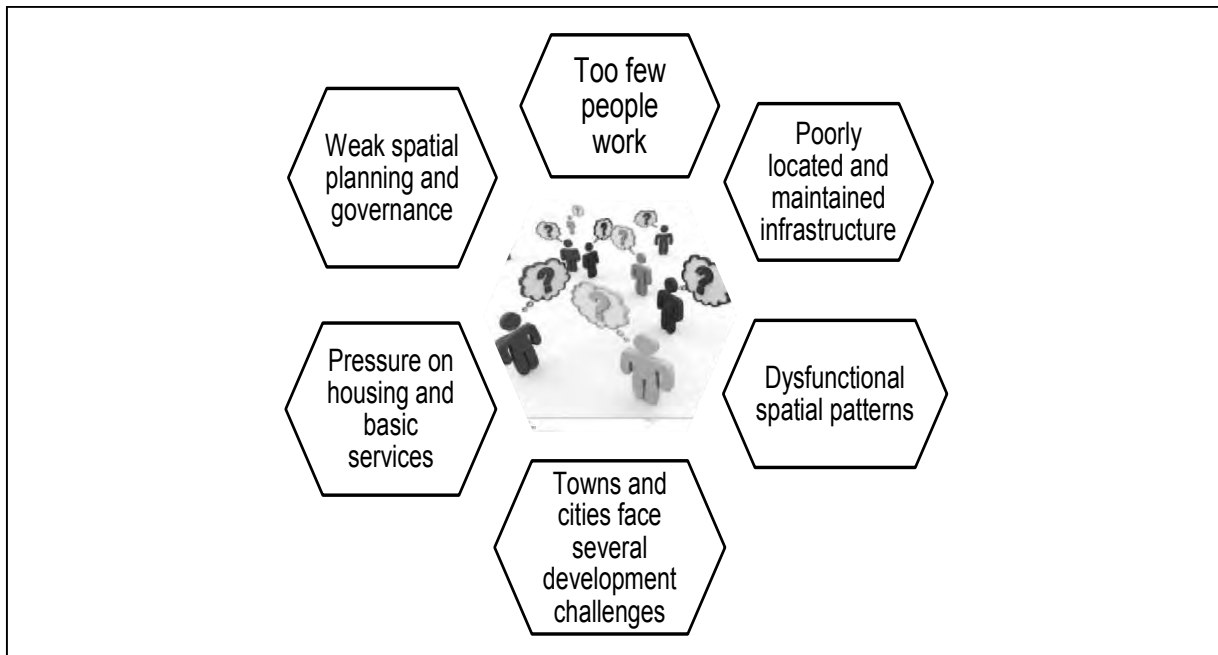


Figure 4.8: Urban challenges as presented by Chapter 8 of the NDP

Source: COGTA (2015:5).

The nature of these challenges in South Africa has been argued to be a result of policies that approach urban system components programmatically in isolation such as dealing with spatial patterns without acknowledging issues that exacerbate poverty. In addressing these challenges the approach that the IUDF proposes echoes Mammon *et al.* (2008:4) suggestion of urban economy approach inclusive and integrated – provide economic growth simultaneously with land-use development, social upliftment and poverty eradication. Therefore, to fulfil this transformative and integrative vision, four strategic goals introduced and these goals inform the priority objectives of seven policy levers as outlined in Figure 4.9 as shown below.

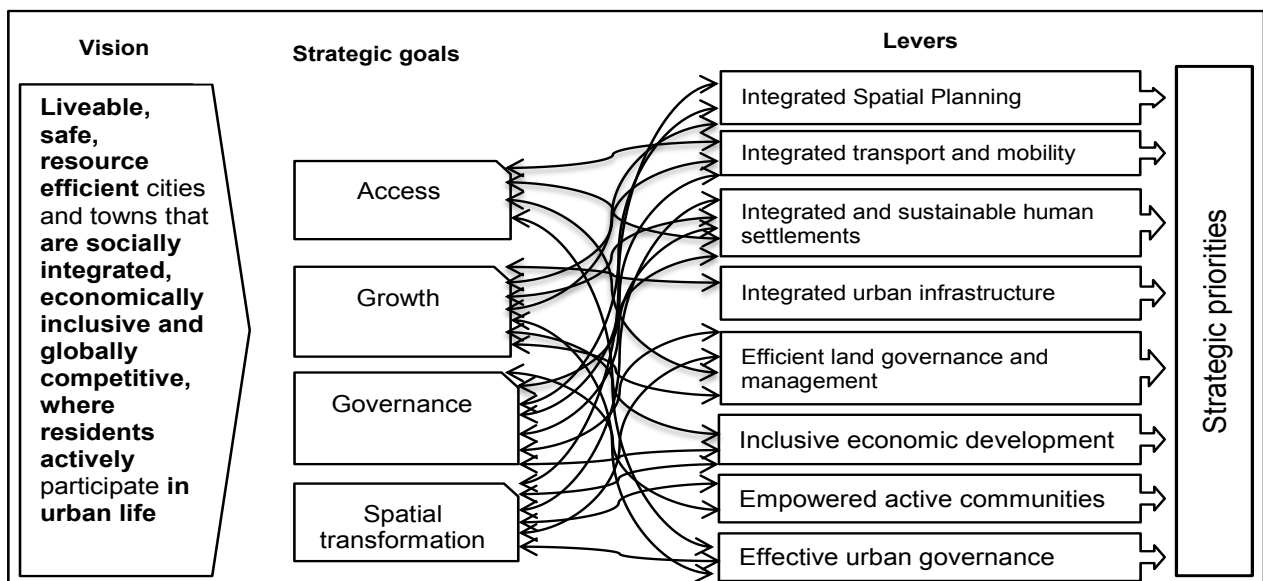


Figure 4.9: Integrated urban development framework

Source: COGTA (2015:13).

The policy levers have no hierarchical significance – they should not be interpreted as such although there is a strategic vertical link in achieving urban development. From the transformative and integrative perspective being dealt with the workings of policy levers and consolidated effort to address urban development are summarised below by COGTA (2015:13).

The levers are premised on an understanding that (1) **integrated spatial planning** forms the basis for achieving integrated urban development, which follows a specific sequence of urban policy actions: (2) **integrated transport** that informs targeted investments into (3) **integrated human settlements**, underpinned by (4) **integrated infrastructure network systems** and (5) **efficient land governance**, which all together can trigger (6) **economic diversification and inclusion**, and (7) **empowered communities**, which in turn will demand (8) **deep governance reform** to enable and sustain all of the above.

In the context of urban integration, municipalities are strategically placed to influence spatial trends - the “where” of development is guided at national level (COGTA, 2015:30). This means that municipalities in conjunction with supportive regional and national perspective provide an opportunity to institutionalize strategic approaches as implementation and success of the framework in executing integrated urban development depends on proactive intergovernmental

collaboration. The end result of IUDF is expected to be cities and towns that are liveable, integrated and multi-functional, in which all settlements are well connected to essential and social services, as well as to areas of work opportunities (COGTA, 2015:30). Conclusively formulated policies, passed laws and regulations as well as various local and international initiatives express the need for urban transformation and coherent spatial organizing framework.

4.5.2.4 National Transport Master Plan (NATMAP) 2050

The NATMAP (2050) goal is to develop a dynamic, long-term, sustainable land use/multi-modal transportation systems framework for the development of networks infrastructure facilities, interchange termini facilities and service delivery that shall be demand responsive to national/provincial/district and/or any socio-economic growth strategy, and/or any sectoral integrated spatial development plan (NDOT, 2011:1). The following objectives were formulated:

- Maximisation of the utilization of existing infrastructure facilities;
- Development of future infrastructure facilities and improve operations;
- Development of an up to date and accurate central land use/transportation DATA BANK – Geographic Information Systems (GIS);
- Promotion of effectiveness and efficiency of maritime transport;
- Integration of multimodal public passenger transportation;
- Determination of the economic role of transport; and
- Integration of transport and land use development.

Phases of the NATMAP (2050) planning process graphically presented in Figure 4.10 include:

- The Status quo, Phase 1, provides an overview of current transportation systems, land-use, demographic and socio economic conditions.
- The Analysis, Phase 2, dissects the status quo information and accordingly this phase represents the quantitative analysis of different land-use/transportation integrated scenarios.

- Forward Planning, Phase 3, is not “what is, or what will be, but simply what ought to be”. Given a clear understanding of the current situation and the impacts on society as derived from the previous two phases, this phase is about the alternative strategies that can be followed in the future and consequently also the decisions to be made.
- The Agenda for Action, Phase 4, takes the alternative strategies to its final stage, focusing on an action agenda for implementation (NDOT, 2011:1).

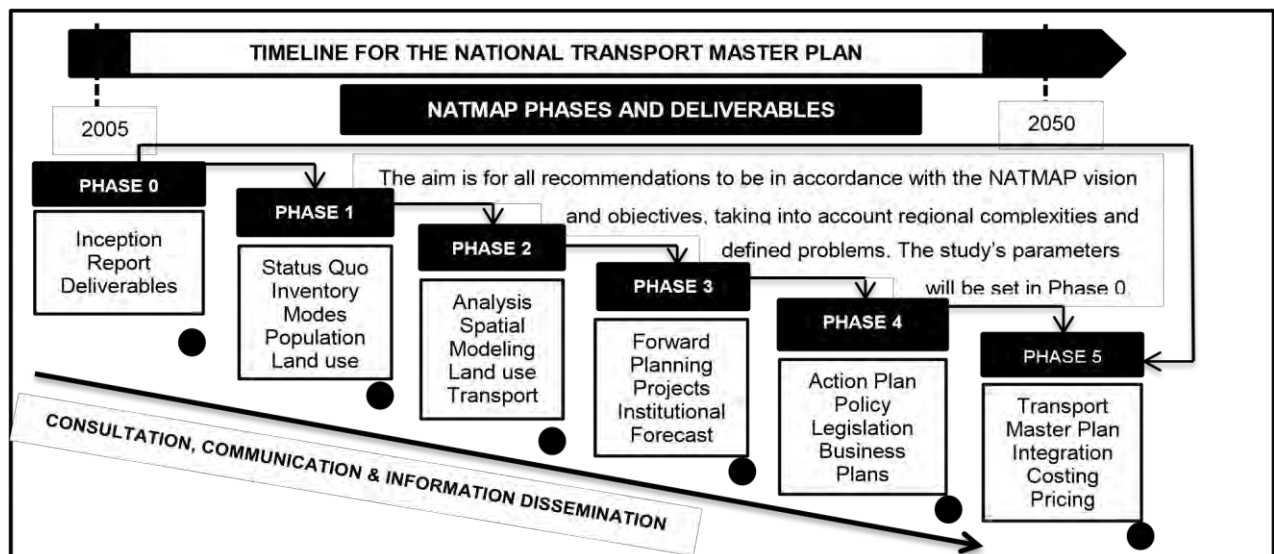


Figure 4.10: NATMAP (2050) project Phases

Source: Schoeman (2013a:9).

These phases provide a framework for multimodal transportation systems and various land-uses coordinated and rationalized through a sustainability theme that is intended to cut across the entire scope of NATMAP.

4.5.2.5 National Land Transport Strategic Framework (NLTsf) 2014

The NLTsf is a legal requirement initiated by Section 21 of National Land Transport Transition Act (NLTTA) (Act 22 of 2000). NLTsf (2014) is a summary document of the findings of the qualitative literature review/assessment and research of policy documents, strategies and plans

relevant to transport (NDOT, 2014:1). This includes focusing on obtaining and reviewing elements most useful in understanding the current transport context. The framework also addresses implementation mechanisms and measures for monitoring the implementation of the NLTsf. Thus, the NLTsf is being reviewed in line with any changes in the transport policy, strategy and planning environment (NDOT, 2014:1).

The NLTsf (2014) is the Phase 2 of the NLTsf (2006) Phase 1 which embodied the overarching national five year (2006 to 2011) land transport strategy, which gives guidance on transport planning and land transport delivery by national government, provinces and municipalities for this five year period (South Africa, 2006:6). The NLTsf (2014) revises, reviews and rationalizes the functional areas framework or/ strategic themes of the NLTsf (2006). The NLTsf (2014) contextual framework, processes and detailed activities undertaken that inform the strategic approach are:

- A qualitative literature review/assessment and research of policy documents, strategies and plans relevant to transport;
- An assessment of the national strategic policy documents and functional areas policy documents with a view to:
 - ✓ Define the vision and objectives of transport,
 - ✓ Understand role of transport in achieving these wider objectives,
 - ✓ Determine key broad national strategic issues facing the transport sector,
 - ✓ Determine blockages to progress and roll out of national transport strategies,
 - ✓ Determine key challenges facing transport nationally,
 - ✓ Determine headline transport initiatives/projects being considered over next five years (e.g. investments, studies, plans, implementation (PRASA Rolling Stock programme, IRPTN, Transnet)) and others.
 - ✓ Define drivers of change in transport,
 - ✓ Assess each statutory requirement of the NLTsf in line with any changes in the transport policy, strategy and planning environment as well as any gaps in the current framework,
- Assess the current national transport vision/objectives of NLTsf;
- Synthesize and document literature gathered;
- Review NLTsf (2006) document in terms of:
 - ✓ Relevance of context given changing national policies and legislation;

- ✓ Consideration of whether the contents of the framework are still relevant and valid,
- ✓ Recommendation of the NLTSF report format and contextual amendments, and
- ✓ Review of the functional areas with a view to rationalizing them to ten strategic planning areas (NDOT, 2014:1-2).

The contextual framework reviewed and within which this NLTSF has been prepared is transport-related legislation and its associated policy in presented by Table 4.4 below.

Table 4.4: NLTSF (2014) policy documents reviewed

High level strategic documents	Functional area policy documents
• Department of Transport Strategy (2012 – 2014) • National Development Plan (2012) • National Transport Master Plan 2050 (2011) • Moving South Africa (1998) • Gauteng Integrated Transport Plan (2013) • White Paper on National Transport Policy (1996)	• National Freight Logistics Strategy • Road Freight Strategy • PRASA National Strategic Plan (2012) • Transnet Long Term Planning Framework (2012) • Non-Motorised Transport (NMT) Policy (2012) • Spatial Planning and Land Use Management Act (2013) • Transport Action Plan (2010) • Public Transport Strategy (2007) • Public Transport Action Plan (2007 – 2010) / Public Transport Strategy and Action Plan (PTSAP) • Action Plan to guide the provision of accessible public transport systems in South Africa, draft for discussion (2009) • Implementation Strategy to guide the provision of accessible public transport in South Africa (2009) • National Spatial Development Perspective (2006) • A guide to the national planning framework (2009) • Rural Transport Strategy of South Africa (RTSSA) (2007) • Final Draft National Scholar Transport Policy (2009) • Road Infrastructure Strategic Framework for South Africa (2006) • Green paper: National Strategic planning (2009)

Source: NDOT (2014:2-3).

The NLTSP (2014) outlines each document about current and future courses of action/thinking and form the basis of understanding the current realities in transport while considering other developments within the transport policy in South Africa.

4.5.3 Policy and legislative framework guiding urban transformation and alignment of urban planning tools

The old planning system (pre-1994) and recent formations in the national planning highlight massive transformative process of urban policy and legislative framework. One of the reasons is that legislation and policy lose value and usefulness overtime when applied as an instrument of spatial and socio-economic engineering (Bogopa, 2005:20). It is also important to note that with democratisation in 1994 the new government inherited a segregated and fragmented spatial system guided by an ineffective policy and legislative framework (Schoeman, 2010:2).

The urban transformation in the democratised South Africa commenced with the interim Constitution on 27th April 1994 that was replaced with the Constitution of the Republic of South Africa Act of 1996 promulgated on the 4th February 1997. With enactment of the new Constitution the urban planning started taking shape. The Constitution incorporates the New Bill of Rights of which its selected provisions are applicable to the implementation of law on urban planning. According to Ghandhi and Ruiz-Rufino (2015:108) the basic theory is that including rights in constitutional text facilitates enforcement of activity in order to uphold, respect and protect human rights. With respect to planning the clauses in the Bill of Rights that play a significant role are property and housing clauses (Van Wyk, 2012a:50) and as well as environment clauses in the scope of this research. The summary and relevance of these clauses is presented by Table 4.5 below.

Table 4.5: Clauses in the Bill of Rights that underpin transformative planning

Environment clause (Section 24)	Property clause (Section 25)	Housing clause (Section 26)
• Promote environmental protection and grant the right to healthy environment: *Prevent pollution and ecological degradation; *Promote conservation; and *Secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development.	• Promote right of access to land and other related reforms: *Ensure transformation and legitimacy of land reform (restitution, security of tenure reform) and redistribution efforts (to increase access to land and housing); *Related reforms (access to water and mineral resources).	• Promote right of access to housing: *The provision is premised on the grounds of: →Housing needs; →Housing and land needs; →Financial assistance. *Prevents demolition of homes and expulsion from land of people referred to as squatters without court judgement.

Source: Own construction (2015) – extracted and summarised from the Constitution of RSA (1996).

In cases where other rights provisions are significant to land rights and other interventions in the development process Van Wyk (2012a:50) indicates that the right to just administrative action and the Promotion of Administrative Justice Act (Act 3 of 2000) will ensure that fair and just procedures are followed. The direct legislation guiding and regulating urban planning transformation framework is the SPLUMA (2013). In essence, the SPLUMA is the framework legislation that facilitates transformation and alignment of spatial (land-use) planning with other urban planning instruments specifically transportation planning and environmental management in this context. This framework provides for monitoring, coordination and review of spatial planning and land use management system (NDOT, 2014:11).

However, the success and/or realization of coordination and transformative solutions for urban planning depend on understanding what can be referred to as coordination points. For example, the concept of accessibility is the key to understand how transportation and land use relate to one another (it hinges on highway expansions and additions, transit expansions and additions, airport expansions, intermodal freight facility expansions and additions, etc.) (Rodrigue *et al.*, 2013:42). The interaction between transportation and land use at local level in South Africa from policy and legislation framework perspective is defined by:

- Land use densification;
- Mixed land use activities;
- The enforcement of land use and traffic policies;
- Accessibility;
- Centralised transportation data and land use data and GIS files;
- Mobility etc. (Schoeman, 2015b:18).

These relationships between transportation and land use qualify incorporation of transport planning in the land use planning of South African cities (Van Wyk, 2012b:119). Therefore, urban planning transformation, issues of inclusive development and operational activities of land use planning (spatial planning and environmental management) from transportation planning perspective according to Schoeman (2013c:521) are prescribed and guided in the National Land Transport Act (NLTA) (Act 5 of 2009) and its promulgated regulations. The NLTA (2009) transformative solution is to provide for public transport formalization and transport planning improvement. The NLTSP (2014) provides the supportive mechanism identifying national policies and legislative objectives that set the direction for full transformation and integration of multi-modal sustainable transport and land-use planning (NDOT, 2014:36).

Where the urban planning transformation requires environment management or the planning and development of urban areas interacts with environment the role of environment in development is prescribed and guided by the principles and procedures set out in the National Environmental Management Act (NEMA) (Act 107 of 1998) in order to ensure integrated environmental management of activities. The detailed NEMA principles that provide for relationship between environmental management and planning as well as drive urban transformation land use planning and development; resources conservation and utilization; and waste management and pollution control in the context of this research.

The ultimate goal is to guide the transformative process and alignment between spatial planning, environmental management and transportation by incorporating all functional area policy and legal framework applicable to urban planning and development. Spatial (land use) planning, environmental management and transportation planning transformation are directed and guided by range of policies and plans (Schoeman, 2015b:16). The policy and legislative

framework guiding alignment in terms of policy and legislative framework is contained in Table 4.6 and Table 4.7 below.

Table 4.6: Core policies guiding the interface between spatial planning, transportation planning and environmental management

Urban and regional planning	Transportation planning	Environmental management
*Reconstruction and Development Plan (1994) *Growth, Economic and Redistribution Strategy (1996) *White Paper on South African Land Policy (1997) *Urban Development Framework (1997) *Rural Development Framework (1997) *White Paper on Water and Sanitation (1997) *White Paper on Local Government (1998) *Green Paper on Development and Planning (1999) *National Integrated Rural Development Strategy (2000) *King Report II on Corporate Governance for South Africa (2002) *White Paper on Spatial Planning and Land Use Management (2001) *National Spatial Development Perspective (2003) *Mining Charter (2003) *Construction Charter (2005) ASGISA, 2006 *National Spatial Development Perspective (2006) *Housing Atlas (2006) *Sustainable Human Settlement Planning: Resource Book (2008) (NDoH) *Area Based Planning. Department of Rural Development and Land Reform (2008/2009) *NPC: A Guide to the National Planning Framework (2009)	*White Paper on National Transport Policy (1996) *Moving South Africa (1996) *Rural Transport Strategy for South Africa (2003) *Draft minimum requirements for the preparation of integrated transport plans (ITP) (2007) *NDOT: Public Transport Strategy (2007) *NDOT: Public Transport Action Plan (2007-2010) *National Land Transport Strategic Framework (2006-2011) (2002) (Draft) *NDOT: Road Infrastructure Strategic Framework for South Africa (2006) *NDOT: Rural Transport Strategy for South Africa (2007) *NDOT: Implementation Strategy to Guide the Provision of Accessible Transport in South Africa. (2009) *NDOT: Final Draft National Scholar Transport Policy (2009) *NDOT: Transport Action Plan (2010) *NDOT: National Transport Master Plan 2050 (NATMAP) (2010) *NDOT: Road Freight Strategy for South Africa (2011)	*Global Biodiversity Strategy: Guidelines for action to save, study and use earth's biotic wealth sustainably and equitably (Published by the WRI; IUCN and UNEP in 1992) *Balancing the Scales: Guidelines for increasing Biodiversity's Chances through Bioregional Management, (Published by the World Resources Institute in 1996). *Minimum requirements for the Classification, Handling and Disposal of Hazardous Waste (Second Edition (1998) (DWAf) *Integrated Environmental Management Guidelines Series (1992) *DEAT: An Environmental Policy for South Africa (Green Paper) (1996) *White Paper on Integrated Pollution and Waste Management for South Africa (2000) *Strategic Environmental Assessment in South Africa (2000) *DEAT (2002a) <i>Screening, Information Series 1</i>, Department of Environmental Affairs and Tourism (DEAT), Pretoria. *DEAT (2002b) <i>Scoping, Integrated Environmental Management</i>, Information Series 2, Department of Environmental Affairs and Tourism (DEAT), Pretoria. - DEAT (2002c) <i>Specialist Studies, Information Series 4</i>, Department of Environmental Affairs and Tourism (DEAT), Pretoria. *DEAT (2002d) <i>Impact Significance</i>, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria. *DEAT (2004a) <i>Overview of Integrated Environmental Management</i>, Integrated Environmental Management, Information Series 0, Department of Environmental Affairs and Tourism (DEAT), Pretoria. - DEAT (2004b) <i>Criteria for determining Alternatives in EIA</i>, Integrated Environmental Management, Information Series 11,

*NPC: Green Paper. National Strategic Planning (2009) *Comprehensive Rural Development Programme. Department of Rural Development and Land Reform (2009) *National Planning Commission Diagnostic Overview (2011) *National Development Plan (2012) *Draft Integrated Urban Development Framework (2015)	*NDOT: Non-Motorized Transport (NMT) Policy (2012) *NDOT: Department of Transport Strategic Plan (2012-2014) *TRANSNET: Long Term Planning Framework (2012) *PRASA: PRASA National Strategic Plan (2012) *NDOT: Draft National Land Transport Strategic Framework (NLSF) 2014) *NDOT: NATMAP Synopsis Report (Draft) 2015	Department of Environmental Affairs and Tourism (DEAT), Pretoria. *DEAT (2004c) <i>Environmental Impact Reporting</i>, Integrated Environmental Management, Information Series 15, Department of Environmental Affairs and Tourism (DEAT), Pretoria. *Strengthening Sustainability in the Integrated Development Planning Process (2001) *State of the Environment Reporting: Draft Guidelines for Local Municipalities (2005) *DEAT Information Series (2004-2009) *National Framework for Sustainable Development (2008)
*Refer to list of abbreviations for abbreviations.		

Source: Schoeman (2015a:7).

Table 4.7: Core legislative framework guiding interface

Urban and regional planning	Transportation planning	Environmental management
*National Building Regulations and Building Standards Act (103 of 1977) *Town Planning and Township Ordinance, Ordinance 15 of 1986 *Land Use Ordinance (Cape of Good Hope), Ordinance 15 of 1985 *Removal of Restrictions Act 84 of 1967 *The Less Formal Township Establishment Act, Act 113 of 1991 *The Physical Planning Act, 88 of 1967 (Sec 6, 8 and 11) *Development Facilitation Act, Act No. 67 of 1995 (DFA) *Constitution of the Republic of South Africa (108 of 1996) *Bill of Human Rights (1996) *Physical Planning Act (88 of 1967) *Municipal Structures Act (117 of 1998) *Restitution of Land Rights Act (22 of 1993) *Interim Protection of Informal Rights Act (76 of 1995) *Prevention of Illegal Eviction from Unlawful Occupation of Land Act (19 of 1998) *Reconstruction and Development Programme Act (79 of 1998)	*Advertising on Roads and Ribbon Development Act (21 of 1940) *Fencing Act (31 of 1963) *National Land Transport Transition Act (Act 22 of 2000)* *Urban Transport Act (Act 78 of 1977) *National Transport Interim Arrangements Act (Act 45 of 1998) *Transport Appeal Tribunal Act (At 39 of 1998) *Cross Border road Transport Act (Act 4 of 1998) *Road Traffic Act (Act 29 of 1989) *National Road Traffic Act (Act 93 of 1996) *The South African National Roads Agency Limited and National Roads Act (7 of 1998)	*Health Act (63 of 1977) *Water Act (54 of 1956) *National Water Act (36 of 1991) *Water Services Act (108 of 1997) *National Environmental Management Act 107 of 1998 *National Environmental Management: Air Quality Act (39 of 2004) *National Environmental Management: Waste Act 59 of 2009 *National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) *National Environmental Management: Protected Areas Act 57 of 2003 (NEMPAA) *National Heritage Resources Act 25 of 1999 (NHRA) *Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) *World Heritage Convention Act 49 of 1999

*Municipal Systems Act 32 of 2000 *Development Facilitation Act 67 of 1995 (DFA) *Physical Planning Act 125 of 1991 *Less Formal Township Establishment Act 113 of 1991 (LEFTEA) *Subdivision of Agricultural Land Act 70 of 1970 (SALA) *Removal of Restrictions Act 84 of 1967 *Community Land Reform Act 28 of 1996 *Housing Act (107 of 1997) *National Land Use Management Bill (Draft 2008) *Local Government: Municipal Integrated Development Planning Regulations, 2001. *Spatial Planning and Land Use Management Act (SPLUMA) (Act 16 of 2013) *R. 239 SPLUMA Regulations (23 March 2015)	*National Land Transport Act, 2009 (Act 5 of 2009) and Regulations (R.1208, 2009) *R. 877 National Land Transport Act (5/2009): *National Land Transport Regulations on Contracting for Public Transport Services.	*Biodiversity Act 10 of 2004 - R.543: National Environmental Management Act (107/1998): *Environmental Impact Assessment Regulations, 2010 (33306) *R.544: Listing Notice 1: List of activities and competent authorities identified in terms of sections 24 (2) and 24D (33306) *R.545: Listing Notice 2: List of activities and competent authorities identified in terms of sections 24 (2) and 24D (33306) *R.546: Listing Notice 3: List of activities and competent authorities identified in terms of sections 24 (2) and 24D (33306) *R.547: Environmental Management Framework Regulations, 2010
*Refer to list of abbreviations for abbreviations.		

Source: Schoeman (2015a:8).

In line with this policy and legislative framework, the statutory manifestations, implications and provisions are discussed alongside the forces of sustainable urban transformation and demand for integrated urban development (inclusive of creating economic opportunities, social upliftment and poverty alleviation). As a result, these planning instruments (spatial planning/transportation planning/environmental planning) evolution and interfaces are critical for urban planning and development transformative solutions.

4.5.3.1 Spatial planning transformation

The pre-democracy negotiations between the African National Congress (ANC) and the National Party (NP) established nine provincial units of government that replaced the four provinces of the apartheid era (Acton, 2013:138) should be used as point of entry to analyse the post-1994 subsequent transition and transformation of spatial context. With new nine provinces that were operationalized in the democratic South Africa, one of the reasons for their

establishment is to contribute towards national building – develop national integration and to construct new identities across spatial realities of ethno-linguistic diversity (Webb, 2002:140). As a matter of fact provincial governments share many areas of concurrent power with the national government (to ensure role in education, housing, welfare, environment, health, tourism, agriculture, trade, etc.) and also has powers related to local government (Reynolds, 1999:23).

These nine provinces mark the new era of reconstruction in spatial planning in South Africa. According to Mabin and Smit (1997:217) the dividing consequences of apartheid were remedied by the creation of nine provinces that in turn unified local authorities and initiated the formation of new planning departments to plan for re-integration of housing, land use, towns and townships, cities and homelands that have been long divided. These nine provinces offer the ostensible support to national spatial development in terms of administrative procedures. This includes the creation of nine Provincial Spatial Systems (PSS) as a result of National Spatial System due attention to the latter development. Each PSS consists of wall-to-wall municipalities inclusive of Metropolitan, District and Local Municipalities.

In essence, a wall-to-wall local government system provides for municipalities to be established throughout the territory of South Africa (SALGA, 2011:1). The cornerstone of this approach is to facilitate the integration of communities and spatial systems (regions, core areas, rural orientated areas and various corridors and networks linking the core areas and hinterland of the spatial systems). SALGA (2011:1) summarized this spatial transformation of municipalities as it occurred in three phases as indicated in Figure 4.11 below:

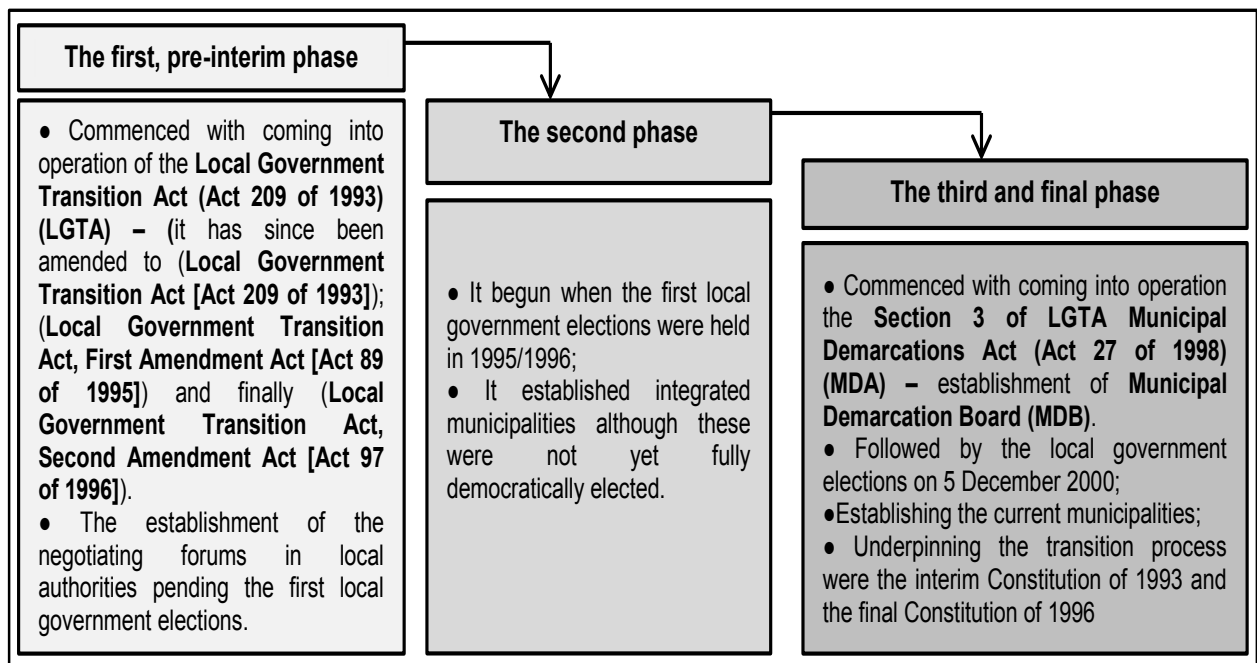


Figure 4.11: Transformation of local government – municipal demarcations

Source: Own construction (2015) – content derived from SALGA (2011:1).

Central to the municipal demarcations is the Local Government Transition Act, 1998 (Act 117 of 1998) for the establishment of Local Government Demarcation Boards in respect of various provinces (South Africa, 2008:1). This Act has been amended a few times, first in 1993 (Local Government Transition Act [Act 209 of 1993]); 1995 (Local Government Transition Act, First Amendment Act [Act 89 of 1995]) and finally 1996 (Local Government Transition Act, Second Amendment Act [Act 97 of 1996]). Although the focus here is the division of the spatial systems it is worth noting that this Act introduced a strategic tool called the Integrated Development Plan (IDP). The process of the IDP really gained momentum as a central element of local government planning processes, key policy issues and planning priorities highlighting its importance. As the result, in 1998 the Local Government Municipal Structures Act (Act 117 of 1998) was enacted and central to its functional areas is the IDP as it will be discussed later.

Returning to the division of the spatial systems the core to the entire transformative process is the MDB role in ensuring that an ideal structure of municipalities that are spatially integrated, institutionally sound, functionally viable and developmental in orientation is achieved (MDB, 2013:1). This means that the MDB role and responsibilities exceed the delineation of municipal

boundaries and administrative processes. Schoeman (2015a:4) argues that it entails the content of regional planning, spatial system realities and potential that are not addressed in an inclusive fashion. There is some criticism levelled at demarcation processes on the basis that the authorities wanted to impose a uniform municipal government system on the entire country in total disregard of its suitability to the rural and traditional areas (Ray & Reddy, 2003:272).

In various reviews, the consensus is that rural and urban strategies cannot be discussed as separate items (National Planning Commission (2012:5); UN-Habitat (2014a:3); UN-Habitat (2014b:2)). The NDP encourages an integrated policy approach but brings it to attention that rural and urban agenda and priorities on the other hand are different. In basic terms, separate approaches to the planning and management of land-use for example are critical but handled through coherent policy.

Therefore, the chronological understanding of the context within which the events and activities that have impacted on the existing spatial development and transformation is critical. In order to understand this relationship the planning and development before and since democratization in 1994 should be noted and discussed accordingly in linear fashion. The following four development phases are proposed:

- Phase 1: Urban and rural formation phase (1652 to 1948).
- Phase 2: Urban and rural separation (fragmentation) phase (1948 to 1994).
- Phase 3: Urban re-integration phase and rural development (post 1994 to 2010).
- Phase 4: Urban reconstruction, integration and consolidation phase (Post 2011 to the present) (Schoeman, 2015a:5).

For the purposes of this research this phased guide is adopted. Phase 1 and phase 2 have already been discussed in a linear fashion in the preceding section. Therefore, in this section, phase 3 and phase 4 are discussed in the same fashion. With the knowledge that new policy entails new visions, objectives and developmental perspective lacking in existing statutory planning (Mabin & Smit, 1997:217) phase 3 and phase 4 are discussed in the integrated manner as outlined below.

Therefore, returning to post-1994, and directing attention to the problems of lopsided urban form/development and to redress policies to facilitate comprehensive spatial form and reintegrate urban areas the transformative policies and legislation framework have emerged. The RDP was the first developmental policy established by the democratic government in the form of the White Paper for Reconstruction and Development (South Africa, 2014b:33). The RDP became the first South African integrated socio-economic policy (Powell & Hendricks, 2009:295). Achieving this would require consideration of spatial dynamics, hence the policy's subsequent attention to the poor people who were excluded from the city – located far from job opportunities and critical public facilities. In essence, the RDP spatially interpretable social and economic challenges to the previously disadvantaged poor people and its commitment to public goods and services to correct the mistakes of the past urban areas are grappling with is the foundation and the basic point of departure for the policy framework in RSA.

The deepened fragmented spatial system has challenged the course of the RDP. Briefly, these characteristics of spatial planning were later restructured by formulation of the new law namely the Development Facilitation Act (67 of 1995) which in turn lost ground to Spatial Planning and Land Use Management Act, 2013 [Act 16 of 2013] (SPLUMA) and the spatial challenges have also provoked the establishment of the National Planning Commission (NPC) in 2011 and its mandate executed through the formation of the National Development Plan (NPD) in 2012.

The RDP programme was established alongside the Growth, Employment and Redistribution (GEAR) programme as a twin developmental programme. According to Du Plessis and Napier (2001:3) although the RDP in all its facets was a government reconstruction and development priorities programme since being devolved to the national line, departments has been substituted by GEAR. GEAR objective was to boost economic growth to 6 per cent, the minimum rate needed to create jobs, extend service delivery and overcome inequality (Powell, 2012:14). In terms of national development, clearly GEAR was meant to be an economic strategic enhancement formula (NASHO, 2013:22). However, proposed benefits of this latter strategy planned to trickle down to the impoverished masses have in recent years failed, losing its grip to the pursuit of a policy direction increasingly reflecting the notion of a democratic developmental state (Pieterse, 2004:15).

Despite the criticism levelled against these policies it is clear that their drafting underlined the widening of development inequality, the RDP particularly, with its main concern that housing and other services should be located geologically, environmentally, and with respect to economic opportunities and social amenities (ANC, 1994:13). This implies that development initiatives in disadvantaged neighbourhoods and affluent neighbourhood are equally important. As a result the RDP provides the strategic base to address the spatial inefficiency and lack of services in disadvantaged neighbourhoods. As put by Atkinson and Marais (2006:24) throughout the RDP, there has been a focus on the needs of all citizens, regardless of where they may live as its base for transformative development.

To achieve this, the RDP office was established – this is the same office that developed the Development Facilitation Act in order to cease transcending of the old planning system allowing for its mechanisms to be bypassed which allows old planning mechanisms to be bypassed. This was supported by formulation of Land Development Objectives (LDOs) (newly Integrated Development Plans (IDPs)) directive for all authorities to set LDOs and establishment of a Commission to lead further change in planning (Mabin & Smit, 1997:217). Number of strategies were coordinated by the RDP Office before its closure early in 1996 and downsized to Development Planning Branch – this includes Urban Development Framework (UDF) and Rural Development Framework (RDF). Interestingly, the RDP office did not follow a one size fits all strategy when addressing spatial imbalance challenges, fostering economic growth and promoting equity in both urban and rural areas.

The UDF was located in the Department of Housing in 1997 (currently known as the Department of Human Settlements) based on the foundation laid by the RDP policy document. The Framework's vision was to develop spatially and economically integrated centres, affording the inhabitants economic and social opportunities, good housing and infrastructure in a more participative manner (Drewes & van Aswegen, 2013:24). Alongside South African strategic objectives the UDF expressed the country's allegiance to the UN-Habitat agenda goals. The RDF was compiled by Department of Land Affairs (DLA) (currently Department of Rural Development and Land Reform (RDLR)). The RDF aim was to achieve rapid and sustained reduction in absolute rural poverty incorporating issues of migration and urbanization. Both UDF and RDF proposed linkage between rural and urban areas to promote economic relations

(Atkinson & Marais, 2006:25). Despite these well-intended efforts the apartheid spatial patterns still persist in cities alongside rapid urbanization and there is still little coordination between urban and rural areas.

The IUDF (2014) through its proposed eight levels responds and/or builds more specifically in Chapter 8 of the NDP reflects the necessity of groundwork that both the UDF and the RDF attempted to achieve. For example, the UDF and the RDF proposed that small towns close to agricultural production areas can be strategic locations to create rural-urban linkages serving both rural and urban populations. Therefore, the IUDF spatial transformation strategic goals were aligned to the NDP demand for integrated urban aims to forge new spatial settlements and integrated transport and mobility premised on the understating that they will trigger economic diversification and social inclusion. From the rural-urban perspective, to achieve this RDP (Section 2.5.17) indicates that rural areas [peri-urban] require more frequent public transport to enhance access to affordable services and improved facilities at an affordable cost.

Following the linear fashion, after establishing DFA, eventually the spatial planning scene changed significantly with the promulgation of the Constitution (Act 108 of 1996) (Schoeman, 2015a:6). The spatial transformation need escalated and the Municipal Structures Act [117 of 1998] (MSA) and the Municipal Systems Act [32 of 2000] were promulgated. The requirements set out in the MSA stipulate the need for Integrated Development Plans (IDPs) which in turn give effect to Spatial Development Framework (SDF) and relevant to Land Use Management in the integrated development planning process. The IDPs facilitate the relationship between the local authority and its community (Homann, 2005:138) encouraging the integrated approach the urban transformation advocates. This will inform SDFs on participation level decision-making for space interpretation linked to national and regional trends. SPLUMA requires that SDFs be aligned to its terms of provision, development principles and norms (Schoeman, 2015a:6).

Parallel to (or as a result of) DFA the Green Paper on Development and Planning (1999) came about due to delays in land development approvals in some areas. Its emphasis was on consistent and uniform direction for spatial planning direction and spatial justice (development that upholds human rights, protect environment and preserve resources and optimize the use thereof) (South Africa, 1999:1). The spatial planning system of the Green Paper on

Development and Planning spawned modified MSA (2000) SDFs and encouraged more flexible LUMS. The call for spatial transformation intensified with the National Spatial Development Perspective (NSDP) (2003) and (2006). At the core of NSDP (2003) the priority was that the development should take place in areas where the greatest need (high levels of poverty) and highest potential for economic growth and investment coincided. However, it tended to leave a lot of room for spatial interpretation, lacked specific guidelines and measures in development potential areas (Drewes & van Aswegen, 2013:20).

In the light of the constraints of the NSDP (2003) this led to the formulation of the NSDP (2006) which expresses the commitment to develop and redress the general urban-rural bias by disseminating spatial data to target the areas of greatest poverty and diffusion of economic activity from major urban areas. The programme for the spatial transformative solution is entwined with an understanding of the spatial economy guided by infrastructure investment to describe spatial manifestations of the main social, economic and environmental trends. The intentions of the NSDP are reflected in the NDP multidimensional expressions of the national space.

These urban and regional planning subsequent to democratic transition all of them played an enabling role for new planning tools namely: the NDP, the IUDF and SPLUMA. The need for this additional legislative and policy framework with regard to urban planning and urban management is on the basis of spatial priorities multiplication and inevitable interface with economic growth, transportation issues, integrated human settlements, job creation and poverty alleviation (Harrison, 2002:23). In essence, it has been realised that there is no single functional area in the Constitution that can be carried out without land (South Africa, 2014d:1). As a result, SPLUMA on its own covers a wide range of themes that form a comprehensive framework for urban and regional planning and other related fields. This includes setting parameters that will regulate issues linked to municipal planning including zoning of land, township establishment, integrated development plans (IDPs) and spatial development frameworks (SDFs).

Clearly, this makes spatial transformation a key tool for urban reconstruction, urban reintegration and reversal of spatial fragmentation to achieve greater socio-economic sustainability and desired physical pattern. Therefore, strategic goals of NDP, IUDF and

SPLUMA jointly offer a visionary perspective of what the spatial transformation of South Africa cities could be in practical terms.

- A connected public transport city;
- A city that is green;
- A city of quality living environments;
- A compact and walkable city;
- A city with a polycentric structure;
- A city with a diverse economy.

These key features of spatial transformed and integrated South African city have to be tangible in nature as being spatially appropriate. By and large; these are the spatial classifications of urban and regional behaviour throughout the country's neighbourhoods.

4.5.3.2 Transportation planning transformation

Transportation planning is evolving in South Africa as is the case with spatial systems as indicated above. However, it worth noting that the evolution of transport policy and legislation is not rapid like spatial transformation. At the same time, given that the land use planning and transport planning are manifestly interrelated – the need for transportation planning transformation is not surprising. Therefore, to some extent the evolution of transport policy can be analysed mostly in two sets of discussions. According to Schoeman (2015c:122) the first period is 1970 to 2000 which consisted of two subsets namely the *apartheid era* (from 1948 to 1994) followed by the *transformation era* (after democratisation until 2000). The basis of Schoeman's categorisation is that the latter subset of the then existing policy and legislative framework, inherited from the previous dispensation's provisions, guided transportation planning and development well into the democratized post-2000 era.

The second period of policy and legislative framework is from 2000 to the present. In the words of Schoeman (2015c:120) the real policy and legislative changes took effect after 2000. Therefore, following the sequential manner of discussion proposed in this research – Schoeman

(2013b:15) points out that Transport planning in South Africa became a statutory planning activity with the enactment of the Urban Transportation Act (Act 78 of 1977) together with Road Transport Act (Act 74 of 1977). The Urban Transport Act 78 of 1977 providing for urban transport plans was superseded by the National Land Transport Transition Act (Act 22 of 2000) that formed the basis for IDPs by acknowledged need to accommodate such policy change. In the timeline of land transport policy and legislation framework a period leading to 2000 Act provided a preparative transformation brought about by Constitution (1996). A number of statutory policies were published starting with the White Paper on National Transport Policy (1996) and Moving South Africa (Vision 2020) (1998).

After 2000 and up to 2014 the evolution of land transport planning instruments and strategy formulation intensified in reaction to new democratic approaches to transportation planning (Schoeman, 2015c:124), new challenges in the land transport practice and policy and rapid urbanisation. The drastic transportation transformation again might benefit Heyns' (2015:84) assertion that the traditional land use and urban transport planning processes have given rise to unsustainable transport planning systems. As a result the following transportation planning and development instrument came into existence: the Rural Transport Strategy for South Africa (2003) and later (2006 and 2007); National Land Transport Strategic Framework (2006) and draft (2014); National Development Plan (2012); Department of Transport Strategy (2012 – 2014) and the National Transport Master Plan 2050 (NATMAP 2050). The visions for these policy documents are summarized in Table 4.8 below.

Table 4.8: Land transport policies (plans) and their visions

Policy or plan	Vision
White Paper on National Transport Policy (1996)	Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of services and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.
Moving South Africa (1998)	To develop a strategy to ensure that the transport system of South Africa meets the needs of South Africa in the 21 st century and therefore contributes to the country's growth and economic development – Visions 2020). The three key thrust ground of the vision are: high volume corridors, sustainable operations and improved efficiency.
Rural Transport Strategy for South Africa (2003-2007)	The government should provide rural transport infrastructure so that it can be a catalyst for sustainable economic development to improving social access and poverty alleviation.

NATMAP (2006)	To develop a dynamic, long-term, sustainable land use/multimodal transportation systems framework for the development of networks infrastructure facilities, interchange termini facilities and service delivery that shall be demand responsive to national/provincial/district and/or any socio-economic growth strategy, and/or any sectoral integrated spatial development plan.
Road Infrastructure Strategic Framework (2006)	Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of services and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.
Public Transport Strategy (2007)	To ensure sustainable, equitable and uncongested mobility in liveable cities and districts is achieved through Integrated Public Transport Networks (IRPTNS).
National Land Transport Strategic Framework (2006-2014)	To provide policy statements on twenty one different aspects of land transport which are: Transport Planning; Taxi Mode; Bus Mode; Rail Mode; Institutional Structures; Land Use Restructuring; Roads; Cross-Border Roads Transport; Freight Transport; Interprovincial Land Transport; Rural Transport; Safety; Transport for Persons with Disabilities; Non-Motorised Transport; Transport and Environment; Transport and Tourism; Inter-modalism and Integration of Transport Planning; Conflict-Resolution Mechanisms; Key performance and Funding.
Public Transport Action Plan (2009)	Ensure that passengers transport services address user needs. Including those of commuters, pensioners, the aged, scholars, the disabled, tourists and long distance passengers.
National Scholar Transport Policy (2009)	To ensure the provision of a transport service that caters for the needs of scholars.
PRASA National Strategic Plan (2012)	Implementing a bold plan to transport and modernize passenger railways.
NDOT Strategic Plan (2013/2014)	Ensure that transport is the Heartbeat of Economic Growth and Social Development.

Source: NDOT (2014:3-5).

The framework legislation for these policies, strategies, programmes and plans is the National Land Transport Act (NLTA) (Act 5 of 2009) and its Regulations (2009). It replaced the National Land Transport Transition Act (Act 22 of 2000). The NLTA (2009) was enacted to provide further in the process of transformation and restructuring of national transport system (South Africa, 2009:1). It provides for variety of transport frameworks and integrated transport plans (ITPs) (Van Wyk, 2012a:119). The ITPs originate from the Integrated National Transport Plan (INTP) which the Transportation Lekgotla (Convention) held on 08-09 April 2005 resolved for its development. The ITPs before being encompassed in the NLTA (2009), according to Schoeman (2013b:16), were referred to as NATMAP (2006).

In the context of NLTA (2009) the ITPs must be developed by municipalities in order to enhance the effective functioning of urban and rural areas through integrated planning of transport infrastructure and facilities, transport operations including freight movement, bulk services and transport services (South Africa, 2012:37). At the provincial level, NLTA (2009) and its Regulation (2009) prescribe contents of Provincial Land Transport Frameworks (PLTF) in order to give broad strategic direction to transport development in province, from provincial perspective (South Africa, 2011:1).

The PLTF is assigned implementation of twelve cities integrated rapid transport network and bus rapid transit (BRT) system identified by Public Transport Action Plan (2007 – 2010) / Public Transport Strategy and Action Plan. One objective of these strategies/plans was to guide the provision of accessible public transport systems in South Africa for the FIFA World Cup tournament that South Africa hosted from 11 June 2010 until 11 July 2010. Thus far this is the largest transformative transportation initiative/project. For example, there was the R20 billion Gauteng Rapid Transit Rail System (Gautrain) development (Harrison *et al.*, 2007:71). If this project is viewed in totality it was taken within the scope of development principles, norms and standards that guide spatial (land use) planning/development/management, environmental management and related processes.

Therefore, reflected in the transportation planning transformation is an effective and efficient framework for spatial planning and land use management integration. It is understood that the fundamental problems of urban space and its related spatial systems (metropolitan areas, cities, towns, neighbourhoods, precincts) can be addressed through land transport framework interface and later integration.

4.5.3.3 Environmental management transformation

Environmental management is one of the main requirements to advance sustainable urban transformation and core applications for the planning system in South Africa. According to Rossouw and Retief (2013:189), due to the modernist apartheid planning system and resultant spatial segregation, although a spatial component itself – it is not surprising that environmental management promotes spatial integration while undertaking amongst others equitable

distribution of natural resources so is most of South Africa's planning policies. In order to understand the inception and transitional requirements for environmental management in South Africa, Strydom and King (2009:974) suggest that four stages can be distinguished, namely:

- Phase 1: Inception (1976 to 1989);
- Phase 2: Formation (1980s to 1992);
- Phase 3: Formalisation (middle 1990s to 2000s);
- Phase 4: Refinement (middle 2000s to the present).

The 1976 South African Council for the Environment Report benchmarked the first procedures for environmental evaluation in South Africa (Strydom & King, 2009:974). It was followed in 1979 by the Symposium on 'Shaping our environment' that strongly stressed the value of Environmental Impact Assessment (EIA) to changing environmental conditions as principal tool for effective environmental management and mechanism that offers guidelines (EIA principles) for use by professional planners (Civil Engineering, 1982:189). Incorporation and/or consideration of environmental management in planning and development intensified in 1980 with the formulation of the White Paper on a National Policy Regarding Environmental Conservation. The instrument is intended to formulate national policy to provide normative principles for environmental conservation (Cowen & Cowen, 2008:286).

The Environmental Planning Professions Inter-disciplinary Committee proposed guidelines to assist planning professionals in taking environmental aspects into account (Strydom & King, 2009:974). The formulation of the Environment Conservation Act (Act 100 of 1982) marked the first regulatory instrument for environmental management in South Africa. The aim was to provide coordination in all activities that might have an impact on the environment (Mokhahlane & Obi, 2011:240). From this it was apparent that the EIA should inform all planning activities as highlighted by series of consultations and deliberations as summarised below. According to Strydom and King (2009:974) the following events took place:

In 1982 the President's Council (an advisory council to the President) pressured by new developmental projects and demographic trends (urbanisation) advised that the EIA needed to be prioritised on development and conservation – specifically local and regional management systems. The consultations and deliberations intensified in 1983 – the Council for the Environment and a subcommittee came into existence, initiating research, workshops and consultation on EIA to develop a mechanism that would suit the South African context. Subsequently, the President's Council in 1984 published the report that initiated compulsory EIAs for development projects outside Guide Plans followed by the National Workshop on the significance and necessity of EIA in 1985 as part of a comprehensive holistic planning procedure. As a result a Working Group (consisting of EIA Committee and members of the Council for the Environment) was appointed to develop the philosophy on environmental assessment for South Africa (Strydom & King, 2009:974).

These activities/events initiated the enactment of the Environment Conservation Act (Act 73 of 1989) that made provision for an environmental policy (Section 2) and EIA (Section 22, 23 and 26). Simultaneously, the concept of Integrated Environmental Management (IEM) was developed to serve as an over-arching and holistic environmental management philosophy as well as set out the principles and procedure for the evaluation of policy, programmes and projects (Strydom & King, 2009:974).

The evolution of integrated environmental management (IEM) in South Africa was based on international experience and development in environmental policy and the application of environmental assessment techniques and the application of environmental assessment and management tools (Schoeman, 2010:4). IEM is designed to ensure that the environmental consequences of development proposals are understood and adequately considered in the planning, implementation and management of all developments (DEAT in Schoeman, 2010:4). The period proved critical as it developed into strategic level assessment – the term Strategic Environmental Assessment (SEA) intends to serve as a baseline to ensure that environmental values from both international and local practices are strategically integrated into decision-making process. Through SEA guidance the enabling legislation emerged (Strydom & King, 2009:974).

The publication of National Environmental Management Act (hereinafter referred to as NEMA) of 1998, which repeals most of the provisions in the Environment Conservation Act (Act 100 of

1989) marked the next evolution of environmental statutory planning. The NEMA is a framework law, providing overarching principles that apply to all state activities (Rossouw & Retief, 2013:189). The NEMA prescribes statutory mechanisms for achieving co-operative environmental governance, such as a set of national environmental management principles, planning frameworks and procedures for conflict resolutions (OECD, 2013:42).

The intention of NEMA was formalized through publication of the EIA Regulations (2006). On 3 August, 2010 the revised NEMA EIA Regulations (Government Notices R.543 to R. 547, June, 2010) were promulgated that includes changes in the process, procedure and listing of activities (Schoeman, 2015a:9-10). NEMA urged a focus on sustainable urban development and transformative solutions – the cross-disciplinary link is critical. NEMA intends to align itself with a broad range of South Africa's planning laws and policies to achieve the objectives of sustainable land use as shown by Table 4.6 and Table 4.7. In addition several legislatives pieces and policies in turn make provision environmental management – both ways making integration inevitable.

This includes a range of multi-sectoral planning and assessment processes such as Environmental Management Frameworks (EMFs), Spatial Development Frameworks (SDFs), Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIAs), Land Use Management Schemes (LUMS) and to support and streamline environmental decision-making to the entire planning and development transformative solution and integration.

Therefore, further reference in order to understand urban transformation either one of planning instruments (transportation planning/spatial planning/environment management) should align itself to others. Against this background, the interface between foci and instruments as provided for in spatial planning, transportation planning and environmental management policies and legislation should indicate due attention to the integration in urban planning and development (Schoeman, 2015a:11) as will become clear hereunder. Given the historical context of South African urban area planning, failure to integrate these transformative solutions and complementarity relationships that exist in spatial, transportation and environmental policy and legislation frameworks will elicit fairly weak efforts at redress for general urban bias in South Africa.

4.6 Alignment and integration between spatial planning, transportation planning and environmental management

The link between spatial planning, transportation planning and environmental management is obvious in the planning and development principles of spatial planning outlined in SPLUMA (2013) (Refer to point 4.5.2.1). The SPLUMA (2013) confirms its position as the main/cross functional framework for alignment and integration in terms of its vision, “*To provide a framework for spatial planning and land use management in the Republic of South Africa*”. The approaches to alignment and integration are well-known to be linear or vertical (or both). Analytically, deduced from SPLUMA principles its approach to alignment and integration is strongly constructed on both horizontal and vertical alignment and integration strategy. In essence, at the function level spatial planning does not only provide the alignment framework of the target systems but it align with to the common goal – it provides a cross cutting policy and legislation framework (Refer to Figure 4.11). However, there is first a need for a linear alignment to ensure that each instrument (spatial planning/transportation planning/environmental management) policy and legislation frameworks focuses, actions and strategies for aligned planning and development are provided and clearly understood. The approach is illustrated in Table 4.9 below.

Table 4.9: Interface in focus and instruments as provided for in spatial planning, transportation planning and environmental management

SPLUMA (2013)	NLTTA (2000)/NTA (2009)	NEMA (1998)
• Development principles and norms and standards • Intergovernmental support • Spatial Development Frameworks (SDF's) • National Spatial Development Framework (NSDF) • Provincial Spatial	• General principles for transportation planning • Types of transportation plans • Provisions on transportation planning • National Land Transport Strategic Framework (NLTSF) • Provincial Land Transport Frameworks (PLTF) • Integrated Transport Plans	• General objectives • Environmental Implementation Plans (EIP's) • Environmental Management Plans (EMP's) • Integrated Environmental Management (IEM)

Development Framework (PSDF) • Regional Development Framework (RSDF) • Municipal Development Framework (MSDF) • Land Use Management (LUM) • Land Development Management (LDM) • Municipal Land Use Plans (MLUP) • Statutory Planning(SP)	(ITPs) • Freight Transport Plans (FTP) • Transportation plans and changes in land use and public transport infrastructure and services • Rationalization of public transport services (RATPLANS) • Public Transport Plans (PTP's) • Commuter rail plans (CRP) • Transport Impact Studies (TIS's) • Traffic Impact Assessments (TIA's)	• Environmental Impact Assessments (EIA's) • Environmental Authorizations (EA's) • Strategic Environmental Assessments (SEA's) • Environmental Management Programme (EMP's) • Monitoring and Performance Assessment (M&PA's) • Mine Closure Plans (MCP's)

Source: Schoeman (2015a:7) - from SPLUMA (2013), NLTTA (2000), NLTA (2009) and NEMA (1998).

The key to this kind of alignment lies in dealing with the interactions between these three frameworks (SPLUMA, NLTTA/NLTA and NEMA) to obtain aligned and integrated planning and development framework. Therefore, if the objective of the alignment is to align and integrate all the common focuses to the common focus a need for a circular alignment is inevitable. The approach is illustrated with the graphical application and alignment between strategic, planning and operational level of instruments (Table 4.6, Table 4.7 and Table 4.9) as shown in Figure 4.12 below.

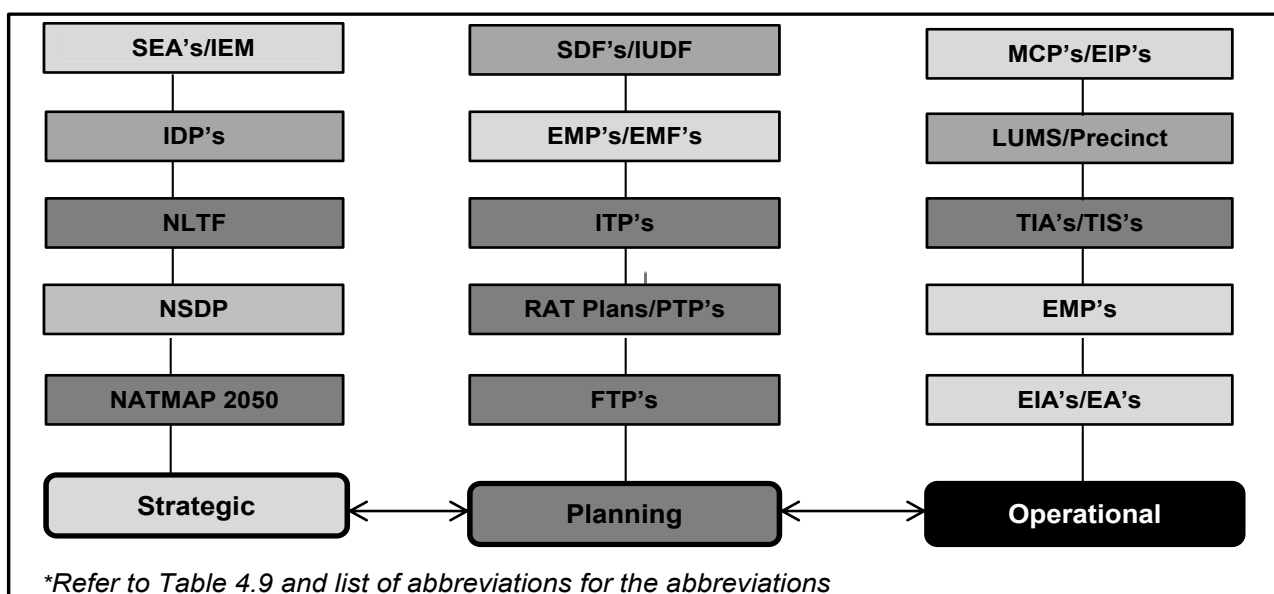


Figure 4.12: Alignment between planning instruments

Source: Schoeman (2015a:13).

Obviously, this form of alignment and integration is complex and challenging as it is based on the alignment of the planning instruments themselves and their various systems involved in planning and development. In addition, the strategic alignment and integration approach increase complexity as it strive to combine/incorporate the best of the individual planning instruments objectives in single operational vision. Exacerbating these complex conditions Walker (in Pienaar, 2014:356) points out that the government institutions and other authorities form part and parcel of alignment and integration between planning instruments.

For this reason, the impacts and relationships of these governmental institutions need to be clearly illustrated as they involve critical statutory bodies in promoting integration and ensuring implementation. In essence, the whole of planning and development policy and legislative framework depends on various spheres of government and sector departments for implementation (OECD, 2013:18). This incorporates another strand in the alignment and integration between spatial planning, transportation planning and management policy and legislation framework as the issue of statutory bodies is prescribed and guided by legislative

competencies on different levels (national, provincial and local government) as shown in Figure 4.13 below.

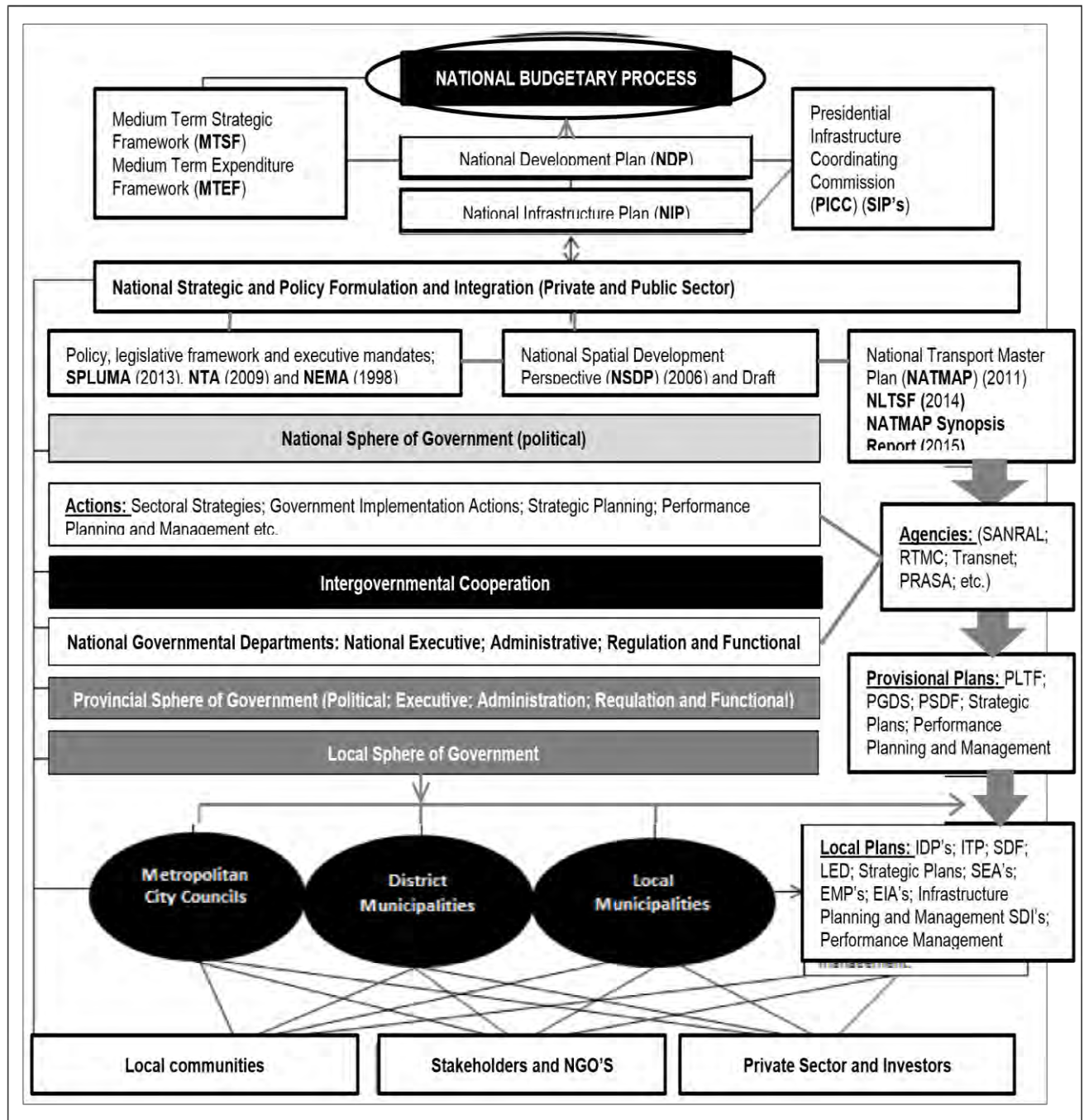


Figure 4.13: Complexities of integration between spatial planning, transportation planning and environmental management between spheres of government

Source: Own construction (2015).

It is clear that integrated sustainable urban development is based on transportation planning, environmental management and land-use integration. This linkage the professionals often struggle to understand (Heyns, 2015:84), consequently posing worrying social, economic and environmental planning practices of professionals embodying urban sustainability. The conditions for integration also depend on the institutional arrangements – land use planning, environment management and transport planning integration can only be achieved if legislative bodies and spheres of government and sectoral departments relevant to planning are themselves integrated (UN-Habitat, 2013c:185) as shown in Figure 4.13 above.

The principle legislative competence is to define the functions of government agencies, determines their relations (such as co-existing and overlapping of spheres of government and sectoral departments). In delivering support to capacitate urban development policy in the context of this research, the competencies are laid down in the SPLUMA (2013) and the Draft SPLUMA Regulations (2015); National Land Transport Act (NLTA) (Act 5 of 2009) and its Regulations (2009) and NEMA (1998) and its revised EIA Regulations (2010) and other related major policy documents that been generated, adopted and promulgated.

The constitutional principle of co-operative governance in South Africa indicates that the three levels of governance should support one another, share information and co-ordinate their planning and development initiatives (OECD, 2013:18). The premise behind these spheres of government is autonomy meaning they are distinctive, inter-related and inter-dependent (South Africa, 2014c:38) – they should not be seen as hierarchical. This is a somewhat unusual manner and it is perplexing that these spheres of government do not ascribe to more conventional 'levels' or 'tiers', where the lower tier is beholden to the higher (Van Wyk, 2012b:288). However, the common viewpoint or casual observation suggests hierarchical behaviour.

Notwithstanding this polemical point of view, these spheres of government play critical administrative coordination roles between statutory planning bodies as well as planning instruments to address spatial systems, transportation systems and the natural environment realities in an inclusive fashion.

Against this background SPLUMA (2013) of which the functional areas overlap with transportation planning and environmental management, provides a fundamental framework to promote inclusive, developmental, equitable and efficient spatial planning at all government spheres. The analysis covering land-use, transport systems and environmental management also directs the focal point of SPLUMA to addressing past spatial and regulatory imbalances creating responsible land use authorities tasked to promote greater consistency and uniformity in application procedures of spatial planning and land use (NDOT, 2014:11). In essence, it accelerates the requirement of MSA (1998) that all three tiers of government should prepare the SDFs. To capacitate and support SPLUMA requires municipalities to establish Municipal Tribunals and prepare Land Use Schemes.

This functional area within the spatial perspective itself is well reflected in MSA (1998) which requires provincial and municipal governments to prepare SDFs. A fundamental effect of MSA to municipalities is Section 1(a) of Article 84 that identifies and prescribe development planning as one of the core functions of municipalities (both local and district municipalities). As matter of fact the IDPs encompass the SDFs at local government level.

The SPLUMA (2013) and MSA (1998) implement transport policies and strategies. The NLTA (2009) vision is that land transport planning must be integrated with the land development and land use planning processes (NDOT, 2014:3). At the national level the NLTA (2009) requires formulation of the national level the National Land Transport Strategic Framework supported by Provincial Land Transport Strategic Frameworks (both formulated every five years) (NDOT, 2014:21). The directions for district and municipal planning (inclusive of its spatial systems: metropolitans, cities, towns, neighbourhoods and precincts) are provided by Integrated Transport Plans (ITPs) invigorated by the IDPs.

At this level efficient provision of transport systems and well-functioning spatial systems (such as cities and precincts) are undertaken by planning authorities namely Intermodal Planning Committees/Land Transport Advisory Boards (with presentation of government and private sector). This institutional arrangement is responsible to draw comprehensive transport plan, development of policies and procedures to enhance scheduling and service planning activities in urban areas with multimodal transit systems.

On extending the overall transport system's efficiency and the integration of public transport modes, the National Public Transport Regulator has been established. Expanding the capacity and establishing the link at the operational level of government the National Public Transport Regulator requires (twelve largest) metros to formulate Integrated Public Transport Network Plans (IPTNPs). Overall the norms and standards as well as regulations provide coordination between plans and planning authorities to guide making transport land use planning and environmental (taking cognizant of its respective SEA) decisions together in order to guide the development of public transport for urban and rural passengers.

The essential complementary link is an environmental management body. NEMA (1998) requires incorporation of SEA at national, provincial and municipal levels for efficient framework for environmental land use planning and management. The key inputs at provincial and municipal levels are the SDFs as they are required to prepare and incorporate SEA. Other SEA like processes at various levels include EMPs (national); Scoping Reports (provincial); EIA (regional) and EA's (municipal). The provinces and district municipalities often assume certain regulatory responsibilities of municipalities that lack capacity to execute them (Chapter 6) NEMA (OECD 2013:49).

Despite criticism, the spheres of government are responsible for integrated development planning and implementation of actions and strategies. Goga and Pegram (2014:29), shedding light onto this complex situation in a research paper titled "*Water, energy and food: A review of integrated planning in South Africa*" conclude that South Africa has integrated development planning at national, provincial and municipal levels with reasonable vertical alignment between them. Failure to identify and underline these functional structures is the inability to engender meaningful integration. The policy making, reforms and ordained institutions would not be effective and planning and development of urban areas will be flawed. Therefore, as part of enhancing integrated development planning, great strides have been made in developing more concise functional policies, plans and strategies.

4.6.1 Spheres of government planning instruments nexus for integrated planning

Generally the bases of traditional and contemporary planning comprise the consideration of what can be expected and where it should happen in spatial systems. These planning principles applied in the context of urban and regional planning, transportation planning and environmental management happen to span the foci and the interaction of different policies and practices across regional space, and set the role of spaces, places and interaction between professions in a wider context (Schoeman, 2015a:15). Therefore, in an attempt to further synergies and undertake integrated planning – three functional areas (spatial, transportation and environmental) policies, strategies and plans are well translated into national, provincial, regional and municipal plan that give effect to integrated plans as highlighted in Figure 4.14 below (also as indicated in Figure 4.12 and Figure 4.13).

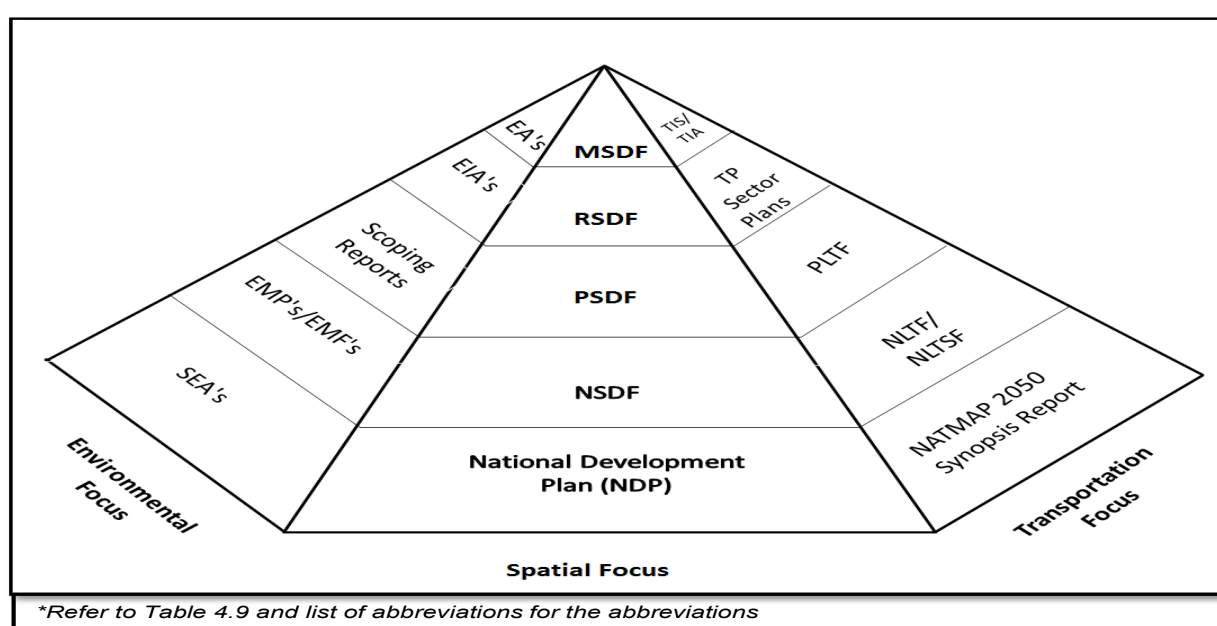


Figure 4.14: Spheres of government planning nexus for integrated planning

Source: Schoeman (2015a:19).

The NDP is the key strategic nexus for integrated planning between spatial, transportation and environmental policies (strategies/plans/action fields). Though pivotal spatial development it consists of a vast array of cross-cutting objectives and strategies that are inclusive of transport,

environment, economic, infrastructure and energy, and knowledge objectives/strategies among others in pursuit of vibrant, equitable, resilient, competitive, sustainable and integrated cities. Clearly, the integrated planning carries out excessive operational activities extending to sophisticated functional and strategic processes beyond the scope of traditional statutory planning that involves compliance and authorization. The broad objectives of these planning instruments, spheres of government competencies and presentation of alignment and integration have been discussed in the preceding sections. For better understanding graphical presentation of Figure 4.14 should be read together with Figure 4.12, Figure 4.13 and Table 4.10.

When considering the responsibilities and planning authorities the three systems/domains planning instruments both NATMAP (2050) and NDP (2012) are not components of legislative frameworks unlike the SEAs. Against this background, they have restrained authority over relevant government departments. This inability of direct influence raises concerns about a possible inability to generate meaningful integration. However, this issue must not be misinterpreted as lack of guidance of these plans. The plans are long-term strategic guiding documents categorized by NDOT (2014:2) as high-level strategic documents with formulated implementation plans. The implementation plans make provision for statutory commitment of the various spheres of government to the implementation of the principles of NATMAP (2050) and NDP (2012).

The integrated planning is defined as planning and management decisions that consider interaction between domains/systems (Goga & Pegram, 2014:5) in this context (spatial, transportation and environmental). In consideration of three domains (spatial planning, transportation planning and environmental management) the imperatives of the integration will include among others integrated transport and land use development; transport which is economically and environmentally sustainable (minimizes negative effects); transformed urban and rural spaces and balanced spatial systems (land use densification – mixed use developments along priority public transport corridors). On the other hand lack of operational integration directly translates to poor land use-transport connection. Consequent policy scenario from transportation planning perspective it that the response of transport system will be slow to the land use development, environmental issues and not a contributor to stimulate economy while practically exacerbating sporadic unplanned development along corridors (NDOT, 2014:15).

As a way of analysis of both vertical and horizontal alignment and integration another significant consideration is determining benefits that are deemed derivable from the spatial scale (national, provincial, regional and municipal level) horizontal linkage. This is based on the argument that although planning instruments (and spheres of government themselves) are clearly aligned from the national level descending and devolving through provincial, regional and coming to end at municipal level, Goga and Pegram (2014:29) assert that indeed the benefits derived from a nexus-based approach varies at various levels.

According to Pavlovska (2014:81) irregularities in the planning process at national and regional level become all too apparent at the local level where the actual implementation occurs. The deduced understanding is that the actual integration, harmonization and alignment of planning instruments takes place in municipal level. Further, on this basis it can be argued that the alignment and integration between spatial planning, transportation planning and environmental management policy and legislation framework have as its ultimate goal arriving at what Schoeman (2015a:4) refers to as an ideal structure of local government – municipalities that are spatially integrated, institutionally sound, functionally viable and developmental in orientation.

Under the auspices of local government are different scales of municipalities namely Metropolitan, District and Local Municipalities that are inclusive of related spatial systems (metropolitan areas, cities, towns, neighbourhoods and precincts). Therefore, the local government municipality level of interest or key focus area is the local municipality given the claim that it is where the true integration between planning instruments occurs and policies actually implemented. Another reason is that a local municipality is inclusive or can take cognizant of the city-neighbourhood level which is a core focus of this research. In addition, municipal systems have been radically transformed since 1994 – they have constitutional powers (OECD, 2013:49).

Based on this line of argument and prior discussions (refer to point 4.5.4.2) the port of entry to integrate spatial planning, transportation planning and environmental management at municipal level is IDPs (Refer to point 4.5.4.2). In essence, a municipal IDP is not just an important instrument for service delivery or urban and rural development frameworks – it is anchored in

planning instruments as a strategic position for regional and national developments (UN-Habitat, 2013b:56) as well as urban land development. In essence it requires that the management of transportation planning, spatial planning and environmental management incorporates elements of visionary but inclusive approaches to depict needs, to re-act to such needs and the application of integrated management and approaches between such disciplines (Carel & Schoeman, 2011:160). The central contention is that the smaller the area addressed, the more precise and coercive planning regulations are (Bevir, 2006:60).

The key issue is the context within which integration and implementation occur. In the enlightenment of prior discussion the efforts of this research reflects on the already existent interface between planning instruments in local municipalities and the implementation thereof. It raises real challenges of alignment and integration. These implications draw attention to strategic planning themes. In essence, it requires visionary directive of functional strategies, policies, programmes and plans that form an integral part of the context within which the interface between spatial planning, transportation planning and environmental management are synchronized in local municipalities.

4.7 Contested policy outcome – sustainable urban form

From the preceding sections of this chapter the urban planning policy prerequisite is achieving integrated urban planning leading to sustainable urban structural form and sustainable modes of living. The deduced understanding is that the end product of policy and legislative framework activities such as transformation processes, alignment and integration has to have the actual physical existence, taking into consideration assertions that they are all expressed spatially. Within the context of urban planning and development both sustainable development and urban policy transformative forces are expressed from the landscape perspective concepts such as sustainable urban form, well-planned cities and well-designed cities concepts.

Central to these efforts is the need to integrate the city amongst others through planning for higher density land-uses and development along the priority public transport network within the urban core (NDOT, 2014:8). According to Rogers (1999:35) sustainable urban form is based on a series of interlinked neighbourhood units. It is supported by the physical functions such as

transportation and the entire physical elements of the built environment. This urban policy and legislative framework underpins all trajectories of urban planning, urban management and governance as indicated in Figure 4.15 below.

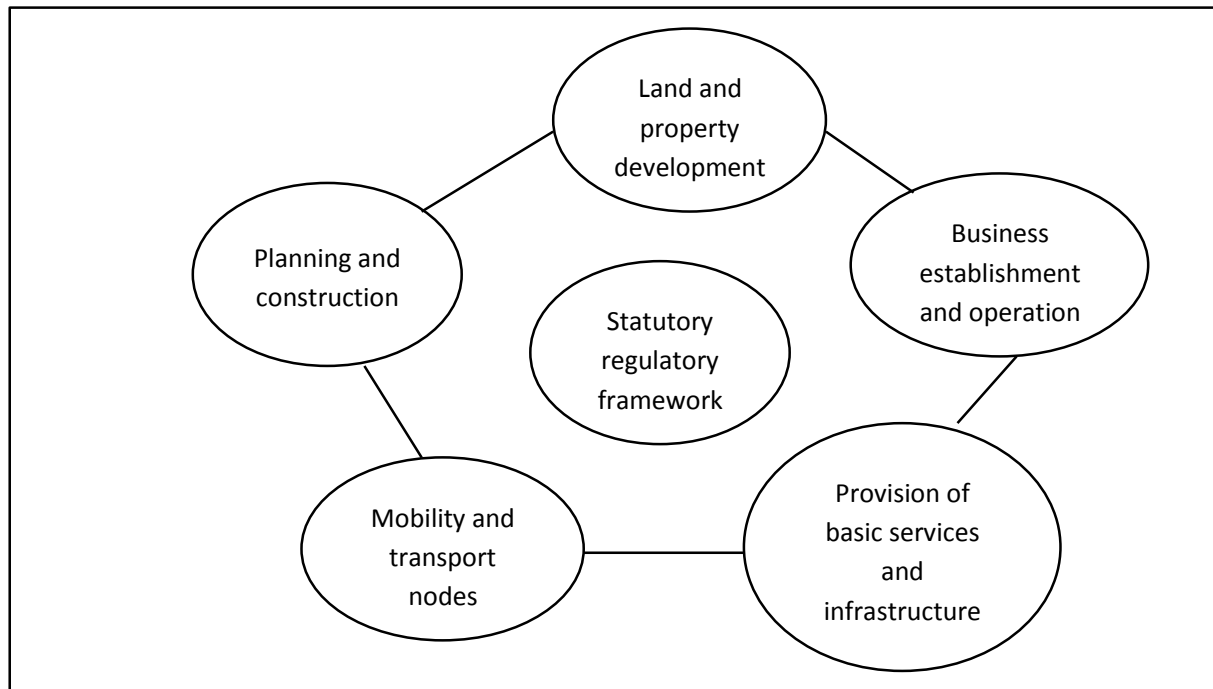


Figure 4.15: Statutory regulatory framework for the urban built environment

Source: Own construction (2015).

These policy and operational systems have an extensive impact on urban mobility and the urban economy (UN-Habitat, 2013b:15) as well as environmental management. Clearly, inefficient and inequitable urban policy and institutions interventions are the root cause or failure to tackle complex urban management issues and inequitable urban land development. Therefore, the provision of this urban land development requires robust policies that merit coordination of built environment attributes to attain compact city development.

These characteristics provide a substantive perspective of the physical shape of a neighbourhood/city and its built environment. It is understood that through the physical dimensions of urban sustainability it appears possible to determine which urban forms are closely associated with sustainability and inform policy in order to achieve sustainable

neighbourhoods. This is attributable to urban form expressed physically in terms of size, structure, land use, configurations and distribution of open space (Jenks & Jones, 2010:1). These physical dimensions reflect a compact city scenario. In essence, a compact city is the core of urban policies in South Africa. Obviously a spatial component in terms of the compact city notion is entrenched or is influenced by the spatial planning policy – moreover it is embedded in transportation planning policy in South Africa.

These planning instruments policy measures are required and/or they pursue the notion that a compact city policy should form the basis of all sustainable cities initiatives of all sizes in respond to urban development challenges in South Africa. A policy structural cause established by compact city concept establishes tangible goals. The urban form gives a clear indication of what sustainable neighbourhoods will look like (design) and function and how it will change over time (Williams *et al.*, 2000:35). There are criticisms and debates as to whether a compact city can be considered a sustainable urban form – the question first asked by Jenks *et al.* (1996) and the debate carried forward in the work of Burton *et al.* (2013), as well as Boelens (2011) among others. However, a concern here is that if sustainability depends more on abstract issues – for example social and economic dimensions objectives of achieving social and economic diversity and vitality – notwithstanding their examples of sustainability good practise – it is difficult to make sure that policies become effective (Jenks & Jones, 2010:2).

The conceptualisation of urban form – compact city in this context - is arriving at sustainability practices that are easily evident in physical dimensions. Purported benefits that lay a foundation for the claim that more compact, high-density and mixed use urban forms are sustainable (Jenks & Jones, 2010:3) are easily evident in physical dimensions. Moreover, a proportionate evidence base to put planning policies into physical function is a neighbourhood – making it a dynamic catalyst for urban development through networks of neighbourhoods as well as its nearby urban extensions (Rogers, 1999:67). According to Boelens (2014:208) neighbourhoods put in place key ingredients to operationalize compact development plans into action. In Figure 4.16 below, Rogers' (1999) advocacy for sustainable urban form using the compact city concept is illustrated.

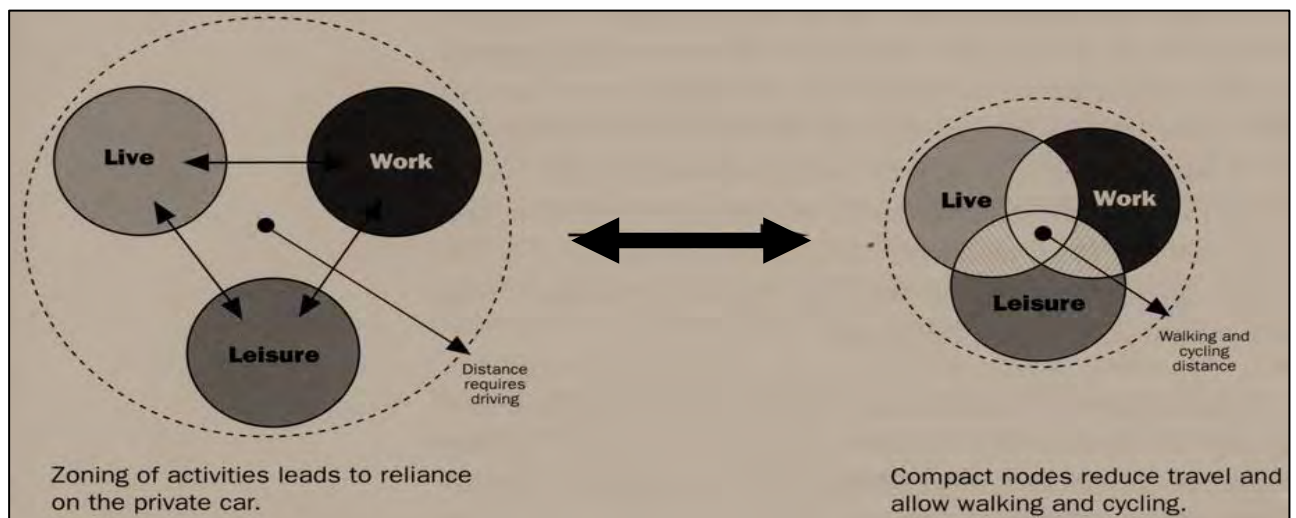


Figure 4.16: Compact versus dispersed activities

Source: Rogers (1999:67).

Figure 4.9 creates grounds to inform policy for those compact mixed-use nodes to create lively sustainable neighbourhoods by reducing journey requirements. This implies that the existing sectoral policies such as SDFs, IDPs, ITPs and SEAs should create efficient frameworks to deal with urban form design issues in order to attain multiple benefits of urban areas – spontaneously getting rid of single-function developments. For example, OECD (2013:18) points out that if the urban forms are combined with sympathetic design at neighbourhood levels, high-quality and inclusive urban areas can be created.

There are a number of countries where urban policy frameworks have successfully aligned neighbourhoods to the operational version of urban form. According to Jenks and Burgess (2004:45) numbers of spatial models and strategies have been developed to change the urban structure to achieve the desired sustainability benefits. In Australia, Melbourne undertook a similar urban policy initiative called Melbourne 2030, planning for sustainable growth. The plan as presented by Department of Sustainability and Environment State Government of Victoria – 2005 is summarised below and graphically presented by Map 4.1 to illustrate how the sustainable urban form is developed for the whole urban areas.



Map 4.1: Managing urban growth

Source: State Government of Victoria – Department of Infrastructure (2005).

Case study of Australia, Melbourne – according to the Department of Sustainability and Environment (DSE) – the Draft Implementation Plan applies to the growth areas on the fringe of the metropolitan Melbourne that have been designated for urban use and are on and around regional transport corridors. These growth areas constitute of municipalities of Wyndham, Hume, Whittlesea, Casey and Cardinia (DSE, 2005). The plan also applies to Melton to addresses the need to review the area between Melton M Township and Caroline Springs in order to assess the long-term feasibility of developing the Caroline Springs growth area along the rail and road corridor. The main aim of this plan relative to sustainable urban form are based on the neighbourhood principles that demonstrate the following characteristics:

- an urban structure where networks of neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network (PPTN);
- compact neighbourhoods that are oriented around walkable distances between activities and where neighbourhood centres provide access to services and facilities to meet day-to-day needs;
- reduced dependence on car use because public transport is easy to use, there are safe and attractive spaces for walking and cycling, and sub-division layouts allow easy movement through and between neighbourhoods;
- a range of lot sizes and housing types to satisfy the needs and aspirations of different groups of

people;

- integration of housing, workplaces, shopping, recreation, and community services to provide a mix and level of activity that attracts people, creates a safe environment, stimulates interaction and provides a lively community focus;
- a range of open spaces to meet a variety of needs, with links to open space networks;
- a strong sense of place because neighbourhood development emphasises existing cultural heritage values, attractive built form and landscape character;
- environmentally friendly developments that include improved energy efficiency, water conservation, local management of storm-water and waste water treatment, less waste and reduced air pollution.

As highlighted in Figure 4.17 the sustainability benefits of this urban form, according to Jenks and Burgess (2004) will be high densities, short journeys to work, easy access to services, widespread mass transit use, the development of self-contained new towns and settlements and the adequate provision of public space.

Figure 4.17 below demonstrates the changes this strategic planning policy will introduce in the growth areas ensuing from such a sustainable urban form.

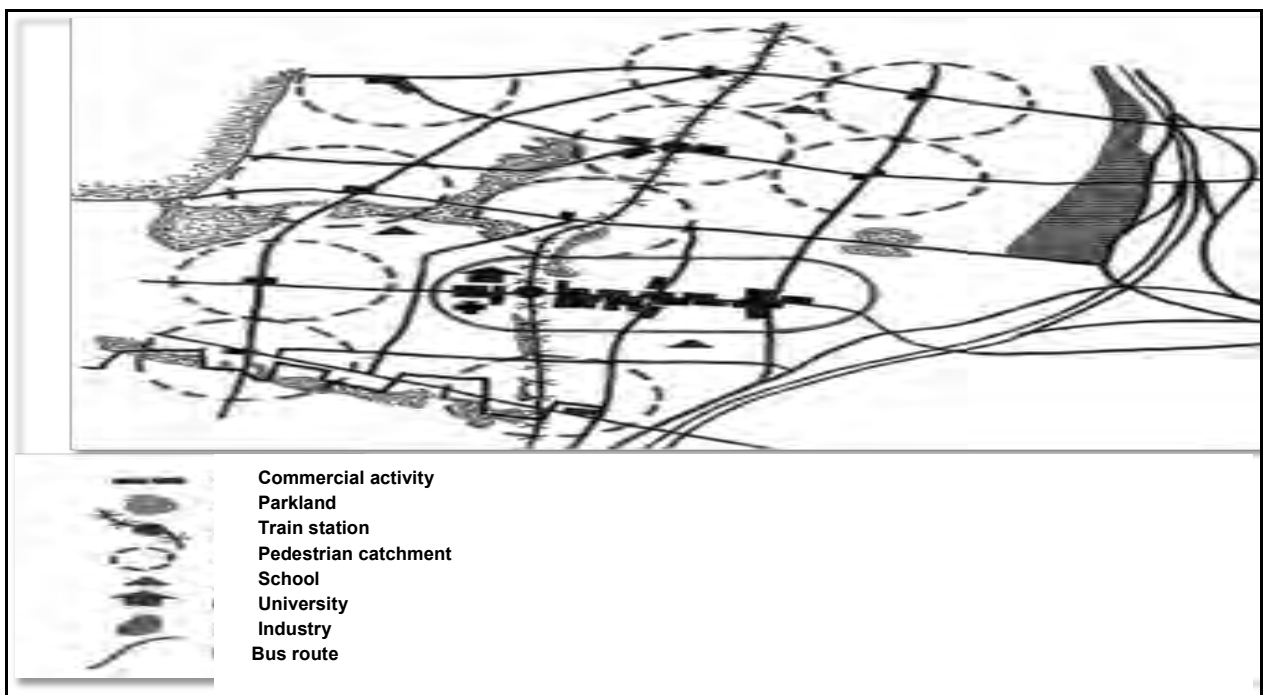


Figure 4.17: Sustainable urban structure planning in growth areas

Source: State Government of Victoria (2005).

As a result, in order to draw conclusive evidence on sustainable urban forms and planning policies UN-Habitat (2013b:40) shed more light through Serbia case study as summarised below.

Serbia, urban design to integrate internally displaced people – After the conflict (genocide) which took place from 1992 to 1995, Serbian cities were faced with the need to integrate internally displaced persons and other vulnerable groups and other general local development challenges as well. Therefore, UN-Habitat due to its extensive experience of urban policy field and funding with support from the Italian Government, undertook a multifaceted support project focusing on provision of social housing, upgrading of marginal settlements and citywide planning and design, supported by territorial information systems.

In addition, the project extensive implications included enabling municipalities to better orient local development and investment opportunities. Highlighting multi benefits impact – although the project primary aim was to delivering several hundred social housing units for internally displaced persons and minorities in turn the emphasis was placed on the design of the settlement area and of the buildings. Consequently, new buildings were carefully merged into the existing urban fabric and their layout and organization of public space was designed to augment the quality of the entire neighbourhood. As a result, the impact has been positive in terms of integration. The complementary relationship was reflected in new integrated neighbourhoods that were established with the support of additional measures to redress social segregation and vulnerability. The approach was further strengthened by providing municipalities with urban planning tools and information management systems to enable further orientation of investments.

4.8 Sustainability appraisal of planning policy and legislation framework

Within the context of evidence based policies approach expressed in the previous section the appraisal of policies, programmes and plans objectives against sustainability dimensions/criteria is critical to the realisation thereof. The extent to which there are significant effects in terms of planning policy objectives deliverance to actualization of integrated sustainable urban development is critical. Therefore, in order to ascertain the impact of urban planning policies on sustainability an important component to consider is sustainability appraisal. The sustainability appraisal is a systematic process that is carried out in order to ensure that policies deliver

sustainable development (Lewes District Council, 2015:2). As put by Sheate *et al.* (in Colantonio, 2011:44) sustainability appraisal is a type of assessment that intends to accomplish well-informed strategic decision-making.

A full consideration is given to balancing and assessing potential social, economic and environmental effects (Jaeger *et al.*, 2011:5). In essence, policies, plans and programmes documents objectives are assessed on the basis of sustainability consistency, strength capabilities and components – social, environmental and economic impacts. From urban sustainability perspective, the framework or package of measures and/or comparative basis for planning decision is limited to sustainable development tripartite considerations (social, economic and environmental dimensions). According to Colantonio and Dixon (2009:1) economic activity agglomerations (or diversification of economies), environmental management improvements and social simulation have increasingly influenced integrated approach and incorporation of key sustainability issues that urban policy intends to address.

Given the urban policy issues that are being dealt with in this research a broader sustainability appraisal framework is required. In the South African context, the urban policy prospects approach to planning for transformation, reconstruction and integration indeed has broadened sustainable urban development concerns. Presenting a scenario befitting South Africa urban policies sustainability issues, Dalal-Clayton and Sadler (2014:568) indicate that sustainability appraisal identifies measures to provide guidance to local authorities on adopting a more integrated approach to urban environmental management and to sustainable urban transport, to support exchange of best practice and to capitalise on opportunities for synergy with other policies.

The central contention is that circumstances of sustainable development rooted in urban realities are in turn the ones spanning the policy issues and approaches (Levent *et al.*, 2008:253). Clearly, the impact or influence cuts both ways. Either way the purpose of sustainability appraisal is providing a framework to assess urban planning policies objectives performance in achieving integrated sustainable urban development against compiled sustainability measures, themes, objectives and guiding principles.

Overall, the sustainability appraisal provides vital information about the criteria that are developed according to a predetermined level of goal achievement and comparative basis for decision-making with respect to predetermined policy objectives. These sustainability appraisal principles and prospects would fulfil an important role of guiding urban planning policy to achieve its sustainability objectives in South Africa. In order to do so – the knowledge and understanding of sustainability appraisal framework development, principles settings and approaches are vital as they serve as baseline mechanisms to determine which policy settings are the best ways to enhance prospects of sustainability in cities.

4.8.1 Sustainability appraisal framework and approach

Lawrence (2013:10) has put forth some of reasons that have necessitated appraisal of planning policies as summarised below.

- A sustainability multi-dimensional approach with its various interpretations renders legitimacy of decisions problematic – decisions rely heavily on substantive considerations which are in nature subjective;
- Policy bias – policy settings favour socio-economic gains at the expense of the environment;
- A need to integrate and balance economic, environmental and social dimensions into the plan-making;
- Engaging communities (acknowledge trade-offs at the decision level).

Against this background, the sustainability appraisal framework's consequent improvement fulfils an important role of evaluating policies to improve their overall sustainability performance. The major format of this sustainability assessment tool is usually described in terms of a matrix – whereby predetermined planning policy objectives are compared against sustainability framework encompassing criteria selected, based on the neighbourhood/city relevant issues and tested through factors. The criteria and factors represent the options of alternatives that can be considered for each objective of the policy, plan and programme as illustrated in Table 4.10. In order to simplify the understanding of Table 4.10 and generic appraisal within a matrix

structure – in this case the horizontal axis (criteria and indicators) - check the vertical axes (planning policy objectives) to see whether they are consistent and assessing them (objectives) for sustainability details/content and focal points.

The selected criteria and indicators are influenced by the South African planning policy focus and attention on transformation, reconstruction and integration processes, cities strive to become sustainable (specific needs and respond to wider opportunities) attuned to planning policy, best practise examples and UN-Habitat sustainability themes/urban agenda.

Table 4.10 establishes a policy and legislative framework to identify the factors that impact on and/or facilitate the evaluation of urban sustainability. This policy and legislative framework is drawn from Table 4.6 and 4.6 where an entire list of policies and legislations is provided and discussed. As discussed in section 4.5 the forces of sustainable urban transformation and demand for integrated urban development resulted in passing of new laws and other laws being repealed – no longer having the force of law. However, these planning instruments serve as background to understand the nature and focus of the existing documents in practice. In order to understand significance of a sustainability framework and approach, it is equally essential to understand its incorporation background in urban planning policies.

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Table 4.10: Policy and legislative framework objectives impact factors on urban sustainability

Objectives	Criteria (High impact factors)	Spatial and environment	Urban density/compact city	Culture and society	Connectivity and mobility	Economic	Smart growth	Service quality	Food production and distribution /urban-rural linkage	Urban governance	Liveability	Factors	Socio-economic	Sustainable urbanisation	Infrastructure	Environment protection	Inclusive planning	Public transport	Safety and security	Compactness	Land use	Quality of services	Capacity development programmes	Institutional framework	Liveability	Funding
Urban and regional planning																										
Spatial Planning and Land Use Management Act 2013																										
Promote inclusive, developmental, equitable and efficient spatial planning at all government levels																										
Provide framework for monitoring, coordination and review of spatial planning and land use management system																										
Provide for facilitation and enforcement of land use policy																										
Address past spatial and regulatory imbalances																										
Promote greater consistency and uniformity in application procedures and decision making by authorities responsible for land use																										
Provide for the establishment, functions and operation of municipal planning tribunals(MPTs)																										
Municipal Systems Act 2000 (Act No.32 of 2000)																										
Integrated development planning																										
To enable municipalities to move progressively towards the social and economic upliftment of local communities and ensure universal access to essential services that are affordable to all;																										
To define the legal nature of a municipality as including the local community within the municipal area, working in partnership with the municipality's political and administrative structures;																										
To provide for community participation;																										
To empower the poor and ensure that municipalities put in place service tariffs and credit control policies that take their needs into account																										

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

The strategy highlights urban sustainability functional areas that need attention and provide a way to balance policy objectives and more so, if possible, integration. It is clear that this approach can aid articulation of sustainability considerations in a more integrated manner rather than dominant separate silos prevalent in South Africa. This strategy is then able to make a great impact on decision-making. The decision-makers will be able to make choices that maximise the benefits of each policy and minimise any conflicting opinions.

The most appealing fact is that it is generally considerably easier to make decisions when operating in decision environments that are certain. This implies that each policy sustainability contribution or number of sustainability components in integrated sustainable urban development initiative should be well known – in totality the outcome of all policies is known with certainty. Although validating reasonable evaluation, absolute certainty remains difficult – there is invariably an element of uncertainty in these categorical classifications and techniques (Munda, 2004:667). With this research objective premised on evidence basis the uncertainty to some extent compromise the quality of the output. However, most appraisal techniques such as sustainability appraisals tackle this variable that influences decision-making outcomes. A sensitivity analysis might be used as a first step to effect consistency and robustness testing.

Therefore, to improve or reflect more effectively scientific rigour in decision-making various methods are used for appraisal. The Multi-Criteria Analysis (MCA) is widely regarded as a good appraisal method to evaluate the impact of various policies, in this context planning policies with optimal sustainability outcomes (cities transformation and integration realities). Therefore, the sub-section below provides an in-depth analysis of MCA in order to understand its consequent improvement of quality of outputs needed to achieve more sustainable and integrated cities/neighbourhoods.

4.8.2 Multi-Criteria Analysis

MCA is a decision-making framework developed for complex multi-objective decision-making, comprising both qualitative and/or quantitative elements to integrate multi-dimensional sustainability issues/criteria in the decision-making process (Kibert *et al.*, 2005:209; Karsak &

Ashilka, 2005:1542). As put by Munda (2004:667) the concept of multi-criteria evaluation is a possible useful framework for the application of choice to the difficult policy problems of the millennium. In line with this conceptualisation MCA techniques can be used to identify a single most preferred option, to rank options, to short-list a limited number of options for subsequent detailed appraisal, or simply to distinguish acceptable from unacceptable possibilities (Bakopoulou *et al.*, 2007:422).

It is important to mention that MCA has many advantages over informal judgements unsupported by analysis (Dodgson *et al.*, 2009:20) although in turning MCA from a theoretical framework into applicable guiding principles at the functional scale, numerous limitations have to be taken note of. The advantages are summarized by Dodgson *et al.* (2009:20) and disadvantages by Wolfslehner *et al.* (2004:159) as follows:

Table 4.11: MCA advantages and disadvantages

Advantages	Disadvantages
• It is open and explicit; • The choice of objectives and criteria that any decision making group may make are open to analysis and to change if they are felt to be inappropriate; • Scores and weights, when used, are also explicit and are developed according to established techniques. They can also be cross-referenced to other sources of information on relative values, and amended if necessary; • Performance measurement can be sub-contracted to experts, so need not necessarily be left in the hands of the decision making body itself; • It can provide an important means of communication, within the decision making body and sometimes, later, between that body and the wider community, and • Scores and weights are used, it provides an audit trail.	• The analysis can only be undertaken when stakeholders agree on a minimum range of criteria (e.g. programme's specific objectives); • The practical difficulties of choosing the factors to be studied, to determine comparison criteria, and to produce grading grids can result in lengthy debate; • The lack of reliable data over a period of time sufficient to organise and validate the methodologies can be a handicap; • The time span allocated to the analysis is often the limiting factor in an evaluation context; • The technical proficiency required for the effective use of the methodology is self-evident. In addition to the knowledge of computer applications, evaluators should have skills in mathematical concepts and data aggregation methodologies, in order to avoid poorly based conclusions or undertaking the analysis in the absence of a structured process.

Source: Own construction (2015) from Dodgson et al. (2009:20) and Wolfslehner et al. (2004:159).

Notwithstanding some criticism, complexity of neighbourhood sustainability requires an understanding of the MCA method because of its ability to process different and conflicting values. The main objective of this sustainability analysis technique is to handle the difficulties and imperfectability of decision making as a result of human inefficiency to process or make judgement of large amounts of complex information in a consistent way (Kiker *et al.*, 2005:209). A criterion is a principle or standard that an issue is judged by and factors infer the status of a particular criterion (Macoun & Prabhu, 1999:6). In the words of Wolfslehner *et al.* (2004:158) MCA is widely used to analyse and appraise multiple criteria and factor approaches.

A criterion can, therefore be seen as a second-order principle, one that adds meaning and operationally to principle without itself being a direct measure of performance (Macoun & Prabhu, 1999:7). Criteria are the intermediary points to which the information delivered by factors can be harmonised and synchronised – this is where an interpretable appraisal crystallises and ultimate point of integration (Prabhu *et al.* in Sheil *et al.*, 2004:2). Integrated assessment is about generating information relevant for decision-making (Giampietro *et al.*, 2006:59).

4.8.3 Urban planning policy objectives integrated weighting approach

In an attempt to capacitate decision-makers and also ensure that integrated sustainable neighbourhoods are achievable from the objectives of legislation, policies, plans and strategies – MCA integration approaches are used, and this includes weighting the criteria and factors that are presented in Table 4.10. Each objective weight under a given criterion and factor are normalised (scaled in the range 0 to 1) (Kiker *et al.*, 2005:209) – in basic terms, weighting integrate criterion multiple objectives into single objective where the numeric value determine relative importance or according to Zeferino *et al.* (2007:126) set the priorities for the decision criteria as illustrated in Table 4.12 below.

Table 4.12 shows the MCA methodology – calculating the combined weights for each criterion and factor in order to integrate and prioritise the sustainability objectives.

Table 4.12: MCA methodology – calculating the combined weights for each criterion and factor

Criteria (C_i)	Normalized(C_i)	Criteria Weight
Spatial and environment	0.510	0.104
Urban density	0.100	0.032
Cultural and social	0.530	0.107
Connectivity and mobility	0.590	0.118
Economic	0.760	0.148
Smart growth	0.310	0.069
Services quality	0.490	0.100
Food production and distribution (urban-rural linkage)	0.000	0.014
urban governance	1.000	0.190
Liveability	0.590	0.118
Factors (F_i)	Normalized (F_i)	Factor Weight
Socio-economic	0.602	0.112
Sustainable urbanisation	0.660	0.122
Infrastructure	0.414	0.080
Environment protection	0.178	0.040
Inclusive planning and implementation	0.403	0.078
Public transport	0.288	0.059
Safety and security	0.047	0.018
Human settlement - compact neighbourhood	0.031	0.015
Land use	0.440	0.084
Quality of services	0.387	0.075
Capacity development programmes	0.000	0.010
Institutional framework - neighbourhood management	1.000	0.179
Liveability	0.581	0.108
Funding	0.058	0.020

Source: Own construction (2015).

From an assessment of the content of the policy and legislative framework as presented by Table 4.12 each weighting criterion can be assessed against another. On this basis the decision-makers and planners will be able to rank different criteria by order of importance. The integrated approach derived from this quantitative assessment of policy – single-objective outcomes – makes it possible to evaluate whether the policy and legislative frameworks meet transformation and integration aimed at improving liveability of cities and quality of life for all

city residents. The weighted criteria and factors show that the strength of South African urban policy based on set/selected criteria rests on urban governance as most of objectives conform to institutional framework. This heightens possibility that integration of urban systems (cities, neighbourhoods and precincts) can be achieved through city-based urban governance.

4.9 Conclusion

South African urban planning and development have a wealth of legislation and policy frameworks to address the spatial distortions in the disadvantaged neighbourhoods. The policies, strategies, programmes and plans that embrace integrated development planning stem from the spatially distributed demands and spatial economy necessities. Spatial priorities have introduced promoting economic growth, integrated human settlements, job creation and poverty alleviation.

By and large, urban planning is strategic in nature – strategically set to achieve certain objectives – whether rectifying detrimental effects of apartheid or effecting integrated sustainable urban planning. The processes of transformation, necessary interventions, alignment and integration of planning instruments are operationalized by strategic planning such as IDP processes as it is conceived as a strategic instrument. In addition, strategic planning initiatives in this discussion have been reflected as operational mechanism for policies individually to achieve their objectives.

Integration that should result in integrated sustainable neighbourhoods and cities in South Africa is guided mainly by spatial planning, transport planning and environment management although there are various processes that are interconnected such as corporate governance, economic growth and sustainable development among others. Both vertical and horizontal approaches to integration requires clear understanding and knowledge of this policy and legislative framework guiding urban land planning and development mechanism for nexus alignment, for example, an understanding that SPLUMA (and to some extent spatial planning instruments) is the framework Act to facilitate integration of land-use planning, transportation

planning and environmental management necessary to transform or integrate polarised urban areas in South Africa.

In addition, vertical and horizontal approaches to integration require an understanding of which legislation and policy enable high level for coordinated planning of planning authorities (institutional structures) and planning function such as NDP, NLTF and SEAs that have capabilities to clusters/links various government departments – and at municipal level IDPs.

Based on implementation requirements (practical reality) and scales of operation – municipal level and its IDPs are regarded as the real agent of planning and development on the ground. They are the key transformative instruments in (re)structuring urban land development given that they enshrine constitutional mandate and cognizant of spheres of government competencies; they have efficient and competent institutional capacity; integrated budget planning; reactive to community needs and desires and its style of implementation is spatially oriented in order to achieve realistic overarching developmental goals.

It is critical that urban policies' spatial expression is determined through the urban forms such as the compact city concept to reflect on transformation and integration solutions – whether sustainable urban forms are attained or not.

Lastly, the quantitative processes of MCA depict a significant role towards an integration approach and the decision-making necessary to operationalize policy and legislative framework – weighted criteria (weighted summation of objectives) depict the impact of planning policy such as policies functional areas that need to be improved or the optimal policy objectives function. The pre-eminence of the urban governance criterion gives an indication that the integrated urban systems or integrated sustainability dimensions can be achieved based on the fact that urban governance is a technical criterion having significant influence on the overall results.

The roadmap for these processes can be summarized as illustrated by Figure 4.18 below in order to have a view of an integrated sustainable urban development.

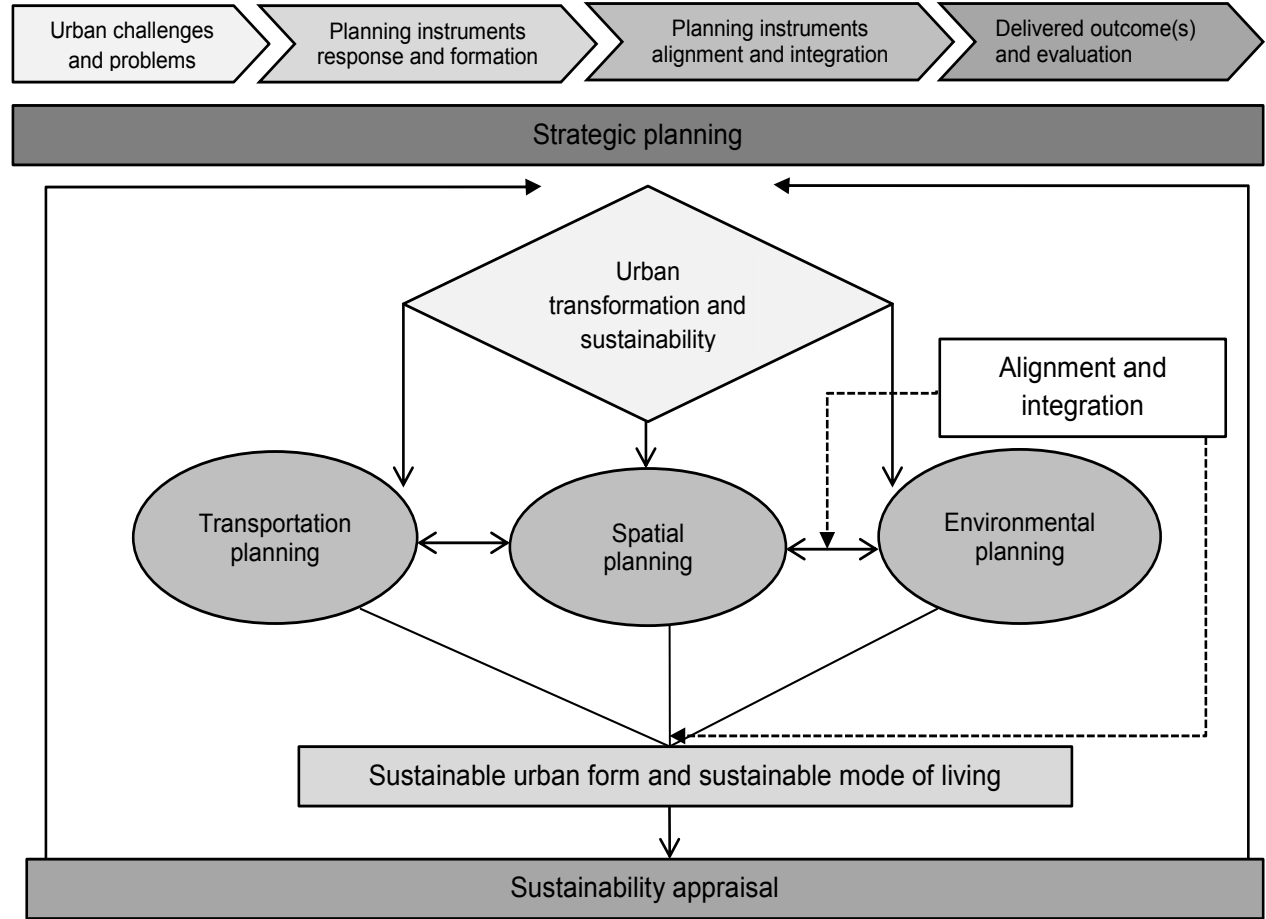


Figure 4.18: Transformation, alignment and integration of planning instruments roadmap

Source: Own construction (2015).

Chapter 5: Methodology

5.1 Introduction

This chapter outlines the methodology adopted in this research in order to achieve the research aims and objectives. The research aims to explore the level of sustainability in South African neighbourhoods produced by patterns of residential segregation and different groups within those neighbourhoods (formal settlements and informal settlements). The theoretical base of this research is an attempt to achieve more liveable neighbourhoods that function as integrated and interconnected communities as well as mechanisms behind neighbourhood effects. Thus this chapter discusses the methods of accessing, generating and analysing sustainability practices and possible actions from communities' perspectives – as the community is an important social science research method. The role of science for sustainability is not to provide definitive answers or to take decisions, but to facilitate a process of mutual social learning, aiming at solving problems, empowering people, and exploring alternative pathways (International Council for Science, 2002:2). According to Rudlin and Falk (2010:167) sustainable urban neighbourhoods represent important principles. One way to interpret this is that sustainability has been premised on possibilities, abilities and potentials of the neighbourhood and wider urban systems to be sustained over time (Barton, 2000:6).

Decision-makers lack decision-support approaches to meet sustainability goals in neighbourhood development (Bass *et al*, 1995:20). This is also evident in policies, strategies, programmes and plans that are to give legitimacy to solutions upon the implementation of sustainability criteria. These policies and strategies are inefficiently underpinned to support the assessment of and decision making on complex urban sustainability issues because they need a framework for integration as they are faced with problems of cross-disciplinary nature. This explains the significant gap that exists between neighbourhood sustainability concepts and the practical implementation of the idea. Therefore, providing these systems with practical guides to sustainable modes, such as offsetting the prevailing problems, needs explicit action – well-integrated and developed structures enabling policy measures. Generally, the operationalisation of such measures is steered by numerous research and decision processes (Omann, 2004:8). The point stressed is that the mentioned gap can be overcome by developing a new understanding of scientific practice and research approaches such as MCA.

The structural component of this chapter and subsequent chapters discussions is outlined in the research design section (refer to point 5.3).

5.2 Research approach

The purpose of the research approach is to provide a direction to guide this research – for research questions to be answered, get a solution to the research problem, meet the research aims and realise fundamental research purposes of generating new knowledge. The research approach outlines the fact that empirical research processes are needed to achieve the gaps identified in this research. This is done in number of ways in this research: spanning from verification of theoretical assumptions, ideas and concepts so as to develop neighbourhood sustainability assessment tool called *Successful Neighbourhood Model* (SNM) (see chapter 8) and moving to more detailed methods of data collection, analysis, interpretation and presentation to answer the research questions and test hypotheses.

As the backbone of this research is developing an SNM to evaluate sustainability impact, the results obtained from empirical procedures will then be administered and subjected to evaluation in SNM. In part, the research objective for providing sustainable and integrated strategy/approach/systems in an attempt to offset city-neighbourhood disintegration is subjected to examination – SNM will be integrating its conceptual framework and evidence (weighted policy objectives (see chapter 4) and case study results). The proposed method of SNM operationalization is Multi-Criteria Analysis (MCA) – its suitability for sustainability evaluation and the adequacy of decision-making requirements that enable comparative analysis, drawing conclusions and recommendations will be tested in totality for empirical application. As a result the research approach employed in this research is the mode called multi-criteria methods, which include MCA application, both qualitative and quantitative data and statistical analysis. The research approach involves several decisions that need to be taken in line with procedures of inquiry (namely research designs) and specific research methods of data collection, analysis, reporting and interpretation.

5.2.1 Qualitative and quantitative approaches

The methods employed in this research to generate data include both qualitative and quantitative sources. Defining these approaches within the theoretical framework and streams of data collection activities – both the quantitative approach and qualitative approaches - have theoretical differences. The latter is commonly defined on the basis of feelings and attitudes (Creswell, 2013:26). These factors gather and evaluate the opinion of individuals or group of people that ascribe towards a particular attribute, variable, factor or a question (Naoum, 2012:35). In order to achieve this goal, there are several data-collection methods that can be used; however, due to the fact that the task of data collection takes place after the research problem has been defined – it becomes clear on which methods to use. In this research this goal of qualitative data-collection methods includes interviewing, discussions, observations, focus group, survey, case studies and analysis of documents.

Quantitative research is defined as “a formal, objective systematic process in which numerical data is used to obtain information about the world” (Bless & Higson-Smith, 2000:26). This approach is used to describe variables, examine relationships between variables, and determine the cause and-effect interaction between variables. In this research the autonomy of the quantitative approach and qualitative approaches is understood and appreciated. However, in practice the division becomes reconcilable between these two types of data sources – as they are employed to support each other. In this research for example, quantitative research approach questions establish answers to how and what questions including follow-up questions such as: How many? How much? How often? How frequently? Therefore, the enlightenment of ‘*why*’ things happen is better investigated with qualitative approaches that provide data about perceptions, attitudes, and behaviour (Blackman in Lupala, 2002:81).

This complementary relationship on the basis that the study rests tends to be more qualitative than quantitative or vice versa and qualifies this research approach as a mixed-methods approach. The mixed methods research resides in the middle of this continuum because it encompasses elements of both qualitative and quantitative approaches (Creswell, 2013:12). It should therefore prove important to view definitions of these three key terms shown in Table 5.1 as applied in this research. In this thesis the mixed method will be used.

Table 5.1: Alternative research approach

Quantitative	Qualitative	Mixed methods
• Experimental designs • Non-experimental designs, such as surveys	• Narrative research • Phenomenology • Ground theory • Ethnographies • Case study	• Convergent • Explanatory sequential • Exploratory sequential • Transformative, embedded or multiphase

Source: Creswell (2013:12).

5.2.2 Statistical modelling approach

The purpose of research design in both descriptive and explanatory research is also outlined. While it is essential to identify the type of evidence that is consistent with a particular theory or explanation there is a need for alternative rival explanations that enable the researcher to identify which of the competing explanations are most compelling empirically. In order to realise this goal – the quantitative data analysis involve statistical significance and correlation coefficient to model the present research overall neighbourhood satisfaction as it is determined by a set of neighbourhood quality measures (derived from locational settings, sense of neighbourhood, spatial and functional connectivity, demographic variables, economic context and level of services). These relationships can then be interpreted and transposed into conclusions and recommendations contributing to sustainable urban neighbourhood future.

Following the argument that the realisation of this research strategy is based on studies involving qualitative and quantitative data, the case studies will be presented by two components. The first component (chapter 6) will focus on geographical location features, demographic profile, spatial and socio-economic characteristics, public transport and urban governance. In this context it is understood that the case studies will give the richness of the phenomenon and the extensiveness of the real-life context (Yin, 2003) in disadvantaged/segregated neighbourhoods. The second component (chapter 7) will focus on hypothesis testing – determining neighbourhood satisfaction through neighbourhood quality

measures using statistical significance and correlation coefficients as shown by Figure 5.1 below.

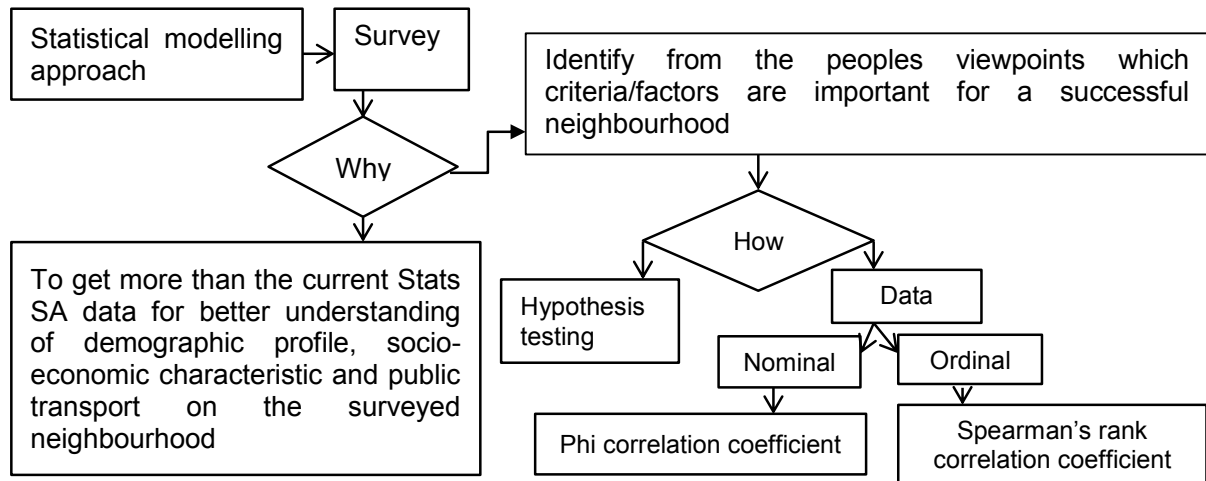


Figure 5.1: Statistical modelling approach

Source: Own construction (2015).

5.2.1 Multi-criteria analysis

As the aim of this research is to evaluate the potential role of MCA for decision-making processes aiming at sustainability, the defined appraisal requirements are used as the criteria to test the appropriateness of the MCA within a sustainability assessment framework (theory and empirical level (policy objectives and case studies)). In order to operationalize the approach (MCA), criteria and factors have to be defined and determined. The sustainable (successful) neighbourhood principles (discussed in chapter 3) and policy objectives (chapter 4) determine the criteria and factors due to their insight into the appropriateness of given working definitions for sustainable urban development/sustainable neighbourhoods as illustrated in Figure 5.2.

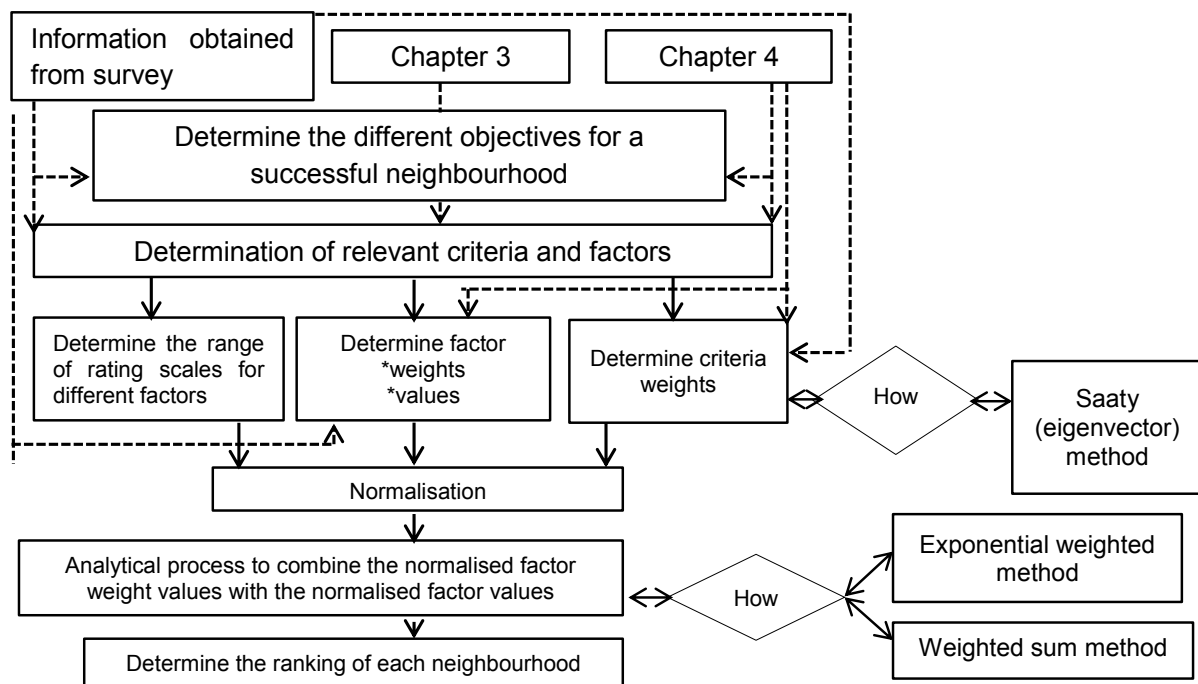


Figure 5.2: MCA method

Source: Own construction (2015).

With respect to MCA the data collected will be used to determine neighbourhoods' functionality through evaluating criteria measured in terms of respective criteria's factors. The results obtained from MCA will then be used to draw conclusions and formulate recommendations optimising MCA ability to identify efficient solutions according to neighbourhoods' needs and circumstances.

5.2.4 Literature review

A literature review has been a critical aspect in the previous chapters of this research process and includes assisting in the choice and formulation of the research topic; framing the research problem being investigated and the research questions. As a result literature relevant to the topic, the research problem and research questions have been used to contextualise and/or frame this research. In addition, separate chapters of literature review have been conducted –

to demonstrate to the readers how research fits within a larger field of study (University of Southern California, 2005:2). This included an overview of the neighbourhood, sustainability and sustainability assessment tools issues, principles and theories and or other subjects/theories related to neighbourhood/city/urban sustainability. Moreover, these chapters reveal any gaps that might be existent in the literature (Creswell, 2007:60).

In this chapter a literature review is conducted to identify methodological and practical aspects that can develop solution(s) to research problem and answer research questions. This includes formulating a research plan (the process of designing the entire research), methods and procedures such as reviewing and selecting methods of data collection, analysis as well as analysis frameworks. Following the methodological review, literature will be presented in the subsequent chapters in order to be able to compare and contrast research findings. The literature will be used to develop an SNM – with selection of criteria and factors as well as reviewing existing sustainability assessment tools relevant to neighbourhood, city and/or urban form. Finally, in the conclusion the main agreements and disagreements in the literature will be outlined, give summary of identified gaps in the literature and research as well as guiding the overall perspective of the research on the topic.

5.3 Research design

Following identification of the research approach – a research plan or structure (research design) is necessitated by its ability to enable the smooth orderly flow of the various research operations (Khan, 2011:72). In addition, Yin (1994:23) points out that research design links the produced empirical data to fundamental research objectives of the research in a coherent chronological structure and eventually to its conclusions.

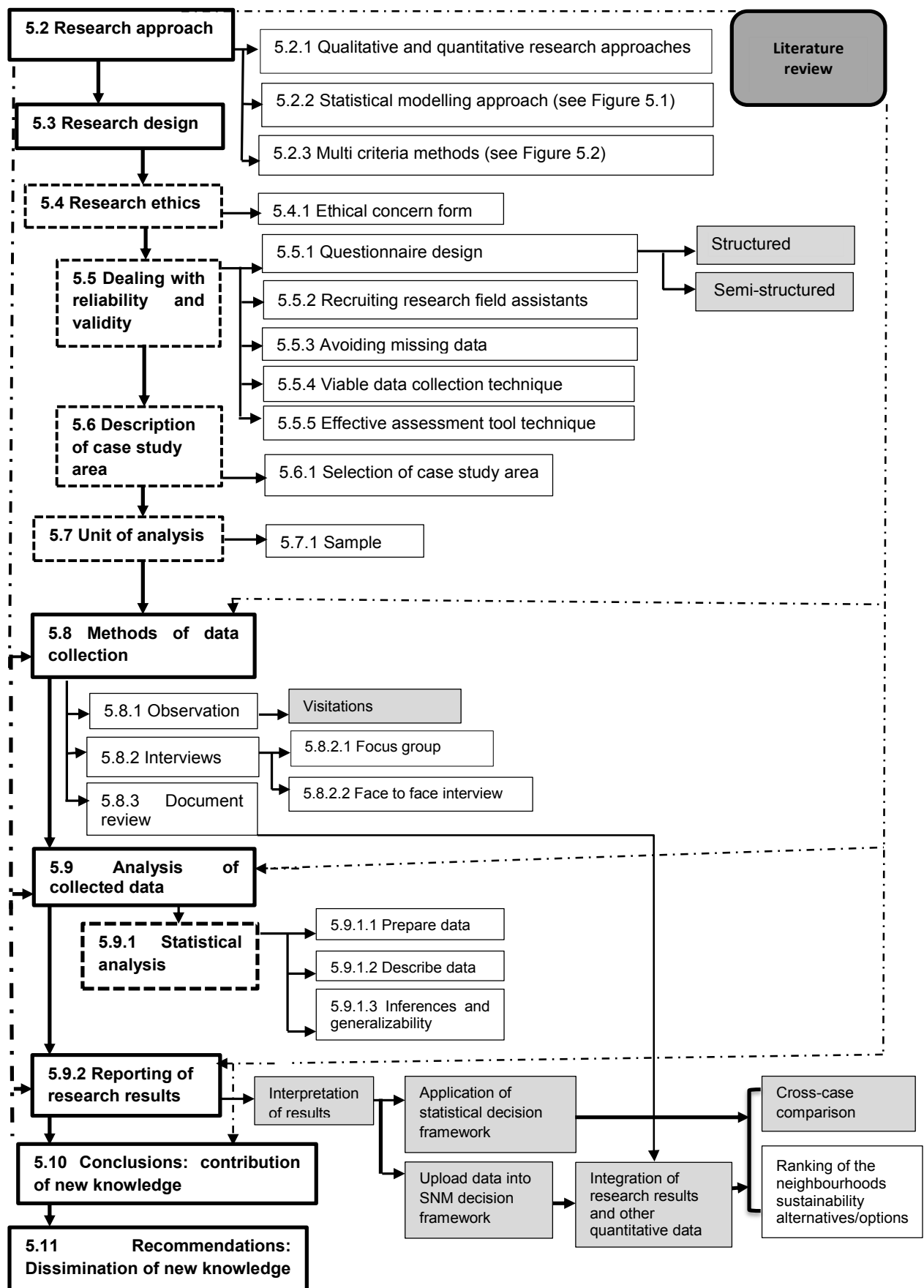


Figure 5.3: Research strategy (Source: Own construction, 2015).

In essence, a research design is typically a procedure to answer the research questions with the most appropriate and feasible methods (Cargan, 2007:47) in that way ensuring that research is proficiently efficient to engender the highest quality of information with the least expenditure of exertion, time and money (Kothari, 2004:32). According to Teriman (2012:42) having a research design serves to clarify the logic of the research and avoid any discrepancy between the empirical evidence and the initial research questions. This is subjective to the way data in research study is collected, analysed, interpreted and reported (Creswell & Plano, 2007:6). Research depends on facts, experience and data, ideas and concepts, hypothesis and conjecture, and principles and laws (Amaratunga *et al.*, 2002:15). Hence, it is constructed in the spirit of enquiry.

It is, therefore, imperative that an efficient and appropriate design must be prepared before starting research operations. For the purpose of this research the neighbourhood sustainability level that this research is set to determine, should be examined further from an empirical point of view – utilising the parameters set by research methods. Therefore, in order to achieve its aims this research adopts the research design. As the main aim of this research is to integrate strategies to provide a framework to assess the level of sustainability – research design appears to fit this purpose. It provides a structure or plan that allows one to identify appropriate research approaches to use despite complexities of integrated sustainable urban development requirements that complicates the overall decision regarding which research approach should be used.

5.4 Research ethics

Research ethics are referred to as norms for conduct that apply to widely acceptable moral standards (Resnik, 2011:1). In basic terms ethics emphasise the standards of conduct that promote good research (this includes methods and procedures for deciding how to act). In addition, ethical norms support the purpose of research and apply to people who conduct scientific research. Therefore, ethics provide guidelines and conduct values that interviewer(s) must adhere to in order to instil trust, accountability, mutual respect, and fairness among others in this research.

5.4.1 Ethical consent form

The letter that introduces the interviewer(s) bearing the North-West University (Potchefstroom Campus) is written and signed by the promoter. The interviewer as part of the introduction briefly explains why and how the household has been selected and asks for respondents' consent for being interviewed. The covering letter explains the purpose of the survey (in this research to gathers households opinions and perceptions about their neighbourhood quality of life attributes). An ethical issue also involves protecting the identity of respondents, and in order to ensure anonymity respondents are not to give names. According to Lankshear (2004:51) a covering letter or brief explanatory statement is the survey instrument itself of the main survey research tools.

5.5 Dealing with reliability and validity

This research identifies reliability and validity as indications of research consistency, accuracy and soundness. In basic terms, reliability and validity are techniques the researcher uses to raise concerns or plausible threats put them under the explicit control as possible. These strategies apply to both research design and research methods in order to ensure that research results are valid, reliable and conclusive. Therefore, pertaining to validity – a cause and effect relationships will be established where specific conditions are shown to result in other conditions. This is an internal type of validity – adopted to give an indication as to whether the condition produces a variance to the outcome or not – supported by adequate evidence to substantiate the claim. In principle, this validity is the core to fully address the issue of the cohesion and interrelations in research study – between conceptual framework methods, questions and findings (Creswell, 2013:23).

The research intends to achieve external validity by drawing a fair sample from the population being studied – because a sample (randomly selected) is representative of the population and results from the survey can be generalised with confidence to the population being studied. As

a result approximate truth about inferences regarding cause-effect or causal relationships based on a study will be warranted. Reliability aims at demonstrating that if the operations are repeated, such as data-collection procedures under similar circumstances, similar results can be obtained (Pandit in Lupala, 2006:88). Therefore, a number of strategies are deployed to ensure reliability of results in this research.

5.5.1 Questionnaire design

Firstly, for the purpose of ensuring reliability a questionnaire was designed with and approved by the Statistical Support Services (Prof Faans Steyn) of the NWU (Potchefstroom Campus). A good questionnaire design includes content, structure, wording, sequence and format (Hay, 2005) these form the basic design for obtaining valid data from the population sample and meeting research objectives (Azzara, 2010:228). As a result, Hoinville and Jowell's (1978:125126) precautions regarding a reliable questionnaire were adopted. These are:

- The questions should be administered easily by the interviewer;
- The questions must be clear and easily understood by respondents;
- The flow, length and structure must motivate respondents to complete the questionnaire;
- The recorded answers should be easily edited, coded and transferred onto a computer file for statistical analysis.

The content of the questionnaire used to ensure reliability and validity of the research finding is derived from theoretical literature (chapter 2 and chapter 3) and interviewing/discussions with municipal officials (those with relevant knowledge and understanding to the phenomenon investigated) (refer to section 5.8.2). Based on the guideline of the questionnaire design and complexity of urban [neighbourhood] systems the closed-ended questions are formulated (see Annexure A) – utilising point scales of different ranges. The Likert scale where all categories are named respondents indicates the degree to which they agree is used.

The Likert scale answers provide a neutral category (don't know) choice to questions, an example is: (a) strongly agree (b) agree (c) disagree (d) strongly disagree (e) don't know. Absence of neutral category could bias the answers, thereby leading to reliability issues as the respondent would have to be positive or negative – referred to as forced-choice (Likert) scale (Mooi & Sarstedt, 2011:69). Many respondents feel more comfortable about participating in a survey when offered free-choice scales (Mooi & Sarstedt, 2011:69). The answer categories in questions 17 and 18 are designed in the manner that answers of questions overlap with clear category ranges (e.g. (a) R101 - R200 (b) R201 – R300 (c) R301 – R400 (d) R401 – R500 (e) Over R500.

The entire questionnaire is divided into eight sections (See Annexure A). Section A questions deduce the demographic profile and investigate the socio-economic characteristics of the households. Section B is intended to gather a sense of neighbourhood – to determine events that encourage the formation of close-knit networks within the neighbourhood. Section C is intended to gather opinions on the impact of crime and the extent of anti-social behaviour. Section D is intended to examine the level of public services and facilities. Section E is intended to determine the extent of local participation in and the impact of local urban regeneration initiatives. Section F aims at to ascertaining respondents' views on public transport and investigating affordability, connectivity, reliability and accessibility of public transport. Section G is intended to investigate perceptions about the road conditions and safety.

5.5.2 Recruiting research field assistants

Another measure undertaken to ensure quality of data was to recruit research field-workers in view of the size of the sample needed in order to give sufficient evidence in results to be obtained. The eight fieldworkers assisted with conducting the interviews of which five have completed matric and three have a tertiary qualification, and can also communicate in black languages as well as Afrikaans and English. Interpreting was used where communication with respondents unable to converse fairly in English proved to be a barrier. The researcher assumes conducting the interviews in the home language is instrumental in making the respondents feel at ease, thus enhancing the chances of getting more accurate data.

Conversely, the translation to home language and interpretations of answers by fieldworkers might bring about a negativity founded in bias.

The fieldworkers are trained to minimize bias, understand the questions and agenda, inform respondents of the purpose and the use of the information collected from them and answer respondents' questions. The researcher meets with fieldworkers every morning to distribute the questionnaires and collect completed. These meetings are used to offer advice and answer any questions the fieldworker has. During the interviews the research engagement with the fieldworkers is facilitated telephonically to assist fieldworkers in order to enhance quality of data collected.

5.5.3 Avoiding missing data

The problems that might have resulted from missing values from the questionnaire are identified and dealt with beforehand. As adopted in this research, missing data according to Stopher (2012:32) arises from at least three different situations:

- A respondent may not be asked a particular question because it is not relevant and there is a skip pattern in the survey that avoids the question;
- A respondent did not know the answer to the question;
- A respondent may have refused to answer the question.

In dealing with questions' relevance – the questions are designed to gather information on the entire household, meaning any household member 18 years and over (a legal age of becoming an adult in South Africa) can answer. However, there are other questions that are concerned with the individual household members who are working due to the nature of public transport category questions. In order to avoid irrelevant questions and skipping patterns these questions are answered by the household contact person who is working. Due to the absence of working respondents during the weekdays working hours, the interviews were conducted on weekends.

It is further established that some workers work on weekends although most of them work half the day and as a result most of the interviews were conducted in the afternoon.

In order to avoid missing data items simply being left blank because the respondent seemed not to know the answer or refused to answer the question the 'don't know' category is provided. The data was then processed through manual editing during the household survey checking the answers reliability and inconsistency and where necessary quickly revising the results. This includes discussions with respondents where uncertainties are identified. The process is carried out for all the questionnaires, reading each question and cross-checking whether the appropriate code for the respondent's answers had been assigned – followed by data analysis.

5.5.4 Viable data-collection technique

A questionnaire being a method of data collection is substantiated through coherent data-collection methods in all cases, including carefully collecting, recording and storing databases for each household and case study. The application of the same variables for all cases facilitates cross-validation techniques and pooling of results from these cases. In addition, to boost validity of the data – the results obtained will be analysed statistically – the validity of the relationship between dependent and independent variables will also be strengthened and the validity of conclusions and interpretations made in the research enhanced.

5.5.5 Effective assessment tool technique

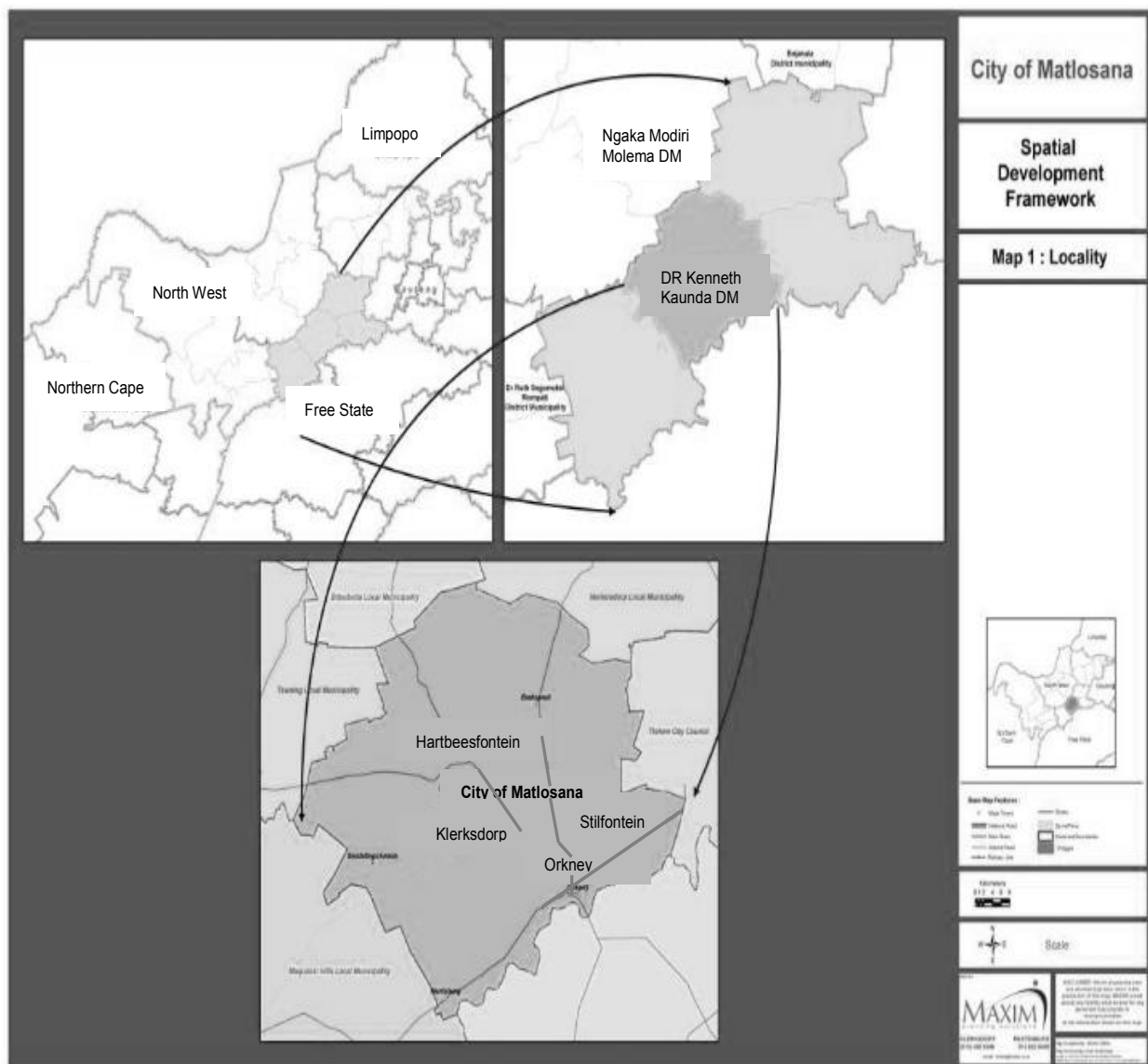
Lastly, reliability and validity are used and integrated in a decision process model. Validity of the assessment tool and the reliability of input information are critical as scoring and ranking of results cannot be valid and reliable otherwise. The application of assessment instruments and procedures in all cases will allow cross-validation techniques to be used. In basic terms, the reliability will be ensured by the extent to which the assessment tools and procedures measure

the same thing in all the cases – this ensures that validity evidence exists for conclusions and interpretations of the assessment tool quality and usefulness.

5.6 Description of case study areas

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and the context are not clearly evident; and in which multiple sources of evidence are used (Yin 2003:23). Yin (2003:138) adds that this structure is recommended for explorative studies and thesis-writing. Stark and Torrance (2005:33) refer to case studies as teaching examples in texts where case studies describe specific situations the student may encounter in their future work. On this basis the aim for the City of Matlosana Local Municipality (CMLM) based case studies is to compare neighbourhoods with each other and provide a platform to promote urban neighbourhoods' sustainability assessment. The case study maps' sustainability assessments and related processes and highlights emerging issues identified by scientists; illustrates science and digests it for decision-makers and suggests a number of issues for consideration (UN-Habitat, 2014a:5).

Therefore, description of the case study areas is critical as the cases to some extent have to be different for the reason that similar cases are equivalently single case studies which are criticised for being less fruitful to scientific development. As result these research case study areas are described in order to identify features or characteristics that make them distinct and fit the purpose. The case study is the City of Matlosana Local Municipality (CMLM) as demonstrated by Map 5.1 below.



Map 5.1: Position of the CMLM towns in relation to DR KKDM and North West Province

Source: Maxim Planning Solutions (in SACN, 2012:1).

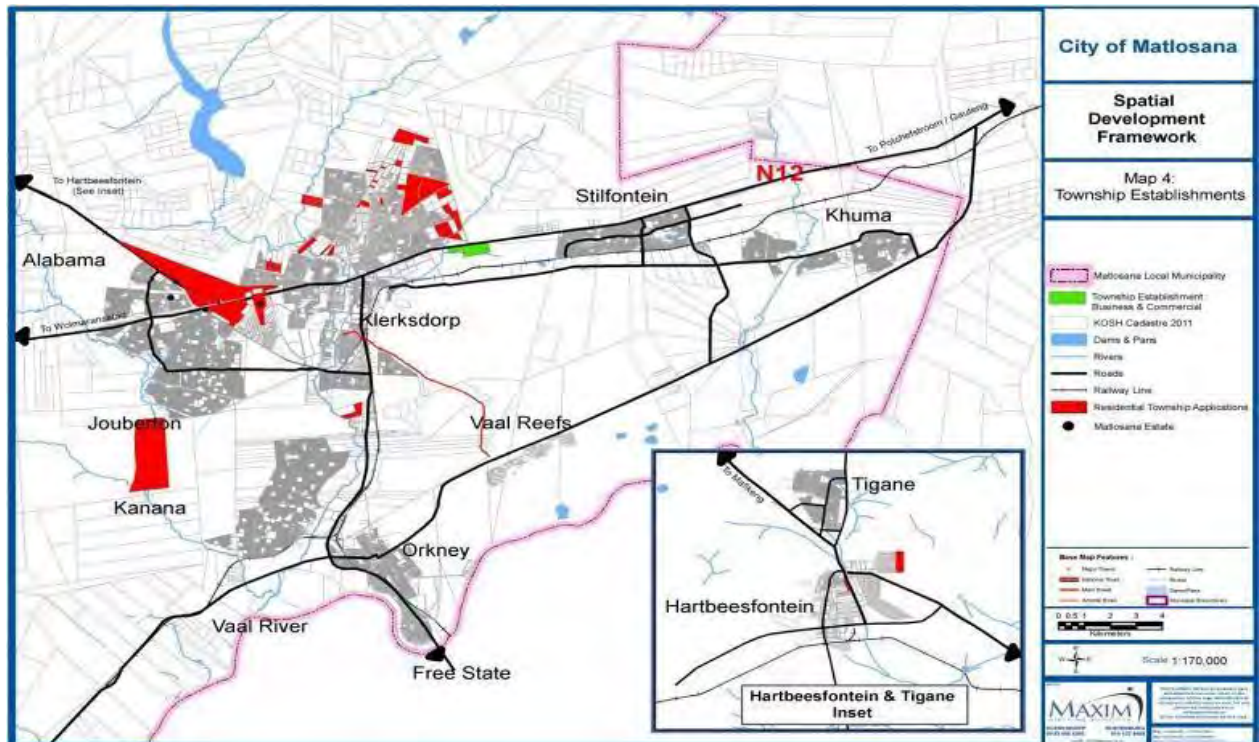
The CMLM is located in DR Kenneth Kaunda District Municipality (DR KKDM) in the North West Province. It is one of the four local municipalities in DR KKDM as indicated by Map 5.2 below.



Map 5.2: Position of the CMLM in relation to the rest of DR KKDM

Source: CoM Annual Report (2013:10).

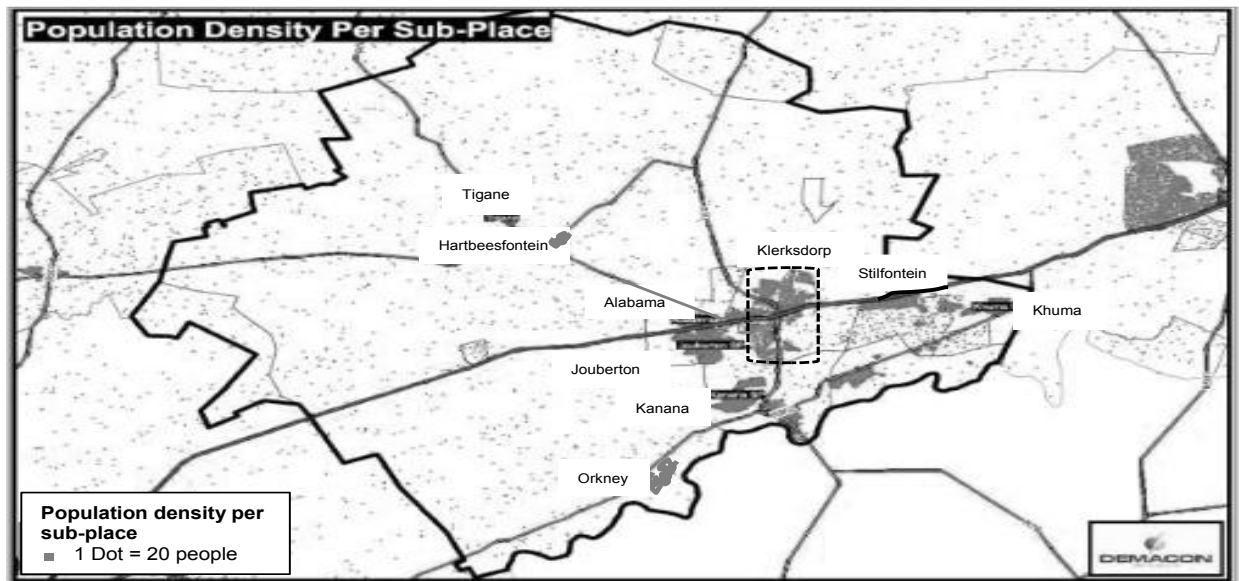
The CMLM consists of five major towns that are Hartbeesfontein, Klerksdorp, Orkney and Stilfontein. Each of these towns has a township (except Klerksdorp with two) namely: Tigane [Hartbeesfontein]; Jouberton and Alabama [Klerksdorp]; Kanana [Orkney] and Khuma [Stilfontein] as shown in Map 5.3 below. These townships were originally developed in terms of the Group Areas Act as separate dormitory townships with each township having its intermediate size centre. The Municipality was previously referred to as KOSH, incorporating Klerksdorp, Orkney, Stilfontein and Hartebeesfontein. These towns each had their own municipality; they have now been incorporated into a single body which is the City of Matlosana Local Municipality (SACN, 2012:12).



Map 5.3: Locality of the case study – spatial relations between towns and townships and between both (towns and townships) and Klerksdorp

Source: Maxim Planning Solutions (in CoM Township Regeneration Strategy, 2012:6).

The merging of these towns has generated a hierarchy of central places setting the scene to make a distinction between the case studies. Based on the functional patterns and population density the higher order central place in this case is Matlosana (Klerksdorp) dominating and/or serving entirely the towns and townships of CMLM as shown by Map 5.4 below.



Map 5.4: CMLM population density per sub-place

Source: Demacon (in City of Matlosana Annual Report, 2013:14).

On a functional level goods and services in hierarchical order and according to accessibility serve as the parameters to identify cases' different components and set selections. When considering the accessibility of goods and services within the same urban area, taking into account the specific spatial dimension – challenges of goods and services accessibility are synonymous with townships in South Africa. This includes issues of socio-economic challenges (most importantly poverty) and spatial imbalances (that is characterised by lack of appropriate public utilities and facilities among other issues) that are deemed unsustainable, whereas the city neighbourhoods make the city centre, well located, spatially and visually well connected.

Having goods and services as criteria to describe and select cases, a myriad of different norms and standards can be used to describe and select neighbourhoods' cases. The norms and standards to be used are based on the following factors:

- Distance from the city centre (CBD);
- Proximity to the main transport corridors;
- Proximity to shopping facilities;
- Proximity to public facilities and services;

- Density patterns – population threshold.

It is from this understanding that deviant cases (neighbourhood types, mixes of formal and informal settlements) are designated as cases for investigation in this research to address the research problem, produce new knowledge, setting parameters for future pathways and suggesting issues for consideration.

5.6.1 Selection of case study areas

Several factors are considered for selecting case studies for in-depth analysis. The intention is to select case studies that fall under the same geographical boundary and for which there is enough data publicly available. The issues of data availability, even more so information-rich cases, according to Patton (1987:51) is one of the fundamental techniques for case study selection as it provides an understanding of and insight into what one wants to study and issues of central importance to the purpose of evaluation. Consequently, accessibility to case location and case data should be taken into consideration when selecting cases (Flyvbjerg in Lupala, 2006:87) – also important are cases of convenience sampling (Paton, 1987:52).

These factors are used for selection of cases in this research – in addition, the research cases selection criteria are motivated by cases of special importance. According to Paton (1987:52) this includes politically important cases. This criterion is associated with emergent issues bringing about predetermined criteria for selecting cases. Therefore, based on the research problem the research employs these several criteria in selecting cases.

Firstly, content analysis of relevant documents such as the Council for Scientific and Industrial Research (CSIR) Guidelines for the Provision of Social Facilities in South African Settlements (2012); Department of Public Service and Administration (DPSA) Guideline on Improving Geographic Access to Government Service Points (2012) and CSIR Guidelines for Human Settlements Planning and Design Volume 1 (2005) are important in determining the demand of

services/facilities for the different case studies. The documents were adopted because they determine the right range of service(s) for a specific settlement/neighbourhood/city in which normative and quantifiable standards provide measures and comparative levels of provision that can be used to determine sustainability maturity levels of the different neighbourhoods. For example, facility provision standards relating to the access distance and population serving provision threshold of facilities to be provided are the starting point for the development of well served, sustainable and integrated neighbourhoods (CSIR, 2012:17). The documents guidelines are used as the main method for determining the demand of case studies morphological characteristics and neighbourhood design qualities. Therefore, these case studies are selected in the following manner (illustrative mode is offered in Figure 5.4):

- Firstly, by determining that the population of the settlement is a population catchment within 15 or 25 km of the settlement centre;
- By establishing the basic population demand which determines what social facilities should be provided for that settlement (these guidelines are available online at http://www.csir.co.za/Built_environment/pdfs/CSIR_Guidelines.pdf);
- By determining that the settlement type relates to population and settlement role.

In essence, the population in a household set-up forms the basis for planning and service delivery (Stats SA, 2013:5). In order to apply these sets of access, distance norms and population threshold provision values that are used are determined from Klerksdorp for all the townships and from each township town are given which indicated that Klerksdorp is a higher order central place. The criterion used is based on these parameters:

- Klerksdorp is CMLM commercial, financial and service hub;
- Towns and townships in the area purchase their main supplies from Klerksdorp;
- There are several amenities, including excellent schools, shopping malls and various government services, private hospitals and other medical facilities available (SACN, 2012:22).

Likewise, the relationship and characteristics that exist between Klerksdorp and surrounding towns as well as townships exist between each town and its township. Therefore, selecting the case studies for sustainability assessment, the two scenarios presented here require different access distance norms and population threshold provision values for social facilities. Figure 5.4 below provides an example of how these exceptions may be applied in terms of the provision for sports facilities.

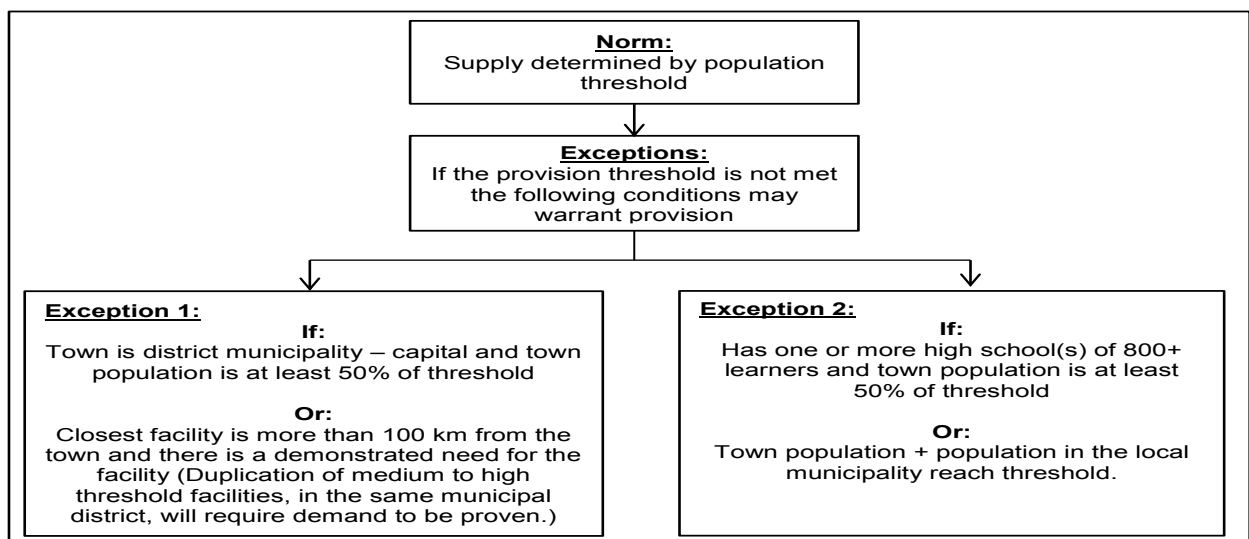


Figure 5.4: Facility provision norms for a range of settlement types

Source: CSIR (2012:16).

These selection criteria connect these five residential case studies to different typologies of residential forms across the urban form, transport accessibility, built forms and their linked density and site layout pattern, household sizes and other morphological characteristics useful for conducting and comparing their sustainability performance assessment.

Since sustainability is the main focus of the analysis, it is important to select international case studies as a template. Purposive sampling is used to seek out international case studies that have research subjects with characteristics that meet the needs of this research and which are information-rich. The international case studies findings are included in chapter 8 to provide an analytical framework in order to compare the local cases with international ones to determine any relative strengths or weaknesses in the local context. The aim is also to determine which

urban design strategies effectively deliver greater environmental, social and economic integration in these case studies neighbourhood developments. As a result the case studies provide the platform to determine whether certain urban form design principles contribute comparatively more than others to sustainability.

Therefore, specific evaluation requirements are developed in order to examine the appropriateness of these case studies in terms of their supporting the implementation of sustainability. The procedures and results obtained from the case studies are then improved with the MCA. The MCA has been found appropriate for developing evaluation of criteria or factors. Lastly, the case studies provide the competence needed to fill the gaps identified in this research and develop solutions.

5.7 Unit of analysis

Following description and selection of case study areas, due attention is needed at this point about the unit of analysis. The unit of analysis is the first step that defines how data will be analysed (Trochim, 2006:35). According to Strang (2015:35) in most cases the research topics are clearest in the case of who or what it is being analysed for the study. By and large, the who or the what in conjunction with the level of analysis set boundaries based on prior decision the researcher has outlined a need to know about or test the unit of analysis of the research. The unit of analysis in an urban study such as this might comprise individual persons, small groups, organisations, agencies, municipalities, households, settlements, communities, neighbourhoods, towns and cities among others (Patton, 1987:50).

In addition, such is the case in this research and Strang (2015:35) points out that there may be multiple units and levels of analysis, or that the units of analysis could exist at different levels. Based on the research title, problem, questions and objectives the main units of analysis for this research are the urban neighbourhoods. After employing several criteria in selecting cases (see 5.6.1) township neighbourhoods are the major units of analysis in turn within these township neighbourhoods, sub-units of analysis (formal settlements and informal settlements) are established to enable in-depth insight and analysis of the township neighbourhoods sustainability provided with mix of settlements. Therefore, as the main aim of the research to

evaluate neighbourhoods' level of sustainability, neighbourhoods' households subjective perceptions of neighbourhood sustainability are gathered and analysed. Finally, the units of analysis become all the households in the sample for each case.

5.8 Methods of data collection

Clearly, the units selected for analysis allows identification of the most appropriate data-collection methods that will allow research to be questions answered, to elicit appropriate data for statistical analysis (testing hypotheses) and produce information that is linked to the assimilation of new knowledge. The basic idea is to identify and describe the processes and approaches to data collection. It should be clear that in a research data can be collected using different methods – having different forms. The examples of these data collection methods are documents, archival records, interviews, direct observation, participant-observation and physical artefacts (Yin, 1994:78).

Therefore, the task of data collection begins after units of analysis have been identified, consequently directing which data-collection instruments and procedures must be employed in a particular research project. In fact, the methods of data collection are many and therefore the intention of this research is not to provide an all-inclusive list of methods but rather those that are deemed to be most appropriate to provide information that will enable one to answer research questions. It is important to note that most of these methods if not all are applied in combination or parallel with each other. For example, the survey, interviews and observations among others are undertaken in a case study and procedures of interviews constitute a survey (refer to Figure 5.3). In subsequent sub-sections most appropriate data-collection instruments and procedures in this research are listed and in-depth explanation of their application offered.

5.8.1 Observation

Observation is a systematic data-collection approach (Cohen & Crabtree, 2006:1). Observation is undertaken as primary method to study cases about settlement types, housing layouts, types of facilities and services, land uses, primary economic activities and community and participatory mode among others. In simple terms the process of observation involves the visitations to the case study workers conducting the observation survey. The checklist is formulated and used during the visitations in order to ensure that all the gaps identified and are to be filled are satisfactorily addressed and that the case study allows the neighbourhood sustainability assessment as indicated in Table 5.2 below.

Table 5.2: Neighbourhood urban form elementary survey

Checklist	Yes	No
Does the neighbourhood constitute of one of these settlements types? • Township formal settlements; • Informal settlements; • Township settlements		
Is the population catchment within 15 or 25 km of the settlement centre establish the basic population demand which determines what social facilities should be provided for that settlement?		
Is the travel distance (in km) to access social facilities less than 5 km e.g. schools, health services, police stations, recreational spaces, etc.		
Are the following transportation infrastructure and safety satisfactory? • Road conditions • Taxi/Bus ranks less than 15 minutes' walk away • Crossings and signage		
Are the following public transport and accessibility measures satisfactory? • Availability and frequency of taxis and/or buses • Streets and pathways (footpath ways)		
Does the neighbourhood have mix of two or more of the following housing types? • Formal housing • Traditional housing • Informal housing		
Does the neighbourhood consist of the following land use(s) and local services and facilities? • Commercial/retail services e.g. local fresh produce market, supermarkets, kiosks and stalls, • Healthcare facilities: private clinics and public health centre • Recreational facilities: playground, football field, park, garden, open spaces, □ Support services: bank, post office, police station etc.		
How are the neighbourhood work related travel patterns? In terms of: • Walking all the way to place of work • Workers mode of transport – does a neighbourhood have a mix of two or more of the following public transport modes (taxi, bus and train)? • Walked to and time waited for the first public transport (taxi, bus and train) • Movement cost (return trip)? • Travel distance		
Does the neighbourhood have scholar transport and what are scholar transport modes?		

Source: Own construction (2015).

This checklist is used to identify potential problems that affect the quality and validity of the survey results and capturing the case study preliminary details.

5.8.2 Interviews

Interview is a systematized questioning technique. As defined by Kvale (1996:6) it is an exchange of information that has a structure and a purpose. The purpose is to gather accounts of the life-world of the representatives of the population of interest with respect to their understanding of the phenomena being investigated (Fowler, 2009:17). A central theme is that interviewing entails asking questions and attaining answers of the described phenomena. This interviewing is done in two ways in this research: interview the municipal officials on the basis that they have knowledge about and understand the phenomenon investigated. Their works are linked to spatial, economic and social determinants that this research is investigating how they impact on the level of neighbourhood sustainability.

The other strand is households' interviews which play an important role in structuring and recording residents' perceptions about their neighbourhood satisfaction (this includes their satisfaction with housing, public schools, public health care facilities, public transport, roads, personal safety and the overall quality of life in general). Both these strands depend on numerous communication possibilities offered by interviews. In essence, there are different types of interviews such as face-to-face (in-person), telephone, email and internet interviews. The choice of type of interview technique depends on various conditions besides being directed by characteristics of the units of analysis and what the research intends to establish.

Aforementioned in the preceding sections there is the issue of reliability and validity that deployed technique needs to ensure. In addition, among other considerations are the issues of sample size, time and cost that arise when choosing an interview technique such as travelling costs and the length of the interview (if long will be time consuming and costly telephonic). The other important factor is the structure of the interview – there are structured interviews, semi-structured and unstructured. Both structured and semi-structured interviews are used in this research for different target groups of interest. The latter was used solely for municipal officials

in order to guide the interchange to the relevant issues while the former is used to interview households respondents.

According to Yin (1994:84) a structured interview is easily understandable along the lines of a formal survey. In a survey the main way of collecting information is by asking as many people as possible closed questions; their answers constitute the data to be analysed (Fowler, 2009:17). Overall, the primary focus of this research is structured interviews. It must be remembered that the semi-structured interview is intended initially to elicit information in order to inform and guide the structured interviews which in this research have taken a form of closed-ended questionnaire (see Annexure A). However, both structured and semi-structured interviews are conducted through face-to-face conversations in this research.

The face-to-face interviews are chosen over other types on the basis of sample size and they (face-to-face interviews) are characterized by simultaneous communication in time and space (McKnight, 2010:116). Moreover, the face-to-face interviews afford the research possibilities to make observations which is another data-collection method the researcher deems appropriate to gather information in this research.

5.8.2.1 Interviews with officials

Having the knowledge of which municipal official can give relevant information directed the use of purposive sampling in this research. According to Stommel and Wills (2004:302) purposive sampling is a technique that allows the researcher to deliberately handpick the sample or cases. Therefore, purposive sampling is used to select the officials on the basis of the belief through their relevant designations to research investigation they are better placed to assist with relevant information. This includes informal discussions with municipal officers in Tlokwe Local Municipality (TLM) mainly because it falls under the DR KKDM, putting officers in TLM in a better position to have some knowledge about CMLM and secondly, the TLM closeness to the researcher. As a result, useful feedback provided is used to formulate the household survey questionnaire and guiding methods to analyse data.

The interview with officials is undertaken to expand and deepen the understanding of the researcher with general understanding about the study area such as the spatial and socio-economic characteristics. The interviews are held with local government municipal officers responsible for IDPs, human settlements, infrastructure services and planning in Matlosana City Local Municipality (MCLM) and Dr Kenneth Kaunda District Municipality (DR KKDM).

5.8.2.2 Interview with household respondents – sampling procedure

The method of selecting respondents used in this research is systematic random sampling for townships based on the number of households per township. One household is randomly selected from the first five households through the 'lottery technique' and then the next is selected and subsequent households based on the five households' interval are identified. In basic terms each fifth household is interviewed for each case subsections/clusters (formal and informal settlements). Thus once the sampling fraction has been randomly assigned, all the rest of the households' samples to be interviewed are determined (Bowling & Ebrahim, 2005:196). This technique is then used to link specific urban forms in low, medium and high density settlements in all the cases providing as much as possible variation in each neighbourhood. With the aid of Google Earth Maps a Geographic Information Systems (GIS) a cluster analysis of land use, housing density, and local accessibility characteristics of places, a regional typology is created of the study area.

The calculation of the sample size of interviews is based on a statistical equation that determines the confidence level. This statistical tool was developed for determining sample sizes for surveys (Lane, 2013:28). The Creative Research System offers, as a public service, an online sample size calculator – the important features include:

- An easy-to-use calculator that determines how many people (households) need to be surveyed/interviewed to get results that reflect the attitude or knowledge of the target population;

- This calculator allows a researcher to find out how precise the results are if the population is already sampled;
- It supports simple sampling methods such as random sampling that do not require more responses;
- The calculator requires the researcher to know the confidence level that the researcher is willing to accept.

Most studies consider a confidence level of anything less than 0.95 unsatisfactory (Lane, 2013:28). In this research number of households in CMLM, viz. 70526 (IHS Global Insight, 2014:1) is used in order to determine a suitable sample size and the sample size calculator availed by Creative Research Systems (2007-2010) is utilised following much of practical emphasis on confidence level satisfactory/unsatisfactory analysis.

Determine Sample Size

Confidence Level: ☒ 95% ☐ 99%

Confidence Interval:

Population:

Sample size needed:

Find Confidence Interval

Confidence Level: ☒ 95% ☐ 99%

Sample Size:

Population:

Percentage:

Confidence Interval:

Figure 5.5: Sample size calculator

Source: Creative Research Systems (2007-2010).

Given that the number of households in CMLM townships is 70526 the sample size of 644 is then proportionalised into five townships to determine a sample size (number of households respondents to interview) per each case. The proportion is determined by each township household population as illustrated in Table 5.3 below:

Table 5.3: Sample survey for each township computed from sample survey per percentage of townships households

Townships	Number of households	Percent of each township per total township households	Sample size needed
		$P = \frac{A}{N} * 100$ Where: P is the percentage in the population; A is the total number of households in each township; N is the total number of households in the townships	$S = 644 * \%$ Therefore: S is computed from the total sample survey by each township percent
Jouberton	28509	$P1 = \frac{28509}{70526} * 100 = 41\%$	$S1 = 644 * \frac{41}{100} = 264$
Kanana	20717	$P2 = \frac{20717}{70526} * 100 = 29\%$	$S2 = 644 * \frac{29}{100} = 187$
Khuma	13553	$P3 = \frac{13553}{70526} * 100 = 19\%$	$S3 = 644 * \frac{19}{100} = 122$
Alabama	3928	$P4 = \frac{3928}{70526} * 100 = 6\%$	$S4 = 644 * \frac{6}{100} = 39$
Tigane	3819	$P5 = \frac{3819}{70526} * 100 = 5\%$	$S5 = 644 * \frac{5}{100} = 32$
Total	70526	$P1 + P2 + P3 + P4 + P5 = 100\%$	$S1 + S2 + S3 + S4 + S5 = 644$

Source: Own construction (2015) from CMLM (2011) data.

In general, the sample size that is statistically representative of the case study strategizes interviews (data collection) and establishes the generalizability of the conclusions drawn from the research (Horrocks & King, 2010:29).

5.8.3 Document review

Document review is a systematic data-collection method from the existing records in a given case study (Yin, 1994:81). According to Guinta (2006:55-56) document review is the secondary source of data – the data already exists. Guinta indicates that this strategy of data collection is utilised to provide evidentiary findings. According Lupala (2006:87) these documentary sources of evidence for case studies include, among others, company annual

reports, publications, meeting notes, presentations materials, memos, business articles and company websites. Guinta (2006:60) adds that the sources can be government publications, census, news articles and earlier researches. These sources as mentioned by Guinta are used in this research together with strategic plans and data from official website to provide a significant input to empirical evidences of detailed case study areas.

The first stream of documentary sources of data in this research are the documents presented in section 5.6.1 that are used for selection of case study areas and provided a better understanding of norms and standards. In addition the recent documents and those relevant to urban planning and development provide figures and facts and focus or promote sustainability and integration are used as sources of secondary data. Therefore, the current and relevant documents used are City of Matlosana Local Municipality (CMLM) (IDPs 2013-2014, SDF 2014, CMLM Annual Report 2013/2014, City of Matlosana (CoM) Township Regeneration Strategy 2012 and data from official website), Dr Kenneth Kaunda District Municipality (IDPs 2012-2016), North West Provincial (SDF), North West Provincial Growth and Development, Stats SA (Household Survey 2014, South African National Household Travel Survey 2013, Census 2011), IHS Global Insight Database 2014, DPSA (Guideline improving geographic access to government service points, 2012) and CSIR (Guidelines for the Provision of Social Facilities in South African Settlements, 2012). Lastly, earlier researches findings that corroborate this research are used.

5.9 Analysis and reporting of collected data

Analysis is the process of systematically exploring and extracting the information from processed interview transcripts (reports) in order to attain important, actionable insights that can be utilised to enhance understanding (Brown, 2004:212) and improve cases' sustainability performances. On the other hand, reporting is the process of ordering data into informational summations (Lynch, 1990:75) in order to establish different neighbourhoods' sustainability performance in this research. In simple terms, reporting purpose is to express raw data into information while the aim of analysis is to answer questions by interpreting the data at a deeper level and providing actionable recommendations (Lynch, 1990:75). It is worth noting that reporting and analysis processes can be entwined. Reporting on its own cannot give the whole account of the action necessary to make decisions or reach meaningful conclusions and

recommendations in turn it requires analytical tool, thus analysis, to bridge the gap between data and action.

5.9.1 Statistical analysis

Following the collection of data – the data is subjected to statistical procedures in an attempt to uncover the relationships, patterns, trends among others as outlined in the subsequent sections.

5.9.1.1 Preparing data collected for analysis

This section is about the process of taking complete questionnaires and interview surveys and preparing them to be put into a form that can be read and processed by the computer. Because qualitative data is made up of words rather than numbers, analysing the data is less straight forward, more subjective, and more labour intensive than analysing quantitative data (Creswell, 2013:62). It is therefore, critical to manage, organize, arrange and prioritise this amount of data into operational units. The step by step approach that facilitates reducing and breaking down the data in a methodological controlled analysis of texts within their context of communication – without quick quantification is used. This means that qualitative data is undergoing the systematic classification process forming or constructing a framework thereby adding value to the content to be analysed.

The framework allows the qualitative data to be condensed into categories or themes that are based on the identification of significant patterns that are emerging. Having the categories and a coding scheme allows totalling the number of times each theme is mentioned. Respondent(s) answer in some questions includes more than one theme thereby more than one theme code is attached. Then calculate the percentage of people who give a certain response. This is a critical step in this process as the textual responses have adopted quantitative data format.

5.9.1.2 Describing data

Following preparation of collected data – the data is summarised and presented in the form of tables and graphs. This is then followed by wording in the form of sentence(s) or paragraph that sufficiently describes these results in satisfactory depth and width. The procedure is descriptive statistics which is the process of summarising data and/or presenting data in a condensed form and describing the trends emerging from that data (Garnsey & Hefferman, 2005:44). Therefore, this graphic analysis supported by descriptive statements form the base for quantitative and qualitative analyses in this research.

5.9.1.3 Inferences and generalizability of data collected

The values of these statistical tools extend the findings to the population and serve as an additional technique to estimate specific parameters in which to investigate and interpret the results of the research questions. This assertion is supported by the ability of confidence intervals to describe the range within which the true value (and/or assessing the difference between two estimates) of mean, proportion or median lies for the sample (Ottawa University, 2012:1). This can involve the estimate for each group – males and females – for instance by calculating the standard error of differences between the groups and then deriving the confidence intervals by computing the estimate for the group of interest (Ottawa University, 2012:1).

This procedure that is used to make a generalisation from a sample from a population is called inferential statistics (Garnsey & Hefferman, 2005:44). The inferential tests are applied to the data to make possible the drawing of conclusions as a way of reporting the results of inferential statistics.

5.9.2 Reporting and interpreting the collected data

When conducting collected data interpretation the framework for reporting is outlined first. The reporting of research results through the qualitative and quantitative data is used as a platform to investigate and assess the differences in sustainability levels between the different types of residential neighbourhoods in the case study multiple cases (five selected cases). The combination of qualitative and quantitative methods is utilised in a multiple-case study analysis. The results are reported using the tools for data analysis that involve statistical significance and correlation coefficient. Reporting the survey results of multiple cases expands the scope of work and provides a better basis for analysis. The rationale for selecting five cases in CMLM is for in-depth analysis and enabling multi-objectivity for performance measurement requirements.

These aforementioned statistical tools are the initial step to comparative research (cross-case comparison) providing analytical exploration of the data set. Therefore, with the aim of producing information to support decision-makers the model (SNM) is used to provide a framework to reassess cases – enhancing consistent comparative analysis (improving quality of data to be used in decision making). SNM analytical tools are utilised in order to provide cross-case comparison to enhance explanations or analysis of actual data and to produce comprehensive strategy. Thus, applying SNM analytic tools in the research process combines actions which add together the actions in the designed setting. The data integrated into the framework will provide perspective in assessing sustainability, prioritising and ranking neighbourhoods. The SNM output will then be interpreted and comprehensive accounts of cases' phenomena positioned within the context of the entire city.

5.9.3 Uploading collected data into the SNM

The results from the statistical analysis and reporting of the collected data are uploaded into the SNM to advance interpretations and decision-making processes. The SNM is used to integrate research findings with other sources of data to narrow the neighbourhood sustainability assessment and focus. The SNM uses the MCA strategic assessment

methodology to accommodate gaps in research data – using criteria for identification of data options to support data reported using statistical instruments. The MCA strategic assessment is used to report on the strengths and weaknesses of the criteria and alternatives. This is done through utilising MCA weighting of criteria that provides comparative analysis and ranking of alternatives and neighbourhoods. These procedures outline the complete spectrum of SNM decision strategies to provide an overall alternative ranking.

5.9.4 Drawing conclusions based on SNM application

In order to determine whether by proxy or not, this framework/model is the best practice example for neighbourhood sustainability assessment method, the conclusions to be drawn from its application are determined on the basis of the research purpose (whether the objectives of the research are achieved – this includes exploring the principal components of the model), outline of the main findings and leads to the implication of the research findings. A conclusion will also include a consideration of the limitations of the research and offer suggestions for future research.

5.10 Contribution and dissemination of new knowledge

This is the last stage of this research whereby the significant contributions of knowledge to the gaps that considerable field of knowledge in terms of literature review identified are determined. Therefore, in an attempt to address the gaps the process that will be used to contribute new knowledge includes synthesizing the existing knowledge to construct the research knowledge.

The empirical research process will be used as the first evidence method to determine whether the research has made a significant contribution to new knowledge that can recommend ways to address evidence practice and policy gaps among others. Therefore, to provide evidence practice constructs, the research begins by deducing the knowledge insights from case study

research. As a result the contribution of the case study research to practical and theoretical suggestions is examined.

Another way of making a significant contribution to new knowledge is developing a framework/model as there is a value in adding new perspective. This includes positioning SNM to demonstrate widespread results in practice – suggesting how the outcome based sustainability analysis can be undertake practical applications including trend analysis, comparative decision-making, target setting and system improvements.

Therefore, this research will propose that modelling builds knowledge that can be incorporated into the neighbourhoods, cities, municipal, provincial and national ongoing practice. In addition, various processes of SNM as a way to make a contribution to new knowledge to address the gaps identified will be examined. These include suggesting the prospects of using criteria/factors and weighting criteria to solving problems and provide an overall alternative ranking to meet local needs and respond to priorities set by local municipality. Finally, all the over-arching ideas and contributions that SNM can propose to create successful neighbourhoods/cities will be embedded into ongoing urban and regional planning practice.

5.11 Conclusion

This chapter has outlined the research methodology that seeks to investigate how gaps that have been identified can be addressed. This has led to the proposition to adopt both qualitative and quantitative methods to collect data from the case studies and analyse it. Data validity and reliability as well as research ethics are explained how the research will deal with them. It presented the MCA framework and statistical modelling approach that will be used to report, analyse and evaluate collected data. It outlined how methods of data collection will be integrated and evaluated through the practical application of SNM. Finally, conclusions will be drawn and new knowledge derived will be used to formulate recommendations.

Chapter 6: Survey results on neighbourhood satisfaction

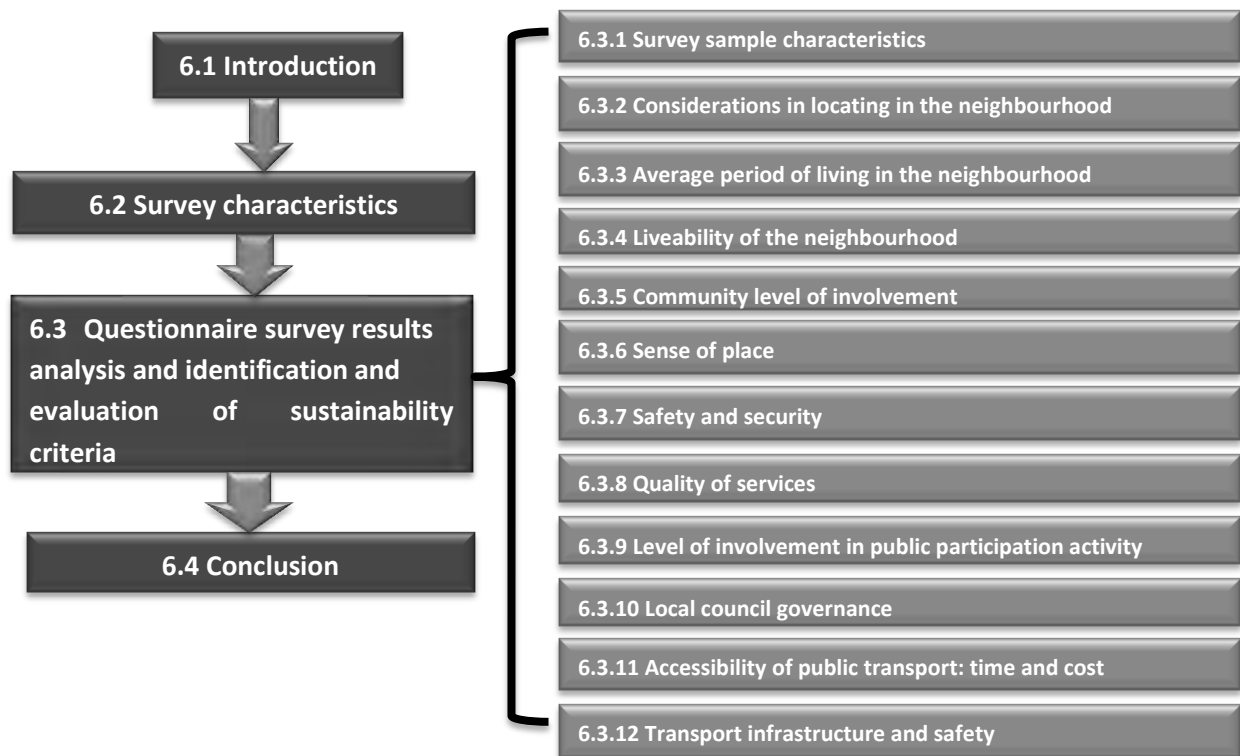


Figure 6.1: Structural components of chapter 6

Source: Own construction (2015).

6.1 Introduction

This chapter presents analytical processes leading to the results intended to achieve the main research objective of evaluating the level of sustainability in different township neighbourhoods. The chapter is structured into four main sections. Following the introduction, the second section reports survey characteristics and third section reports data collected through questionnaire survey in an attempt to establish how the people living in CMLM reflect on the overall sustainability levels of CMLM. Each of these questions' results is used to suggest its own set of criteria that will be used to measure the level of sustainability. Local and international research findings will be briefly introduced to explore the effectiveness of the approach and compare the findings and trends in order to identify areas in which the current research can learn from international cases. Then, the factors that are deemed relevant to

neighbourhood sustainability practices are adopted so that neighbourhood cases (Alabama, Jouberton, Kanana, Khuma and Tigane) can be measured and compared.

6.2 Survey characteristics

Before survey results provide insight into residents' subjective perceptions (criteria) of neighbourhood sustainability relative to sets of neighbourhood quality measures, it is important to discuss the demographic composition of the responses received in order to reveal and/or determine whether it influences analysis of sustainability discourse in neighbourhoods. Firstly, the CMLM population is estimated to be 412 030 and the number of households is estimated to be 122 363 (IHS Global Insight, 2014). Therefore, with the survey targeted to cover CMLM township neighbourhoods (resulting from patterns of residential segregation), Census 2011 provides the specific categorization of data – in this case settlements types as outlined by Table 6.1.

Table 6.1: Settlement types by race, age, household size, and gender in South Africa

Settlements type	Black		Coloured		Indian or Asian		White	
	2000	2011	2000	2011	2000	2011	2000	2011
	%	%	%	%	%	%	%	%
Rural areas	78.6	79.5	8.8	8.8	2.5	2.6	10.1	9.0
Urban areas	64.7	69.0	13.3	13.2	4.7	4.1	17.5	13.6
Urban TS	95.7	95.7	4.1	4.0	0.1	0.1	0.1	0.2
Urban IS	97.7	97.1	1.9	2.2	0.5	0.0	0.0	0.0
Other urban areas (excluding TS & IS)	36.9	42.6	21.5	22.2	8.7	8.0	33.0	27.0
Average Total	78.6	79.5	8.8	8.8	2.5	2.6	10.1	9.0
Note: TS = township formal settlements; IS = informal settlements; TS & IS = township settlements								

Source: Stats SA (2011).

The sample that is used in the survey is drawn from these townships as defined and categorised by Stats SA (2011). These categories are adopted as a strategy to seek to target settlements throughout the case studies that meet this description. In this survey, 644 questionnaires were proportionally distributed per township (Jouberton, Kanana, Khuma,

Alabama and Tigane) and administered. The qualitative data was gathered through informal observations and respondents giving additional information during the household survey. The quantitative fieldwork for this research commenced on the 17 November 2012 utilising both Saturdays and Sundays for all the respective weekends and ended on 9 December 2012.

6.3 Questionnaire results, analysis and interpretation

This section aims to establish measures of neighbourhood satisfaction for the evaluation of and/or for the purpose of achieving neighbourhood sustainability following the extensive presentation of questionnaire results by analysing the data followed by qualitative interpretation thereof.

6.3.1 Survey sample characteristics

Out of 644 respondents, 380 respondents were females (59%) and 264 were males (41%). The gender distribution of respondents for each neighbourhood revealed more female respondents than male respondents.

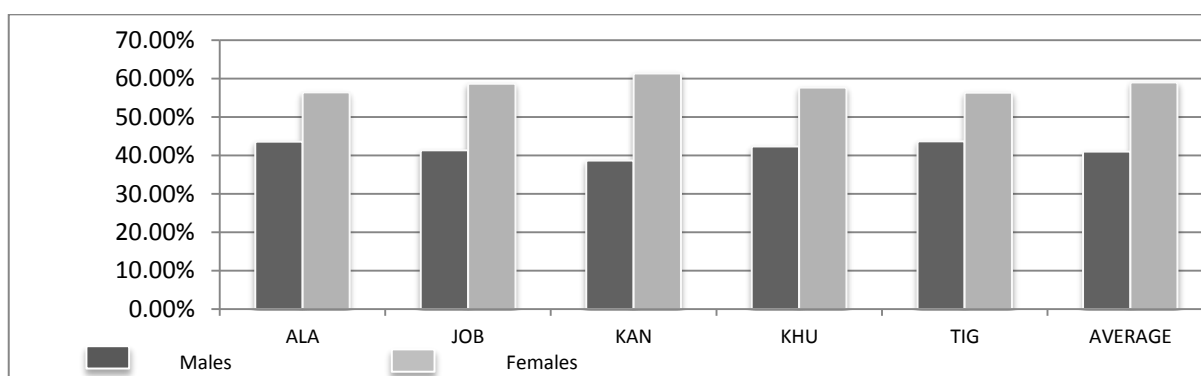


Figure 6.2: Survey respondents by gender

Source: Own construction (2015).

Kanana had a vast majority of female respondents (61.30%), and (38.70%) male respondents followed by Jouberton (58.70%) female, and (41.30%) male respondents; Khuma (57.70%) female and (42.30%) male respondents; Alabama (56.40%) female, and (43.60%) male respondents and Tigane (56.30%) female and (43.70%) males respondents as shown in Figure 6.3. Interestingly, Census 2011 revealed that the gender composition of the City of Matlosana consists of (50.01%) females and (49.99%) males.

Given both the Census 2011 and survey results gender – women seem to be more interested in taking part in neighbourhood activities. As a result, the respondents' gender response rate is uneven amongst neighbourhoods. This has been expected as the interviews in this research were conducted on Saturdays and Sundays targeting households' members who worked due to the nature of public transport questions. The main bearing point is that these neighbourhoods are mining towns' neighbourhoods as a result most of male household members were reported to be working. More interestingly, the high rate of female respondents besides work related issues is that (36.7%) of households in CMLM are female headed (Stats SA, 2011:1). Moreover, the different age groups in CMLM reveal that there are more females than males as indicated in Figure 6.3 below.

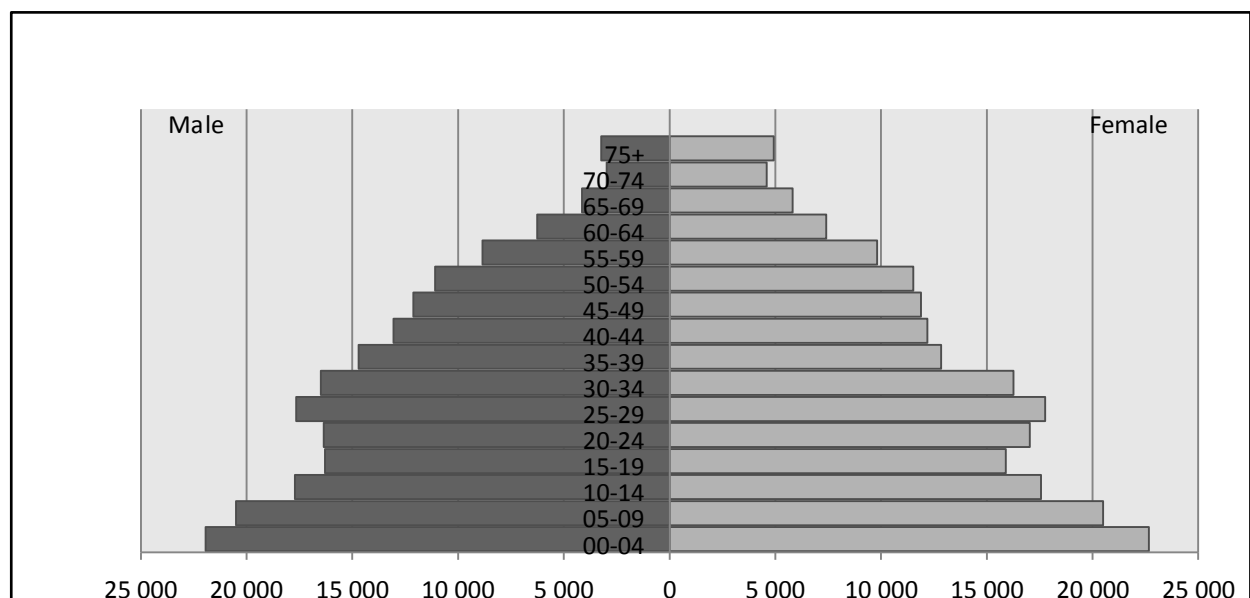


Figure 6.3: CMLM population pyramid by age and sex

Source: IHS Global Insight (2014).

Therefore, substantive conclusions cannot be drawn and extrapolated from this kind of analysis. However, it worth mentioning that gender may be able to give an analysis of which gender relates most to neighbourhood sustainability initiatives/activities if other survey characteristics are considered, such as determining the level of involvement in neighbourhood sustainability initiatives/activities between males and females. Functionally, the purpose of gender analysis in this research is to understand the underlying research results and thus having insight into latent constructs that underlie sets of responses. This nature of results, according to Andrew *et al.* (2002:89) reflects a need to put specific gender-based concerns on the urban sustainability agenda.

6.3.2 Considerations in locating in the neighbourhood

The respondents were asked to reveal the main reason why they decided to locate in their respective locations, and this ranged from being born here, married here, job opportunities, low crime rate, has all I wish for, opportunity to save, close to amenities and nowhere else to go. This question was administered to elicit information as to how satisfied the respondents are as per the number of years they had lived in their neighbourhoods and decision to reside in their neighbourhoods. It is assumed that this question of inquisitiveness into choice of location to some extent will exercise some control over level of willingness to engage in matters that aim to promote neighbourhood sustainability. The results are presented in Figure 6.4 below.

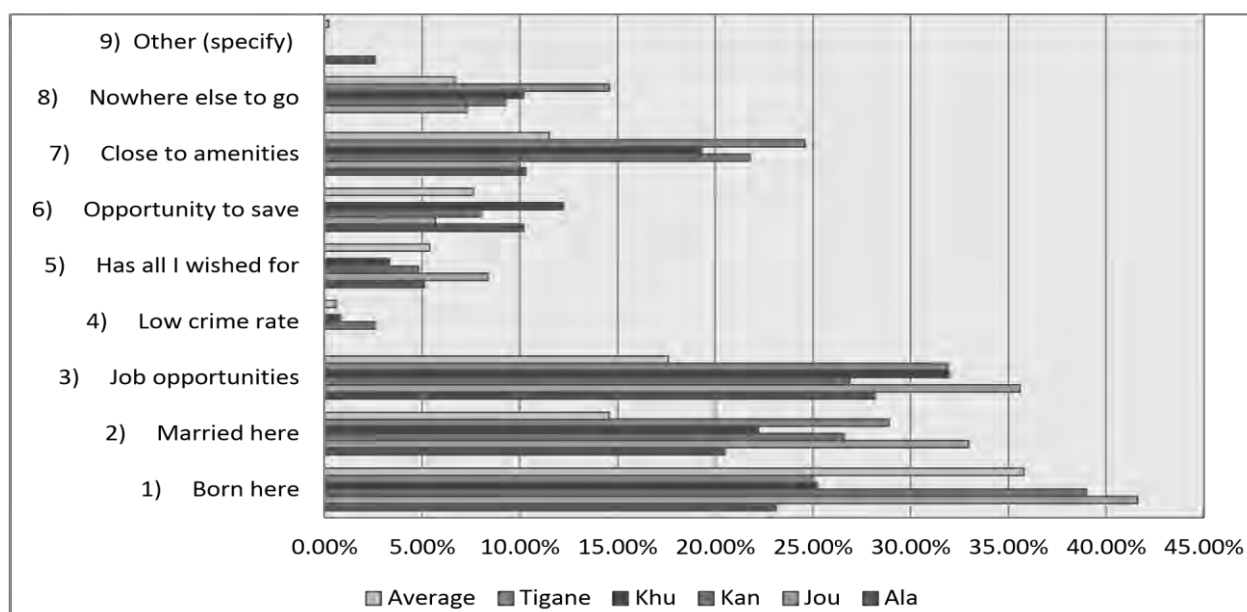


Figure 6.4: Reason for neighbourhood choice

Source: Own construction (2015).

The results presented above reveal various reasons for a residential decision. In all five neighbourhoods most respondents (35.80%) chose the category *born here* as their reason, followed by *job opportunities* (17.60%) and *married here* (14.60%). While not underplaying other reasons it appears these reasons reflect socio-economic trends. The category *close to amenities* (11.50%) responses reflects services and accessibility criteria. The responses *opportunity to save* (7.60%), *nowhere else to go* (6.70%), and *has all I wished for* (5.40%) have profound implications for socio-economic criteria. It is followed by the category *low crime rate* (0.60%) which is the indicator that asked about the overall perception of safety. Finally, the results revealed that there were other respondents (0.20%) who indicated none of the above reasons as representing their views.

The level of satisfaction or dissatisfaction with a place is thought to be governed by a wide range of factors including economic, social and physical attributes of the residential environment (Oktay *et al.*, 2009:273). The high aggregate positive responses in this regard make the social and economic factors the most influential factors for choosing the residential location. An analysis of this information demonstrates socio-economic variables to promote some operational version of sustainability can be used to infer the status of particular criteria

such as spatial, economic and quality of services. For example, job opportunities would be an indicator for employment levels (number and type of jobs and job growth), income levels as well as location and accessibility of employment.

From the social perspective, a reason based on *born here* and *married here* highlighted what Riger and Lavrakas (1981:150) in their research presented to highlight two distinct dimensions of place attachment, which are *rootedness* and *bonding*. These dimensions are expected to be good indicators of community involvement as dimensions assume a high amount of contact residents have built over some years which will make them feel involved in the neighbourhood activities. Keeping with the evidence of survey results socio-economic criteria to create basis for contested integrated sustainable neighbourhoods – they have highlighted the strengths and weaknesses of these criteria. This question has set measures that can be used to describe complex social, economic and physical realities in order to achieve sustainability. Considering the main objective of this research these findings are deemed most appropriate to measure sustainability levels so that these neighbourhood cases can be compared.

6.3.3 Average period of living in the neighbourhood

The respondents were asked to reveal how long they had resided in CMLM. The range of answers included: less than 1 year; 1–5 years; 6–10 years and over 10 years. The question was formulated to determine the correlation between average period of living in the neighbourhood and neighbourhood satisfaction as a means of determining neighbourhood liveability and measurement of sustainability level. Figure 6.5 below depicts the results.

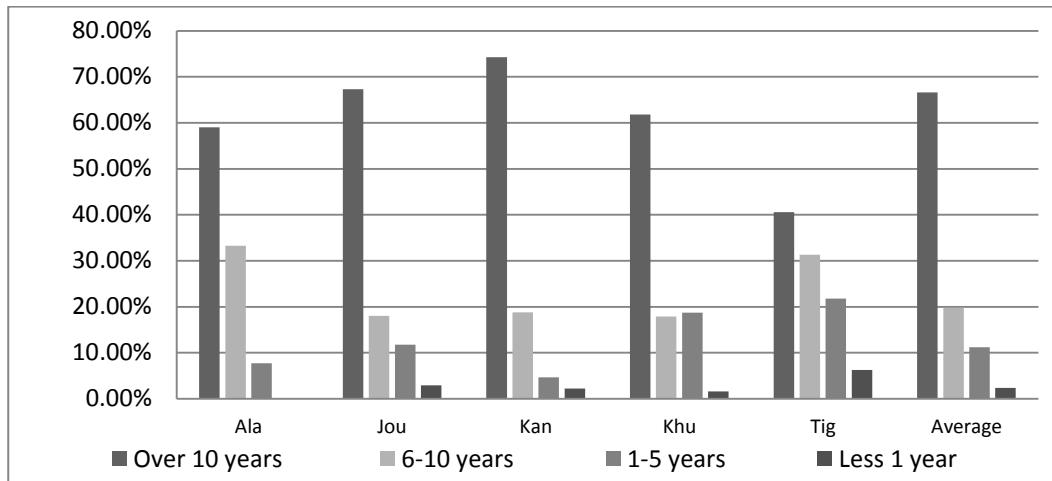


Figure 6.5: Length of stay

Source: Own construction (2015).

The average results across all the neighbourhoods revealed that the majority of respondents have lived in their neighbourhoods over 10 years (52.30%). This is followed by those who stayed in their neighbourhoods for the period of 6–10 years (24.22%). Both these categories and to some extent 1–5 years (12.88%) represent longer length of stay. This can be interpreted to mean that the residents were satisfied with their neighbourhoods presumably with socio-economic conditions. Furthermore, the longer length of stay appears to demonstrate the degree to which residents enjoy their stay which is the standard criterion for quality of life the neighbourhoods offered. Often the shorter length of stay – less 1 year (3.10%) is likely to coincide with the effects of in-migration which are typically neighbourhoods' pull factor effect, such as socio-economic attributes.

This also seems to support the concept of neighbourhood quality having a similar positive influence on liveability criteria for a sustainability measurement framework. However, comparatively speaking the longer length of stay reflects a stable composition of population, with presumably positive consequences for sustainability factors. These features develop specific criteria and factors to measure the physical, economic and social qualities of the neighbourhood that will qualify it satisfactory or sustainable.

6.3.4 Liveability of the neighbourhood

The respondents were asked questions that would illustrate threshold of neighbourhood liveability. The respondents were to answer: yes definitely, yes to some extent, and no. The respondents painted a picture as illustrated by Figure 6.6 below.

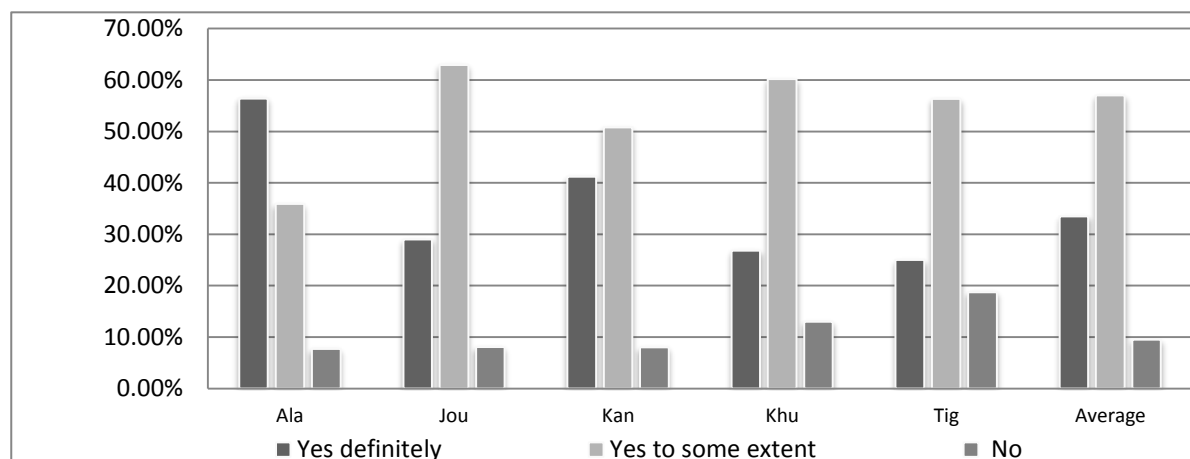


Figure 6.6: Liveability of the neighbourhood

Source: Own construction (2015).

The average results revealed the dominant response to be yes to some extent category (57.00%) followed by yes definitely (33.50%). From sustainability perspective, liveability must be clearly associated with set measures that could offer the insight of what sort of factors enhance or limit liveability utility. Based on these results – these neighbourhoods ability ought to be characterised by good transport systems, housing conditions, education, infrastructure, and availability of employment opportunities open parks, low crime rate and other liveability related requirements.

The relevance and importance of each of these additional factors is potential to highlight issues of concern such as answering why there were respondents (9.50%) who indicated that they do not enjoy living in the neighbourhood. Considerably, liveability is the sum of factors that add up to a community's quality of life – including built and natural environments, economic prosperity,

social stability and equity, educational opportunity, and cultural, entertainment and recreational possibilities (Urban Land Institute, 2015:1).

From the survey result follows that liveability positivity is contestable as the specifics and particularities of the liveability situation to be measured were not clearly factored in the underlying question. However, the results of this question show considerable agreement over sustainability and performance measures. They can be employed to quantify and measure various determinants of liveability at the neighbourhood level.

6.3.5 Community level of involvement

Community involvement is considered a desirable factor to improve the general performance and sustainability of neighbourhood based on event(s) that involve a high level of local participation such as community meetings (UN-Habitat, 2013b:53). The respondents were asked a question that would illustrate on community level of involvement (namely on level of working together (within 15/20 minutes walking distance)). The main purpose of asking these questions is to evaluate empirical conception of sustainability criteria for participation. Figure 6.7 below reveals these results of community level of involvement.

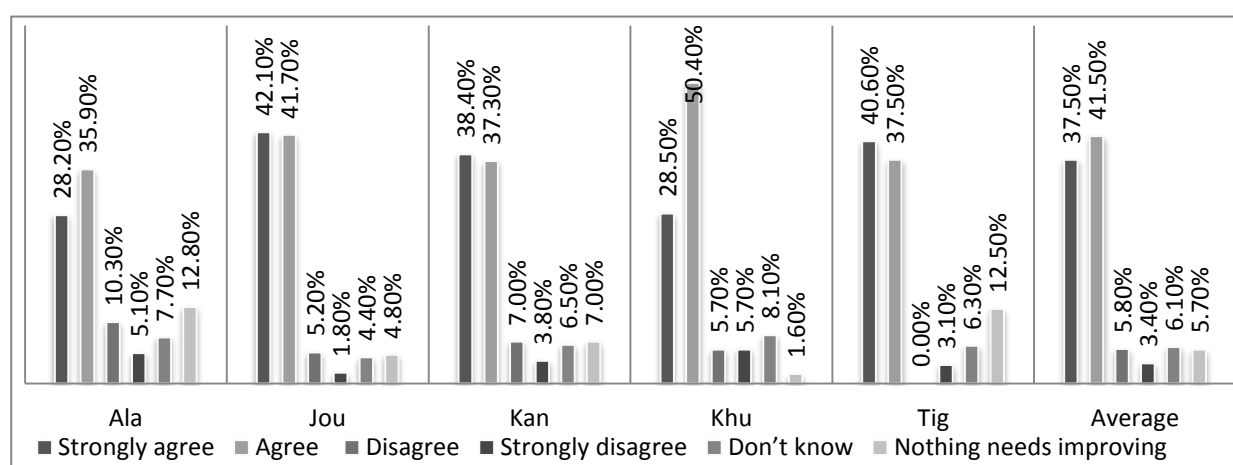


Figure 6.7: Community level of involvement

Source: Own construction (2015).

Using the average results, the responses strongly agree (37.50%) and agree (41.50%) were the majority responses, therefore on aggregate community level of involvement yielded positive results. As the result, aggregated to give total score majority of the respondents (79.00%) revealed the community level of involvement within 15/20 minutes walking distance to be very high. The remaining percentage of respondents (21.00%) consisted of categories disagree (5.80%), strongly disagree (3.40%), don't know (6.10%) and nothing needs improving (5.70%).

The high level of involvement revealed by survey results indicate that there is (or can be) massive influence of sustainability practices in CMLM. This is explained by range of factors attached to involvement at the local level such as participation, social capital, consensus-based decision-making and inclusiveness. Some other researches denote a connection between age, gender and education and community level of involvement (Kitchen & Walliams, 2009:16). Such is the case in this research as the results revealed women to be slightly more likely to participate in answering research questions than men.

Based on the results, this high level of community involvement reflects potentially profound implications of sustainability in neighbourhoods. On the flipside the negative results revealed although obviously understood as backdrop to the successful achievement of sustainability objectives they could be important to understand in order to provide solutions and aggravate community involvement criteria. In addition, this negativity in this research is aggravated by people residing in informal houses and settlements tendency that they have to benefit something (that will put food on their tables) or else they find such activities not worth their time. According to Williams (2002:3) community volunteers come mostly from the middle classes among others need to included. Based on this analysis these criteria can provide sustainability-related performance measurement framework that allows comparing of neighbourhoods and determining overall neighbourhood sustainability.

6.3.6 Sense of place

A sense of place is a combination of unique characteristics and qualities that provide the meaning to a location basically growing from identifying oneself in a relation to physical surroundings (environment), social and cultural variables (Xu & Croos, 2012:273). The

respondents were asked questions that would illustrate on sense of place (sources of data being people's willingness to help their neighbours, close-knit of neighbourhood and level of neighbourhood values).

The main purpose of asking these questions is to establish how residents feel about their living, built and natural environment as essential factors for environment, social and economic sustainability as illustrated by Figure 6.8, 6.9 and 6.10. This question that was asked includes sub-questions. The average results of these neighbourhoods revealed the positive response (aggregated to give total score) for sub-question neighbourhood willingness to help their neighbours, close-knit of neighbourhood and different values (88.70%, 82.4% and 86.6% respectively). The results on the level of neighbourhood values are interpretably positive as most respondents disagreeing to different values transpose to sharing the same values.

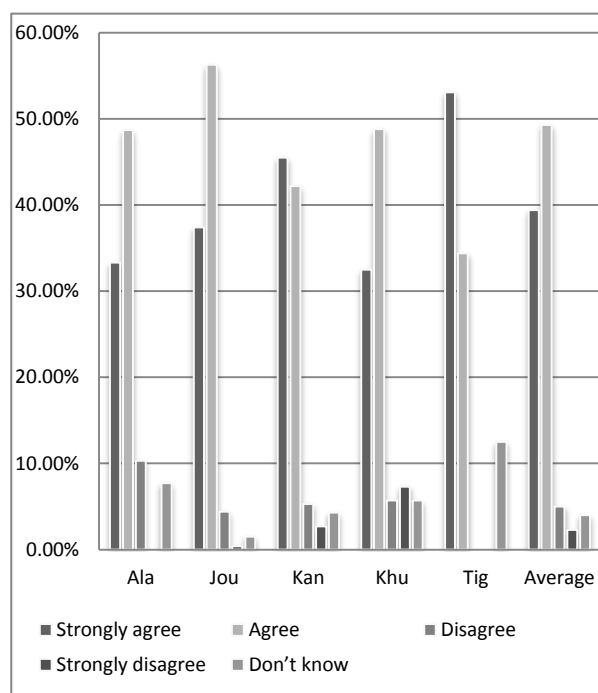


Figure 6.8: Neighbourliness

Source: Own construction (2015).

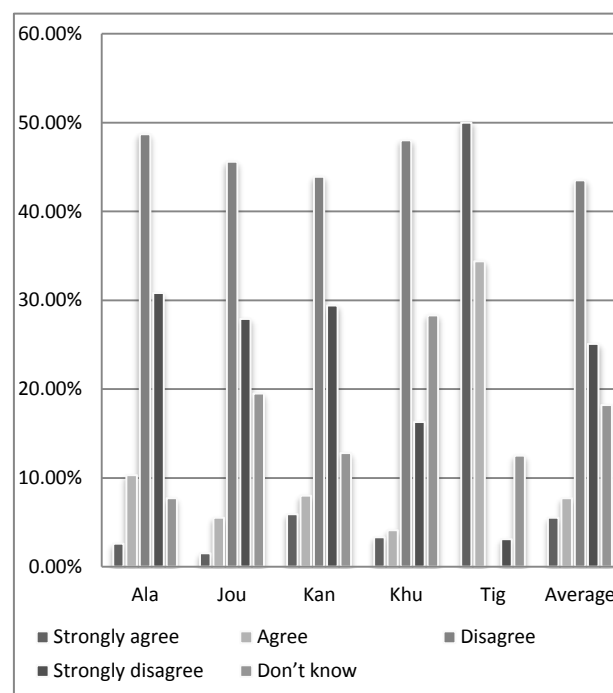


Figure 6.9: Different values

Source: Own construction (2015).

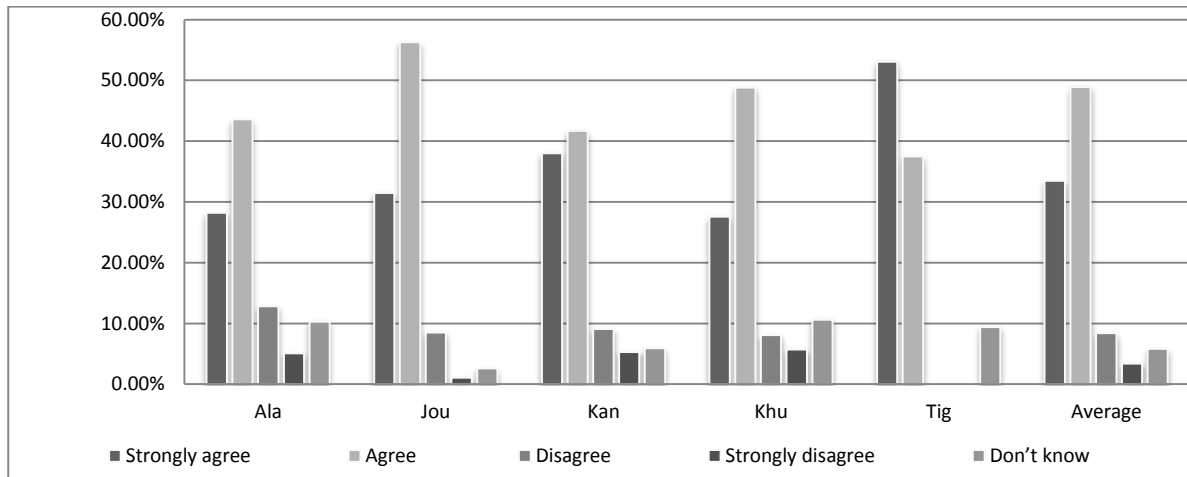


Figure 6.10: Close-knit

Source: Own construction (2015).

These measures reflect how residents of these neighbourhoods relate and feel about their places of residence (spatial settings). In this case the results suggest that on average the utility of sense of place indicate residents attached to their neighbourhood and showing potential to work together and integrating different skills to attend to community development issues and areas of concern.

Therefore, investing in sense of place as a tool for sustainability is essential to secure the inputs of community. According to Saville (2009:387) it is essential to establish and maintain equitable relations between community and built (and natural) environments. Keeping with the findings of research survey, the results suggest that CMLM can contribute positively to the enhancement of environment, community, social, cultural and economic surroundings at the neighbourhood level. Under this view, the overall opinions/views/perceptions that residents have about their neighbourhoods are aggregated as criteria of sustainability – neighbourhoods with high sense of place are then considered to have high sustainability level. These aggregate measures allow comparison between neighbourhoods to observe which has a high level of sustainability.

In addition, it is important to mention that due to diversity of personal senses involvement, close-knit and values in a neighbourhood are based on varied lifestyles, people's demands and preferences (Geo & Hakao, 2006:167). Identifying these communities' characteristics utilising

sense of place will broaden the understanding of the opportunities for sustainable community development activity for efficient urban growth management (Ramamurthy & Devadas, 2012:36).

6.3.7. Liveability

Liveability is an important element to the establishment of sustainable neighbourhood on the basis that it is sum of a number of broad and inter-related aspects that contribute to the quality of life of a place (Urban Land Institute, 2015:1) or aspects of sustainable communities agenda (UN-Habitat, 2014e:15). On this basis, the respondents were asked questions to indicate how worried they were about having their home broken into and something getting stolen, being mugged and robbed, being subject to a physical attack because of skin colour, ethnic origin or religion and being a victim of all types of crime in general. The purpose of this question is to measure individuals' beliefs and perceptions in order to quantify these subjective factors for safety and security sustainability criteria. Figures 6.11, 6.12, 6.13 and 6.14 below reveal these results of safety and security.

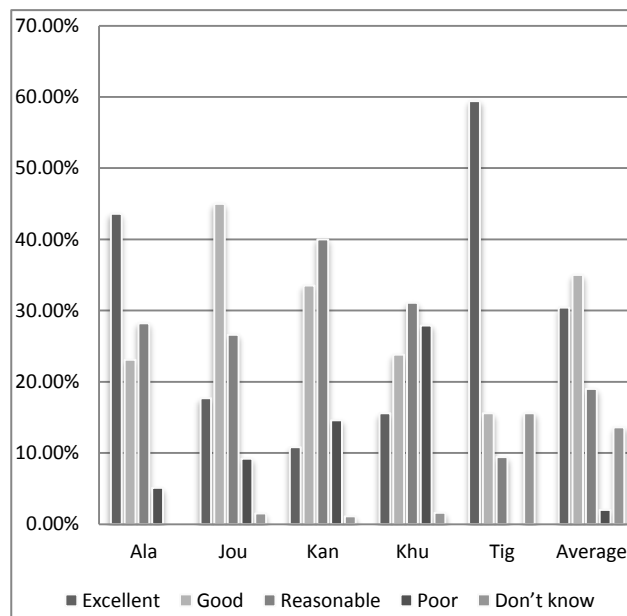


Figure 6.11: Safety at home

Source: Own construction (2015).

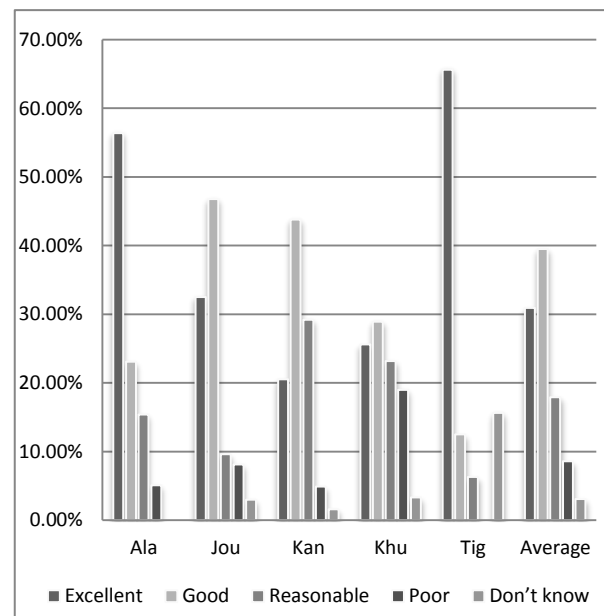


Figure 6.12: Safety around resident

Source: Own construction (2015).

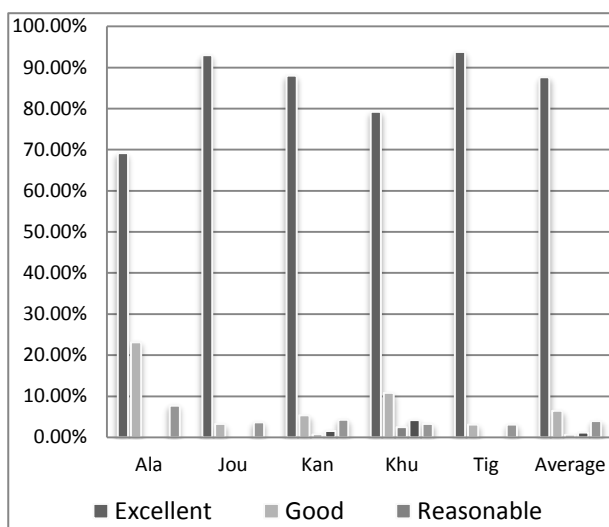


Figure 6.13: Ethic/religion stability

Source: Own construction (2015).

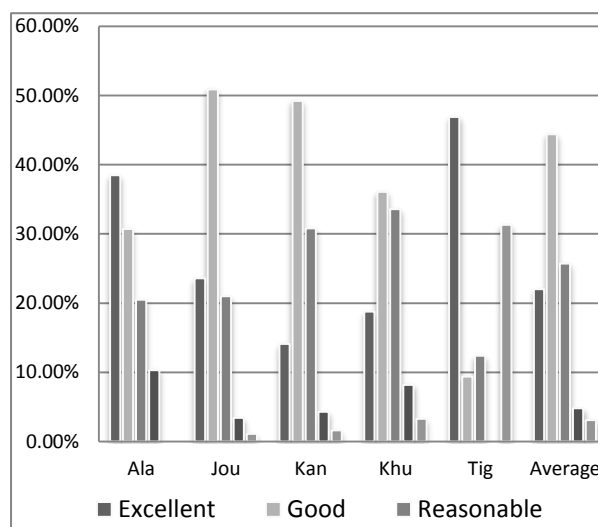


Figure 6.14: Safety in general

Source: Own construction (2015).

With relation to safety and security, survey results showed distinct peaks when all positive responses were aggregated to give total scores with safety at home being (84.40%), safety around resident being (88.30%), ethic/religion stability being (84.80%) and safety in general being (92.10%). Clearly, very few respondents regarded safety and security an issue of concern. This implies that the neighbourhoods have lower rates of crime and fear of crime which makes them more liveable. Looking into safety in general – measures of perception used were road traffic and accidents incidents. As revealed by results road traffic and associated accidents are important factors for community safety that create the basis for sustainability in CMLM. This makes crime and safety factors of liveability criterion which is one of key construct of sustainability practices. Crime and safety measures can be regarded as primary outcome measures to compare and rank neighbourhoods respective sustainability levels.

Moreover, other researchers (Sampson, 2001:190; Vacha & McLaughlin, 2000:496) findings illustrates that the rate of crime is higher in neighbourhoods that are poverty stricken and decaying infrastructure such as roads, housing and electricity among others. This is due to the fact that crime and other social vices thrive under such conditions and such is the case in CMLM. The criminology concept “awareness space” predicts that people with criminal intents will not travel far from places they are familiar with to commit illegal acts (Spelman, 1993:481).

In all locations it was observed that there is a relationship between informal housing (shacks) and perceived risk of crime. Conversely, Ferguson and Mindel (2006:322) study revealed that the higher the physical and social disorganization disorder in a given society, community or neighbourhood, the more residents feel vulnerable to crime and other social vices.

A point of contention deducted from the analysis is a relationship between crime and spatial layout. In a broader view planning, design and appropriate management is critical to induce the spatial arrangement and enhance element of safety in an area. The volume aims and relations of this liveability criterion contribute to the general understanding of neighbourhood sustainability as it includes range of perspectives and disciplines to provide the basis for sustainability measurement framework for successful neighbourhoods.

6.3.8 Quality of services

The households were asked to express their satisfaction/dissatisfaction level with different types of services including: local schools, housing, local-street cleaning, local policing, local health services, local public transport, parks and open space and variety of shops. These are important measures concerned with quality, affordability, accessibility and availability of services in pursuit of the overall neighbourhood sustainability as revealed by Figures 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21 and 6.22. It follows that most respondents were neither satisfied nor dissatisfied and fairly satisfied with the quality of education, housing conditions, local street cleaning, local policing, local health services and local public transport. For parks and open spaces and variety of shops most respondents were fairly dissatisfied and with some substantial percentages neither satisfied nor dissatisfied once more. Overall, most of respondents in all these categories were neither satisfied nor dissatisfied.

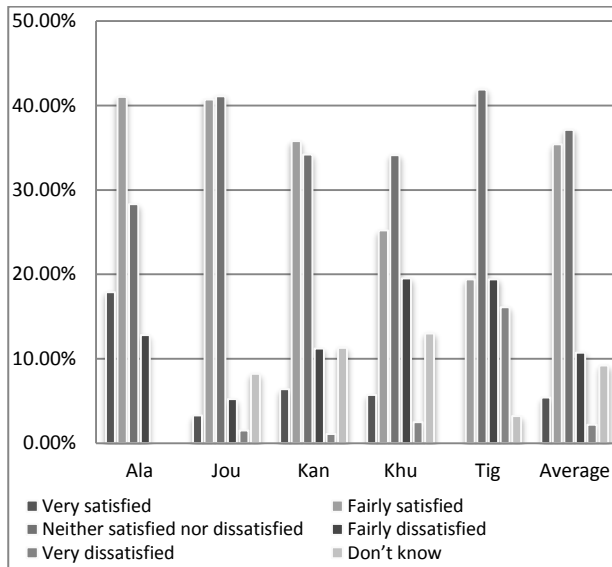


Figure 6.15: Education

Source: Own construction (2015).

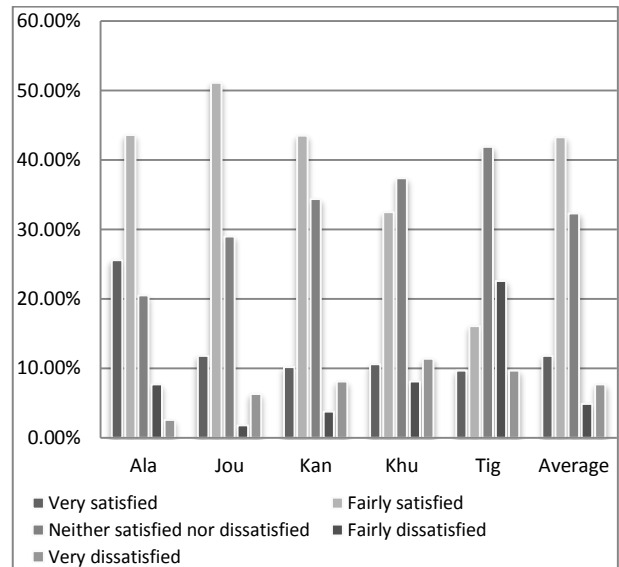


Figure 6.16: Housing

Source: Own construction (2015).

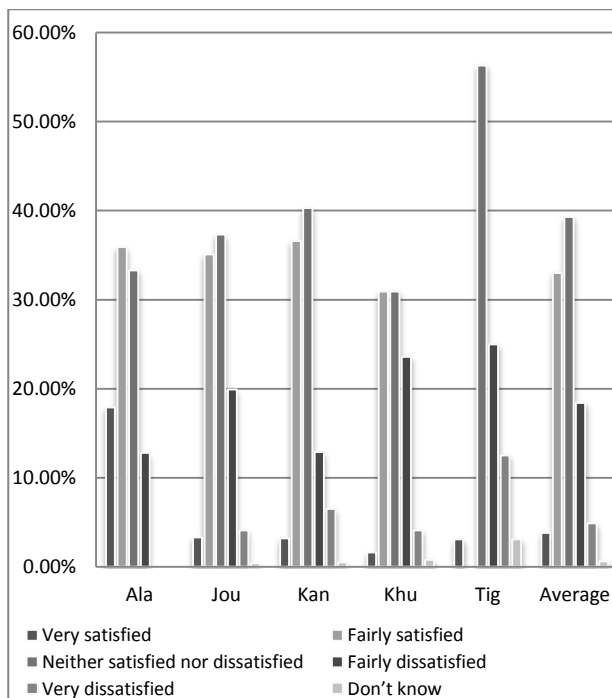


Figure 6.17: Local street cleaning

Source: Own construction (2015).

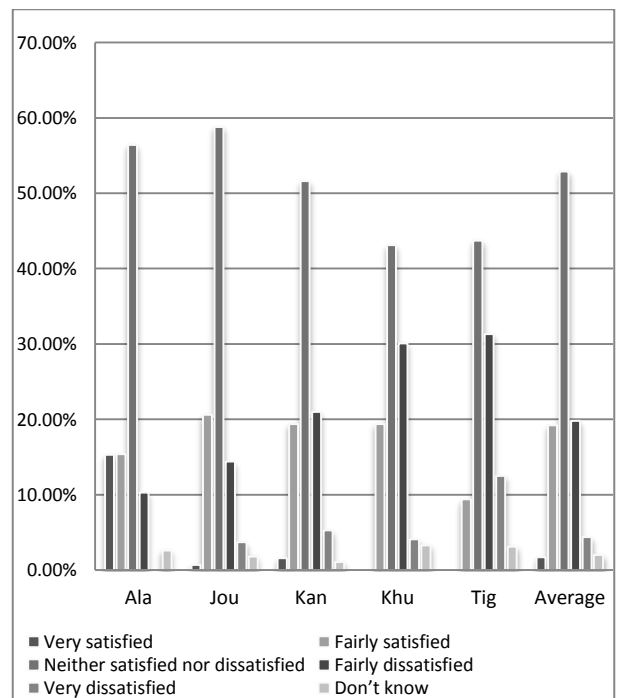


Figure 6.18: Local policing

Source: Own construction (2015).

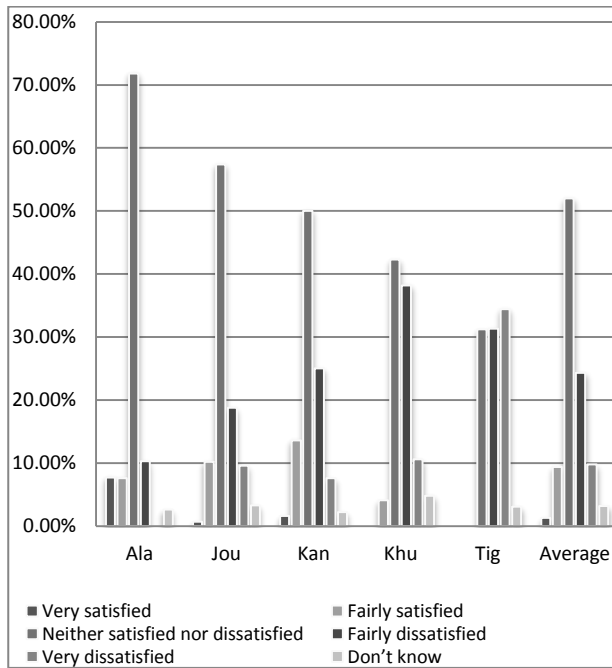


Figure 6.19: Local health services

Source: Own construction (2015).

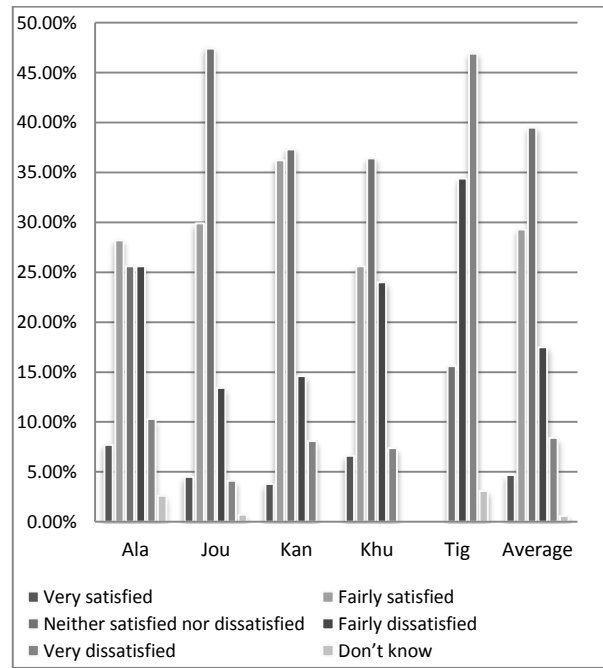


Figure 6.20: Local public transport

Source: Own construction (2015).

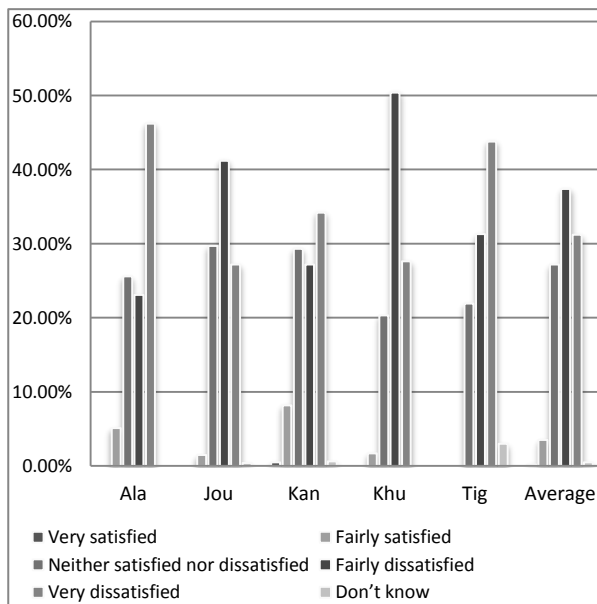


Figure 6.21: Parks and open spaces

Source: Own construction (2015).

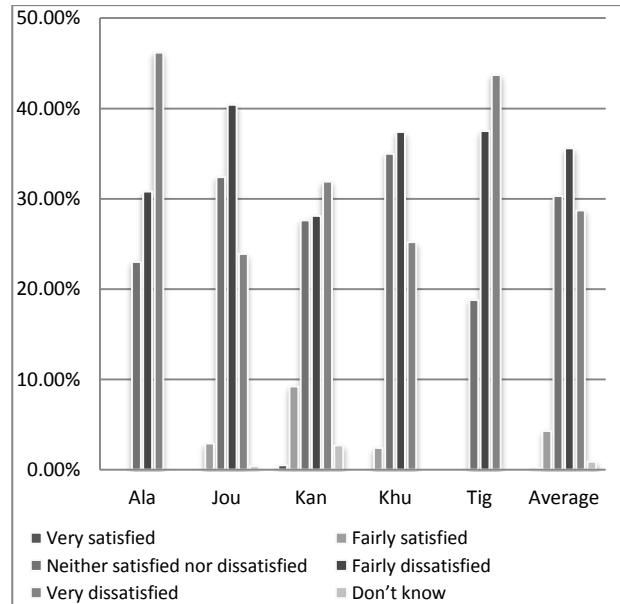


Figure 6.22: Variety of shops

Source: Own construction (2015).

From the positive results perspective, these services have the highest level of responsibility to achieving sustainability. According to Jenks and Jones (2009:106) these attributes offer residents what can be summarised as good quality of life. In addition these variables offer insights of a clear idea of what sort of factors would enhance the concept of quality of life which is a function of urban sustainability. Considering the nature of these factors – these positive relationships reflect on the urban quality as housing, open space and parks, streets and shops are linked and/or constitute urban form. Keeping in mind the evidence as provided by research survey results – the factor's utility is limited in this research to being neither satisfied nor dissatisfied and this does not give the objective preference/importance and concrete facts about neighbourhood sustainability practices of these neighbourhoods.

It is understood that responses become useful in terms of sustainability criteria if they highlight issues of concern and provide measures of progress. However, measures of the quality of services can be employed to measure various determinants of sustainability. A broad range of criteria can be used for these services to contribute and measure the level of sustainability in relation to accessibility, availability and affordability of these services. For analytical purposes, the spatial economics foundation suggests that houses in proximity to particular land-uses are more preferred. These analyses corroborate Basolo and Strong's (2002:26) findings that these variables measure the status of a neighbourhood's physical environment, access to places of activity and services, and socio-cultural setting. With respect to sustainability level these measures create the basis for neighbourhoods to be measured and compared.

6.3.9 Level of involvement in public participation activity

The level of involvement in public participation is assumed to be a desired and necessary part of sustainable neighbourhood development (UN-Habitat, 2014a:2). In the light of this, the households were asked to indicate whether they had taken part in a consultation about local services or problems in their area in the last twelve months by completing a questionnaire, attending a public meeting and being involved in a group set up to discuss local services problems. The purpose of these measures is to consider what degree of participation would correspond to the important themes within sustainability performance measurement and strengthen sustainability. Figure 6.23 presents these results.

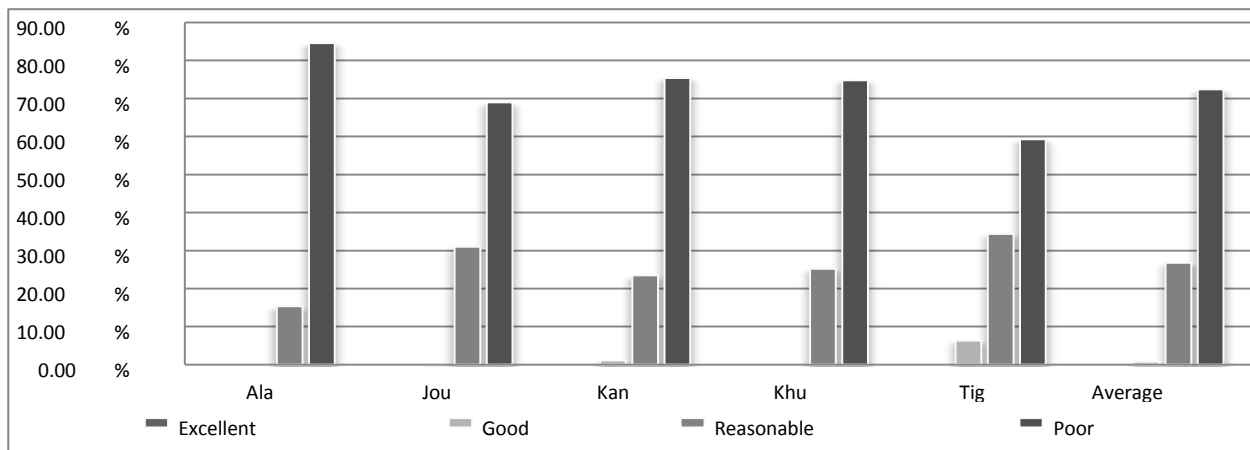


Figure 6.23: Level of involvement in public participation activity

Source: Own construction (2015)

Average results of these neighbourhoods revealed almost all the respondents (99.20%) classified their level of involvement in public participation activity negatively. However, the remaining percentage of respondents (0.80%) was found to be positively involved. These results revealed limited public participation in neighbourhood development processes. This subjective factor utility is limited by the empirical evidence that in the last twelve months most of the respondents indicated that none of mentioned activities took place. This means that CMLM is faced with the biggest challenge of achieving a transition to sustainability through community involvement.

When acting in concert with public participation definition as proposed by various authors and researchers (Williams, 2002:4; Kelly, 2012:43; Kelley & Becker, 2000:86) public participation is a collaborative planning process. In this light, the relationship between level of involvement in public participatory activity neighbourhood satisfaction can be interpreted to mean that the greater the involvement, the higher the neighbourhood satisfaction. According to Pierce and Dale (2011:289) increasing involvement in community activities is accompanied by a shift away from simply representing different interests and needs but coherent approaches that influence the environment, economic and social dimension of urban neighbourhood sustainability. Focusing on this key initiative of particular significance for achieving sustainability at the

neighbourhood level these results reveal a need for measurable and quantifiable factors as they can highlight issues of concern and provide measures of progress.

In this case results show that the level of involvement in public participation activities has been an effective criterion and feedback loop that can be measured so that neighbourhoods within CMLM can be compared. In terms of sustainable participation objectives measures incorporate opportunities to participate in local government planning. This factor gives comparative outcome data so that neighbourhoods within CMLM can be compared and ranked. It can guide neighbourhoods to move along a path of development that is more sustainable.

6.3.10 Local council governance

Sound urban governance structure is an integral element of sustainable urban development – embracing strategies for inclusive city (UN-Habitat, 2014b:56). On this basis, the households were asked to rate their trust in their local councils in order to have a good measure of sustainability criteria for urban governance. Figure 6.24 presents these results as shown below.

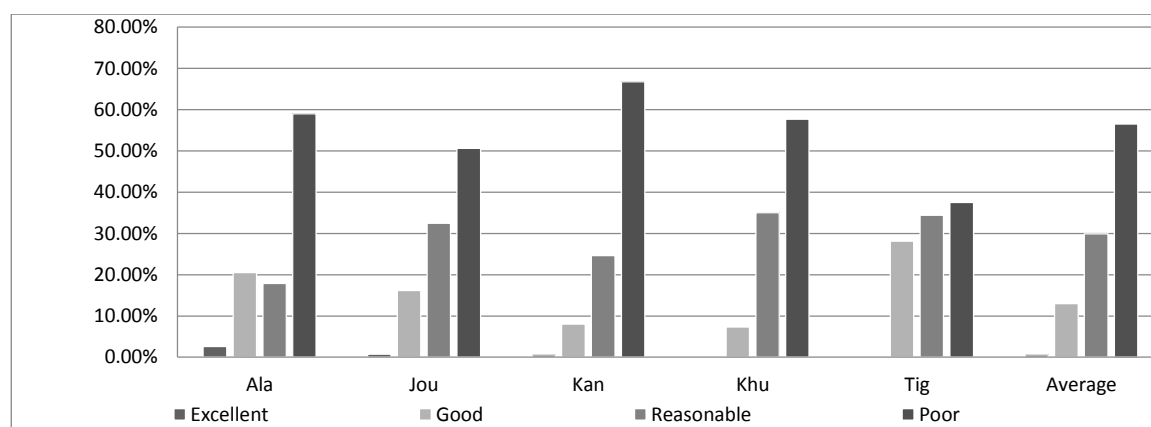


Figure 6.24: Rate of trust in local council

Source: Own construction (2015).

The average results of all neighbourhoods revealed that the majority of respondents (56.50%) rated their trust in their respective local councils to be poor followed by fairly poor category (29.90%). However, few respondents (13.00%) rated their trust to be good and very narrow (0.60%) rated their trust to be excellent. These results are based on the consideration that the trust illustrated by the respondents represents the average rating of confidence in the local council of which in this case the results had revealed it as negative.

These results imply that there is a need for a more consistent approach to incorporating transparency and participation as a sustainability objective. Perceptions of trust, while a good measure, are less relevant to neighbourhood level but it would be better measured at the local government levels. However, the results and analysis here by contrast focus on sustainability criteria that may be relevant for the implementation of neighbourhood sustainability related performance measurement framework. As a result this subjective factor was used to measure trust in the ward councillor level in order to have some measure of sustainability range suitable for comparing and measurement purposes between neighbourhoods.

This criterion will permit comparison of neighbourhoods/cities based on the quality of their urban governance (UN-Habitat, 2013c:25). In addition, a research at the national level has demonstrated that the good governance correlates with positive development outcomes (UNHabitat, 2014b:121). On this basis, neighbourhood criteria can be developed to respond directly to different contexts and needs with urban areas.

6.3.11 Accessibility of public transport: time and cost

Accessibility, mode of transport, traveling time, duration of trip and costs constitute a key element of city-level sustainability strategies (UN-Habitat, 2014b:84) especially in populous, sprawling and fragmented cities (UN-Habitat, 2013b:123). In addition successful cities across the globe show that effective systems for urban mobility are essential for achieving socio-economic growth overall (UN-Habitat, 2013b:123).

6.3.11.1 Public transport access to work

In terms of accessibility (time on public transport, walking time to public transport and waiting time for public transport) the results as presented in Figures 6.25, 6.26 and 6.27 are vital in ensuring that the positive or negative accessibility and mobility effects can be utilised in a way that lead sustainable urban mobility. Similarly, Stats SA (2014) undertook the *National Household Travel Survey 2013* to gain a better understanding of the transport needs and behaviour of households that in turn will assist in identifying the disadvantaged regions and transport needs for investment in transport infrastructure.

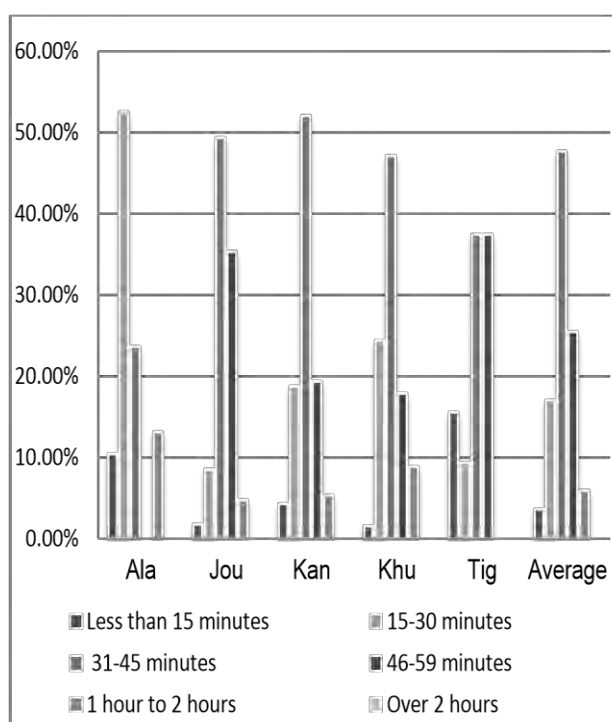


Figure 6.25: Accessibility (one way): time on walking to public transport

Source: Own construction (2015).

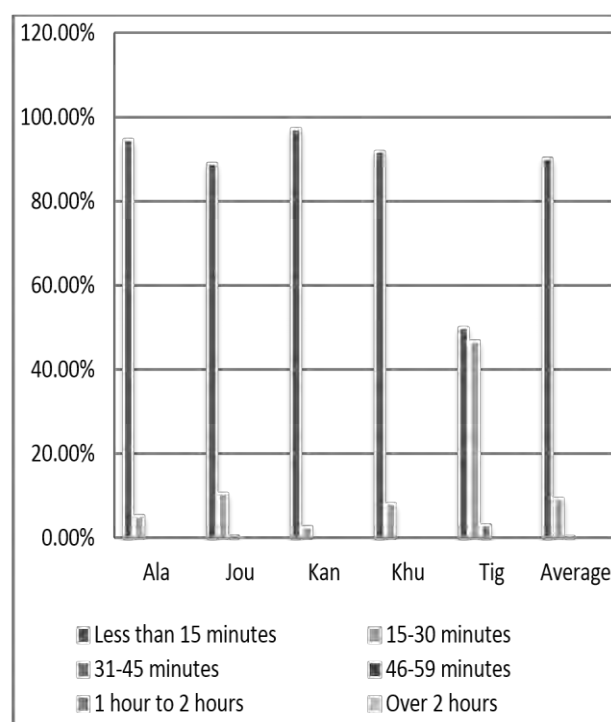


Figure 6.26: Accessibility (one way): time on public transport

Source: Own construction (2015).

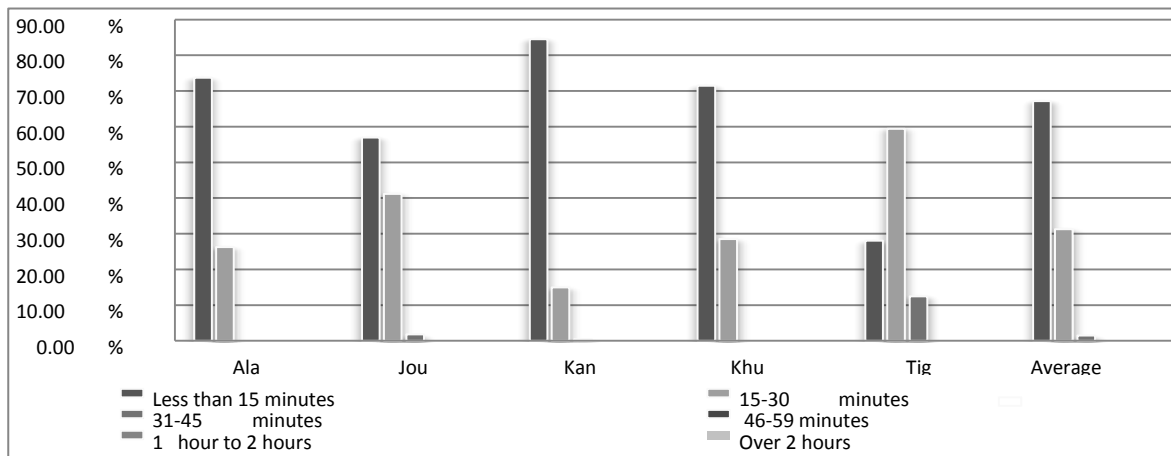


Figure 6.27: Accessibility (one way): waiting time

Source: Own construction (2015).

Survey results from the five neighbourhoods revealed significant variations in access to public transport in terms of time spent on public transport, walking time and waiting time. Most of respondents (47.70%) indicated that the average time on public transport was less than 45 minutes. Nationally and in the North West province the total time needed to travel to place of work by majority of workers (42.30%) and (41.90%) using a taxi is 30-60 minutes.

In Figure 6.25 most respondents (90.30%) indicated the walking time to be less than 15 minutes. Agreeing to these findings only 14.70% of workers revealed walking to their first public transport to be more than fifteen minutes nationally (Stat SA, 2014:4) and in the North West Province the figure is estimated to be 13.50% (Stats SA, 2014:53). Figure 6.26 depicts majority of respondents (67.20%) to have indicated the waiting time to be less than fifteen minutes. Provincially and nationally majority of workers (53.00%) and (58.60%) respectively waited for public transport for less than five minutes.

Interestingly, waiting time for both the province and the country is less than fifteen minutes and it is likely to closely agree with CMLM, given that fifteen minutes waiting time is 19.30% and 18.40% respectively. Compared to metropolitan and urban areas, workers in rural areas were more likely to wait for more than fifteen minutes (11.30%) (Stats SA, 2014:5). The pattern holds true in CMLM as it has been mentioned that it is mostly rural. It is important to mention that

taxis are the only public transport access to work that can be used in CMLM. Nationally 39.10% of workers use public transport as their main mode of travel to work of which 29.60% use taxis while 9.20% and 6.30% respectively use trains and buses (Stats SA, 2014:4).

Although taxis are the only mode of public transport available in CMLM, their routes are spatially well aligned in formal settlements and to some lesser degree in new housing settlements and informal settlements. These results interpretably reflect unequal public transport access between these extended settlements and formal settlements, the reason for this unequal accessibility being the excessive amounts of time needed to reach central city destinations. This has also made the waiting time duration higher in extended settlements compared to formal settlements. With regard to walking time the results showed that taxi riders living near access points enjoyed better accessibility benefits than those situated some distance away from access points (taxi routes).

These results, influenced by taxis being the only mode of transport, might affect the overall neighbourhood sustainability performance ranking - the reason being that it would be difficult to give a value of an accessibility index as this one modal choice (taxi) does not allow having reference values for comparison from other modes of public transport such as trains and buses. Like any other performance factor as means to measuring the level of sustainability – public transport accessibility index lies in a comparative context too. Having knowledge from preceding chapters of this research (literature review) it is understood that there are advantages and disadvantages between different modes of public transport appropriate for local level that control for important utility factors that influence mode choice such as traffic congestions, average speed, travelling time (this includes time schedules and scheduled stops) and the nearest public transport stop.

These are the measures that can make one mode of public transport enjoy a big accessibility edge over the other(s). It would be good to use these measures to analyse in both depth and width levels of accessibility that could be reached through different modes of public transport. However, the survey results in this case had indicated travel time to work by public transport mode an appropriate factor that can be measured so that these neighbourhoods can be compared and ranked.

6.3.11.2 Average travelling cost per day

Cost-effective or affordable public transport ensures access for the peri-urban poor to markets and opportunities in the city centres and overcoming segregation patterns within the city through improved access and mobility is imperative (UN-Habitat, 2014b:84). As revealed in Figures 6.28 and 6.29 assessing the cost for public transport is imperative in determining a transition towards more reliable and cost-effective public transport systems.

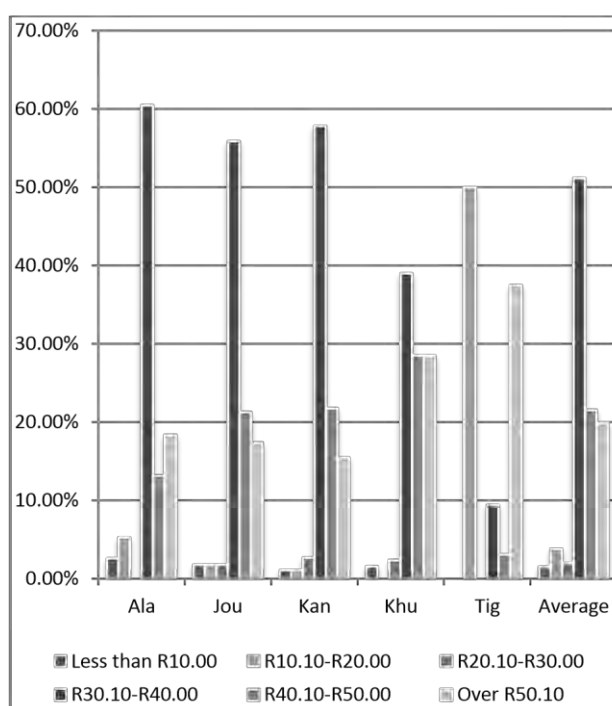


Figure 6.28: Home to work travelling cost per day

Source: Own construction (2015).

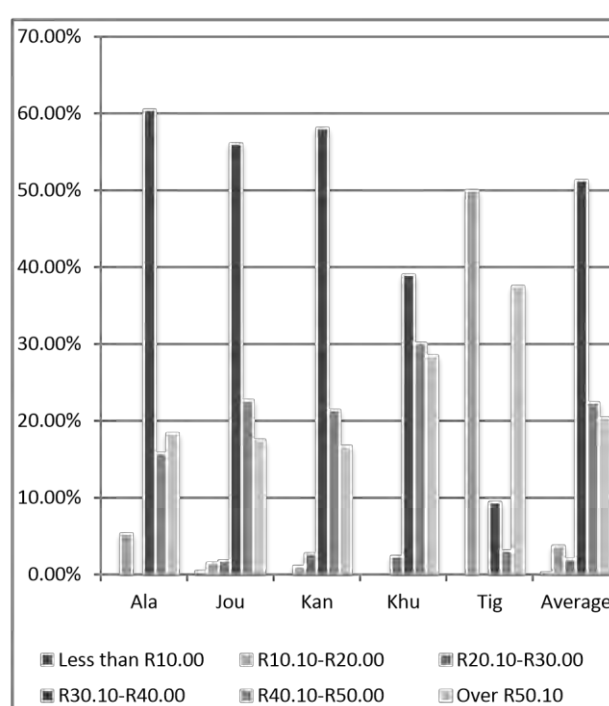


Figure 6.29: Work to home travelling cost per day

Source: Own construction (2015).

The average travelling cost per day can only be assessed if the distance and traveling time are included. Therefore, understanding these specific terms (distance and travelling time) and their relationship with public transit cost will assist in pinpointing the variables that serve to measure progress toward sustainable mobility. The results revealed how much it costs to get to work

using public transport (taxis) based on the distance travelled. The overall results aggregated to give the average daily travelling cost revealed it to be < R30.00 as per distance and travelling time. Both nationally and provincially the majority of workers (95.90%) and (94.70%) respectively average a monthly cost of transport by taxi of above R200 with the mean estimated to be R515 and R543 respectively (Stats SA, 2014:62).

The study revealed that taxis were the only mode of public transport available and the taxi fare is fixed for each neighbourhood in relation to different destinations. The most commonly used factor to measure public transport travelling cost is affordability. Whilst affordability measures are regarded as the primary outcome measure of the price range, in this case the results revealed that there were no alternative public transport to compare with. As put by Litman (2014b:4), aspects such as reliability, frequency, travel time and fare levels are critical in customer evaluations of public transport service quality. This corroborates Litman's (2014b:4-7) findings that travelling costs, available modes of transport influence the urban structure. In other studies lack of modes of public transport coupled with travel time inconveniences, reliability and quality dimensions have resulted in people's resistance to change from private travel modes (European Commission, 2000:12; GTZ, 2012:3). These trends interpreted from the sustainability perspective, the underlying assumption is that there is a direct link between the actual service and the customer's perception of it – this affects overall neighbourhood sustainability performance.

However, in South African township neighbourhoods the correlation between transport and neighbourhood satisfaction demands a more expanded approach – the apartheid system created unequal access between the township neighbourhoods and city proper neighbourhoods. It follows that this research on public transport accessibility results contradicts sustainability initiatives such as smart growth measures. In terms of sustainable transport objectives it is unclear what price range is affordable in this case but the analysis indicates that less expensive fares induce satisfaction. However, these results become useful sustainability criteria as they can be employed to quantify public transport access to work and neighbourhood proximity to workplace (less/more expensive fares) so that neighbourhoods within CMLM can be compared.

6.3.12 Transport infrastructure and safety

The respondents were asked to reveal the extent to which they perceive the provision of their neighbourhoods' roads and safety. This was investigated through crossings and speeding within the neighbourhood. The overall perceptions of road conditions and transport infrastructure constitute important sustainability criteria for safety (traffic safety indicators). Figures 6.29 and 6.30 present the results that developed these subjective factors. In Figure 6.30 the road crossings within the neighbourhoods were considered to be reasonable by the majority of the respondents (52.90%) followed by (14.30%) that indicated crossings to be good, while only 32.80% suggested that road crossings were poor.

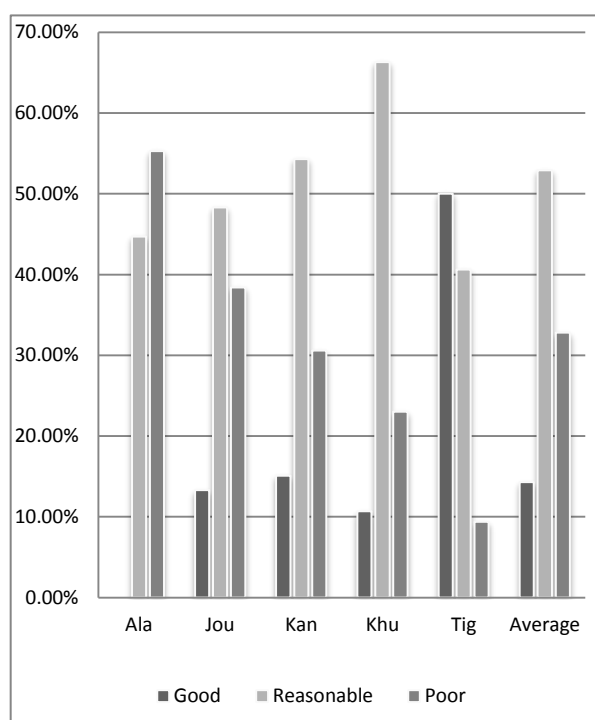


Figure 6.30: Crossings

Source: Own construction (2015).

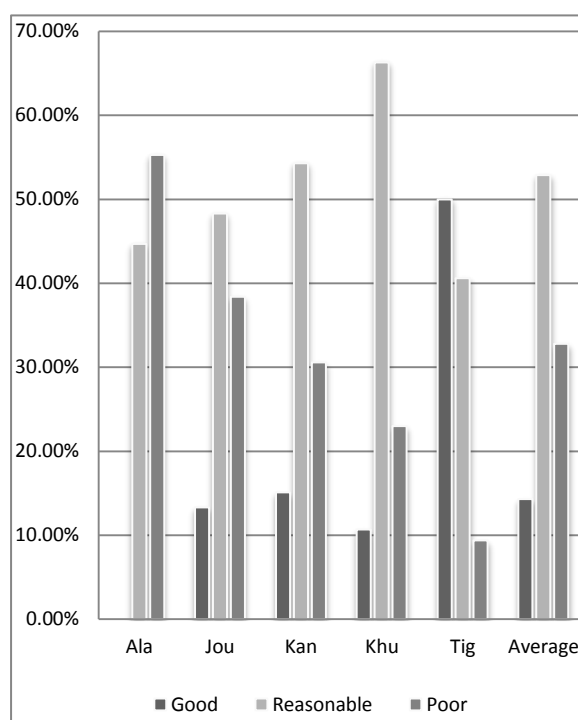


Figure 6.31: Road conditions

Source: Own construction (2015).

Figure 6.31 reveals that the majority of respondents (49.10%) indicated road conditions to be reasonable, while 44.40% of respondents were adamant that the roads conditions were poor. Only the remaining 6.50% indicated the roads to be in good condition. Not such a high

percentage of respondents were dissatisfied by road condition in general in their neighbourhoods. But it is important to remember that car ownership in CMLM townships is only 28.20%. Measured by the survey question, respondents' views and attitudes of road conditions turned out to be a major challenge of achieving sustainability. The transport infrastructure and safety importance covers both the accessibility and the quality of infrastructure. On the basis of survey results analysis of transport infrastructure quality, areas of concern found were tarred road and pavement quality and pedestrian crossings as they were factors used to measure and quantify these subjective factors.

With regard to pedestrian crossings the results suggest a need for traffic safety improvement. It is this criterion (traffic safety) that pedestrian crossings seek to measure. Its factors include the traffic speeds and traffic calming measures. Roads safety is a key area to be considered in the set of urban areas sustainable development requirements (UN-Habitat, 2013c:3). The variable of mobility within the neighbourhood conforms with the analysis that safe roads will ease the access to walking and cycling and increasing the street connectivity. The neighbourhood roads are the daily casual concern that threatens urban vibrancy which is an element of liveability. Although these road safety conditions are purely subjective, these actual conditions are critical to inform key policy issues and planning priorities by highlighting specific characteristics and providing a better understanding of the root causes of unsafe roads as objective facts are observed and experienced by respondents. These indicators, through quantifying the positive and negative aspects as revealed by survey results, can be measured at the neighbourhood level so that neighbourhoods within the CMLM can achieve sustainability and measure performance.

6.4 Conclusion

This chapter presented reference scenarios derived from discussing and assessing neighbourhood sustainability issues underlying the dynamic aspects of urban systems, operational urban planning and spatial planning conjoined to socio-economic, cultural, political and environmental forces shaping the use of land in urban areas. These results are used in the subsequent chapters for the purpose of modelling with the aim of supporting the planners in making decisions about the best scenarios and the appropriate action plans.

Chapter 7: Statistical modelling

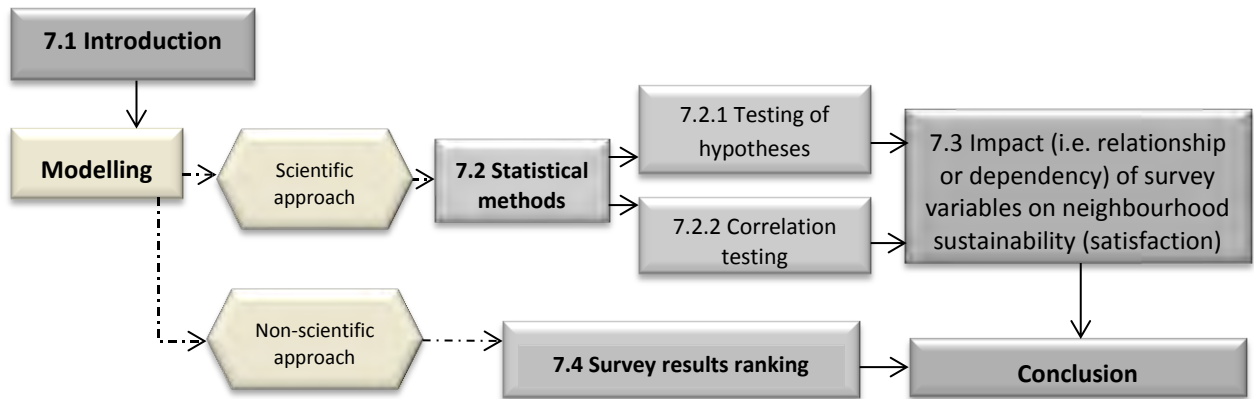


Figure 7.1: Structural components of chapter 7

Source: Own construction (2015).

7.1 Introduction

The interpretation of the research survey findings of the five case study neighbourhoods is presented here. The analytical objective is based on the statistical tools' findings - mainly the statistical significance and coefficient correlation findings that will be interpreted to determine their suitability in sustainability measurement framework for successful neighbourhoods. In essence, the coefficient correlations are to be taken as indicative and main drivers to inform a decision making in this research – as they were used to specify the relationship between neighbourhood quality measures and satisfaction.

Following statistical analysis sustainability, comparative analysis is carried out in the form of performance ranking. The last section provides a conclusion on the processes and outcomes of the study. The implications of these results are expected to be guiding principles for achieving sustainable urban form. The structural components of the entire chapter are presented below.

7.2 Statistical methods

A number of key structuring elements were identified and discussed throughout this research which needs to inform the spatial structuring of the urban areas and sustainability. The fundamental motivation for this research has been the awareness of highly unbalanced urban settings that need to be reversed to create equal opportunities in urban areas of different sizes and scopes. It is hypothesised in this research that there are spatial and socio-economic characteristics that aggravate the level of urban settings highly unbalanced nature. The implications of this assumption are quite important as they set a stance to probe into the nature and character of townships, in this special case. For analytical simplicity, the hypothesis is premised on the notion that townships have low levels of community facilities and commercial investment, high unemployment, low household incomes, poverty and inconvenience public transport. Furthermore, they also have low housing typology coupled with overcrowding and little sense of place.

In the various reviews and reflections offered, these challenges have appeared to be key issues underlying the dynamic aspects of the urban systems. While this is the generally held view from the theoretical point of view – much, therefore, depends on the empirical results due to be presented in the subsequent sections. The mainstream position is to determine how these socio-economic variables can improve spatial interaction particularly city-neighbourhood spatial relations. The scale of this urban area also presents a good opportunity to determine how community can be a fundamental element of a hierarchical structure of an urban area and appropriateness of different scales of urban operation.

7.2.1 Testing of hypotheses

The hypotheses testing are based on the research survey data collected. A wide range of factors are included as levels of satisfaction within a place are thought to be governed by these factors as discussed in the preceding sections. As a result the null hypotheses and alternative hypotheses are determined for each set of data.

7.2.1.1 Null hypothesis

H_0 : (*The variables or attributes of X and Y are independent*). According to Levine and Stephan (2005:126) a null hypothesis is considered true until evidence indicates otherwise.

7.2.1.2 Alternative hypothesis

H_a : (*The variable X and Y are dependent*). Levine and Stephan (2005:126) point out that the alternative hypothesis represents the conclusion reached by rejecting the null hypothesis. This means that the null hypothesis is rejected if evidence from the sample statistic indicates that the null hypothesis is unlikely to be true.

In this thesis the chi-square test was applied to test whether variables are independent. As such the hypotheses testing determine the relationship between neighbourhood satisfactions attributes of Y and/or residential quality attributes of X are gathered and processed through structured interviews in the case study. In determining the correlation between gender distribution and neighbourhood satisfaction – the hypotheses were set as follows:

H_0 : There is no correlation between gender distribution (men and women) and neighbourhood satisfaction.

H_a : There is a correlation between gender distribution (men and women) and neighbourhood satisfaction.

The research hypotheses tested are formulated in this manner (see Table 7.2 for attributes of X and outcomes).

7.2.1.3 The p -value approach to hypothesis testing

A type 1 error occurs when H_0 is rejected when it is in fact true. The probability of a type 1 error is denoted by α and is called the level of significance. The p -value (for instance, the exact level of significance of a test statistics) is defined as the lowest significance – level at which H_0 can be rejected then the corresponding value of the test statistics is said to be statistically significant at the level α . This means that for a one-sided test for $\alpha = 5$ per cent if the p -value is less than 0.05 then the null hypothesis is rejected and the alternative hypothesis is not rejected as illustrated in Table 7.1 below. An analysis of neighbourhood factors and the population characteristics was conducted and the p -value determined.

Table 7.1: Decision-making in determining the rejection or not of the null-hypotheses

p-value	Outcome of test	Statement
greater than 0.05	Fail to reject H_0	No evidence to reject H_0
between 0.01 and 0.05	Reject H_0	Some evidence to reject H_0
between 0.001 and 0.01	Reject H_0	Strong evidence to reject H_0
less than 0.001	Reject H_0	Very strong evidence to reject H_0

Source: Own construction (2015) - adapted from statistical interpretations.

7.2.2 Correlation and data types

The researcher uses the statistical correlation to describe the association between two variables. The correlation purpose is to establish an association between the independent and dependent variables. The research data types are nominal and ordinal resulting in application of different correlation coefficients as listed below:

- The Phi Coefficient denoted (ϕ) computes the correlation between two nominal variables (for instance, having more than two categories) in general and also in the

special case of dichotomous variables. It is effectively utilised when one or both variables are nominal. The guidelines to interpret these correlations are as follows:

- ✓ $\phi = 0.1$: No correlation;
 - ✓ $\phi = 0.5$: Medium correlation;
 - ✓ $\phi = 0.7$: Large correlation.
-
- Spearman's rank correlation denoted rho (r_s) computes the correlation between two ordinal variables in which its categories are ranked (for example income in 5 categories, denoted by the integers 1 to 5). The guidelines are the same as for ϕ .
-
- ✓ $r_s = 0.1$: No relationship;
 - ✓ $r_s = 0.5$: Medium relationship
 - ✓ $r_s = 0.7$: Large relationship.

Let the significance level $\alpha = 0.05$. When ϕ or r_s is obtained, its magnitude has to be interpreted to establish practical significance by using the above guidelines.

7.3 Impact of survey variables on neighbourhood sustainability

A key issue is that in a two-way table or correlation, there is either a positive or negative relationship between, say, density and neighbourhood satisfaction. This carries forward into a statistical model expected to illustrate patterns between different survey outcomes and neighbourhood satisfaction in turn provide the general structure for the sustainability measurement. Numerous research hypotheses to be discussed in the subsequent sections provide a flexible tool for establishing the direction and strength of relationships while simultaneously taking account of the relationships with other variables as presented by Table 7.2 below.

Table 7.2: Level of statistical significance and outcome of test

Variables Let Y=Neighbourhood satisfaction	Correlation coefficient		p-value	Level of significance	Outcome	Statement
	Φ or r_s	Statement: on linear relationship				
X₁ - Gender distribution	$\Phi = 0.033$	No linear relationship exists between X ₁ and Y	0.951	Not significant	No evidence to reject H ₀	X ₁ and Y independent
X₂ – Considerations in locating in a neighbourhood	$\Phi = 0.324$	Small linear relationship exists between X ₂ and Y	0.000	Significant	Very strong evidence to reject H ₀	X ₂ and Y dependent
X₃ - Average period of living in the neighbourhood	$\Phi = 0.227$	Small linear relationship exists between X ₃ and Y	0.001	Significant	Very strong evidence to reject H ₀	X ₃ and Y dependent
X₄ - Liveability of the neighbourhood	$\Phi = 0.196$	Small linear relationship exists between X ₄ and Y	0.001	Significant	Very strong evidence to reject H ₀	X ₄ and Y dependent
X₅ - Community level of involvement	$\Phi = 0.214$	Small linear relationship exists between X ₅ and Y	0.073	Not significant	No evidence to reject H ₀	X ₅ and Y independent
X₆ - Sense of place						
S ₁ - Involvement	$r_s = 0.2697$	Small linear relationship exists between S ₁ and Y	0.000	Significant	Very strong evidence to reject H ₀	S ₁ and Y dependent
S ₂ - Close-knit	$r_s = 0.241$	Small linear relationship exists between S ₂ and Y	0.002	Significant	Very strong evidence to reject H ₀	S ₂ and Y dependent
S ₃ - Different values	$r_s = 0.553$	Medium linear relationship exists between S ₃ and Y	0.000	Significant	Very strong evidence to reject H ₀	S ₃ and Y dependent
X₇ - Liveability						
L ₁ - Safety at home	$r_s = 0.459$	Medium linear relationship exists between L ₁ and Y	0.000	Significant	Very strong evidence to reject H ₀	L ₁ and Y dependent
L ₂ - Safety around resident	$r_s = 0.42$	Medium linear relationship exists between L ₂ and Y	0.000	Significant	Very strong evidence to reject H ₀	L ₂ and Y dependent
L ₃ - Ethnic/religion stability	$r_s = 0.283$	Small linear relationship exists between L ₃ and Y	0.000	Significant	Very strong evidence to reject H ₀	L ₃ and Y dependent
L ₄ - Safety in general	$r_s = 0.468$	Medium linear relationship exists between L ₄ and Y	0.000	Significant	Very strong evidence to reject H ₀	L ₄ and Y dependent
X₈ - Quality of services						
Q ₁ - Local schools	$r_s = 0.36$	Medium linear relationship exists between Q ₁ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₁ and Y dependent
Q ₂ - Housing	$r_s = 0.296$	Small linear relationship exist between Q ₂ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₂ and Y dependent
Q ₃ - Local street	$r_s = 0.29$	Small linear relationship exists between Q ₃ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₃ and Y dependent
Q ₄ - Local policing	$r_s = 0.347$	Medium linear relationship exists between Q ₄ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₄ and Y dependent

Q ₅ - Local health	$r_s = 0.35$	Medium linear relationship exists between Q ₅ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₅ and Y dependent
Q ₆ - Local public transport	$r_s = 0.42$	Medium linear relationship exists between Q ₆ and Y	0.000	Significant	Very strong evidence to reject H ₀	Q ₆ and Y dependent
Q ₇ - Parks and open space	$r_s = 0.28$	Small linear relationship exists between Q ₇ and Y	0.001	Significant	Very strong evidence to reject H ₀	Q ₇ and Y dependent
Q ₈ - Variety of shops	$r_s = 0.27$	Small linear relationship exists between Q ₈ and Y	0.001	Significant	Very strong evidence to reject H ₀	Q ₈ and Y dependent
X₉ - Level of involvement of in local people in public participation activity						
I ₁ - Completion of a questionnaire	$\Phi = 0.089$	No linear relationship exists between I ₁ and Y	0.272	Not Significant	No evidence to reject H ₀	I ₁ and Y independent
I ₂ - Attendance of public meetings	$\Phi = 0.095$	No linear relationship exists between I ₂ and Y	0.207	Not Significant	No evidence to reject H ₀	I ₂ and Y independent
I ₃ - Task team involvement	$\Phi = 0.052$	No linear relationship exists between I ₃ and Y	0.780	Not Significant	No evidence to reject H ₀	I ₃ and Y independent
X₁₀ - Urban governance	$\Phi = 0.223$	Small linear relationship exists between X ₁₀ and Y	0.001	Significant	Very strong evidence to reject H ₀	X ₁₀ and Y dependent
X₁₁ - Accessibility of public transport: time and cost						
A ₁ - Accessibility: time on public transport	$r_s = 0.407$	Medium linear relationship exists between A ₁ and Y	0.002	Significant	Very strong evidence to reject H ₀	A ₁ and Y dependent
A ₂ - Accessibility (one way): walking time	$r_s = 0.339$	Medium linear relationship exists between A ₂ and Y	0.000	Significant	Very strong evidence to reject H ₀	A ₂ and Y dependent
A ₃ - Accessibility (one way): waiting time	$r_s = 0.4$	Medium linear relationship exists between A ₃ and Y	0.000	Significant	Very strong evidence to reject H ₀	A ₃ and Y dependent
A ₄ - Travelling cost per day (origin to destination)	$r_s = 0.6$	Medium linear relationship exists between A ₄ and Y	0.000	Significant	Very strong evidence to reject H ₀	A ₄ and Y dependent
X₁₂ - Transport infrastructure and roads						
T ₁ - Crossings	$r_s = 0.303$	Small linear relationship exists between T ₁ and Y	0.000	Significant	Very strong evidence to reject H ₀	T ₁ and Y dependent
T ₂ - Roads	$r_s = 0.133$	No linear relationship exists between T ₂ and Y	0.174	Not significant	No evidence to reject H ₀	T ₂ and Y independent

Source: Own construction (2015)

From Table 7.2, it follows that neighbourhood satisfaction, which is conceptualised as the function of sustainability or potentially having profound implications for the physical and socioeconomic feasibility of sustainability in the neighbourhoods, depends on the following variables in this research:

- Considerations in locating in a neighbourhood: High impact;
- Average period of living in a neighbourhood: High impact
- Liveability of the neighbourhood
- Sense of place: High impact;
- Liveability: High impact;
- Quality of services: High impact;
- Urban governance: High impact;
- Accessibility of public transport (time and cost): High impact;
- Transport infrastructure and roads – crossings: High impact;

These variables with their different impacts are determined from the correlation coefficients strength of the relationships that have been determined to be statistically significant as they have tested the null hypothesis that there is no relationship. These results are represented by Table 7.3.

Table 7.3: Impact of survey variables on neighbourhood sustainability

Variables	Neighbourhood satisfaction	
	No impact	High impact
Gender	X	
A reason to locate in a neighbourhood		X
Average period of living in the neighbourhood		X
Liveability of the neighbourhood		X
Community level of involvement	X	
Sense of place		
Involvement		X
Close-knit		X
Different values		X
Liveability		
Safety at home		X
Safety around resident		X
Ethnic/religion stability		X
Safety in general		X
Quality of services		
Local schools		X
Housing		X

Local street		X
Local policing		X
Local health		X
Local public transport		X
Parks and open space		X
Variety of shops		X
Level of involvement of in local people in public participation activity	X	
Urban governance		X
Accessibility of public transport: time and cost		
Accessibility: time on public transport		X
Accessibility (one way): walking time		X
Accessibility (one way): waiting time		X
Travelling cost per day (origin to destination)		X
Transport infrastructure and roads		
Crossings		X
Roads	X	

Source: Own construction (2015) from Table 7.2.

An important aspect of these results is to establish the contribution neighbourhood satisfaction has on sustainable livelihoods and spatial planning priorities. The focus is on discussing the appropriateness and usefulness identifying and selecting criteria that assess the extent to which sustainable development objectives are driven by core ideas of spatial and socio-economic requirements.

7.4 Survey results ranking

By using the results from the survey and by ranking the answers to the questions that are most in favour of a successful neighbourhood is 1 and the lowest level of favour of a successful neighbourhood is 5 as shown in Table 7.4 below.

Table 7.4: Case studies ranking

Survey Question	Criteria/factor:	Survey - Rank				
		Ala	Jou	Kan	Khu	Tig
	Order by rank (1 = Best and 5 = Worst)	1	3	2	4	5
	Order by rank (Impact)	1	3	2	5	4
2	Rank by job opportunities -(Ranked by job opportunities)	3	1	2	4	5
3	Average period of living in each neighbourhood	4	2	1	3	5
4	Liveability of neighbourhood	1	2	3	4	5
5	Community involvement	5	2	3	4	1
6	Sense of place	3	1	2	5	4
6.1	Involvement	4	1	2	5	3
6.2	Close-knit	5	2	3	4	1
6.3	6.3 Different values	1	2	3	4	5
7	Liveability	2.5	1	4	5	2.5
7.1	Safety at home	2	3	4	5	1
7.2	Safety around resident	1	2	4	5	3
7.3	Ethic/religion stability	4	2	3	5	1
7.4	7.4 Safety in general	2	1	3	5	4
8	Quality of Services	1	3	2	4	5
8.1	Education	1	2	3	4	5
8.2	Housing	1	2	3	4	5
8.3	Local street cleaning	1	2	3	4	5
8.4	Local policing	1	2	3	4	5
8.5	Local health services	1	3	2	4	5
8.6	Local public transport	2	3	1	4	5
8.7	Parks and open space	2	4	1	3	5
8.8	Variety of shops	4	1	2	3	5
9	Level of involvement of in local people in public participation activity	1	4	2	3	5
10	Urban governance	4	2	5	3	1
11	Accessibility of public transport: Time and cost	1.5	4	1.5	3	5
11.1	Accessibility: Time on public transport					
	Less than 45 minutes	1	5	2	3	4
11.2	Accessibility (one way): Walking time					
	Less than 15 minutes	2	4	1	3	5
11.3	Accessibility (one way): Waiting time					
	Less than 15 minutes	2	4	1	3	5
11.4	Average travelling cost per day					
	Average daily travelling cost < R22.20	1	3	2	5	4
12	Transport infrastructure and safety	3	4	1.5	1.5	5
12.1	Crossings	4	3	2	1	5
12.2	Roads	3	5	1	2	4

Source: Own construction (2015).

Looking at the number of criteria/factors by deviation score for these cases Alabama ranks one, followed by Kanana, Jouberton, Khuma and Tigane. Analysis indicates that Alabama's strengths lie in quality of services and accessibility of public transport (time and cost) compared to other neighbourhoods for it to rank first. Kanana and Jouberton scored high in community involvement and sense of place; however, they have the fewest number of indicators and as a result this makes Alabama hold the advantage as the factor groups where it scored highest have more factors.

7.6 Conclusion

Based on the preceding analysis a framework for urban neighbourhoods sustainability can be proposed in terms of both structure and process. These statistical tools have provided ways to measure and establish the relationships that determine neighbourhood satisfaction which has been presented as the function of sustainability. Therefore, determining the impact of the variables (perceptions of residents' in relation to their neighbourhoods' areas) on neighbourhood sustainability the underlying design used provided the useful assessment processes and rating (ranking) system that permits comparisons to the situations. As a result ranking of the sustainability impacts provides alternatives to prioritise local sustainability needs. Therefore, through the use of these statistical tools Figure 7.2 below embodies the fundamental aspects of sustainability decision elements.

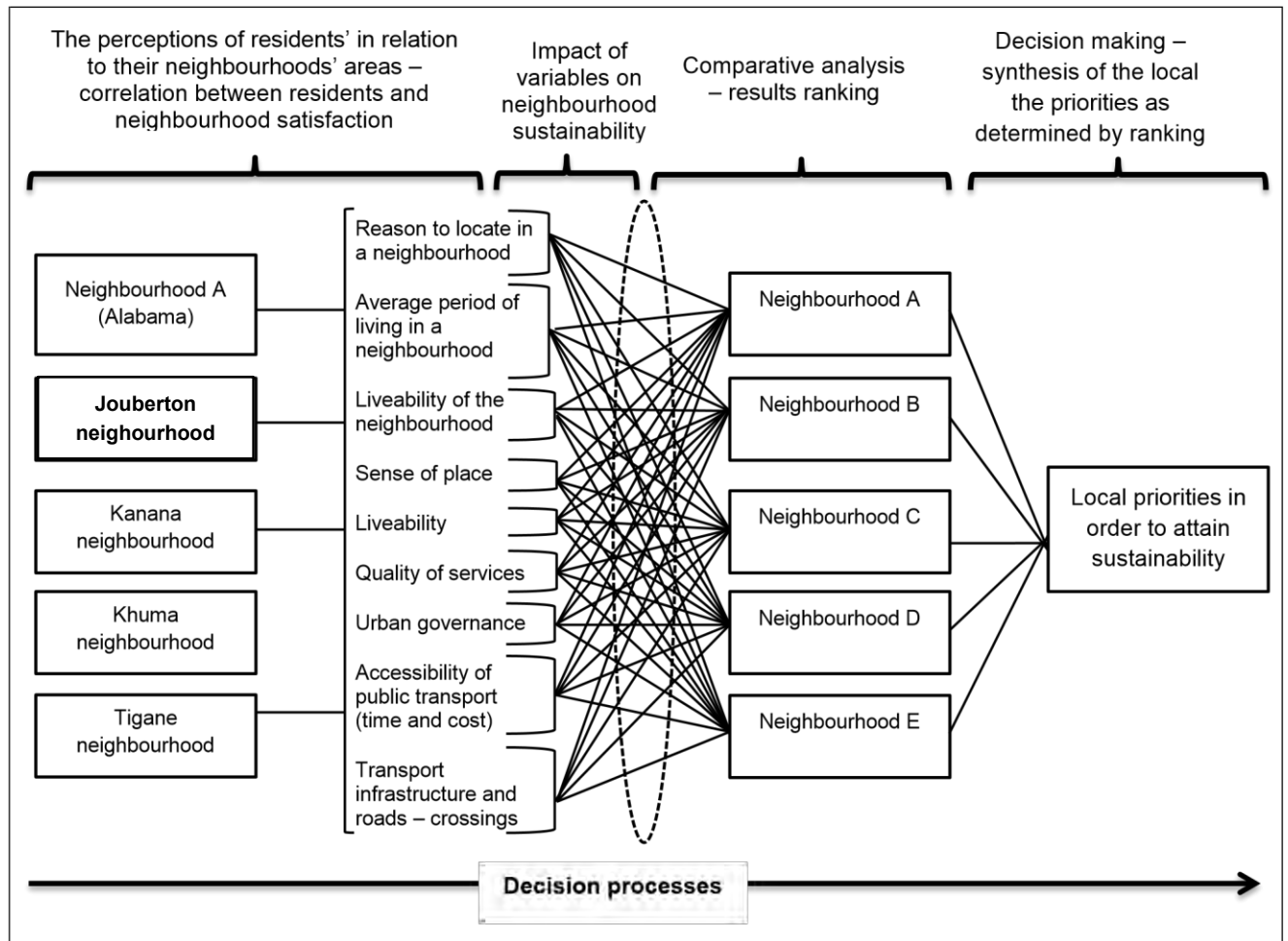


Figure 7.2: Decision processes for prioritisation of local sustainability options

Source: Own construction (2015).

It worth mentioning that ranking of the alternatives in order to achieve sustainability–liveability has demonstrated a stronger contributory role to performance evaluation that can reflect various perspectives of sustainability and/or give effect to various dimensions of a sustainable urban neighbourhood development.

Chapter 8: Integrated sustainability assessment modelling

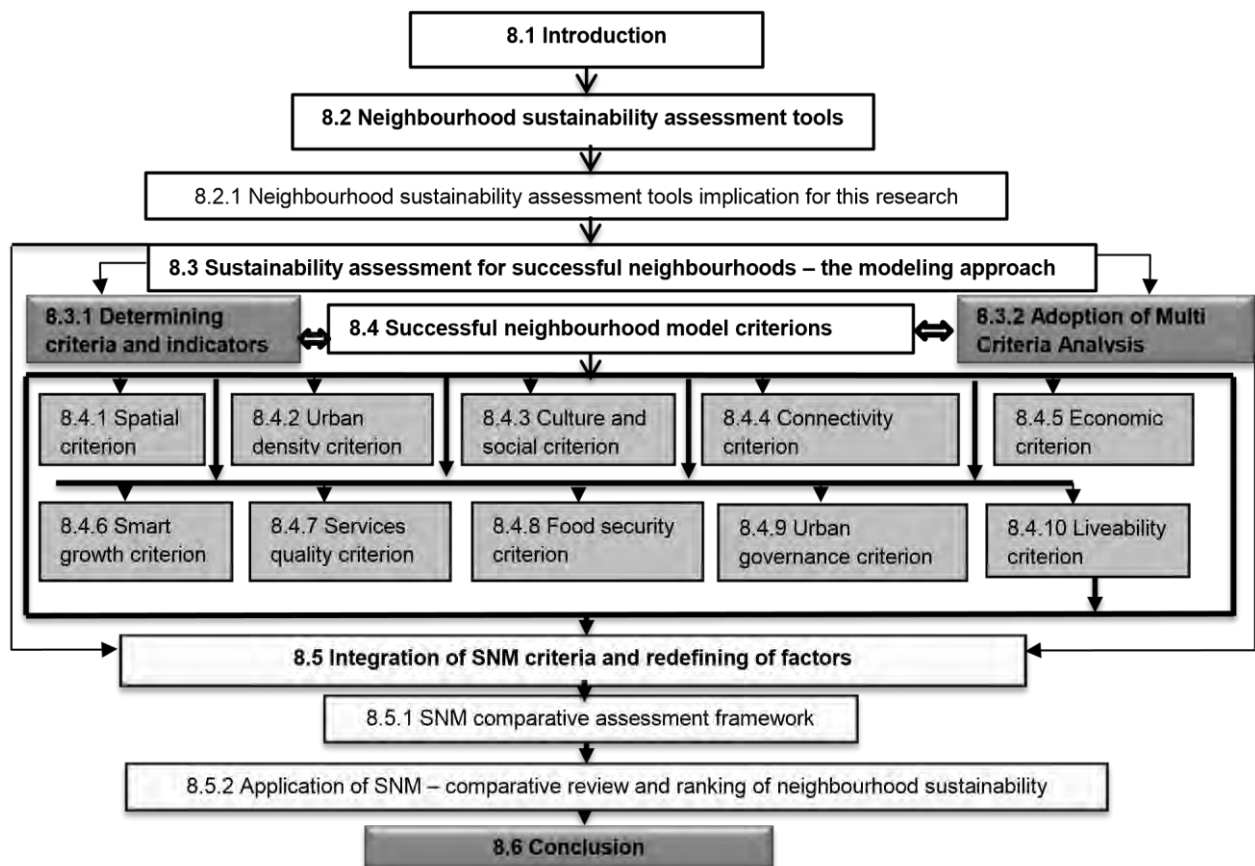


Figure 8.1: Structural components of chapter 8

Source: Own construction (2015).

8.1 Introduction

Chapter 8 aims to identify existing urban modelling tools and providing detailed approaches thereof. It provides critical literature review of urban concepts, theories, development and planning principles in order to stimulate the formation of knowledge or acquire indication to fulfil one of these research objectives to develop sustainability model called Successful Neighbourhood Model (SNM). Therefore, in the next section SNM is applied to the research data analysed and interpreted in the previous chapter to provide comparative review and ranking of neighbourhood sustainability using its criteria and factors. This section also integrates

research data with other related sources of data in order to meet SNM criteria and factors that attempt to be inclusive of all relevant factors that allow measuring the level of neighbourhood sustainability performance. The conclusion is the last section that closes this chapter aimed at examining the process and outcomes of sustainability measurement in order to determine the efficiency and effectiveness of the modelling approach as a guiding tool to establish neighbourhood sustainability priorities. This chapter is entirely structured as demonstrated below.

8.2 Neighbourhood sustainability assessment tools overview

The neighbourhood strategic planning initiatives, management and sustainability imperatives (discussed in chapter 2 and 3) have set the stage and provided clear ideas of key factors that can encourage progress towards sustainability within neighbourhoods or can create barriers to the successful achievement of sustainability objectives. The challenge now is to provide a range in terms of sustainability – a measure that can determine a degree of neighbourhood sustainability initiatives.

It is worth mentioning that there are a number of means of assessment tools that are established to assess sustainability – the foundation was laid by Strategic Environmental Assessment (SEA) to perform environmental sustainability-based impact assessments (Sharifi, 2013:65). Defined, SEA is an instrument that aids decision-making that contributes to strengthen and encourage society allegiance to sustainable development, increase resource efficiency and green economy (Partidario, 2012:11). SEA aims at integrating environmental considerations issues in the development of plans, programmes and policies (Rossouw & Retief, 2013:189).

In 2002 the Dashboard of Sustainable Development was developed by the International Institute for Sustainable Development (IISD) Consultative Group on Sustainable Development. Indicators were introduced as a contribution to the World Summit on Sustainable Development (assessing the United Nations' core set of sustainability indicators and later utilised to assess Millennium Development Goals indicator set). Using the metaphor of a vehicle's instrument

panel, it displays country-specific assessments of economic, environmental, social and institutional performance toward (or away from) sustainability (IISD, 2007:1).

It follows that over the last two decades a significant number of environmental and sustainability assessment tools for building have been developed such as Building Research Establishment's Environmental Assessment Method (BREEAM), Sustainability Building Tool (SBTool), Leadership in Energy and Environmental Design (LEED), constitutes the basis for other approaches used throughout the world (Castanheira & Braganca, 2014:1). These methods' main function is evaluating a series of partial and aggregate features of construction, resulting in environmental ratings or sustainability scores (Braganca, 2007:380). These tools contributed to the new generations of sustainability assessment tools used in different scales of urban areas to guide and assist urban components (cities and neighbourhoods) to become more sustainable in response to rapid growth of cities and degrading urban areas.

These new generations include: BREEAM Communities, LEED-Neighbourhood Development, Sustainable Communities Tools (SCTool), Comprehensive Assessment System for Built Environment Efficiency-Urban Development (CASBEE-UD), EarthCraft Communities (or Green Star Communities). The CASBEE-City as first established by Japan Sustainable Building Consortium in 2011 is the first most well-established city sustainability assessment system mainly aimed at assessing environmental performance and its output effects on social and economic benefits or hindrances to the city's populace (Murakami *et al.*, 2011:195). In Table 8.1 below the CASBEE-City 2012 version is provided.

Table 8.1: Assessment items of CASBEE-City

	Major and minor categories	Sub-categories	Assessment indicators	Unit
Quality (Q)	Q1. Environmental aspects			
	Q1.1 Nature conservation	Q1.1.1 Ratio of green and water spaces	(Forest areas + major lake areas)/total land areas	%
	Q1.2 Local environment	Q1.2.1 Atmosphere quality	Number of days in which the hourly concentration of photo-chemicals during the day is 0.12 ppm or higher (average)	day
		Q1.2.2 Water quality	75% of average daily biochemical oxygen demand (BOD) in rivers	mg/l
	Q1.3 Resource recycling	Q1.3.1 Recycling rate of general waste	Recycling rate of general waste	%
	Q1.4 CO ₂ sinks	Q1.4.1 CO ₂ absorption by forests	(Current forest area * unit of absorption)/adjusted population	t-CO ₂ /person
	Q2. Social aspects			
	Q2.1 Living environment	Q2.1.1 Quality of housing	Total floor area per dwelling unit	m ²
		Q2.1.2 Traffic safety	Number of traffic accident/ adjusted population	#/1,000 people
		Q2.1.3 Crime prevention	Number of crime accident/adjusted population	#/1,000 people
		Q2.1.4 Disaster preparedness	Number of disaster response per 100, 000 persons	#/100,000 people
	Q2.2 Social services	Q2.2.1 Adequacy of education services	(Number of students/number of teachers) at elementary school	
		Q2.2.2 Adequacy of cultural services	(Number of community centres + number of libraries)/land area of municipality	#/10 km ²
		Q2.2.3 Adequacy of medical services	Number of doctors/adjusted population	#/1,000 people
		Q2.2.4 Adequacy of childcare services	Number of childcare facilities/pre-school population (aged 0-4 years)	#/100 people
		Q2.2.5 Adequacy of services for the elderly	Number of senior care facilities/ senior population (aged 65 +)	#/1, 000 people
	Q2.3 Social vitality	Q2.3.1 Rate of population change due to births and deaths	(Number of births - number of move-outs)/total population	%
		Q2.3.2 Rate of population change due to migration	(Number of moves-ins - number of move-outs)/total population	%
	Q3. Economic aspects			
	Q3.1 Industrial vitality	Q3.1.1 Amount equivalent to gross regional product	(Agricultural output + value of manufactured goods shipments + sales of commercial goods)/adjusted population	¥1,000,00 /person
	Q3.2 Financial vitality	Q3.2.1 Tax revenue	Tax revenues of the local government/adjusted population	¥1,000,00 /person
		Q3.2.2 Outstanding local bonds	Real debt service ratio	%
	Q3.3 Emissions trading	Q3.3.1 Emissions trading	Presence or absence of an emissions trading scheme	
Environmental load (L)	L2. CO ₂ emissions from energy sources			
	L1.1 Industrial sector	CO ₂ emissions from industrial sector/adjusted populations		t-CO ₂ /person
	L1.2 Residential sector	CO ₂ emissions from residential sector /adjusted populations		t-CO ₂ /person

	L1.3 Commercial sector	CO ₂ emissions from commercial sector/adjusted populations	t-CO ₂ /person
	L1.4 Transportation sector	CO ₂ emissions from transportation sector/adjusted populations	t-CO ₂ /person
	L2. CO ₂ emissions from non-energy sources		
	L2.1 Waste disposal sector and others	CO ₂ emissions from waste disposal sector and others/adjusted populations	t-CO ₂ /person
*Abbreviation CO ₂ = Carbon dioxide; ¥ = Japanese yen; % = percent ; mg = milligram; m ² = meter square ; km ² = kilo meter square; # = number t = time			

Source: Kawakubo et al. (2014:4).

Another latest assessment tool developed is the Portugal version of SBTool developed in 2012 aimed at the urban scale built environment sustainability assessment tool developed (iiSBE, 2013:1). The SBTool - Portugal adapted the International Initiative for sustainable Built Environment (iiSBE) to fit the Portuguese context for the sectors of tourism, services and urban planning (iiSBE, 2013:1). The evaluation is done according to a set of indicators aggregated into categories and organised according to sustainable development tripartite dimensions: environment, society and economy (Ecochoice, 2012:1).

According to Castanheira and Braganca (2014:4) this tool consists of twelve categories (criteria) and forty one factors (indicators) fitting the specifics and particularities of sustainable development tripartite considerations with an additional category to cover the sustainability of buildings and information communication techniques at the urban scales as shown in Table 8.2.

Table 8.2: List of categories and sustainability indicators for the SBTool-UP methodology

Dimensions	Categories	ID	Sustainability indicator
Environment	C1. Urban form	1	Passive solar planning
		2	Ventilation potential
		3	Urban network
		4	Natural land aptitude
		5	Density and flexibility of uses
	C2. Land use and infrastructure	6	Reuse of urban areas
		7	Built environment rehabilitation
		8	Technical infrastructures network
		9	Distribution of green spaces
		10	Connectivity of green spaces
	C3. Ecology and Biodiversity	11	Indigenous vegetation
		12	Environmental monitoring
		13	Energy efficiency
	C4. Energy	14	Renewable energy
		15	Centralised management of energy
		16	Consumption of drinking water
	C5. Water	17	Centralised management of water
		18	Management of wastewater
		19	Sustainable materials
	C6. Materials and Wastes	20	Construction and demolition waste
		21	Management of urban solid waste
Society	C7. Comfort of outdoor areas	22	Air quality
		23	Outdoor thermal comfort
		24	Acoustic pollution
		25	Light pollution
	C8. Safety	26	Safety in the streets
		27	Natural and technological risk
		28	Proximity to services
	C9. Amenities	29	Entertainment equipment
		30	Local production of food
		31	Public transportation
	C10. Mobility	32	Pedestrian accessibility
		33	Cycle paths network
		34	Public spaces
Economy	C11. Local and cultural identity	35	Heritage valuation and landscapes
		36	Integration and social inclusion
		37	Economic viability
Extra	C12. Employment promotion and investment	38	Local economy
		39	Employability
		40	Sustainable buildings
		41	Information and communication

Source: Castanheira and Braganca (2014:4).

8.2.1 Neighbourhood sustainability assessment tools' implications for this research

The feasibility of sustainability assessment tools at the neighbourhood level in this research limits the discussion to these new trends (CASBEE-City and SBTool-UP). Interesting to evaluation is the point that these methods provide the general structure of the sustainability related performance measurement. The importance of evaluation is that it allows for comparison of municipalities; urban areas and neighbourhoods serving a platform to aid decision making process benefiting authorities, planners and other urban practitioners (Haapio, 2012:166). Germane to the subject of this research is a point that these methods seek a way to address some constraints that need to be overcome to achieve sustainability in neighbourhoods. They embrace comprehensive approach; for example, they require and consider the possibilities of evaluating components of building simultaneous to public transport, services, environment, built environment, neighbourhoods and people (Haapio, 2012:166).

The other common goal is operationalising sustainability by providing performance benchmarks. These assessment tools are used to score and weigh each criterion and factor in order to determine the best practice. This is what this research intends to achieve – which is developing the model that covers a wide range of neighbourhood sustainability requirements and concerns based on rating system that offers the comparative review of sustainability utilising scoring and weighting.

Although these methods represent a significant contribution to assess the sustainability levels of neighbourhood development and to fill this research gap, Sharifi (2013:65) argues that there are constraints that they need to overcome including but not limited to: providing insufficient account of sustainability (not all-inclusive); inadequacy of instruments for addressing the local-specific issues and adaption and inadequacy of instruments to be linked to other performance indicators. A look at all the assessment tools discussed here, the environmental area is by far the most developed and consistently integrated in various tools. Without in-depth critical evaluation of the subjectivity of the scoring and weighting processes these mentioned deficiencies are enough proof that evaluation criteria of these tools are not coincident with the comprehensive assessment criteria this research desires to achieve.

It worth mentioning that of all the assessment tools discussed here, SBTool-UP and CASBEECity appear to cover a wide range of urban planning issues. With respect to sustainability at the neighbourhood level the issues of urban and city scale and scope of some of the criteria and factors on building sustainability will not allow easy insertion to the neighbourhood level. However, these tools structures capture the essence of this research comprehensive pursuit of neighbourhood sustainability. Therefore, in preparing a pool of criteria related to sustainability at the neighbourhood level these systems can be modified.

In essence, SBTool (Portugal) system can be modified to as narrow or as broad a level as desired in order to allow easy insertion of local criteria (iiSBE, 2013:1). However, the confinement of the tool methodology to the imperatives of the social, economic and environmental dimensions appears as the backdrop in a review of urban and regional planning literature. Sustainability related tendencies in urban areas suggest a different development path for the future of planning systems. The incorporation and integration of institutional [political] dimension in sustainability principles are invariably gaining significant attention. In the preceding sections Barekowski (2014:673) and Allen (2009:2) have identified five dimensions of urban sustainability namely: social, economic, ecological, physical and political dimensions. Arguably ecological and physical [spatial] are discussed jointly under environment dimension in much of literature review (Evans & Jones, 2008:141; Haapio, 2012:166).

In the light of this current view, this research widens its view and approach for neighbourhood sustainability assessment. Conversely, these assessment tools aggregated a considerable amount of information into indices for social, economic and environment dimensions. It is important to consider the information furnished by these assessment tools in preparing a comprehensive set of assessment criteria at the neighbourhood level.

8.3 Sustainability assessment for successful neighbourhoods – the modelling approach

Based on preceding discussions, dimensions of urban systems and proliferation of sustainability as a term and its operative version in neighbourhoods – the grounds for a model/framework that the research proposed are established. The groundwork for the development of a Successful

Neighbourhood Model (SNM) is justified. It is important to mention that models are of central importance in many scientific contexts (Frigg, 2006:49). This point highlights the importance of developing SNM in science specific context in order to facilitate strategic understanding of neighbourhood sustainability dynamics.

In the previous chapters (2 and 3) of this research the investigated existing literature does not define successful neighbourhood/city. However, it has provided a focus for understanding conceptual frameworks that may characterise a successful neighbourhood. One of the remarkable theoretical results is that the successful neighbourhood concept is germane to neighbourhood sustainability. Interestingly, sustainable development and its theories are increasingly poised to contribute to urban sustainability, through both basic understanding and action (Childers *et al.*, 2014:320). Having the knowledge that sustainable development is a multidimensional concept, including socio-economic, spatial, ecological, technical, political and ethical perspectives (Omann & Spangenberg, 2002:2; Munda, 2005:663). According to Childers *et al.* (2014:320) the interaction of these sustainability key sources affects all neighbourhoods and provides a focus for understanding the opportunities and constraints that may characterize their sustainability levels.

Parallel to (or as a result) this research is purposed to explore whether neighbourhood sustainability can be measured and its patterns extracted from urban systems concepts such as different spatial, economic and social perspectives, approaches, processes and integration strategies. This is based on arguments that sustainability issues are characterized by influential factors related to residential land use (Cao *et al.*, 2007:536), community development, land use and planning, infrastructure services (Nolon, 2006:30) and various segments including economic, social, institutional and cultural practices. This triggers concern to develop evaluation approaches in the field of urban development (Cao *et al.*, 2007:536). For example, there is a correlation between the urban spatial expansion (structure) and the changes in population size that set parameters for evaluation (Xu & Coors, 2012:273).

With respect to various reviews and reflections (Grimm *et al.*, 2012:218; Childers *et al.*, 2014:320-324) – the understanding of this research is that neighbourhood sustainability will result through the purveyance and interaction of urban systems – typical interdisciplinary between transport and land-use; neighbourhoods, institutions; social-cultural; economic;

infrastructural; management – transitional triggers and change. As a result the ultimate goal is to understand the process by which sustainability and urban systems can be quantified in order to measure and evaluate neighbourhood sustainability objectively.

8.3.1 Determining criteria and factors

This section presents a systems approach to the development of criteria and indicators/factors related to neighbourhood unit principles based on the idea of sustainable urban form and urban system concepts. Generally the urban systems are approached through land use which is evaluated respectively from its environmental, economic and social sustainability (Xu & Croos, 2012:273-274). As noted earlier space is a place of transfer to undertake sustainable urban planning as a result it must be represented in sustainability interpretations and frameworks. This makes spatial measures prerequisite to achieving sustainable urban form (Burton *et al*, 2013:9).

As a result, this requires an understanding of how urban sustainability is spatially distributed across neighbourhoods. In the words of Burton *et al.* (2013:7) to realise sustainable city/neighbourhood there has to be a clear and commonly held concept of what it will look like – therefore, sustainable urban form suggest one particular form based on the issues of size, shape, density and compactness, urban block layout and size, housing type, green space distribution, accessibility to transit systems and various growth options such as intensification, urbanisation, globalisation and decentralisation. This sustainable urban form conceptualisation sets the criteria for a host of different sustainability activities to make allowance for maximum synergies between the different indicators that can be used as a benchmark for assessing the neighbourhood level of sustainability.

Based on these descriptions sustainable urban form seems achievable through some of the mentioned basic characteristics that it should possess. The main bearing point is that form should be considered sustainable if it provides the city/neighbourhood with functional and structural sustainability benefits. The sustainable urban form concepts prescribe contributory role and serve as a useful reference point in determining sustainability criteria and factors for a successful neighbourhood. The criteria and factors system set the parameters within which sustainability concepts relevant to neighbourhood context can be measured for success.

To develop the model, the objective of the first step is to develop the criteria to frame contested sustainability outcome which in this case is successful neighbourhood – and the general structure is called Successful Neighbourhood Model (SNM). The word successful is used to design the frame and choose criteria as a desired sustainability outcome for this research. Its letters are segmented to represent and match each criterion concept set with respect to validity, practicality, relevance and importance to neighbourhood sustainability performance measurement requirements that test for success based on theoretical and empirical literature as shown in Figure 8.2 below.

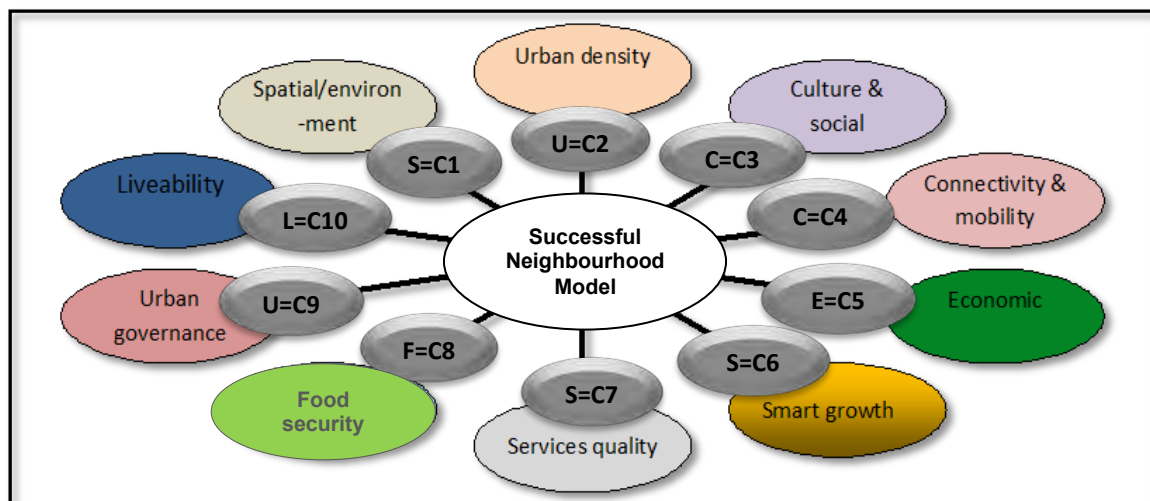


Figure 8.2: Structure of SNM

Source: Own construction (2015) – derived from theoretical construct.

Based on the criteria, each criterion is supported by a set of factors that fit the specifics and conditions of the neighbourhood to be assessed. It is worth noting that these factors are interactive – linking strategic concepts (policies or set possible actions [plans, strategies and programmes]). In addition, the factors of each criterion are measurable and quantifiable in order to allow the measurement purposes. For measurement purposes the weights are assigned to the criteria different themes and factors – in this case it would be criteria that would inform policy in response to integrated sustainable neighbourhood. By considering the data or information of each applicable neighbourhood value, factor value (fi) is associated with each factor.

The utility of these criteria (c_i) is composed into the neighbourhood sustainability index. This is done by combining the weights (w_i) and the different values through the analytical process exponential weighted method or weighted sum method in the Multi-Criteria Analysis (MCA) which is employed to derive utility assigned to criteria in order to describe the relative sustainability of each of these criteria. Based on the outcome simulated results – MCA purveys a composite neighbourhood sustainability index which calculates and describes the variation of neighbourhood sustainability. As a result the value of the sustainability index will make the possibility for the combination of management decision and theoretical result and provides with the scientific guideline and decision-making process for better implementation (Xu & Croos, 2012:274) of dynamic neighbourhood initiatives and strategies.

8.3.2 Adoption of Multi-Criteria Analysis

Drawing upon the identification that the criteria are tools that can be used to collect and organise information in a manner that is useful in conceptualising, evaluating, implementing and communicating sustainable neighbourhood. It appears that applying and/or adapting a set of indicators to neighbourhood situations is an intricate procedure. Despite the complexities, the decision-making process that is utilised to select or modify criteria supposition is the ability to execute multiple factors, reliably, uniformly, logically and transparently (Macoun & Prabhu, 1999:15). One of the specific techniques that can be utilised in the decision-making process cognizant of and/or including these requirements is a Multi Criteria Analysis (MCA) approach (Macoun & Prabhu, 1999:10).

Therefore, MCA methods (logical steps) as described and applied in section 4.8.2 are adopted and will be applied to assess criteria and give an overall preference ordering of alternatives of each criterion.

8.4 Successful neighbourhood model criteria

Before commencing with MCA application each criterion and factors are defined on the bases of their dimensionality such as measurable parameters to evaluate neighbourhood sustainability.

8.4.1 Spatial criterion

The deduced understanding from sustainable development perspective is that spatial factors advance land use management initiatives. The spatial factors have the potency to be utilised as a tool to monitor changes in spatial distribution and utilization (Woillez *et al.*, 2009:156) in neighbourhoods. Much of the literature indicates that spatial structure has linkages with various factors such as population size and density and social and economic organisation among others that used to characterise urban areas (Wray *et al.*, 2013:1). These factors together with physical environment (ecology), transport and infrastructure and housing are used in the research as components that will determine neighbourhood spatial change such as estimate the spatial probability of the urban expansion and spatial relations for the model initiative.

In spatial terms, an expansion or growth of the neighbourhood is driven among others by demand for housing as a function of the changing demographic, economic and social context (Williams *et al.*, 2010:2). For example, in Dublin, Ireland the consequences of rapid economic and demographic change combined with weak planning have produced cascading effects – among the impacts have been escalating housing prices, transport system becoming inadequate, followed by drastic economic recession have had a major impact on the urban landscape (Williams *et al.*, 2012:3). The implications of this urban landscape provide a means of representing the various social and economic classes which in turn determine land use.

Table 8.3: Spatial and environment factors

Criterion	Factors	Example measurable parameters of	Measurement factor(s) of	Unit of factors	Definition	Rating sources
Spatial and environment	Population	Birth rate, immigration /emigration, population structure, mortality etc.	Change in population size where population = # of Birth + # of immigration - # of emigration - # of mortalities Population structure i.e % of total Economically Active Population (EAP) people from 15 to 65 years either employed or unemployed and seeking employment	% of population size	The factors are statistics to capture population density to handle population limits; *Characterise the location and occupation of space; *Can be used in monitoring system to detect changes in the spatial distribution; *Relate spatial distribution properties of urban population to their dynamics, their habitats or climate change (Woilez <i>et al.</i> , 2009)	National Association of Environmental Professionals (Petrov <i>et al.</i> , 2013)
	Socio-economic trends	GDP, sector developments, employment, economic competitiveness, growth and investment capacity, regulatory and fiscal measures affecting location decisions	GDP = C + I + G + (Ex - Im) where C is total spending by consumers, I total investment (spending on goods and services) by business, G is total spending by government and (Ex-Im) is the net exports (exports-Imports)	% of amount of growth rate		
	Urbanisation /spatial planning	Polycentric growth and sprawl, urban region, small scale developments	Dividing area into geometric shapes where area of rectangle (Length X Breadth) + area of square (Length X Length) +area of triangle ($\frac{1}{2}$ X Base X Height) + area of trapezium $\frac{1}{2}(\text{Length 1} + \text{Length 2}) \times \text{Height}$ = Km ² Area size	Km ² Area size		
		Proximity to other cities and rural areas for food supply	Proximity distance is square root between two points A (x ₁ ,y ₁) and B is (x ₂ ,y ₂) therefore $AB = \sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2}$	The proximity distance is obtained in Km		
	Transport and infrastructure provision	Transportation, cross-border and regional transport networks	Total # of records	Total # of records		
	Policy framework, overall trends (political, financial)	Territorial cohesion, regional policy-urban development and environmental	Outcome based assessment	Total # of achieved objectives or targets		
	Ecology	Solid waste recycling	Municipal Solid Waste (MSW) where generation = [Disposal + (Recycling + Reuse) = Disposal + Diversion Therefore, % Diversion = (Diversion/Generation)	% of MSW generated that is diverted from disposal via reuse and recycling	The factor measures percentages of municipal solid waste recycled	U.S. Environmental Protection Agency (1996)
	Pollution	Carbon dioxide emissions, sulphur and nitrogen dioxide density	Emissions per Km	Grams per Km	Measures fuel use for transport purpose	Global Power City Index (2012)
	Natural environment	Renewable water resources	(Total Renewable Water Sources)/[Total Generated Water Sources (Renewable & Non-renewable)]	% of renewable water sources	Measures capacity of water infrastructure relative to demand	
		Level of green coverage	Dividing area into geometric shapes where area of rectangle (Length X Breadth) + area of square (Length X Length) +area of triangle ($\frac{1}{2}$ X Base X Height) + area of trapezium $\frac{1}{2}(\text{Length 1} + \text{Length 2}) \times \text{Height}$	Km ² Area size	The area for a given purpose of parks and natural areas	

			Height = Km ² Area size			
		Alternative energy sources	(Total Energy Generated from Renewable Sources) / [Total Energy Generated (Renewable & Non-renewable)]	% alternative energy source	Number of households and businesses using alternative energy sources	UNESCO (2010)
		Water conservation	Total # of water conservation recorded	Total # of water conservation	Number of households and businesses	World Values Survey (2012)
		Eco-efficient goods or services	Eco-efficiency = (Value of products or services)/(Sum of environmental life cycle impacts)	% of eco-efficient goods and services	Measures households and businesses receipts from goods and services	

Source: Own construction (2015) from Woillez *et al.* (2009:3-8); Petrov *et al.* (2013:12-15); Global Power City Index (2012:32); UNESCO (2010:15); World Values Survey (2012:1).

On these bases, the spatial indicators offer the framework to describe the neighbourhood land use classes and growth. Also, generating information for decision-making processes and facilitating better understanding of urban development processes (Petrov *et al.*, 2013:14). Therefore, understanding the matrix of spatial factors will assist role players in urban planning and development processes to be better positioned to identify the driving forces behind the current and future trends and impacts that influence decision making (Wray *et al.*, 2013:2). In this fashion, a spatial matrix provides a building block for effective land use planning and sustainable urban development (Herold *et al.*, 2005:4).

As a result a selection of appropriate spatial indicators is important for modelling outputs to be able to analyse spatial patterns (Huang & Hsieh, 2014:20) in neighbourhoods. Analysing spatial patterns in this manner (modelling) provides a solid basis to deduce sources of spatial urban growth and give an account of its interaction with its sources such as economic, population and environmental factors (Passerini & Brebbia, 2014:386). In essence, the sustainability concept in urban areas becomes realistic – the futuristic scope of sustainability is reinforced by spatial indicators displayed potential to manage the process of urban development.

8.4.2 Urban density criterion

The concept of density in urbanism is frequently used to describe the relationship between a given area and the number of certain entities in that area – these entities might be people,

dwelling, services, or floor space (Pont & Haupt, 2009:15). This multivariable criterion is linked to urban performance or urbanity; functional mix coded to reflect potential flows, relative to the total landscape (Marchettini *et al.*, 2014:375). This criterion serves as a platform to analyse the connection between urban morphological elements such as housing type mix, higher density, mixed use forms and a range of socio-economic sustainability outcomes (Burton *et al.*, 2013:140). These urban form elements suggest that the bases for urban density factors are entrenched in the compact city concept. These factors are critical in understating cities' functioning – for instance the extent and intensity urban use forms can result in higher traffic and infrastructure services being overburdened.

On the other hand services and facilities accessibility factors favour densification of urban areas, the factors suggest that urban areas densification although relative outcomes of community sustainability raise concerns – they are cascading (Bramley *et al.*, 2006:26). The fundamental effect of these factors is that they set parameters to analyse imbalance distribution of population which poses problems in a way of sustainable neighbourhood development. Despite these arguments, the premise behind this manifestation is straightforward: urban density indicators are operational measures that can detect neighbourhood growth direction as illustrated below in Table 8.4 below.

Table 8.4: Urban density factors

Criterion	Factors	Example measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Urban density/urbanisation	Human population	Urbanisation rate	(Total population living in urban areas)/(Country population)	Ratio (or %) of urban population	Total population living in urban area per city land area	United nations (2012)
	Physical environment	Urban density	(Total population of the city)/(Amount of land in urban use)			
	Movement	Total number of visitors arrivals	(Total # of visitors arrivals)/(Total city land area)			
		Number of working visas	(Total # of working visas)/(Total city land area)			
		Total number of residents departures	(Total # of residents departures)/(Total city land area)			

Source: Own construction (2015) from United Nations (2012:2-8).

If done well, these factors will ensure that population increase does not outperform the most basic infrastructure needs in a neighbourhood. This reflects sustainability neighbourhood management benefit. And platform to identify neighbourhood parts affected by high density relative to local services access (Bramley *et al.*, 2006). Also, see Annexure B for alternative measures that must/can be considered under urban density, these must also be interpreted with the considered urban growth criteria as in Annexure B.

8.4.3 Culture and social capital criterion

The culture index is the core dimension of social capital – these twin concepts are related but not identical. In this context, diversity of citizens' interests, needs and resources stem from the mix of culture and social factors at the local level (neighbourhood) – serving as a good opportunity to track bottom up initiatives (European Union Regional Policy, 2011:35). These factors deal with the interaction between money capital, social capital, and cultural capital (Portes, 2000:1). From a social sustainability perspective, factors that can evaluate social capital include trust, norms, network of horizontal and vertical relationships between people and collective activities (World Bank, 2011:7) (level of involvement in neighbourhood activities among others). Table 8.5 shows culture and social factors.

Table 8.5: Culture and social factors

Criterion	Factors	Example measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Cultural and social capital	Inclusive planning and implementation	Visible efforts to involve citizens	Outcome based assessment	Scaled number of citizen involvement	Measures participatory and community approach within democratic governance and ownership of services, local inclusive culture of services *Diversity of citizens interests, needs and resources at the local level to track bottom up initiatives (Matthies <i>et al.</i> , 2011)	Oxford University Press and Community Development Journal (Morrisey, 2000).
		Sustained citizen interest beyond the planning phase	$(T_{t-1} - T_b)/T_b$ where t is the year in question and b is the base year	% of sustained citizens interest		
		Growth of partnerships among groups	$(T_{t-1} - T_b)/T_b$ where t is the year in question and b is the base year	% growth of partnership		
		Public meetings attendance; attracting new participants	(Total # of attendants)/(Total population of the urban area)	% of public meeting attendance		
		Representations by low-income groups	(Total # of low income households)/(Total # of households)	% of low income households representatives		
	Leadership development	New leaders assuming new roles and positions	(Total # of new leaders)/(Total # of leaders (new and	% of leadership development		

			old leaders)]			
	Social capital	Number of organisations	Total # of recorded organisations	Total number of recorded organisations		
		Strength of organisations	Outcome based assessment	Scaled number		
		Frequency of organisations	(Total # of working together occurred)/ (Total of organisations examined)	% of organisations working together		
	Social welfare	Public sector expenditure	Social cost associated with public expenditure (amount)	Social cost associated with public expenditures	Changes in welfare over years encourage use of indicators such as poverty head counts, years of schooling mortality and longevity or unemployment rates	World Values Survey (2012)
		Corporate and private donations	Corporate and private donations (amount)	Corporate and private donations (amount)		
	Community values	Number of cultural institutions	Total # of cultural institutions recorded	Total number of cultural institutions recorded	The factors are an important tool for evaluating the city's level of social development, cultural resources and assessing the impact of policy	Global Power City Index (2012)
	Cultural facilities for visitors	Number of museums	Total # of museums recorded	Total number of museums recorded		
		Number of declared monuments	Total # of declared monuments recorded	Total number of declared monuments recorded		
		Number of guest rooms	Total # of guest rooms recorded	Total number of guest rooms recorded		
		Number of hotel	Total number of hotels recorded	Total number of hotels recorded		
	Government expenditure	Government expenditure on arts and culture as percentage of total public expenditure	(Total government expenditure on arts and culture)/(Total public expenditure)	% of government expenditure on arts and culture		World Values Survey (2012)
	Households expenses	Households cultural goods and services expenses as percentage of total households expenses	(Total households cultural goods and services expenses)/(Total households expenses)	% of households expenses on cultural goods and services		
	Cultural resources	Number of world heritage sites (within 100km area)	(Total # of world heritage)/(100Km area)	Number of world heritage sites per km		Global Power City Index (2012)

Source: Own construction (2015) from Morrissey (2000:60-72); Global Power City Index (2012:28); World Values Survey (2012:30).

This criterion has integrated the social and cultural factors as a means of putting some order into having collective performance with respect to sustainability assessment. In essence, both cultural and social factors postulated ultimate outcome is social cohesion. Social cohesion provides a framework for measuring participatory and community approach within democratic governance and ownership of services, local inclusive culture of services (Matthies *et al.*, 2011:126). This approach of social cohesion draws attention to the idea of good governance/sustainable urban management as participation translates to neighbourhoods'

residents' involvement in the processes of decision-making (Momeni *et al.*, 2011:65). The overall model approach is to encourage participation as assessment yardstick for democratic governance that can be measured by its factors: responsibility, transparency and accountability over public activities.

8.4.4 Connectivity and mobility criterion

The primary considerations in planning and development of sustainable neighbourhood(s) should be connectivity and accessibility (Ball, 2012:37). Thus, the transport system connectivity requires integration of transport planning and land use planning (Moroke, 2015:48). The roads and rails as well as airports which for instance connect the city and neighbourhood are land use systems. This implies that good connectivity of transportation system which enhances mobility and accessibility is significantly influenced by land-use system. It is therefore, important to develop criteria that identify factors that can improve the connectivity and integration of the transportation system in order to enhance accessibility and mobility of individuals or goods over space. Accessibility refers to the easiness to reach desired land-use activity destination from a specific location enabled by particular transport system (O'Sullivan *et al.*, 2010:87) while mobility describes people's ability to travel over distances (Litman, 2014a:2).

From the sustainability perspective, good connectivity and sustainable mobility and transport are characterised/operationalized by and/or depends on various factors such as transport infrastructure networks, lengths of roadways and connectivity, higher population density, travel modes, availability/affordability/reliability/safety and security as well as schedule coordination of public transport services (Doherty, 2004:7; Litman, 2014a:2-15; Mishra *et al.*, 2012:32) among others as shown in Table 8.6 below.

Table 8.6: Connectivity and mobility factors

Criterion	Factors	Example of measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Connectivity and public transport	Travel mode	Passenger cars, buses and coaches, trains	(Share of each mode)/(Total mode of public transport)	% of modes of public transport	Provides information on the different modes of passenger transport	GTZ (2012)
	Availability	Number, frequency, number of hours for which services is available	(Total # of vehicles)/(Unit time)	Vehicle/Hour (public transport frequency or % of public transport)	Measures the presence of public transport network or mode in an area/locality	
	Accessibility	Walking time to the station or stop, average waiting time for the next service	Access time = Walking time to the station or stop + average waiting time for the next service	Minutes or hours waiting for the service	Measures access time (by walking) from the point of interest to public transport services access points	
	Reliability	Number of breakdowns, share on-time trips	(Total # breakdowns)/(Total # of on-time trips)	% of public transport reliability	Ability of public transport to follow published schedules	
	Safety and security	Accidents and injuries per 100 000 trips, safety of pedestrians accessing public transport, number of incidents of thefts and sexual harassment, ranks visibility and lighting	Total incidents recorded/km travelled or per trips	% of incidents per km travelled	Measures the feeling of safety from accidents and injury while public transport	
	Equity (inclusiveness)	Physical accommodation and facilities for disabled in vehicles and stations baggage carrying facilities	Assessment based on observation	Total number of recorded facilities	Measures easement for disadvantaged groups (people with low incomes, physical disabilities to use system)	
	Affordability and payment	Fares as shares of incomes, fares in comparison to other modes, low income fare provision	Trip fare (cost)	Rand per Km or trip	Estimates public transport affordability	
	Intermodal connectivity	Integration between stations, stops, other modes, service providers	Walking time to next station or stop + average waiting time for the next service	Hours or minutes	Measures the extend transfers can be made from one mode to another physical and fare wise	
	Quality, speed, attractiveness and comfort	Boarding and alighting ease, availability of seats, cleanliness, passenger air quality, basic amenities at stations, air conditioning, bus only lanes, courteous staff, on boarding internet facilities	Assessment based on observation	Total number of recorded features and facilities	Measures attractiveness of public transport to retain existing users and attract new users; level of priority on road (bus only lanes); etc.	
	Environmental impact	Emissions per km, fuel efficiency, passenger transport polluting emissions, energy consumption by public transport	(Passenger transport km travelled)/(Fuel efficiency)	KM/Litre to obtain the amount of CO ₂ emitted from car travel	The level and savings of energy and emissions as a result of increased usage of public transport	
	Presence of policies/norms at national/ state/city levels	Existence of a public transport, policy directives on performance measurement, interagency coordination and cooperation	Outcome based assessment	Assessment based on performance	The policy ability to increase modal shares of public transport by	

					making it the most favoured and priority mode of travel in cities	
	Infrastructure	Private transport infrastructure	(Total private transport infrastructure)/(Total land use for transport)	% of private transport infrastructure	Measures capacity of infrastructure relative to the demand on it	
		Public transport infrastructure	(Total public transport infrastructure)/(Total land use for transport)	% of transport infrastructure		
		Transportation facilities per population	(Total private and public transportation facilities)/(Population of the city)	% of transportation facilities		

Source: Own construction (2015) from GTZ (2012:4-12) and Global Power City Index (2012:32).

Assessing connectivity for transportation system each one of the factors is critical for sustainability assessment of cities/neighbourhoods. It is deduced that good connectivity of the transport system strengthens the sustainable development of neighbourhoods. Therefore, understanding the influence of these transport characteristics in different form of urban settlements is critical in actualising sustainability. As put by Ali (2012:81) the forms of urban settlements vary and assessment indicators react to these variations differently. Analytically, the indicators can be applied to decide which mode of transport is suitable for which location dedicated by spatial and socio-economic class characteristics such as taking precautions against factors that can generate economic cost, cause traffic congestion and so on.

8.4.5 Economic criterion

Economic variables such as income, inflation, tax rate and unemployment for example are variables used to measure neighbourhood quality (Hughes & Lowe, 2007:21). This makes the economic dimension a vital component in the planning of sustainable neighbourhoods. More importantly, the neighbourhood economic factors have the relationships with multiple dimensions of neighbourhood social and physical characteristics that influence the outcome of neighbourhood quality (Franzini *et al.*, 2005:272). In essence, the economic variable is multidimensional and entail strategic factors in pursue of neighbourhood sustainability – for example, neighbourhood economic revitalization strategy has to create wealth, job

opportunities, deliver public services, promote equality and participation and promote environmental and social values among others (NMBM, 2007:20).

In a series of publications, the United Nations Development Program (UNDP) has discussed the importance of this socio-economic envelope that generates parallel benefits towards economic development. As a result, computes a Human Development Index (HDI) for each country each year, composed of three factors: life expectancy, education (adult literacy and combined secondary and tertiary school enrolment) and real GDP per capita serving as a means to measure growth rate and economic development. These aspects are very important because they enable assessment of the neighbourhood economic viability. Typically, cities are judged by economy and development growth rate, this includes the use of economic growth measures like Gross Domestic Product (GDP) which measures increase in total value of goods and services produced. This factor produces differing rationales for interventions related to economic efficiency and competitiveness in neighbourhoods as shown in Table 8.7 below.

Table 8.7: Economic factors

Criterion	Factors	Example of measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Economy	Economic vitality and market size	GDP growth rate	$GDP = C + I + G + (Ex - Im)$ where C is total spending by consumers, I total investment (spending on goods and services) by business, G is total spending by government and (Ex-Im) is the net exports (exports - imports)	% or amount of growth rate	Gauges the city's economy and standard of living, with higher per capita GDP showing higher standard of living	Global Power City Index (2012)
	Human capital	Number of employees in service industry for business enterprise	Employment population ratio = $(\text{Employed persons}) / (\text{Total non-institutionalised civilian population})$	% of employment population	Reveals aggregate economic view of population that have positive effect on employment and production and economic development	
	Education	Share of population aged 15 and above with educational attainment at tertiary level (non-degree)	$[\text{Total \# of population aged 15 and above with educational attainment at tertiary level (non-degree)}] / (\text{The country's population})$	% of population aged 15 and above with educational attainment at tertiary level (non-degree)	The indicator shows the estimate technical skills, intelligence and knowledge to contribute to the economic growth	United Nations (2012)
		Share of population aged 15 and above with educational attainment at tertiary level (degree and above)	$[\text{Total \# of population aged 15 and above with educational attainment at tertiary level (degree and above)}] / (\text{The country's population})$	% of population aged 15 and above with educational attainment at tertiary level (degree and above)		

Source: Own construction (2015) from United Nations (2012:7) and Global Power City Index (2012:62).

One of the most robust pressing economic issues globally is how a city and its peripheral neighbourhoods may become unified or, more integrated putting in perspectives all the pillars of urban sustainable development. Therefore, assessing alternatives for neighbourhood sustainability solutions – economic sustainability is one of key of analytic steps to measure performance (Zaeh, 2013:298). Evaluation with respect to solution (economic sustainability) the factors are utilised to prioritise decision making.

8.4.6 Smart growth criterion

The smart growth is the growth that seeks to transpose the manner in which neighbourhoods develop, function (Filion & McSpurren, 2007:501) and leaving legacy for future generations (Smart growth online, 2006:1). And its principles are multi-functional and recognize the many benefits of sustainable neighbourhood growth. The examples or planning and/or development principles of smart growth are sustainable urban forms (compact, mixed use), sustainable mobility (walking, bicycling) and transportation systems, preserved natural environment and other related principles. These are smart growth principles and sustainability factors. According to Dernbach (2002:836) smart growth is transitioning to a sustainable community. Areas (2009:2) indicates that such views constitute and support neighbourhood development pattern that is balanced in function.

In much of the literature (Talen & Knaap, 2005; Lipes, 2008; Dernbach, 2002; Gospodini *et al.*, 2008) smart growth and sustainable urban development (sustainable neighbourhood, sustainable city etc.) are often used simultaneously and interchangeably. For example, in the US this implied stance on urban phenomenon has recently shifted to a more explicit defines of sustainable urban growth as proponents of sustainable cities have developed affiliations with members of a smart-growth movement (Gospodini *et al.*, 2008:415).

Table 8.8: Smart growth factors

Criterion	Factors	Example of measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Smart growth	Mixed land use	Homes, retails, business, and recreational opportunities	Mix of land uses among acre grid cells for each different land use	Number per cm ² converted to km ² area size	Measures mix of land uses in a city/neighbourhood	Smart growth online (1996)
	Compact neighbourhood	Residents proximity to the business centre	# of dwellings within ¼ mile radius from the city centre	Number of dwellings within ¼ mile radius from the city	Measures residents proximity to city centre, recreation and employment	
		Residents proximity to recreational	(# of dwellings within ¼ mile radius of parks)/(Total dwellings in a city)	% of dwellings within ¼ mile radius of parks		
		Residents proximity to employment	(# of businesses and industrial zones within ¼ mile of city centre) /(Total city land area)	% of businesses and industrial zones within ¼ mile of city centre		
	Multiple transport options	Safe infrastructure for walking, cycling, transit and driving	Assessment based on incidents	Total number of fatalities or injuries resulted from roads accidents in an area by each mode	Modal average number of trips per day for all residents	
	Range of housing opportunities	Different family types, life stage and income levels	Variables are categorised on the interval level	Scaled number	Number of different residences per square mile	
	Sense of place	Number of community gardens	Total # of community gardens	Total number of community gardens		
		Number of who say they have enough of their neighbourhood	Total # of people who responded that they have enough of their neighbourhood	Total number of people who responded that they have enough of their neighbourhood		
		Citizen participation in community project	Respondents scaled number	Respondents scaled number		
		Neighbourhood liveability	Average of listed variables	Average of listed variables		
		Number of people who say most of people can be trusted	Total # of people who say most of people can be trusted	Number of people who say most of people can be trusted		
	Open space and parks	Parks space available	(Parks acre)/(1 000 persons)	Acre per 1 000 persons	Parks acres per 1 000 persons	
		Open space available	(Total open space) /(Total city land)	Km ² area size	Percent of total land use as open space	
	Neighbourhood density	Population density	(Total population of a neighbourhood area)/(Total amount of land in urban use)	% of urban population	Number of people per square mile	
		Residential density				
	Community involvement	Number of citizens participating in community life and decision making	(Total # of citizens participating in community life and decision making) /(Total neighbourhood population)	% of community involvement	Number of participants per neighbourhood population	
	Cost effectiveness	Number of green buildings and infrastructure	(Total # of green buildings and infrastructure)/(Total buildings and infrastructure of the city)	% of green buildings and infrastructure	Track green buildings and other systems that save both money and environment in the long run	
		Percentage of businesses producing or involved in e-commerce goods, services or information	(% of businesses involved in e-commerce goods, services or information)/(% of the city Real GDP)	% of businesses involved in e-commerce goods, services or information		

Source: Own construction (2015) from Smart growth online (1996:1-4).

At the basic level, evaluation of smart growth point out that it is directed at developing sustainable neighbourhoods. The approaches to the crisis of urban area spatial fragmentation, urban sprawl, neighbourhood disparities, and inequalities and related environmental concerns are addressed in these interrelated perspectives: smart growth and sustainability factors.

8.4.7 Services quality criterion

The availability and quality of services is a fundamental determinant of the quality of life. This includes provision of water, electricity, roads, housing, transport, clinics, schools, libraries, shopping facilities and parks (Abusam & Shahalam, 2013:758; Westway, 2006:1). In turn these are important factors for neighbourhood satisfaction (Marans & Stimson, 2011:363) highlighting the extent the attributes of neighbourhood living reflect on sustainability. According to Westway (2006:1) neighbourhood services quality of life are paralleled to service provisions and neighbourhood satisfaction.

Table 8.9: Service quality – household infrastructure services factors

Criterion	Factors	Example measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Services quality-household infrastructure services	Service coverage	Electricity connections, refuse removal, sanitation and water infrastructure	(Total # of households covered)/(Total # of households in the neighbourhood)	% of different categories of service coverage	These factors track the population with access to services (either with direct connection or within reach of a public point) as a percentage of the total population under utility's national responsibility	United Nations (2012)
	Service consumption and production	Litres; persons; day (month, year); connections; removals	*(Total water or service sold)/ (Total population served per month) *(Total annual service supplied)/(Total population service)	% of water consumption		
	Quality of service	Continuity of service, costumers with discontinuous supply, quality of services supplied, complaints about the service	Average hours of service per day (for supply)	Average hours of service		
			(Total # of customers with a service supply that is discontinuous during normal operation)/(Total population served per year)	% of customers with a service supply that is discontinuous during normal operation		
			(Total # of connections)/(Total number of complaints per year)	% of complaints of the total number of connections		
			(Proportion of collected sewage that receives at least primary treatment or secondary treatment)/(Total	% of collected sewage		

			collected sewage generated in the city)			
	Affordability of service	Fares as shares of income	*Total annual operating revenues per population served *Total revenues per service population per GNI per person	*Operating cost person *Fixed amount of the residential tariff per connection per year		

Source: Own construction (2015) from United Nations (2012:4-32).

An understanding derived from the evaluation of quality of services for sustainability is that it reflects on the socio-economic artery of neighbourhood sustainability. For example, in Ethiopia, poor housing conditions, limited coverage of urban services, unreliable service provision and deterioration of the environment are persistent realities in poor-neighbourhood and squatter settlements (Kassahun & Tegegne, 2004:75). In various reviews and reflections offered in this research these factors are commonly used to label the social and economic status of settlements/neighbourhoods/cities.

On the other hand there is evidence that local services have a strong positive effect on regional business growth. For example, if two cities differ only in the quality of their local public services, the city with better services will grow at a faster rate (O'Sullivan, 2007:84). Analytically there are so many alternative interpretations to highlight level of services as an important indicator of sustainability, and these are measurable contextual factors that can be explored and cultivated to give effect to the concept of sustainable neighbourhood. In this research, level of services, availability and quality assessment is used to understand disparities in neighbourhoods and highlighting serious shortcoming arising therefrom.

8.4.8 Food production and distribution criterion

Developing factors of urban neighbourhood sustainability – urban food production is important to meet the needs of urban growing population and also provides opportunities to actualise sustainable urban development tripartite considerations (social, economic and ecological) (UN, 2014:3). Therefore the impact of urban food production is assessed as being a cross-cutting criterion – it reflects various dimensions of urban sustainability. This makes the factors aimed at

assessing sustainability of food production at the urban level multidimensional. For example, urban growth can engender unemployment and food insecurity among poor urban inhabitants that can lead to increase in crime and unrest (UN, 2014:16).

From spatial planning perspective food production in urban neighbourhoods translates to intensified land use to meet the needs of urban growth and improve urban-rural connections. This includes engaging interested residents through community participation and stimulating entire economies around local food systems (Swilling *et al.*, 2012:10). These viewpoints generate a base from which to draw sustainability discourse attention to urban neighbourhood food production. Critically considered, the potential of food security as neighbourhood sustainability indicator in this research is premised on accessibility and availability as indicated in Table 8.10 below.

Table 8.10: Food security factors

Criterion	Factors	Example of measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Food security	Availability	Crop production survey	% of households involved in food production	% of households	The factors measure communities projects or urban families food production systems in backyards to produce a low-cost, sustainable strategy for increasing household food security by direct access to a reliable food supply	UN-parameters of food security (2014)
			% of community functional food production projects in neighbourhood	% of community projects		
	Accessibility	Household consumption survey	Total food expenditure to total household expenditure	% of households		
			(Average # of meals taken a day per household)/ (Total # of households)			
	Stability	Food price and supply	Price of commodities	Cost of crop production		
		Household food production	% of households involved in food production	% of households involved in food production		
		Food crop diversity	Total crop yield production per a neighbourhood	Ton/person		
	Utilisation	Access to utilities and services	Degree of access to utilities and services (e.g. water, energy, health and sanitation)	% of households with access		

Source: Own construction (2015) from UN (2012b:2-8).

The evaluation of this criterion for sustainability is appears easy as the outcomes are practical – urban food production connects local communities more closely to the impacts of their decisions (Swilling *et al.*, 2012:110). As a result, the food security indicators will advance an understanding of policy-relevant issues to neighbourhoods such as sustainable food systems, urban land use intensification and growth.

8.4.9 Urban governance criterion

Urban governance criteria are a set of factors to evaluate and quantify the sustainability of different planning options for given context (Schadler *et al.*, 2013:36). The basic principles that in turn become the factors for evaluation of governance in urban sustainable development are accountability, transparency, predictability and information (UN-Habitat, 2013c:185). To deal with these principles/factors another important factor is citizen participation to ensure a positive impact of the principles and for overall good governance. To place urban governance criterion framework under the conditions of sustainable development principles – a systems approach to a consideration of the economic, social and ecological processes in the neighbourhood becomes inevitable. In essence, urban governance integrate urban sustainability dimensions (social, political, economic, ecological and physical interventions) for it to be able to address broad and complex urban issues as shown in Table 8.11.

Table 8.11: Urban governance factors

Criterion	Factors	Example measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Urban policy	Social	Education and health	Impact evaluation or assessment	Outcome(s) observed per each category	The factors are an important tool for evaluating the city's level of social development and assessing the impact of policy	United Nations (2011)
		Food and nutrition				
		Green housing and buildings				
		Public transport				
		Green energy access				
		Recreation areas and community support				
	Economic	Green productive growth	(% of businesses producing or involved in e-commerce goods, services or information)/(% of the city Real GDP)	% of green productive growth	*Assesses conformance to sustainable development principles using economic statistics such as GDP *Measures the government commitment to eco-efficient sector growth and fiscal management	World Bank (2011)
		Creation of decent employment	Total # of jobs created	Total number of jobs		
		Production and distribution of renewable energy	(Total annual renewable service supplied)/(Total population)	% of renewable energy distributed		
		Eco-efficiency economic activity	*Total # of products *Total # of innovative and non-innovative firms	Data collected of eco-efficient business sector (amount)		
	Environment management	Forest and soil	Impact evaluation or assessment	Outcome(s) observed per each category	Tracks environmental progress assessing environmental performance and supporting policy	OECD (2011)
		Waste and recycling	Municipal Waste (MSW) where	% of MSW generated that		

			generation = [Disposal + (Recycling + Reuse) = Disposal + Diversion Therefore, % Diversion = (Diversion/Generation)	is diverted from disposal via reuse and recycling		
		Energy efficiency	(Usable energy out)/(Total energy in)	% of energy efficiency	Environmental performance is measured against domestic objectives and international commitments	
		Water (freshwater) conservation	Conservation standards	Conservation unit of analysis or conservation measure description		
		Air quality conservation				
		Adaptation to and mitigation of climate change	Impact evaluation or assessment	Outcome(s) observed per each category		
	Urban governance	Planning and decentralisation	Impact evaluation or assessment	Outcome(s) observed per each category	*Measures progress in achieving good urban governance *Demonstrates the importance of good governance in achieving broad development objectives such as Millennium Development Goals and those in the Habitat Agenda *Assesses progress in achieving community participation and good urban governance	UN (2011)
	Reduction of inequalities					
	Strengthening of civil and political rights					
	Support of local, national and regional					
	Cooperation, attitude towards human rights					
	Attitude towards diversity					
	Incorporation of excluded groups in the consultation process monitoring and evaluation					
	Role of key groups in planning, decision making and implementation					

Source: Own construction from UN (2011); World Bank (2011); OECD (2011).

On this basis parameters for urban management and balanced growth in cities/neighbourhoods are set – the city/neighbourhood decisions will be based on good governance as determined by evaluated factors rooted from its source concept: sustainable development. One way to interpret this is that factors highlight both potential success and chronic failures for example, of urban policy.

8.4.10 Liveability criterion

An aspect of sustainability that is often overlooked is human wellness including happiness (Aminmansour, 2013:800) in neighbourhood satisfaction factors (or dissatisfaction) and sustainability considerations. As a liveability factor, human lifestyle is likely to be shaped by this ecological dimension of sustainability and spheres of influence include: healthy living

environment, great and safe living places, open spaces and recreation opportunities, urban-rural linkages, sustainable transport systems and a sense of community (Andreucci, 2013:417).

Table 8.12: Liveability factors

Criterion	Factors	Example of measurable parameters	Measurement of factor(s)	Unit of factors	Definition	Rating sources
Liveability	Cost of living	Average house rent	Mean house rent price levels	Average rent amount	The factors track the difference in living costs between cities	Global Power City Index (2012)
		Price level of goods and services	Price level of goods and services	Price level of goods and service (amount)		
	Security and safety	Number of murders per population	(Total # of recorded murders)/(Total population of the city)	% of total murders recorded	Measures the total number of murders in an area to determine safety	
	Living environment and health care	Life expectancy rate	Average # of years a person in the city is expected to live	Average life expectancy in the city	Measure and compare the quality of health service provision in different areas	
		Number of medical doctors per population	(Total # of medical doctors in the city)/(Total population of the city)	% of medical doctors in the city		
		Availability of private health care	Total # of private health care in the city	Total number of private health care in the city		
		Quality of private health care	Impact evaluation or assessment	Observation outcome		
		Availability of public health care	Total # of public health care in the city	Total number of public health care in the city		
		Quality of public health care	Impact evaluation or assessment	Observation outcome		
	Availability of over counter drugs	Total # of pharmacies in the city	Total number of pharmacies in the city			
	Living facilities	Variety of retail shops	Total # of different retail shops in the city	Total number of different retail shops in the city	Assesses which locations provide variety of shops measure against population density	Global Power City Index (2012)
		Total number of retail shops and restaurants	(Total # of shops and restaurants)/(Total population of the city)	Total number of shops and restaurants per total population		
	Stability	Petty crime	(Incidents)/(Total population of the city)	% of the incident per population	The factors provide a measure of the prevalence and types of crime an area	Economic Intelligence Unit (2012)
		Violent crime				
		Threat of civil unrest/conflict				
	Culture and environment	Discomfort of climate to travellers	Impact evaluation or assessment	Outcome(s) observed per each category (scaled number)	Evaluates the city's level of social development-sports and culture	
		Social or religious restrictions				
		Cultural ... availability				
		Cultural food and drinks availability				
		Consumer goods and services				
	Education	Availability of private education			Measures the capacity of education system to contribute to improvement of standard of living	
		Quality of private education				
		Availability of public education				
		Quality of public education				
	Infrastructure	Quality of road network			The factors show the basic framework for	World Bank
		Quality of public transport				
		Qualitv of international links				

		Quality of energy provision			delivering energy, transport, water and sanitation and information and technology services in a city	(2009)
		Quality of water provision				
		Quality of telecommunications				
		Quality of pedestrian access roads				
		Availability of good quality housing				

Source: Own construction (2015) from Global Power City Index (2012); Economic Intelligence Unit (2012:1); World Bank (2009:12).

Other factors stem from liveability characteristics: design, plan, and the manner in which urban buildings are articulated and infrastructural planning (Jordan & Infante, 2012:535). Evaluated, liveability is an urban (neighbourhood) sustainability assessment tool. In principle, the interface between liveability and sustainability is intertwined. For example, in Melbourne, Australia sustainability and liveability relations have matured to define characteristics of urban planning (Kostas *et al.*, 2010:32). In the context of neighbourhood sustainability – liveability would assess the neighbourhoods that provide the best or worst living conditions (The Economist Intelligence Unit, 2013:1) as indicated below in the case of Kuala Lumpur, Malaysia.

Kuala Lumpur, the capital city of Malaysia is ranked 78th in the 2011 World Liveable City Ranking by the Economic Intelligence Units (EIU). The EIU liveability index rates each city on a scale of 0-100 based on 30 factors and in five categories namely stability (25 per cent), healthcare (20 per cent), culture and environment (25 per cent), education (10 per cent) and infrastructure (20 per cent). Therefore, to attain its position, the Malaysian government has undertaken many initiatives such as Government Transformation Program to create a quality environment for the residents. In Kuala Lumpur, the perception of the residents is the major contributing factor in creating a liveable place and environment because they are the real people who live, work and play in the city itself. So, the city has explored and cultivated this variable to know the factors influencing the urban design quality of the city before implementing any guidelines or regulations regarding the liveability of a city (Shamsuddin & Abu Hassan, 2013:1262).

Directly or numerically assessed, liveability criteria establish an important urban (city /neighbourhood) sustainability tool for decision-making.

8.5 Integrating SNM criteria and redefining factors

The research has identified the potentially most relevant neighbourhood sustainability criteria that can contribute to the development of sustainable urban neighbourhood form measured in terms of criteria ten themes and a vast of relevant factors by applying an appropriate MCA. At this stage the model (SNM) criteria/factors are used to eliminate similar and overlapping by combining and/or modifying them to fit the specifics of the different criterion and situation to be measured. At the end the aim is to weight and score CMLM cases in order to facilitate comparison, ordering and ranking neighbourhoods by their measure of sustainability level. This framework is presented by Table 8.13 below.

Table 8.13: Refined SNM sustainability indicators

Indicator group	Measurement of factor(s)
Spatial and environment	
Locational advantages/opportunities	Average neighbourhood proximity to CBD at various categories: Excellent (≤ 2.5 km); Good (2.501 km-5 km); Moderate (5.001km - 7.5km); Poor (7.501km - 10km); Insignificant (10.001km+)
	Average neighbourhood proximity to work at various categories: Excellent (≤ 2.5 km); Good (2.501 km-5 km); Moderate (5.001km - 7.5km); Poor (7.501km - 10km); Insignificant (10.001km+)
Residential land use	Residential land use (total # of formal houses or brick structures on separate stands)/Business land use (total # of business structures) = % of mix land use per neighbourhood
Urban density: Unequal distribution of urban population in the different neighbourhoods	
Concentration ratio (CR)	The proportion of inequality in the distribution of population in relation to the area = The redistributed % of the cities population to produce an exact correspondence between population size and land area. Normalized neighbourhood concentration ratio = {Excellent (0 – 0.2); Good (0.21 - 4.0); Moderate (0.41-0.6); Poor (0.61 -0.8); Insignificant (0.81 -1.0)}. See Table .7.7 for the calculation of the CR.
Cultural and social capital	
Inclusive planning and implementation	5 year neighbourhood involvement growth rate = $[\text{Total \# of people involved in the neighbourhood regeneration project}_t - \text{Total \# of people involved in the neighbourhood regeneration project}_{(t-5)}] / [\text{Total \# of people involved in the neighbourhood regeneration project}_{(t-5)}] = \%$
	$[\text{Total \# of neighbourhood voting population}] / [\text{Total neighbourhood population}] = \%$ voting population per neighbourhood
	$[\text{Total \# of citizens participating in community life and decision making}] / [\text{Total neighbourhood population}] = \%$ of community involvement
Social capital	$\{\text{Total \# of social (organisations/activities) in neighbourhood}\} / \{\text{Total \# of (organisations/activities) in the city}\} = \%$
Visitors	$\{\text{Total \# of neighbourhood (hotels \& guest) rooms recorded}\} / \{\text{Total \# of the city (hotels \& guest) rooms}\} = \%$
Connectivity and public transport	
Public transport usage	$(\# \text{ public transport usage in residential neighbourhood}) / (\# \text{ of public transport usage in all the residential neighbourhoods}) = \%$
Accessibility	The neighbourhood average access time of public transport in terms of waiting time /The average (for all the neighbourhoods) access time of public transport in terms of waiting time = % of neighbourhood public transport access time per city
	$\{\text{Average daily \# of taxi available seats within 30 minutes or 2 km radius of the neighbourhood}\} / \{\text{Total neighbourhood population}\} = \%$
Affordability and payment	$\{\text{Total \# of households spending} > 10\% \text{ of income on transport fare}\} / \{\text{Total \# of neighbourhood households}\} = \%$ of households spending more than 10% of income on transport fare
Road infrastructure	Road network (%) = $\{\text{Demand in terms of km of road to be tar in the neighbourhood}\} / \{\text{Total neighbourhood road network in km}\}$

	Road maintenance demand (%) = {Neighbourhood road high demand for maintenance in km} / {Total neighbourhood road network in km}
Traffic convenience	(Average neighbourhood travel time per day) / (Average travel time per day in all the residential neighbourhoods) * 100 = %
Economic	
Economic characteristics	% = (The # of people in the neighbourhood whose income is less than \$1.25 a day) / (Neighbourhood population) Measure the neighbourhoods household income by calculating the % of the whole neighbourhood population that can be categories by social housing: No wage income (R0) fully subsidised; Very low income (<R1500) fully subsidised ownership; Low income (R1500 - R3500) Rental and partly subsidised ownership; Middle income (R3500-R7500) Rental; High income (R7500->R8001) No rental and ownership, gap housing
Human capital	{Residential neighbourhood employed #} / {Neighbourhood labour force (i.e. employed + unemployed)} = % (Residential neighbourhood unemployed #) / (Neighbourhood population) = %
Economic vitality and market	{# of the people that own the dwelling in which they live} / {Total neighbourhood population} = %
Smart growth	
Multiple transport options	Total # of neighbourhood transport options / City transport options = %
Range of housing opportunities	Total # of neighbourhood residential dwelling houses options / Total # of city residential dwelling houses options = % of neighbourhood residential dwelling houses options
Sense of place	Total # of people in the neighbourhood that is involved in public participation activities / Total neighbourhood population = % (# of people living in the neighbourhood for more than 10 years) / (Neighbourhood population) = %
Services (i.e. parks/sport fields /education/ scholar transport /housing services)	
Housing services coverage	(Total # of households with piped water connection in the neighbourhood) / (Total # of households in the neighbourhood) = % (Total # of households with electricity connection in the neighbourhood) / (Total # of households in the neighbourhood) = % (Total # of households with access to refuse removal) / (Total # of households in the neighbourhood) = % (Total # of households with flush toilets in neighbourhood) / (Total # of households in the neighbourhood) = % Urban housing = (Current demand for RDP housing in neighbourhood) / (Current demand for RDP housing in the urban area) = %
Accessibility index (See Table 7.8,...7.13. for the calculation of this value)	Evenly distribution of facilities/services. Quality of facilities (Supply) / (Demand)
Food security	
Availability	(Total # of households in the neighbourhood that are involved in food production) / (Total # of households in the neighbourhood) = % (Total # of community functional food production projects in neighbourhood) / (Total # of community functional food production projects in all the residential neighbourhoods) = %
Urban governance	
Human capital	Measure the local municipality human capital by considering: Shortage; Specialise skills; Implementation capacity; Provisioning for all specialised skills and Outsourcing to consultants
Database	Measure local municipality database by considering: Updating consistency; Reliability; Integration between the different spheres of government; GIS data; Completeness in terms of land use data, service data and transport data (See Table 7.14)
Integration between/within the three spheres of government	Measure the integration between/within the three spheres of government in terms of: Linkages between the planning in the three spheres of government and the IDP; Linkages between the programs in the three spheres of government and the IDP; Linkages between the budgets in the three spheres of government and the IDP; Integrated monitoring of expenditure on all three spheres of government; Integrated monitoring on all three spheres of government if programs/projects are finished (on time and within projected budget (See Table 7.14)
Elimination of backlogs	Measure the local municipality backlogs in: Piped water connections; Electricity connections; Refuse removal; Flush toilets; RDP housing (See Table 7.14)
Operational factors	Measure the local municipality operational factors in terms of: Operators adequate training or professional competency; Information systems effectiveness in monitoring operations; Timelines and professional competency; Operations budget to actual financial variance for major budget categories; Level of communication or understanding by decision makers (See Table 7.14)
Maintaining existing infrastructure	(# of days per annum that any residential neighbourhood in the urban area were without water=0) + (# of days per annum that any residential neighbourhood in the urban area were without water=1) + (# of days per annum that any residential neighbourhood in the urban area were without water=2) + (# of days per annum that any residential neighbourhood in the urban area were without water=3) + (# of days per annum that any residential neighbourhood in the area were without water > 3) (See Table 7.14)

Infrastructure programs and projects	Measure the local municipality infrastructure programs and projects by considering: Prioritised projects before budget distribution; Timeously planning and design of new infrastructure; Changes in the urban form (growth and spatial changes); Current & future traffic congestion levels; Areas where there is a need for congestion management (See Table 7.14)
Liveability	
Cost of living	$\frac{\text{Average rent price levels in the residential neighbourhood for a (2 bedroom/3 bedroom/4 bedroom) house}}{\text{Average rent price levels in all the residential neighbourhoods for a (2 bedroom/3 bedroom/4 bedroom) house}} = \%$
Security and safety	$\frac{\text{Total \# of recorded (murders \& housebreakings) in neighbourhood}}{\text{Total \# of (murders \& housebreakings) in all the residential neighbourhoods}} = \%$
Living environment and health care	$\frac{\text{Total \# of medical doctors in 5 km radius from the neighbourhood centre}}{\text{Total population of the neighbourhood}} = \%$ of neighbourhood medical doctors per population
Stability	$\frac{\text{Total capacity of all public health care services in 10 km radius from the neighbourhood centre}}{\text{Total population in the services access distance}} = \%$ $\frac{\text{Crime incidents in the neighbourhood}}{\text{Total population of the neighbourhood}} = \%$

Source: Own construction (2015).

For the purpose of sustainability assessment all the measures are integrated into the framework – each provides its own perspective in assessing sustainability, prioritising and ranking neighbourhoods. This provides a comprehensive process as each criterion has one or more factors that provide specific measurements. The criteria weights and factors weights are allocated as shown in Table 8.14. The weights are computed using Saaty's method in combination with the objectives and goals as contained in South African urban planning and development legislation, policies, strategies and plans objectives that support integrated sustainable urban development (see chapter 4). The MCA procedure is used to establish weight for different policy objectives (refer to section 4.8.2).

Table 8.14: Calculation of the criteria weight and factor weight

Indicator group and factors	Criteria weight	*Factor weight	Normalised factor weight, w _i	Inconsistency index (should be less than 0.1)
Spatial and environment	0.104			0
Locational advantages/opportunities		0.7365	0.076596	
Residential land use		0.2635	0.027404	
Urban density: Unequal distribution of urban population in the different neighbourhoods	0.032			0
Concentration ratio (CR)		1	0.032	
Cultural and social capital	0.107			0.03
Inclusive planning and implementation		0.196	0.020972	
Social capital		0.493	0.052751	
Visitors		0.311	0.033277	
Connectivity and public transport	0.118			
Public transport usage		0.154326755	0.018210557	
Accessibility		0.155186091	0.018311959	

Affordability and payment		0.312961593	0.036929468	
Road infrastructure		0.194177454	0.02291294	
Traffic convenience		0.183348107	0.021635077	
Economic	0.148			0.01
Economic characteristics		0.24	0.03552	
Human capital		0.55	0.0814	
Economic vitality and market		0.21	0.03108	
Smart growth	0.069			0.0103
Multiple transport options		0.55	0.03795	
Range of housing opportunities		0.24	0.01656	
Sense of place		0.21	0.01449	
Services (i.e. parks/sport fields /education/scholar transport/housing services) for residential neighbourhoods	0.1			0
Housing services coverage		0.6	0.06	
Accessibility index (See Table 7.8 for the calculation of this value)		0.4	0.04	
Food security	0.014			0
Availability		1	0.014	
Urban governance	0.19			0
Human capital		0.14	0.03	
Database		0.14	0.03	
Integration between/within the three spheres of government		0.14	0.03	
Elimination of backlogs		0.14	0.03	
Operational factors		0.14	0.03	
Maintaining existing infrastructure		0.14	0.03	
Infrastructure programs and projects		0.14	0.03	
Liveability	0.118			0.056
Cost of living		0.390764137	0.046110168	
Security and safety		0.257683517	0.030406655	
Stability		0.063715176	0.007518391	
Living environment and health care		0.28783717	0.033964786	

Source: Own construction (2015).

Because the MCA method involving weighted summation can reflect the strong and weak points of alternative policy options, Van Herwijnen (2005:3) points out that it could also be used in exploring different aspects of sustainability, since it uses various criteria that measure the performance of criteria in aspects which belong to the economic, social and environmental dimensions. In this light, MCA processes are used to determine the neighbourhood weak and strong sustainability points.

It is worth noting that different factors are neighbourhood-specific [for instance, these factors may vary to meet different neighbourhood requirements/goals/objectives (see Annexure B for alternative measures)]. Therefore, the factor weight values given here is only an indication – not

set in stone. The weights are determined based on the available qualitative data information and using the processes aforementioned. A closer look at the Saaty method (eigenvector method) – it is pointed out to be a crucial theoretical method or framework for determining weights (Terano, 1992:415). The method utilises a technique called pair-wise comparison (Kangas & Pukkala in Helles *et al.*, 2013:101). Through pair-wise comparisons of criteria, a matrix of numbers is formed – each number in the matrix mapping of the judgement in a pair-wise comparison to a scale of importance (Juang & Lee, 1992:415). In this context, this enforces a constraint of consistency and facilitates comparison, ordering and ranking neighbourhoods by their criteria. The weights are tested for consistency by calculating the eigenvalues of the matrix – a consistency ratio greater than 0.10 imply re-evaluation of the comparison matrix.

8.5.1 SNM comparative assessment framework

Having developed SNM, refined the factors and criteria weights assigned the comparison matrix is incorporated into this neighbourhood sustainability evaluation criteria and/or decision-making model. In this case using the SNM criteria five neighbourhoods are compared to determine the relative importance of each criterion and then between the categories/groups (neighbourhoods). Based on the research data and other relevant sources of quantitative data as determined by the criteria each neighbourhood's weights are calculated. This is done by calculating the weights for each criterion separately and adding them together for each of the five neighbourhoods as demonstrated in Table 8.15 below.

This framework provides the main approach to evaluate the level of neighbourhoods' sustainability performance – namely a direct comparison of neighbourhoods (Alabama, Jouberton, Kanana, Khuma and Tigane).

Table 8.15: SNM comparative analysis between case studies

Factor #	Criteria and factors	Normalised factor weight, w_i	Determine the factor value, f_{ij} for each neighbourhood. Here i =factor and j =neighbourhood				Normalised factor value of the different neighbourhoods, $Norm(f_{ij})$. Here i =factor and j =neighbourhood				For each neighbourhood determine the factor score = $Norm(f_{ij}) * w_i$ (For the weighted sums method)			
			Neighbourhood				Neighbourhood				Neighbourhood			
			1	2	3	4	1	2	3	4	1	2	3	4
							$Norm(f_{i1}) = [f_{i1} - \min\{f_1\}] / [\max\{f_{i1}\} - \min\{f_{i1}\}]$	$Norm(f_{i2}) = [f_{i2} - \min\{f_2\}] / [\max\{f_{i2}\} - \min\{f_{i2}\}]$	$Norm(f_{i3}) = [f_{i3} - \min\{f_3\}] / [\max\{f_{i3}\} - \min\{f_{i3}\}]$	$Norm(f_{i4}) = [f_{i4} - \min\{f_4\}] / [\max\{f_{i4}\} - \min\{f_{i4}\}]$	$S_{i1} = Norm(f_{i1}) * w_i$	$S_{i2} = Norm(f_{i2}) * w_i$	$S_{i3} = Norm(f_{i3}) * w_i$	$S_{i4} = Norm(f_{i4}) * w_i$
													Indicator score for each neighbourhood	
	Spatial and environment										$s_{i1} + s_{i2}$	$s_{i2} + s_{i3}$	$s_{i3} + s_{i4}$	$s_{i4} + s_{i1}$
1	Locational advantages/opportunities	w_1	f_{11}	f_{12}	f_{13}	f_{14}	$Norm(f_{11})$	$Norm(f_{12})$	$Norm(f_{13})$	$Norm(f_{14})$	s_{11}	s_{12}	s_{13}	s_{14}
2	Residential land use	w_2	f_{21}	f_{22}	f_{23}	f_{24}	$Norm(f_{21})$	$Norm(f_{22})$	$Norm(f_{23})$	$Norm(f_{24})$	s_{21}	s_{22}	s_{23}	s_{24}
													Indicator score for each neighbourhood	
	Urban density										s_{33}	s_{32}	s_{33}	s_{34}
3	Concentration index (CI)= Deviation of the Lorenz curve from the line of equal distribution	w_3	f_{31}	f_{32}	f_{33}	f_{34}	$Norm(f_{31})$	$Norm(f_{32})$	$Norm(f_{33})$	$Norm(f_{34})$	s_{31}	s_{32}	s_{33}	s_{34}
													Indicator score for each neighbourhood	
	Cultural and social capital										$s_{41} + s_{42} + s_{43} + s_{44}$	$s_{42} + s_{43} + s_{44} + s_{41}$	$s_{43} + s_{44} + s_{41} + s_{42}$	$s_{44} + s_{41} + s_{42} + s_{43}$
4	Inclusive planning and implementation	w_4	f_{41}	f_{42}	f_{43}	f_{44}	$Norm(f_{41})$	$Norm(f_{42})$	$Norm(f_{43})$	$Norm(f_{44})$	s_{41}	s_{42}	s_{43}	s_{44}
5	Social capital	w_5	f_{51}	f_{52}	f_{53}	f_{54}	$Norm(f_{51})$	$Norm(f_{52})$	$Norm(f_{53})$	$Norm(f_{54})$	s_{51}	s_{52}	s_{53}	s_{54}
6	Visitors	w_6	f_{61}	f_{62}	f_{63}	f_{64}	$Norm(f_{61})$	$Norm(f_{62})$	$Norm(f_{63})$	$Norm(f_{64})$	s_{61}	s_{62}	s_{63}	s_{64}

											Criteria score for each neighbourhood			
	Connectivity and public										$s_{\{71\}}+...+s_{\{111\}}$	$s_{\{72\}}+...+s_{\{112\}}$	$s_{\{73\}}+...+s_{\{113\}}$	$s_{\{74\}}+...+s_{\{114\}}$
7	Public transport usage	w_7	f_{71}	f_{72}	f_{73}	f_{74}	Norm(f_{71})	Norm(f_{72})	Norm(f_{73})	Norm(f_{74})	s_{71}	s_{72}	s_{73}	s_{74}
8	Accessibility	w_8	f_{81}	f_{82}	f_{83}	f_{84}	Norm(f_{81})	Norm(f_{82})	Norm(f_{83})	Norm(f_{84})	s_{81}	s_{82}	s_{83}	s_{84}
9	Affordability and	w_9	f_{91}	f_{92}	f_{93}	f_{94}	Norm(f_{91})	Norm(f_{92})	Norm(f_{93})	Norm(f_{94})	s_{91}	s_{92}	s_{93}	s_{94}
10	Road infrastructure	w_10	f_{101}	f_{102}	f_{103}	f_{104}	Norm(f_{101})	Norm(f_{102})	Norm(f_{103})	Norm(f_{104})	s_{101}	s_{102}	s_{103}	s_{104}
11	Traffic convenience	w_11	f_{111}	f_{112}	f_{113}	f_{114}	Norm(f_{111})	Norm(f_{112})	Norm(f_{113})	Norm(f_{114})	s_{111}	s_{112}	s_{113}	s_{114}
											Criteria score for each neighbourhood			
	Economic										$s_{\{121\}}+...+s_{\{141\}}$	$s_{\{122\}}+...+s_{\{142\}}$	$s_{\{123\}}+...+s_{\{143\}}$	$s_{\{124\}}+...+s_{\{144\}}$
12	Economic characteristics	w_12	f_{121}	f_{122}	f_{123}	f_{124}	Norm(f_{121})	Norm(f_{122})	Norm(f_{123})	Norm(f_{124})	s_{121}	s_{122}	s_{123}	s_{124}
13	Human capital	w_13	f_{131}	f_{132}	f_{133}	f_{134}	Norm(f_{131})	Norm(f_{132})	Norm(f_{133})	Norm(f_{134})	s_{131}	s_{132}	s_{133}	s_{134}
14	Economic vitality and market	w_14	f_{141}	f_{142}	f_{143}	f_{144}	Norm(f_{141})	Norm(f_{142})	Norm(f_{143})	Norm(f_{144})	s_{141}	s_{142}	s_{143}	s_{144}
											Criteria score for each neighbourhood			
	Smart growth										$s_{\{151\}}+...+s_{\{171\}}$	$s_{\{152\}}+...+s_{\{172\}}$	$s_{\{153\}}+...+s_{\{173\}}$	$s_{\{154\}}+...+s_{\{174\}}$
15	Multiple transport options	w_15	f_{151}	f_{152}	f_{153}	f_{154}	Norm(f_{151})	Norm(f_{152})	Norm(f_{153})	Norm(f_{154})	s_{151}	s_{152}	s_{153}	s_{154}
16	Range of housing opportunities	w_16	f_{161}	f_{162}	f_{163}	f_{164}	Norm(f_{161})	Norm(f_{162})	Norm(f_{163})	Norm(f_{164})	s_{161}	s_{162}	s_{163}	s_{164}
17	Sense of place	w_17	f_{171}	f_{172}	f_{173}	f_{174}	Norm(f_{171})	Norm(f_{172})	Norm(f_{173})	Norm(f_{174})	s_{171}	s_{172}	s_{173}	s_{174}
											Criteria score for each neighbourhood			
	Services (i.e. parks/sport fields/ education/ scholar transport/housing services) for residential neighbourhoods										$s_{\{181\}}+s_{\{191\}}$	$s_{\{182\}}+s_{\{192\}}$	$s_{\{183\}}+s_{\{193\}}$	$s_{\{184\}}+s_{\{194\}}$
18	Housing services coverage	w_18	f_{181}	f_{182}	f_{183}	f_{184}	Norm(f_{181})	Norm(f_{182})	Norm(f_{183})	Norm(f_{184})	s_{181}	s_{182}	s_{183}	s_{184}
19	Accessibility index	w_19	f_{191}	f_{192}	f_{193}	f_{194}	Norm(f_{191})	Norm(f_{192})	Norm(f_{193})	Norm(f_{194})	s_{191}	s_{192}	s_{193}	s_{194}

											Criteria score for each neighbourhood			
	Food security										s_{201}	s_{202}	s_{203}	s_{204}
20	Availability	w_20	f_{201}	f_{202}	f_{203}	f_{204}	Norm(f_{201})	Norm(f_{202})	Norm(f_{203})	Norm(f_{204})	s_{201}	s_{202}	s_{203}	s_{204}
											Criteria score for each neighbourhood			
	Urban governance										s_{211}+...+s_{271}	s_{212}+...+s_{272}	s_{213}+...+s_{273}	s_{214}+...+s_{274}
21	Human capital	w_21	f_{211}	f_{212}	f_{213}	f_{214}	Norm(f_{211})	Norm(f_{212})	Norm(f_{213})	Norm(f_{214})	s_{211}	s_{212}	s_{213}	s_{214}
22	Database	w_22	f_{221}	f_{222}	f_{223}	f_{224}	Norm(f_{221})	Norm(f_{222})	Norm(f_{223})	Norm(f_{224})	s_{221}	s_{222}	s_{223}	s_{224}
23	Integration between/within the three spheres of government	w_23	f_{231}	f_{232}	f_{233}	f_{234}	Norm(f_{231})	Norm(f_{232})	Norm(f_{233})	Norm(f_{234})	s_{231}	s_{232}	s_{233}	s_{234}
24	Elimination of backlogs	w_24	f_{241}	f_{242}	f_{243}	f_{244}	Norm(f_{241})	Norm(f_{242})	Norm(f_{243})	Norm(f_{244})	s_{241}	s_{242}	s_{243}	s_{244}
25	Operational factors	w_25	f_{251}	f_{252}	f_{253}	f_{254}	Norm(f_{251})	Norm(f_{252})	Norm(f_{253})	Norm(f_{254})	s_{251}	s_{252}	s_{253}	s_{254}
26	Maintaining existing infrastructure	w_26	f_{261}	f_{262}	f_{263}	f_{264}	Norm(f_{261})	Norm(f_{262})	Norm(f_{263})	Norm(f_{264})	s_{261}	s_{262}	s_{263}	s_{264}
27	Infrastructure programs and projects	w_27	f_{271}	f_{272}	f_{273}	f_{274}	Norm(f_{271})	Norm(f_{272})	Norm(f_{273})	Norm(f_{274})	s_{271}	f_{272}	s_{273}	s_{274}
											Criteria score for each neighbourhood			
	Live ability										s_{281}+...+s_{311}	s_{282}+...+s_{312}	s_{283}+...+s_{313}	s_{284}+...+s_{314}
28	Cost of living	w_28	f_{281}	f_{282}	f_{283}	f_{284}	Norm(f_{281})	Norm(f_{282})	Norm(f_{283})	Norm(f_{284})	s_{281}	s_{282}	s_{283}	s_{284}
29	Security and safety	w_29	f_{291}	f_{292}	f_{293}	f_{294}	Norm(f_{291})	Norm(f_{292})	Norm(f_{293})	Norm(f_{294})	s_{291}	s_{292}	s_{293}	s_{294}
30	Living environment and health care	w_30	f_{301}	f_{302}	f_{303}	f_{304}	Norm(f_{301})	Norm(f_{302})	Norm(f_{303})	Norm(f_{304})	s_{301}	s_{302}	s_{303}	s_{304}
31	Stability	w_31	f_{311}	f_{312}	f_{313}	f_{314}	Norm(f_{311})	Norm(f_{312})	Norm(f_{313})	Norm(f_{314})	s_{311}	s_{312}	s_{313}	s_{314}
											Total criteria scores for the different neighbourhood			
											Rank the different neighbourhoods			
											*The lower the ranking the better the sustainability level			

Source: Own construction (2015).

8.5.2 Application of SNM – comparative review and ranking of neighbourhood sustainability

The criteria/factors identified from survey results (see chapter 7 – sections 7.3 and 7.4) are used as the main input for the SNM criteria of sustainability measurement framework though to some extent limited. They are limited by the virtue of survey questionnaire scope – measures that would be appropriate and relevant to measure perception at the neighbourhood level and subjective criteria/factors that would relate the most to sustainability measurement framework. The subjective results from the survey give the view of people living in the neighbourhood on successful neighbourhood. Therefore, to increase the objective of empirical scientific analysis – the SNM criteria and factors are used in order to include neighbourhoods' relevant indicators in pursuit of sustainability practices and within the framework would allow measuring the level of neighbourhood sustainability performance (see Annexure C for the factor values).

Table 8.16 presents results based on the available data sources and the quantitative nature of the data suitable for measurement of neighbourhood sustainability in South Africa.

Table 8.16: SNM assessment process

Criteria & factor(s)	Normalised factor weight =w _i	Normalised factor value for each neighbourhood=norm (f _{ij}). Here i=factor and j=neighbourhood.					Weighted sum method					Exponential weighted method Highest = Best Lowest = Worst					Source of scores (See Annexure C)
		Ala	Jou	Kan	Khu	Tig	Ala	Jou	Kan	Khu	Tig	Ala	Jou	Kan	Khu	Tig	
C1-Spatial and environment							0.0412	0.0670	0.0403	0.1040	0.0031	0.164	0.207	0.164	0.292	0.111	CoM-TRS (2012)
												3	2	4	1	5	
Locational advantages/ opportunities	0.076596	0.54	0.54	0.23	1.00	0.00	0.0412	0.0412	0.0177	0.0766	0.0000	0.136	0.136	0.100	0.216	0.080	
Residential land use	0.027404	0.00	0.94	0.83	1.00	0.11	0.0000	0.0257	0.0226	0.0274	0.0031	0.028	0.071	0.063	0.076	0.031	Stats SA (2011)
C2-Urban density: Unequal distribution of urban population in the different neighborhoods (See Table 7.6 & 7.7)							0.0320	0.0000	0.0134	0.0221	0.0310	0.088	0.033	0.049	0.065	0.086	
												1	5	4	3	2	
Concentration ratio (CR) (See Table 7.7)	0.032	1	0	0.4	0.7	0.97	0.0320	0.0000	0.0134	0.0221	0.0310	0.088	0.033	0.049	0.065	0.086	
C3-Cultural and social capital							0.0333	0.0991	0.0433	0.0457	0.0737	0.167	0.279	0.171	0.174	0.239	
												5	1	4	3	2	
Inclusive planning and implementation	0.020972	0.00	0.62	0.39	0.50	1.00	0.0000	0.0130	0.0081	0.0105	0.0210	0.021	0.039	0.031	0.035	0.058	Research survey (2013)
Social capital	0.052751	0.00	1.00	0.67	0.67	1.00	0.0000	0.0528	0.0352	0.0352	0.0528	0.054	0.147	0.106	0.106	0.147	CoM Department of Social Development (2011)
Visitors	0.033277	1.00	1.00	0.00	0.00	0.00	0.0333	0.0333	0.0000	0.0000	0.0000	0.092	0.092	0.034	0.034	0.034	CoM-TRS (2012)
C4-Connectivity and public transport							0.0794	0.0798	0.0845	0.0753	0.0395	0.252	0.249	0.257	0.228	0.184	Research Survey (2013)
												2	3	1	4	5	
Public transport usage	0.0182106	0.33	0.76	0.00	0.55	1.00	0.0061	0.0139	0.0000	0.0100	0.0182	0.026	0.039	0.018	0.032	0.050	
Accessibility	0.018312	0.81	0.51	1.00	0.77	0.00	0.0148	0.0094	0.0183	0.0141	0.0000	0.041	0.031	0.050	0.040	0.018	CoM IDP (2013)
Affordability and payment	0.0369295	1.00	0.91	0.94	0.58	0.00	0.0369	0.0336	0.0348	0.0214	0.0000	0.102	0.093	0.096	0.067	0.038	
Road infrastructure	0.0229129	0.00	1.00	0.83	0.83	0.83	0.0000	0.0229	0.0191	0.0191	0.0191	0.023	0.063	0.053	0.053	0.053	
Traffic convenience	0.0216351	1.00	0.00	0.57	0.50	0.10	0.0216	0.0000	0.0124	0.0108	0.0022	0.059	0.022	0.039	0.036	0.024	Research Survey (2013)
C5-Economic							0.0355	0.0988	0.0843	0.1046	0.1004	0.215	0.308	0.280	0.333	0.316	CoM-TRS (2012)
												5	3	4	1	2	
Economic characteristics	0.03552	1.00	0.18	0.09	0.00	0.10	0.0355	0.0065	0.0030	0.0000	0.0034	0.098	0.043	0.039	0.036	0.040	
Human capital	0.0814	0.00	0.78	0.66	1.00	0.81	0.0000	0.0631	0.0540	0.0814	0.0659	0.085	0.184	0.165	0.231	0.191	
Economic vitality and market	0.03108	0.00	0.94	0.88	0.75	1.00	0.0000	0.0292	0.0273	0.0232	0.0311	0.032	0.081	0.076	0.067	0.086	

C6-Smart growth							0.0285	0.0232	0.0326	0.0263	0.0607	0.113	0.105	0.118	0.105	0.172	
												3	5	2	4	1	
Multiple transport options	0.03795	0.75	0.00	0.25	0.25	1.00	0.0285	0.0000	0.0096	0.0096	0.0380	0.082	0.039	0.050	0.050	0.105	Research Survey (2013)
Range of housing opportunities	0.01656	0.00	0.75	1.00	0.75	0.50	0.0000	0.0124	0.0166	0.0124	0.0083	0.017	0.035	0.045	0.035	0.028	CoM IDP (2013)
Sense of place	0.01449	0.00	0.75	0.44	0.30	1.00	0.0000	0.0108	0.0064	0.0043	0.0145	0.015	0.031	0.023	0.020	0.040	Research Survey (2013)
C7-Services (i.e. parks/ sport fields/education /scholar transport/ housing services) for residential neighbourhoods							0.0246	0.0740	0.0552	0.0591	0.0723	0.151	0.247	0.200	0.200	0.233	CoM IDP (2013)
												5	1	3	4	2	
Housing services coverage	0.06	0.00	1.00	0.65	0.48	0.30	0.0000	0.0600	0.0391	0.0287	0.0183	0.062	0.168	0.119	0.100	0.084	
Accessibility index (See Table 7.8...7.13)	0.04	0.62	0.00	0.05	0.41	1.00	0.0246	0.0000	0.0021	0.0164	0.0400	0.076	0.041	0.043	0.062	0.111	CSIR 2012, Department of Basic Education (2015)
C8-Food security							0.0000	0.0140	0.0140	0.0140	0.0140	0.014	0.038	0.038	0.038	0.038	CoM IDP (2013)
												5	1	1	1	1	
Availability (% of community crop production projects)	0.014	0.00	1.00	1.00	1.00	1.00	0.0000	0.0140	0.0140	0.0140	0.0140	0.014	0.038	0.038	0.038	0.038	
C9-Urban governance (See Table 7.14)	0.19	1	0.10	0.00	0.42	0.55	0.1900	0.0181	0.0000	0.0795	0.1044	0.569	0.230	0.209	0.318	0.362	Interview CoM officers (2015)
												1	4	5	3	2	
C10-Liveability							0.0664	0.0973	0.0424	0.0287	0.0082	0.230	0.279	0.174	0.156	0.130	
												2	1	3	4	5	
Cost of living	0.0461102	1.00	0.62	0.46	0.23	0.00	0.0461	0.0284	0.0213	0.0107	0.0000	0.128	0.087	0.075	0.059	0.047	Derived from Property 24 (2015)
Security and safety	0.0304067	0.42	1.00	0.11	0.05	0.00	0.0128	0.0304	0.0032	0.0016	0.0000	0.047	0.084	0.034	0.033	0.031	SAPS – CoM (2012)
Stability	0.0075184	1.00	0.60	0.20	0.00	0.00	0.0075	0.0045	0.0015	0.0000	0.0000	0.021	0.014	0.009	0.008	0.008	
Living environment and health care	0.0339648	0.00	1.00	0.48	0.48	0.24	0.0000	0.0340	0.0164	0.0164	0.0082	0.035	0.094	0.056	0.056	0.044	CoM-TRS (2012)
							0.53	0.57	0.41	0.56	0.51	1.965	1.975	1.661	1.909	1.871	
							3	1	5	2	4	2	1	5	3	4	
*Note: In the ranking all the decimal values were used not only the first three																	
Source: Own construction (2015).																	

It is important to mention that each normalised factor value is briefly introduced here – corresponding references for urban density, services accessibility and urban governance are provided in the Tables to follow.

The spatial and urban density criteria are measured by objective measures – locational proximity being absolute distance and urban density calculated from the population size and land area. The concentration ratio (CR) was calculated using the population and area proportion of each neighbourhood in Table 8.17 and 8.18 below. Note that CR of 0 implies complete equality in terms of neighbourhood residential density (i.e. equality between the different neighbourhoods' proportions of population/land area). Also, CR of 100 implies maximal inequality in terms of neighbourhood residential densities.

Table 8.17: Urban density

Residential neighbourhoods Concentration Ratio (CR)											
Total # of neighbourhoods in city=n		Population of each neighbourhood	Area (km ²) of each neighbourhood	Density	Proportion of each neighbourhood		CR of the different neighbourhoods (CR _i) =0.5 X _i -Y _i		Cumulative proportion of each		X _i -Y _i
					% of population = Q _i	% of area = Z _i			X _i	Y _i	
	n=36							Q _i -Z _i			
1	Nooitgedacht	436	22.01	20	0.11	7.40	3.64	7.28	100.00	100.00	0.00
2	Klerksdorp Industrial	86	1.1	78	0.02	0.37	0.17	0.35	99.89	92.60	7.28
3	Stilfontein	17141	138.82	123	4.50	46.65	21.07	42.14	99.86	92.23	7.63
4	Harbeesfontein	1467	6.37	230	0.39	2.14	0.88	1.75	95.36	45.59	49.77
5	Oudorp	1057	3.02	350	0.28	1.01	0.37	0.74	94.97	43.45	51.53
6	Dominionville	676	1.7	398	0.18	0.57	0.20	0.39	94.70	42.43	52.26
7	Elandsheuwel	1570	2.38	660	0.41	0.80	0.19	0.39	94.52	41.86	52.66
8	Wilkopies	5943	8.64	688	1.56	2.90	0.67	1.34	94.10	41.06	53.04
9	Pienaarsdorp	1184	1.59	745	0.31	0.53	0.11	0.22	92.54	38.16	54.38
10	Freemanville	2329	3.09	754	0.61	1.04	0.21	0.43	92.23	37.62	54.61
11	Ellaton	3940	5.15	765	1.04	1.73	0.35	0.70	91.62	36.59	55.03
12	Collerville	279	0.35	797	0.07	0.12	0.02	0.04	90.58	34.86	55.73
13	Orkney	13435	16.43	818	3.53	5.52	1.00	1.99	90.51	34.74	55.77
14	Neserhof	3032	3.2	948	0.80	1.08	0.14	0.28	86.98	29.22	57.76
15	Klerksdorp Central	2939	2.98	986	0.77	1.00	0.11	0.23	86.18	28.14	58.04
16	Flamwood	6339	5.99	1058	1.67	2.01	0.17	0.35	85.41	27.14	58.27

17	Manzil Park	1762	1.62	1088	0.46	0.54	0.04	0.08	83.75	25.13	58.62
18	Elandia	451	0.34	1326	0.12	0.11	0.00	0.00	83.28	24.58	58.70
19	Declercqville	1917	1.35	1420	0.50	0.45	0.03	0.05	83.16	24.47	58.69
20	Doringkruin	3417	2.2	1553	0.90	0.74	0.08	0.16	82.66	24.02	58.64
21	Davanna	841	0.53	1587	0.22	0.18	0.02	0.04	81.76	23.28	58.49
22	Irene Park	1571	0.96	1636	0.41	0.32	0.05	0.09	81.54	23.10	58.44
23	Meiringspark	3443	1.98	1739	0.90	0.67	0.12	0.24	81.13	22.78	58.35
24	Umzimhle	6137	3.4	1805	1.61	1.14	0.24	0.47	80.22	22.11	58.11
25	Adamayview	1746	0.92	1898	0.46	0.31	0.07	0.15	78.61	20.97	57.64
26	Wilkeville	943	0.49	1924	0.25	0.16	0.04	0.08	78.15	20.66	57.49
27	Boetrand	2976	1.53	1945	0.78	0.51	0.13	0.27	77.90	20.49	57.41
28	La Hoff	4667	2.39	1953	1.23	0.80	0.21	0.42	77.12	19.98	57.14
29	Roosheuvel	1977	0.99	1997	0.52	0.33	0.09	0.19	75.90	19.18	56.72
30	Flimieda	3242	1.62	2001	0.85	0.54	0.15	0.31	75.38	18.84	56.53
31	Dawkinsville	818	0.24	3408	0.21	0.08	0.07	0.13	74.52	18.30	56.22
32	Alabama	17551	4.28	4101	4.61	1.44	1.59	3.17	74.31	18.22	56.09
33	Khuma	49033	9.45	5189	12.89	3.18	4.86	9.71	69.70	16.78	52.92
34	Jouberton	121527	23.31	5214	31.94	7.83	12.05	24.10	56.81	13.61	43.21
35	Kanana	76396	14.25	5361	20.08	4.79	7.64	15.29	24.88	5.77	19.10
36	Tigane	18263	2.93	6233	4.80	0.98	1.91	3.81	4.80	0.98	3.81
	City of Matlosana	380531	297.6	1279	CR(City of Matlosana = $\max \{0 \leq l \leq n\} X_i - Y_i = 0.5 \sum_{i=1}^n Q_i - Z_i = 58.7$						

Source: Own construction (2015).

The use of this residential neighbourhood CR is ordering the neighbourhoods by comparing the value of each neighbourhood population and area proportion against each other to determine unequal distribution of urban population in the different neighbourhoods. It follows from Table 8.18 that CR of the City of Matlosana is 58.7, this means that 58.7% of the residential neighbourhood population must relocate in order to achieve equal distribution between the population and area of land within the City of Matlosana. Based on these results Alabama has the highest performance level while Jouberton has the lowest performance level according the CR method applied here.

Table 8.18: Concentration ratio and the normalised concentration ratio

Concentration Ratio (CR)		0 ≤ Transformed value ≤ 1	Norm (CR) value
City of Motlosana	58.70		
Alabama	1.59	0	1
Khuma	4.89	0.31	0.69
Jouberton	12.05	1.00	0
Kanana	7.64	0.58	0.42
Tigane	1.91	0.03	0.97

Source: Own construction (2015).

Likewise, calculation of services accessibility that provides a framework to rank various neighbourhoods types by access standards is illustrated in Table 8.19 below.

Table 8.19: Calculation of services accessibility percentage

Accessibility statistics for neighbourhood facilities/services					
Neighbourhood	Social services/facilities		Education		
	Sports fields	Parks	Secondary schools	Primary schools	
Access distance	3 km - 10 km	0.5 km - 0.75km	5 km	5km	
Demand (#)	0.21 ha/1000 people = ...ha	1 park(1.5ha) for every 5000 people =...ha & # parks	8% of neighbourhood population=# learners	13.7% of neighbourhood population=# learners	
Supply (#) within the respective access distance of facilities.	ha	(.....ha) & (# of parks)	Secondary school(s) learner accommodation capacity = # learners	Primary school(s) learner accommodation capacity = # learners	Assume mutually exclusive intersection between different neighbourhoods' access distances.
Supply/ Demand= ratio. Note: (Supply > Demand => Surplus) or (Supply = Demand => Equilibrium)	$X_1 = \text{Supply/Demand} \Rightarrow \text{Value}(X_1) = \begin{cases} 0 & \text{if } (X_1 < 0.8); \\ 2 & \text{if } (0.8 \leq X_1 < 1); \\ 4 & \text{if } (1 \leq X_1 < 1.5); \\ 6 & \text{if } (1.5 \leq X_1 < 2); \\ 8 & \text{if } (2 \leq X_1 < 3); \\ 10 & \text{if } (3 \leq X_1 < 4); \\ 12 & \text{if } (X_1 \geq 4) \end{cases}$	$X_2 = \text{Supply/Demand} \Rightarrow \text{Value}(X_2) = \begin{cases} 0 & \text{if } (X_2 < 0.1); \\ 2 & \text{if } (0.1 \leq X_2 < 0.2); \\ 4 & \text{if } (0.20 \leq X_2 < 0.3); \\ 6 & \text{if } (0.3 \leq X_2 < 0.40); \\ 8 & \text{if } (0.40 \leq X_2 < 0.60); \\ 10 & \text{if } (0.60 \leq X_2 < 0.80); \\ 12 & \text{if } (X_2 \geq 0.80) \end{cases}$	$X_3 = \text{Supply/Demand} \Rightarrow \text{Value}(X_3) = \begin{cases} 0 & \text{if } (X_3 < 0.8); \\ 2 & \text{if } (0.8 \leq X_3 < 1); \\ 4 & \text{if } (1 \leq X_3 < 1.2); \\ 6 & \text{if } (1.2 \leq X_3 < 1.4); \\ 8 & \text{if } (1.4 \leq X_3 < 1.60); \\ 10 & \text{if } (1.6 \leq X_3 < 2); \\ 12 & \text{if } (X_3 \geq 2.00) \end{cases}$	$X_4 = \text{Supply/Demand} \Rightarrow \text{Value}(X_4) = \begin{cases} 0 & \text{if } (X_4 < 1); \\ 2 & \text{if } (1 \leq X_4 < 1.10); \\ 4 & \text{if } (1.10 \leq X_4 < 1.2); \\ 6 & \text{if } (1.2 \leq X_4 < 1.30); \\ 8 & \text{if } (1.30 \leq X_4 < 1.40); \\ 10 & \text{if } (1.40 \leq X_4 < 1.50); \\ 12 & \text{if } (X_4 \geq 1.50) \end{cases}$	Total out of 48: Supply & Demand
Evenly distribution of facilities or services	$T1 \leq 10 \text{ km} \Rightarrow \begin{cases} \text{Value}(T1) = 1 \\ \text{otherwise} \\ \text{Value}(T1) = 0 \end{cases}$	$T2 \leq 0.75 \text{ km} \Rightarrow \begin{cases} \text{Value}(T2) = 1 \\ \text{otherwise} \\ \text{Value}(T2) = 0 \end{cases}$	$T3 \leq 5 \text{ km} \Rightarrow \begin{cases} \text{Value}(T3) = 1 \\ \text{otherwise} \\ \text{Value}(T3) = 0 \end{cases}$	$T4 \leq 5 \text{ km} \Rightarrow \begin{cases} \text{Value}(T4) = 1 \\ \text{otherwise} \\ \text{Value}(T4) = 0 \end{cases}$	Worst case travel distance (km) for (facility/service)
	$T5 \leq 10 \text{ km} \Rightarrow \begin{cases} \text{Value}(T5) = 1 \\ \text{otherwise} \\ \text{Value}(T5) = 0 \end{cases}$	$T6 \leq 0.75 \text{ km} \Rightarrow \begin{cases} \text{Value}(T6) = 1 \\ \text{otherwise} \\ \text{Value}(T6) = 0 \end{cases}$	$T7 \leq 5 \text{ km} \Rightarrow \begin{cases} \text{Value}(T7) = 1 \\ \text{otherwise} \\ \text{Value}(T7) = 0 \end{cases}$	$T8 \leq 5 \text{ km} \Rightarrow \begin{cases} \text{Value}(T8) = 1 \\ \text{otherwise} \\ \text{Value}(T8) = 0 \end{cases}$	Average travel distance (km) for (facility/service)
	$P1 \geq 35\% \Rightarrow \begin{cases} \text{Value}(P1) = 2 \\ \text{otherwise} \\ \text{Value}(P1) = 0 \end{cases}$	$P2 \geq 97\% \Rightarrow \begin{cases} \text{Value}(P2) = 2 \\ \text{otherwise} \\ \text{Value}(P2) = 0 \end{cases}$	$P3 \geq 60\% \Rightarrow \begin{cases} \text{Value}(P3) = 2 \\ \text{otherwise} \\ \text{Value}(P3) = 0 \end{cases}$	$P4 \geq 60\% \Rightarrow \begin{cases} \text{Value}(P4) = 1 \\ \text{otherwise} \\ \text{Value}(P4) = 0 \end{cases}$	% of neighbourhood beneficiaries (target population) within 3km of facilities

	P5 ≥ 50% => { Value(P5) = 2 otherwise Value(P5) = 0 }	P6 = 100% => { Value(P6) = 2 otherwise Value(P6) = 0 }	P7 ≥ 95% => { Value(P7) = 2 otherwise Value(P7) = 0 }	P8 ≥ 95% => { Value(P8) = 1 otherwise Value(P8) = 0 }	% of neighbourhood beneficiaries (target population) within 5km of facilities
					Total out of 32: Evenly distribution of facilities or services
Quality of facilities	Q_1= # of different sports facility types		Q_4= The % of independent schools		Value(Q_4) =0 if (Q_4 < SA_{mean value}); 3 if (Q_4 = SA_{mean value}); 5 if (Q_4 > SA_{mean value}) }
	Q_2(Clean)={Yes of No}	Q_3(Clean)={Yes of No}	Q_5=The % no schooling aged 20+		Value(Q_5) =0 if (Q_5 > SA_{mean value}); 3 if (Q_5 = SA_{mean value}); 5 if (Q_5 < SA_{mean value}) }
			Q_6=The % of matrics aged 20+		Value(Q_6) =0 if (Q_6 > SA_{mean value}); 3 if (Q_6 = SA_{mean value}); 5 if (Q_6 < SA_{mean value}) }
			Q_7=The % with higher education aged 20+		
	Value(Q_1) =1 if (Q_1 = 1); 2 if (Q_1 = 2); 3 if (Q_1 = 3); 4 if (Q_1 = 4); 5 if (Q_1 ≥ 5); }	Value(Q_2;Q_3) =0 if (Q_2 & Q_3) = No; 3 if (Q_2 or Q_3) =No; 5 if (Q_2 & Q_3) = Yes}	Value(Q_7) =0 if (Q_7 < SA_{mean value}); 3 if (Q_7 = SA_{mean value}); 5 if (Q_7 > SA_{mean value}) }		Total out of 30: Quality of facilities
Accessibility %					TOTAL

Source: Own construction from CSIR (2012:11-22).

Table 8.20; 8.21; 8.22 and 8.23 below show the calculation of accessibility statistics in detail.

Table 8.20: Accessibility demand

Neighbourhood	Demand of sport fields	Demand of parks		Education demand	
	Demand of sport field ha.	Demand in terms of ha.	Minimum # of parks (size 1.5 ha)	Demand in terms of secondary school learners	Demand in terms of primary school learners
Alabama	3.69	5.27	3	1404	2404
Tigane	3.84	5.48	3	1461	2502
Khuma	10.30	14.71	9	3923	6718
Kanana	16.04	22.92	15	6112	10466
Jouberton	25.52	36.46	24	9722	16649

Source: Own construction (2015) from CSIR (2012:17-19) data from DBE (2015:12) and CoM-TRS (2012:22).

Table 8.21: Accessibility supply

Neighbourhood	Supply of sport fields	Supply of parks		Education demand	
	Supply of sport field ha.	Supply in terms of ha.	Minimum # of parks (size 1.5 ha)	Supply in terms of secondary school learners	Supply in terms of primary school learners
Alabama	12.82	1.13	1	3757	2562
Tigane	18.72	3.98	1	1879	3843
Khuma	19.84	4.50	1	6321	9425
Kanana	23.56	0.00	0	9393	11529
Jouberton	38.16	6.20	1	7514	20498

Source: Own construction (2015) from CoM-TRS (2012) GIS data and schools data.

Table 8.22: Accessibility supply/demand

Neighbourhood	Supply/Demand of sport fields	Supply/Demand of parks		Education Supply/Demand	
	Supply/Demand of sport field ha.	Supply/ Demand in terms of ha.	Minimum # of parks (size 1.5 ha)	Supply/Demand in terms of secondary school learners	Supply/ Demand in terms of primary school learners
Alabama	3.48	0.21	0.33	2.68	1.07
Tigane	4.88	0.73	0.33	1.29	1.54
Khuma	1.93	0.31	0.11	1.61	1.40
Kanana	1.47	0.00	0.00	1.54	1.10
Jouberton	1.50	0.17	0.04	0.77	1.23

Source: Own construction from Table 8.20 and 8.21.

Table 8.23: Accessibility total

Neighbourhood	Supply/Demand total out of 48	Evenly distribution total	Quality total	Accessibility Total	Normalised accessibility value
Alabama	28	8	25	61	0.62
Tigane	40	10	26	76	1
Khuma	32	2	19	53	0.41
Kanana	16	4	19	39	0.05
Jouberton	14	4	19	37	0

Source: Own construction (2015).

In addition, education quality of services Q_4 (the % of independent schools); Q_5 (the % no schooling aged 20+); Q_6 (the % of matrics aged 20+) and Q_7 (the % with higher education aged 20+) are derived from Stats SA Census 2011 as shown in Table 8.24 below.

Table 8.24: Education quality

Quality of education facilities	City of Matlosana	RSA
Q_4 (% of independent schools)	7.48%	6.16%
Q_5 (% no schooling aged 20+)	7.90%	8.60%
Q_6 (% of higher education aged 20+)	9.00%	11.80%
Q_7 (% matrics aged 20+)	28,20%	28.90%

Source: Stats SA (2011).

Table 8.25: Calculation of the urban governance index

Urban governance index (UGI) **Let x = (Excellent=5) + (Good=4) + (Moderate = 3)+(Poor=2)+(Insignificant=1)	UGI = 1 if (x=35)	UGI = 0.75 if (28 ≤ x < 35)	UGI =0.5 if (21 ≤ x < 28)	UGI =0.25 if (14 ≤ x < 21)	UGI = 0 if (x < 14)	Sum of binary values =
Human capital *Binary value (Specialise skills) ={(1 if YES) or (0 if NO)}	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values < 2);	*Binary value(No shortage) + Binary value(Specialise skills) + Binary value(Implementation capacity) + Binary value(Provisioning for all specialised skills)+ Binary value(No outsourcing)
Database	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values < 2);	*Binary value(Consistently updated) + Binary value(Reliable) + Binary value (Integrated between the different spheres of government) + Binary value (Contain GIS data)+ Binary value(Complete in terms of land use data, service data and transport data)
Integration between/within the three spheres of government	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values < 2);	*Binary value(Linkages between the planning in the three spheres of government and the IDP) + Binary value (Linkages between the programs in the three spheres of government and the IDP) + Binary value(Linkages between the budgets in the three spheres of government and the IDP) + Binary value(Integrated monitoring of expenditure on all three spheres of government) + Binary value(Integrated monitoring on all three spheres of government if programs/projects are finished (on time and within projected budget))
Elimination of backlogs	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values < 2);	*Binary value(Standards/measurements in place to measure backlogs in piped water connections) + Binary value(Standards/measurements in place to measure backlogs in electricity connections) + Binary value (Standards /measurements in place to measure backlogs in refuse removal) + Binary value (Standards/ measurements in place to measure backlogs in flush toilets) + Binary value(Standards/measurements in place to measure backlogs in RDP housing)
Operational factors	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values < 2);	Binary value(Operators adequate training or professional competency) + Binary Value(Information systems effectiveness in monitoring operations) + Binary value (Standards/measurements in place to measure operation timelines and accuracy of completing tasks) + Binary value(Operations budget to actual financial variance for major budget categories) + Binary value(Standards/ measurements for the level of communication or understanding between operators and decision makers)
Maintaining existing infrastructure	Excellent := (# of days per annum that any residential neighbourhood in the urban area were without water=0)	Good := (# of days per annum that any residential neighbourhood in the urban area were without water=1)	Moderate := (# of days per annum that any residential neighbourhood in the urban area were without water=2)	Poor := (# of days per annum that any residential neighbourhood in the urban area were without water=3);	Insignificant := (# of days per annum that any residential neighbourhood in the urban area were without water >3);	
Infrastructure programs and projects	Excellent := (Sum of binary values=5);	Good := (Sum of binary values =4);	Moderate := (Sum of binary values=3);	Poor := (Sum of binary values=2);	Insignificant := (Sum of binary values <2);	*Binary value(Scientific process is used to priorities projects before budget distribution) + Binary value (Timeously planning and design of new infrastructure) + Binary value(Consideration of changes in the urban form (growth and spatial changes) + Binary value(Consideration of current & future traffic congestion levels) + Binary value(Identify areas where there is a need for congestion management);

Source: Own construction (2015).

Despite these corresponding references, there are alternative measures that can be used interchangeably with those provided in Table 8.16 depending on the set of available data and identified gaps to be filled for neighbourhood(s) under study (see Annexure B). And the purpose of answering the main research question. The results as presented by SNM assessment process reveal priority areas and conditions of these five case study neighbourhoods. Each criterion value represents the sum of its factors (exponential weighted) scores for each neighbourhood. Based on the rating system the values of criteria are aggregated to give the total score. The rank has five levels of categories from 1 to 5 – as shown in Table 8.16, the 1 to 5 ranking is designated as respectively the highest and lowest level of performance. Based on the total criteria values the neighbourhood which has the highest points denotes rank 1 – for instance the highest level of sustainability performance and vice versa.

In addition to the foregoing, 1, which is the most successful neighbourhood represents Jouberton, while 5 is the least successful neighbourhood and represents Kanana (see Table 8.15 and Table 8.26 for the calculation of these values). Both weighted sum method and exponential weighted method give the same results in this regard. The outcomes of these methods differ in criteria connectivity and public transport and service with two neighbourhoods exchanging ranking order. Based on criteria the high performance areas (1) and most critical areas of concern (5) are highlighted with respect to neighbourhood sustainability as shown in Table 8.26 below.

Table 8.26: Neighbourhood sustainability ranking by criteria

Criteria & factor(s)	Weighted sum method					Exponential weighted method				
	Ala	Jou	Kan	Ku	Tig	Ala	Jou	Kan	Khu	Tig
Spatial and environment	3	2	4	1	5	3	2	4	1	5
Urban density: Unequal distribution of urban population in the different neighbourhoods	1	5	4	3	2	1	5	4	3	2
Cultural and social capital	5	1	4	3	2	5	1	4	3	2
Connectivity and public transport	3	2	1	4	5	2	3	1	4	5
Economic	5	3	4	1	2	5	3	4	1	2
Smart growth	3	5	2	4	1	3	5	2	4	1
Services (i.e. parks/sport fields/education/scholar transport /housing services) for residential neighbourhoods	5	1	4	3	2	5	1	3	4	2
Food security	5	1	1	1	1	5	1	1	1	1
Urban governance	1	4	5	3	2	1	4	5	3	2
Liveability	2	1	3	4	5	2	1	3	4	5

Source: Own construction (2015) from Table 7.4.

Therefore, Kanana neighbourhood which is ranked at 5 and Tigane neighbourhood at 4 signify the lowest level of sustainability performance. The criteria and factors determined by both methods indicate that Kanana needs immediate attention as its criteria and factors are on average 4 and the worst criterion is urban governance. However, the best scores are connectivity and public transport and food security at 1 followed by smart growth at 2 and liveability at 3. In the case of Tigane ranking 4 the worst scores are criteria-spatial and environmental, connectivity and public transport and liveability at 5, while the best score criterion is food security at 1 and criteria urban density, cultural and social capital, economic, services and urban governance at 2.

The weighted sum method ranks Khuma 2 and Alabama 3 while the exponential weighted methods are vice versa. Alabama's worst criteria scores in both methods are cultural and social capital, economic, services and food security at 5. Alabama's best criteria scores are urban density and urban governance at 1 followed by liveability at 2. In the case of Khuma the worst criteria scores are connectivity and public transport, smart growth and liveability at 4 while the best criteria scores are spatial and environment, economic and food security at 1. Jouberton which ranks 1 most critical criteria of concern are urban density and urban growth at 5 followed by urban governance at 4. The best criteria scores are cultural and social capital, services, food security and liveability at 1 followed by spatial/environmental and connectivity and public transport at 2.

Furthermore, though the aim is not to determine the best way to present rankings of SNM results or data the radar chart is used to present or plot the scores as demonstrated by Figure 8.3 and 8.4 below. Using these radar charts (1 = Worst, 5 = Best) although the results or values are equivalently on adjacent axes as those presented by Table 8.26 which put the item with the best overall scores first and worst overall scores last. Therefore, it seems that this kind of data is likely to be best presented as a radar chart.

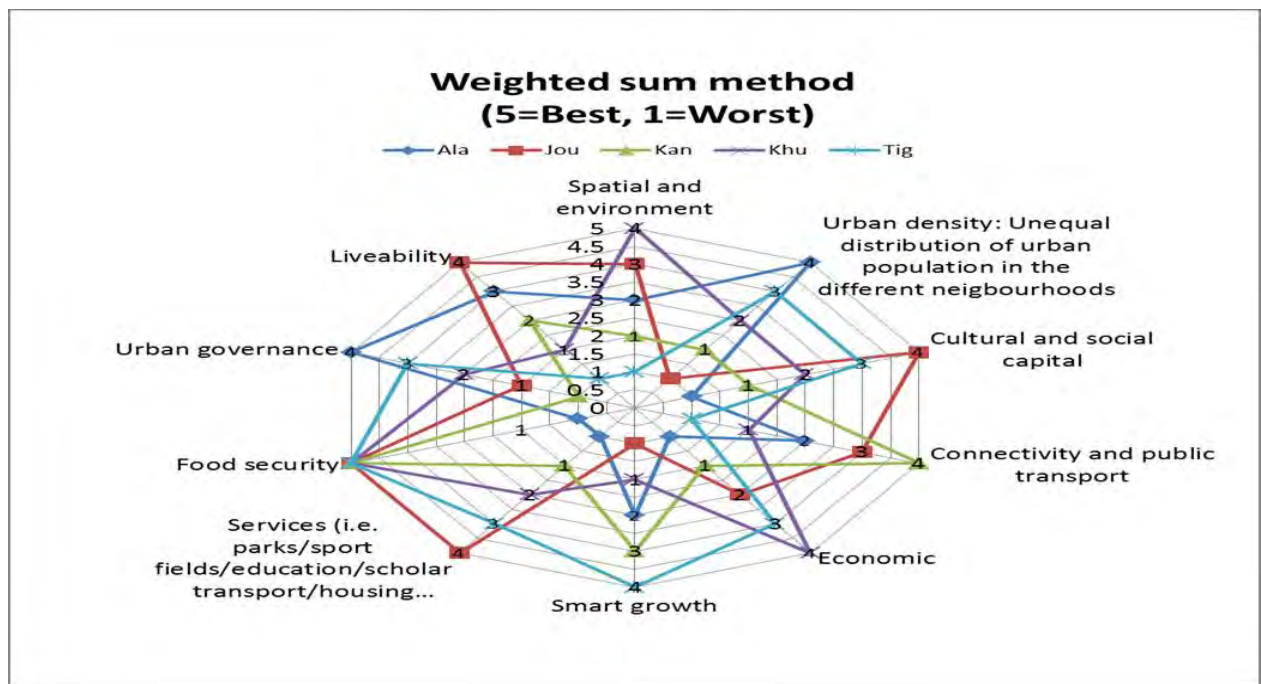


Figure 8.3: Weighted sum method neighbourhoods and criteria ranking

Source: Own construction (2015).

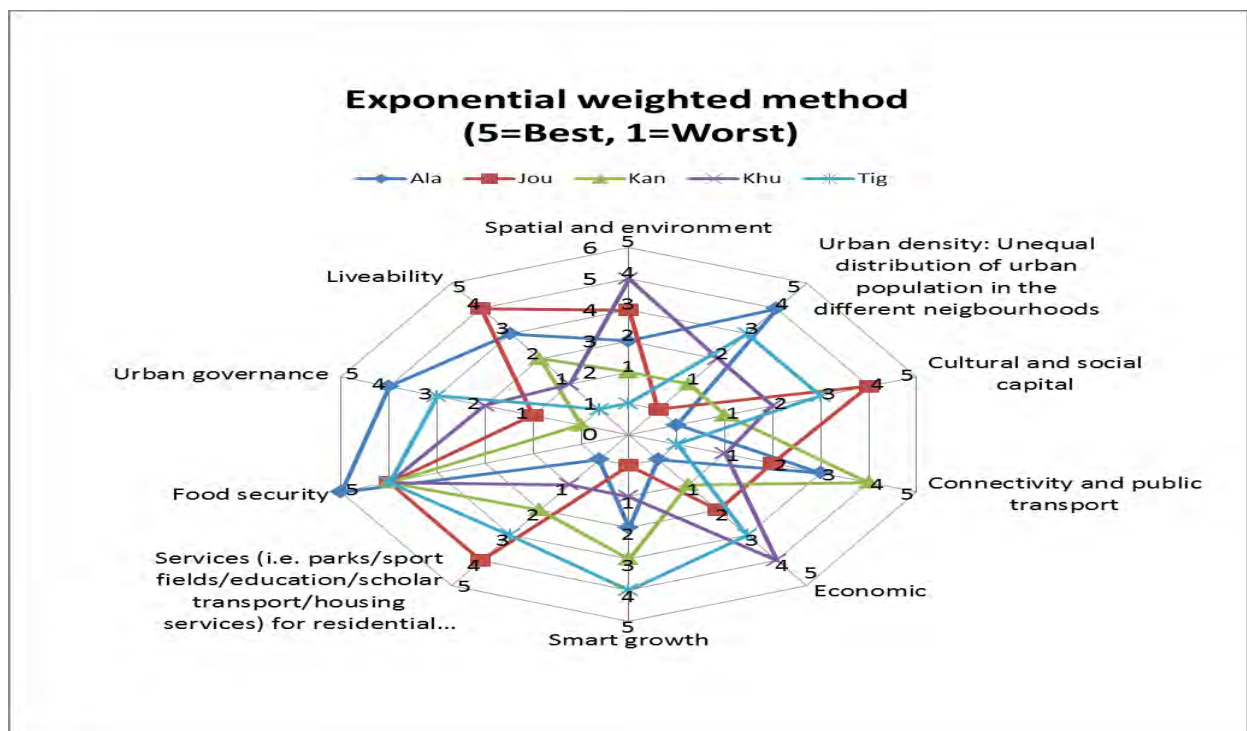


Figure 8.4: Exponential weighted method neighbourhoods and criteria ranking

Source: Own construction (2015).

Due to locational characteristics it was expected for Jouberton and Alabama to rank high as they are the most proximate neighbourhoods to City of Matlosana when taking into alternative economic and social opportunities the City of Matlosana provide for the whole of KOSH area. In essence, City of Matlosana provides the economic and political functions of all these neighbourhoods and their towns as discussed in chapter 5.

8.6 Conclusion

In conclusion, the various assessment tools discussed in this chapter and the establishment of SNM provide a base for assessment processes and comparative review of neighbourhood/city sustainability that aid decision making. In principle, SNM is a neighbourhood sustainability assessment tool to select best sustainability solution alternatives based on the decision making process that utilizes decision criteria, weighting methods, comparative judgement, ranking of alternatives and integration of solution alternatives as demonstrated in Figure 8.5 below.

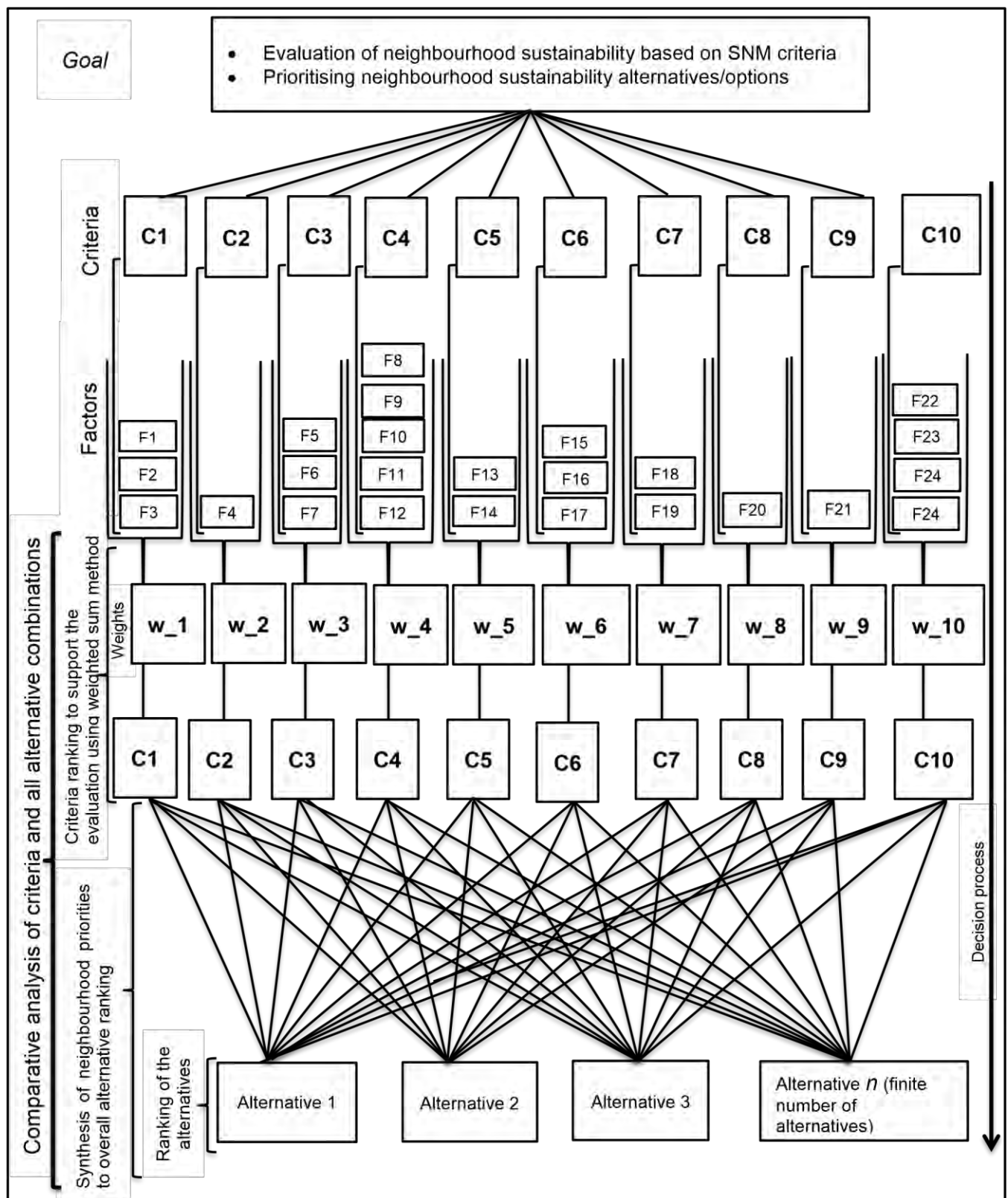


Figure 8.5: Neighbourhood sustainability decision criteria and process

Source: Own construction (2015).

The assessment tools call for a different attitude to operational urban planning with much, therefore, depending on the intellectual and practical underpinnings witnessed in the components (criteria and factors) of SNM. The SNM highlights the importance of linking physical, social, economic, ecological and institutional dimensions to provide a basis for rating and deriving neighbourhood specific approach. Another fundamental character of this interactions point out to promote the integration and connectivity between urban components (inner core and periphery) for them to function as integrated and interconnected communities.

The key issues underlying the dynamic aspects of this model are devoted to the principles of spatial planning processes – to be a good description of the scale of urban operation and interactions. This SNM could provide spatial equity to the neighbourhood/settlement by changing the philosophy of its being spatial restricted and confined to definitional boundaries to one that is porous and open to flows.

Chapter 9: Conclusions: reflecting new knowledge

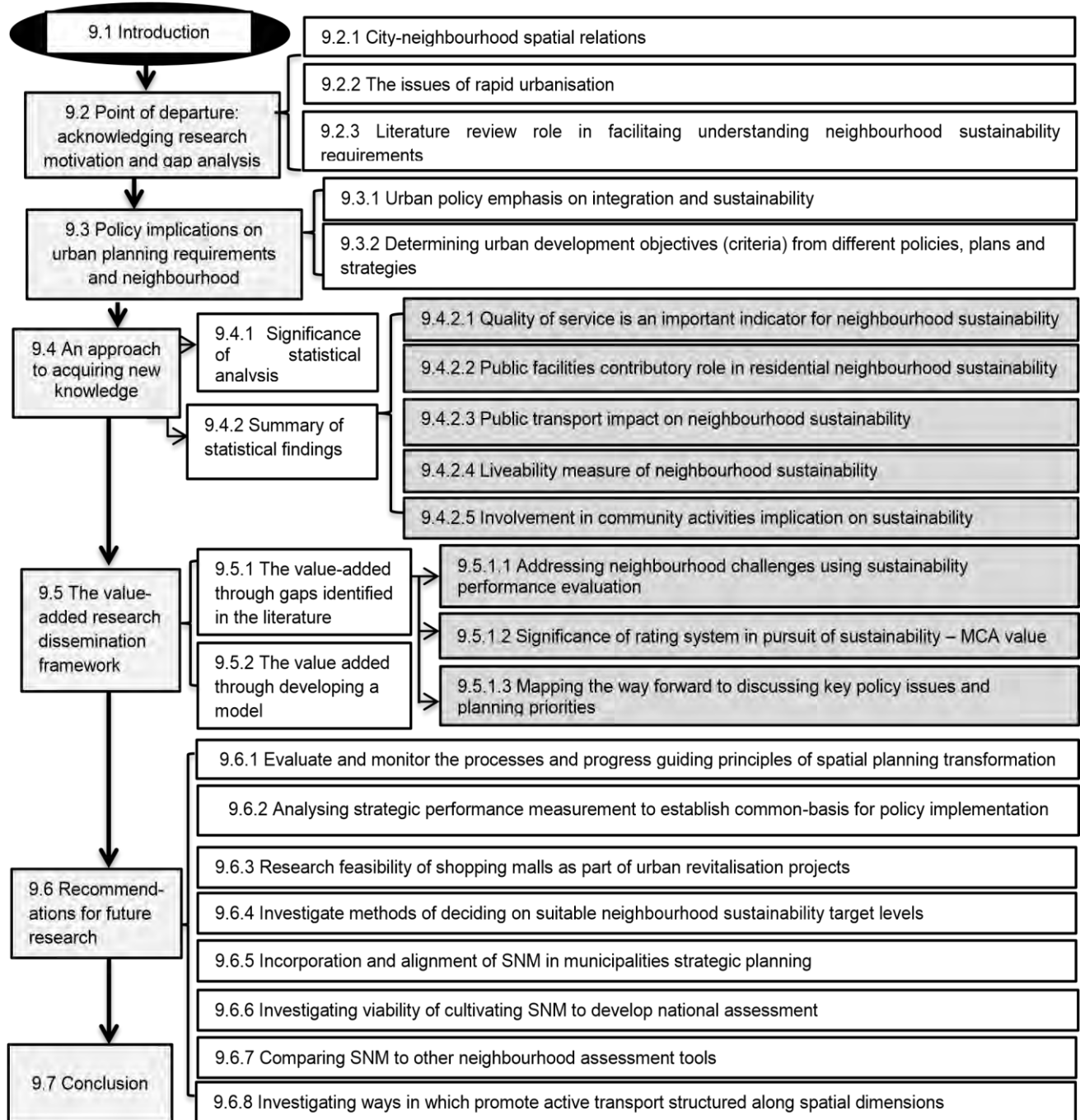


Figure 9.1: Structural components of chapter 9

Source: Own construction (2015).

9.1 Introduction

This chapter aligns and integrates theory and practice – integrating the arguments, viewpoints and findings concerning the neighbourhood contributory role in sustainable urban form, sustainability discourse and suitability for sustainability measurement. It discusses highlights and suggests future research focus areas that the findings of this research point towards.

9.2 Point of departure: acknowledging research motivation and gaps analysis findings

With this research undertaken in urban and regional planning (spatial planning) discipline, one of the main concerns was to ensure that spatial planning processes and sustainable urban form elements receive adequate attention. As a point of departure, the researcher was motivated by contemporary interest in sustainability and its lack of clarity around urban disadvantaged (townships) neighbourhoods. This includes deficiency of concrete facts about townships neighbourhood sustainability practices. This deficiency has created a gap that this research had investigated. This gap identified in the research analysis points to challenges in the areas of urban policy and strategic planning affecting the overall towns sustainability performance as it creates a backdrop to urban planning decisions.

It is important to mention that there is a plethora of policies in South Africa; the challenge is the practical concern or implementation plan to reflect equivalently the level of urban policy interest, especially improving economic conditions (economic growth and investment). Although policies demonstrate the magnitude of government commitment to overcome economic and socio-spatial inequalities in urban areas – the ingredients of success are based on mechanisms to deliver. For example, the economic prospects and competitiveness of the city depend upon the level of strategic integration that in turn can generate spatial alterations (UN-Habitat, 2014b:195). A clear policy and an enabling regulatory framework are important building blocks to generate holistic prosperity and expand opportunities in an attempt to make cities integrated and sustainable (UN-Habitat, 2013b:147).

9.2.1 City-neighbourhood spatial relations

The reader is reminded that the spatial dichotomy between the inner core neighbourhoods and periphery neighbourhoods was instituted by apartheid regime in South Africa. The consequences of this reality are complex – they reflect unsustainable spatial design germane to urban sprawl phenomenon. Apartheid cities were built on the assumption that there was cheap coal-based energy, cheap unlimited supplies of water and low fuel costs for transporting poor people over long distances (Swilling *et al.*, 2005:5). Therein reclined a crucial limiting factor still reverberating within the current urban sustainability debate – the research findings revealed that in reality the greater equity for the townships residents to basic services and place of work is not possible – travelling costs are found to be high, rendering this urban system unsustainable. More effortful reasoning and insight into research outcomes obviously would be that middle class areas are enjoying the highest service levels and are also the main beneficiaries of a system that ensued from gross socio-economic injustice.

The deduced understanding of relationships between people and places and amongst various scales of urban areas in this research pointed the spontaneous perpetual functional connectivity despite very little space that was afforded for connectivity by the apartheid regime. The interaction between various urban fabrics converged to the universal and holistic concept of sustainable development as scale effect and interrelation cannot cope without the existence of balanced growth (Choguill, 2008:42). From this positive perspective, urban spatial form appears to be very important in practice. Because inadequate land policy creates social and spatial imbalances, urban sprawl, unsustainable urbanisation, severe overcrowding and lack of public space (UN-Habitat, 2013b:60).

Therefore, a spatial planning policy crafted in sustainable urban development framework strategic imperatives will include positioning cities as important hubs of regional and national development (UN-Habitat, 2013b:147). The economic aspirations and trade-off between affluent urban areas and peri-urban areas were found to catalyse positive spatial relations supported by intricate network of roads, streets, human activities and transportation issues. In many ways, present spatial solutions depict transportation as a structuring element which integrates with the cities fabric to recreate the relationship between spaces (Rodrigue *et al.*, 2013:15). To maintain

the contributory role integrated and coordinated transportation and urban development are essential to ensuring urban sustainability.

9.2.2 The issues of rapid urbanisation

The core–periphery delineation that is synonymous with city–township neighbourhood relations has been replicated in these urban fabric types by the process of urbanisation. This relationship was determined through the concept of density in urbanism – according to Berke (2005:22) this concept is frequently used to describe the relationship between a given area and the number of certain entities in that area. It has shown that a city space consists of inner core incorporating most of the formal economy succeeded by white dominated residential neighbourhoods and low density suburban form while the outer core (periphery) accommodates the black population and high density residential neighbourhoods (constituted by formal and informal housing). The latter contains most of the informal economy outside key employment locations and high density outpaces supply of serviced land, adequate housing, basic infrastructure services and other basic human population needs (UN-Habitat, 2015:1).

In addition, the current market structures and economic analysis embed practices that are flawed and inherently unsustainable. At the city level, the centrality of manufacturing and trading was facilitated through spatial segregation and by maximizing the economies of urbanization (Pont & Haupt, 2009:5). In townships, opposite mechanisms are at work – high-density situations make it necessary to provide economies of scale and solutions for delivering the required goods and services to the population at affordable prices and with lower environmental impact underutilised. The issue of urbanisation/population growth has not received an equivalent level of policy interest in order to optimise this trend to the advantages of the township neighbourhoods' economic conditions – specifically raising investment. The result has been increasing economic poverty and inequality running in parallel to increased delivery of social services by the state and NGOs (Swilling *et al.*, 2005:7). Peri-urbanisation is by far the most obvious force expanding cities spatial scale – leading to chaotic urbanisation and fragmented spatial systems – increasing social-spatial challenges (UN-Habitat, 2013d:9).

From a positive perspective, the correlation between townships and urban densities gives effect to sustainable development strategic response to economic and socio-spatial restructuring hence the need to be cautiously interpreted as a guideline to attract investment into neighbourhoods. With reference to urbanisation rates, governments, institutions, urban designers, planners, researchers and corporations will be in a strategic position to search for ways to make cities better – weighing planning initiatives at their disposal and fostering innovation to provide populations with the most liveable environments.

9.2.3 Literature review role in facilitating understanding neighbourhood sustainability requirements

The literature review has effectively contributed to an understanding of the neighbourhood sustainability; under-representation of disadvantaged neighbourhoods in sustainability discourse; effectiveness of neighbourhood as urban scale for implementation and building blocks for cities to become more sustainable from urban and regional planning academic perspective as this research has been conducted under its umbrella.

The literature review has provided a sequential account of theories related to the neighbourhood concept and theories that define the basis on which neighbourhoods can be regarded as sustainable and integrated in comprehensive urban planning initiatives. In addition, the theoretical build-up has presented in some respects a good opportunity for the analytical usefulness required to achieve the objectives of this research – the significance and/or influence of neighbourhoods in sustainability activities. With the purpose of steering the strategic planning – the dynamic nature of the neighbourhood as a macro level variable is that it is likely to embrace all factors that can influence integrated sustainable urban development as it can be better managed and harmonized (UN-Habitat, 2013b:56). The objective of the macro-level approaches is to set up the best practice ideas; provide the facts, figures and studies at the scale and make it as clear and understandable as possible.

Neighbourhood can be defined on this basis – sustainability is presented as a nascent form of urban development to which neighbourhoods can contribute to sustainable modes of living,

sustainable urban forms, planning processes and strategies and measures that permit comparison to the situations. In order to undertake a comparative review of sustainability – reviewed literature has drawn attention to the different urban neighbourhoods' fabric types and performances. With a clear understanding of neighbourhood sustainability and integrated urban development requirements the literature review has made possible identification of sustainability criteria.

Finally, the literature review has outlined the potential of measuring the level of neighbourhood sustainability and initiating the assessment process, presenting the development of criteria/factors. Supported by rating system, recommendations can be drawn about the neighbourhood effectiveness as a building block for implementation and/or improvement of decision-making for sustainable urban development. As a result an overarching policy framework can be set up – for example, the policies/strategies/plans that promote the equitable and efficient land use such as IDPs, IUDF, SDF and NDP supported by (or incorporated in) SPLUMA 2013 and/or policies/plans that support the overall vision and objectives for the development of sustainable land transport in South Africa such as NATMAP 2050, NLTSP and ITPs can be integrated to provide a priority ranking of all alternatives. Integrated, these strategies in numerous occasions have demonstrated that they can overcome the challenges pose by rapid urbanization, achieve balanced spatial development and revitalize national and local economies (UN-Habitat, 2013b:56).

9.3 Policy implications on urban planning requirements and neighbourhood sustainability

In the case of sustainability as objective – such as is the case in this research – urban policy credibility and consciousness as determined in relation to its response to spatial arrangements and opportunities are critical. Such policy extends to promote high employment in an economy whose threshold level and effectiveness to deliver are grounded in education, innovations, social and territorial cohesion, contribution of relevant physical interventions, the protection of human life and environment (Moroke, 2015:56). This is evident in SPLUMA 2013 – it provides a framework for monitoring, coordination and review of spatial planning and land use management system – enabling it (SPLUMA 2013) to promote inclusive, developmental,

equitable and efficient spatial planning (South Africa, 2013:3). Urban land management is an entry point to promote citywide, multi-faceted and high-impact interventions such as creating an enabling environment for social and economic investments (UN-Habitat, 2013b:61).

Urban policy has been reflected as being the first empirical conceptualisation of sustainability in neighbourhoods/cities. This is evident in the integration of policy into sustainability visioning processes. Of particular importance are those objectives that relate to community development, encourage integration and influencing sustainability outcomes.

9.3.1 Urban policy emphasis on integration and sustainability

A need for integrated sustainable urban development in South Africa has promoted adoption of policies that put emphasis on the integration of urban areas components and establishing planning tools, processes and procedures in order to achieve sustainability requirements. Harmonising this strategic approach to local level – it realises sectoral interventions as the main approach (UN-Habitat, 2014b:7). The alignment and integration between spatial planning, transportation planning and environmental management at this level is guided by EMFs, SEAs, EIA, IDPs, SDFs, LUMS, ITPs, TIAs, TIS and precinct plans (Schoeman, 2015a:13).

These sectoral interventions are aimed at accelerating sustainability and integration through creation of coordination of service delivery, poverty alleviation, stimulation of new economic activities and other favourable conditions to enable previously disadvantaged urban communities to access development opportunities. Therefore, the NDP chapter 8 provides the guiding principles that align and integrate transportation planning, spatial planning and environmental management. Its mandate and/or objectives are broad and cross-cutting. In order to do this the NDP will require integration and coordination between sectors, different agencies and within governments and municipalities. Failure to integrate these sector departments – interventions in one sector can often be at odds with the intentions of other government departments (UN-Habitat, 2014b:36).

Furthermore, is the context of integrated strategies the NDP needs to be incorporated in SPLUMA (2013) and its Regulations so as to improve planning (functional) and operational decision making and implementation (Schoeman, 2015a:25). In general a vast array of urban policies set parameters for good governance and decision making processes and structures that are integrated (vertically, horizontally and across disciplines and stakeholders groups), collaborative and guided by (and accountable to) sustainability principles and long term community outcomes.

9.3.2 Determining urban development objectives (criteria) from different policies, plans and strategies

The quantitative assessment of legislation and policy has provided means to benchmark and assign relevant regulatory instrument(s) to urban development projects as determined by set of their performance targets. Policy that has objectives that comply and/or confine to numerous criteria is interpreted to signify a more strategic approach and illustrating importance in pursuit of sustainability.

An important lesson learned is that utility of criteria can be used to demonstrate a range of policy options available to urban planners to tackle unsustainable practices in neighbourhoods. Based on this, the criteria used suggest improvements in neighbourhood areas of concern such as service quality, public transport, spatial arrangements and urban governance amongst others. Generally, the premise behind the logic of urban policy has been understood to be a set of goals that serve as guidelines and dispenses its duties to address the problem at hand (UN-Habitat, 2013e:9). That is to say, policies are motivation-driven and the extent to which a policy can be considered a viable instrument for implementation depends on its intended audience (Coglianese, 2012:4).

For this special case, the motive and the main pathway have been grounded in the perspective of government policies related to redeveloping depressed areas, counter spatial distortion, provide essential community facilities and re-plan existing settlements, and also to possibly accommodate slum clearance and resettlement through support and funding. This has included

the social, economic and spatial networks which are being considered to be the components of the process. A striking outcome of policy discussion in this research is that key policy issues and planning priorities are wide and vary with regard to cities of different size and scope.

9.4 An approach to acquiring new knowledge

The research adopted various methods as a way of approaching the research questions systematically. These are scientific methods or approaches to acquiring knowledge directed by specific formulated questions and then systematically finding answers (Gravetter & Forzano, 2011:16). This way of generating new knowledge in the real world context is driven by being focused on problem-solving and is typically interdisciplinary – knowledge is generated in practice (McClean, 2012:456), meaning that it has a potential to impact on practise. Therefore, using correct research methodology is critical in order to find out all the answers till conclusion (Industrial Research Institute, 2010:2)

9.4.1 Significance of statistical analysis

The statistical instruments used facilitated the scientific approach that leveraged the quality of results to be credible to offer a concise overview of level of satisfaction on neighbourhood quality measures. The empirical evidence accumulated through this primary source of data is of high importance as it has revealed new knowledge and stimulates considerations. The service quality has been found to be an important criterion of SNM.

9.4.2 Summary of statistical findings

These are the principal findings of an in-depth empirical research as demonstrated by Table 9.1 and outlined by subsequent sections.

Table 9.1: Summary of statistical findings

Variables	Factors			
	Quality of services	Public transport issues	Liveability	Participation/ involvement
A reason to locate in a neighbourhood	X		X	
Average period of living in the neighbourhood			X	
Liveability of the neighbourhood	X	X	X	X
Community level of involvement			X	X
Sense of place				
Involvement			X	X
Close-knit			X	X
Different values			X	X
Liveability				
Safety at home			X	
Safety around resident			X	
Ethnic/religion stability			X	
Safety in general			X	
Quality of infrastructure services				
Local schools	X		X	
Housing	X		X	
Local street	X		X	
Local policing	X		X	
Local health	X		X	
Local public transport	X	X	X	
Parks and open space	X		X	
Variety of shops	X		X	
Level of involvement of in local people in public participation activity				
Completion of a questionnaire				X
Attendance of public meetings				X
Task team involvement				X
Urban governance			X	X
Accessibility of public transport: time and cost				
Accessibility: time on public transport	X	X	X	
Accessibility (one way): walking time		X	X	
Accessibility (one way): waiting time		X	X	
Travelling cost per day (origin to destination)		X	X	
Transport infrastructure and roads				
Crossings	X	X	X	
Roads	X	X	X	
<i>*Statistical analysis of questionnaire data reveals that the variables correspond mostly to the quality of services, public transport issues, liveability and participation/involvement.</i>				

Source: Own construction (2015).

9.4.2.1 Quality of infrastructure services and amenities is an important indicator for neighbourhood sustainability

It has been found that the level of services is an important consideration to be factored into neighbourhood sustainability analysis, for both availability and accessibility could ultimately determine levels of satisfaction. Such measures as resident satisfaction and involvement, service quality from schools, public transport, health care, police, housing all suggest that neighbourhood management is a critical piece in the jigsaw of solutions needed to tackle economic and socio-spatial disparities. The perceptions of residents' in relation to their neighbourhoods' areas were found to react to both physical and social characteristics of the concerned environment. These results can assist decision-makers in prioritising and improving the services to and play a critical part in enhancing livelihoods.

Taking into account relationships among different settings of place research draws on the some empirical evidence to determine how residential land-use and supportive land-uses contribute to building more sustainable urban agglomerations. In various reviews and reflections offered on economic issues, demographic variables, sustainability and issues of land-use are directly connected and they cannot be interpreted on the grounds of privilege but collectively over a large geographical area. However, urban management is fragmented between formal and informal systems (UN-Habitat, 2014a:203) due to differences in infrastructure services provision. Practical intervention coordination can build and strengthen relations of these systems such as alignment or integration themes proposed by the NDP. Local realities should be a key to improve integrated urban service provision (UN-Habitat, 2014:203). Thus, provision of quality services is accommodated in and/or forms an essential part of IDPs, NDP, IUDF, ITPs, and NATMAP among others.

9.4.2.2 Public transport impact on neighbourhood sustainability

The dynamics of public transport investigated conform to service provision parameters. The results of this research have shown that transport services can be evaluated to reflect on

customer satisfaction with these services. The importance of land transport customer satisfaction is expressed in various transport strategic policy documents and strategies visions such as White Paper on the National Transport Policy (1996), Moving South Africa (1998), Draft National Land Transport Strategic Framework (2014), NATMAP (2006) and NDP (2012) among others.

It was found that in determining the significance of transport accessibility and subjective satisfactory, in general, the results statistical significance and variation of the level of association to neighbourhood satisfaction was contrary to the research hypothesis that cost of travel is an influential factor choice of residential location, whereas it is assumed that the distance and public transport ridership would tend to decrease in value when cost reaches a certain level. Simply put by Litman (2014b:2) prices affect consumers' purchase decisions – for example, in Victoria, Canada the bus ridership increased due to reduced fares, and this resulted in 10-50 per cent of the added trips substituted from other automobile trips.

However, in South Africa, given an overview of spatial realities and the historical context and a future likely to be shaped by these spatial imbalances (cost of travel and optimum location) which were not market determined as is a common practice to determine one's choice of residential location such as level of income were compromised by separate developments – reinforcing racial segregation. This has remained the fundamental character of urban areas in South Africa – township neighbourhoods exposed to this exploitative nature of the urban development process. It has been revealed that to some extent CMLM case study and most likely the most of SA give ambiguous effect when determining the correlation between cost of travel and choice of residential location.

Where residential location decisions are purely based on commuters' preferences, much of literature point out accessibility to be playing a major role (Litman, 2014b:10; UN-habitat, 2014a:18). The points of access that influence this decision are access from home to work location, shopping centre, or leisure facilities (Coleman, 2007:12). Accessibility has also been highlighted as an important measure in evaluating the performance of transport strategies and land use within the framework of successful and sustainable neighbourhood/city.

9.4.2.3 Liveability measure of neighbourhood sustainability

Liveability has been found to determine purpose of various variables researched and measured at the neighbourhood level and city-wide scale. According to Litman (2014a:4) liveability is linked to health, human safety and security, transport/roads safety and security, infrastructure, employment and education indicators; and broad range of sustainability issues. The Economist Intelligence Unit (EIU) that undertakes liveability surveys refers to liveability as a measure of urban quality of life assessing stability, healthcare, culture and environment, education and infrastructure (EIU, 2014:2).

Liveability applies to city planning in South Africa to create cities supportive of sustainability initiatives. The policy efforts in South Africa to promote liveability are linked to the smallest unit of land use planning such as a housing unit and settlements through planning instruments such as Housing Sector Plans (HSPs) to neighbourhood/city and city region through planning instruments such as IDPs, IUDF and NDP. This makes liveability a reliable measure of sustainability and explains why various variables contribute to the assessment of liveability.

9.4.2.4 Research method can be optimised to emphasize the importance of public participation

The survey results, although some of questions were not cultivating citizen involvement but the fact that community was engaged in order to collect necessary data in order to fill identified gaps qualified citizen involvement as an important criterion and factor that should be highly emphasized in the sustainability assessment tools.

9.5 The value-added research dissemination framework

The research has introduced the sustainability assessment at the neighbourhood level derived from theory and national urban policies which are consistent with an overall effort for

neighbourhoods to become sustainable – adding value to the perspectives of neighbourhood sustainability assessment. Based on the selected criteria the model (SNM) integrated case study research findings with other sources of quantitative data of the case study. The application of SNM procedure has been identified to comprise metric benchmarking methodology. The five case study neighbourhoods' results as means of assessment were used to provide the comparative review of sustainability – these results were in turn optimised to cross evaluate criteria applicability in different parts of each neighbourhood.

Before commencing with the clarifying and disseminating of the value of SNM to neighbourhood sustainability assessment, it is worth mentioning that wealth of literature and number of assessment tool (BREEAM Communities, LEED-ND, SBTool-UP, CASBEE-City, etc.) exist and has been acknowledged in this research. These introduced assessment tools in this research illustrated that the use of quantitative criteria better defines and reviews the position necessary to achieve sustainability. Analysis of these assessment tools from the urban planning perspective and neighbourhood sustainability-related requirements also pointed out deficiencies. These tools were found to be not coincident with the comprehensive assessment criteria this research desired to achieve.

Issues such as lack of mechanisms for addressing the neighbourhood-specific issues came to the forefront. Sustainability-related tendencies in urban areas (urban and planning systems) and latest scientific developments in sustainability demand a more expansive approach to implementation of sustainability-related assessment framework. The incorporation and integration of institutional (political) dimension in sustainability principles has been found as a vital pre-requisite in urban planning and achieving sustainability in urban areas.

9.5.1 The value added through gaps identified in the literature

The institutionalisation of sustainability concept is the gap in the existing literature on the general structure of the sustainability measurement frameworks in urban areas (cities/neighbourhoods) in respect of understanding the sustainability issues in cities and neighbourhoods. The synergies between environmental, social and economic sustainability have appeared to owe much of the fundamental character of interactions to good governance

practices, particularly the effective implementation of national sustainable development strategies which integrate government decision making (OECD, 2007:15). This research has established the profound implications for the political (institutional) feasibility of sustainability. In review of urban sustainability (e.g. Barekowsky, 2014:673; Allen, 2009:8) – linkages of sustainability related tendencies in urban areas required political sustainability in interpreting the dimensions of urban sustainable development.

This gap is a knowledge claim that this research contributes new knowledge. According to Cray (2014:2) the significant original contribution emerges from small gaps within saturated research areas – this can be novel interpretations, applications of old ideas or synthesis of existing knowledge. The sustainability assessment tools discussed in this research have not been selected by the political dimension as a means of assessment for sustainability-related performance frameworks. To create the basis for more sustainability, SNM comprehensive set of assessment criteria have selected, prepared and utilised urban governance for assessment of neighbourhood sustainability level, making SNM one of the few assessment tools to measure the institutionalisation and most probably the first in South Africa and the world.

9.5.2 The value added through developing a model

The sustainability assessment framework for successful neighbourhoods (SNM) has been developed to provide a better understanding of sustainability at the neighbourhood level – creating a synthesis of urban (neighbourhood) sustainability dimensions. According to Gray (1996:3) when there is a considerable field of knowledge and a broad body of literature about a specific topic, one way to make a contribution to knowledge is to propose a framework/model for reviewing that knowledge. Gray adds that sometimes such a framework will also highlight an area in which, despite an abundance of knowledge, there is a relatively small amount on that aspect of the topic – such is the case in this research.

9.5.2.1 Addressing neighbourhood challenges using sustainability performance evaluation

Employing the combination of quantitative and qualitative sustainability indicators the research has provided a critical analysis of neighbourhood sustainability. By developing SNM as a means of the quantitative nature of sustainability assessment in pursuit of neighbourhood sustainability – this research has significantly contributed to the existing knowledge theoretical and empirical conceptualisation of neighbourhood sustainability. Practically, measuring sustainability in neighbourhoods has presented possibilities of aiding urban policy decisions regarding sustainability. For example, the urban planners will have the criteria of making a fair distribution of socio-economic and environmental resources across the entire city neighbourhoods based on the performance assessment. By developing and implementing the SNM this research claim to have successfully balanced account of both theoretical and empirical gaps that were identified.

9.5.2.2 Significance of the rating system in pursuit of sustainability – MCA value

In order to capture the essence of cities' efforts to become sustainable one major challenge was putting the neighbourhood sustainability aspects into practice. The diversity of neighbourhood factors that comprise the criteria of sustainability assessment imposed difficulties in terms of setting measures that describe a complex social, economic or physical reality. This has necessitated the need for structured sustainability measurement framework that allowed addressing these sustainability indicator activities in integrated manner – utilising MCA. The MCA fitted the specifics and particularities of the situations to be measured – its rating systems (scoring and weighting) and the assessment process highlighted the successful and less successful determinants of sustainability-related requirements and/or areas of low or high performance. The applicability of MCA is, therefore, acknowledged to have successfully provided a science specific decision making support tool in order to validate SNM choices clearly and invariably.

9.5.2.3 Mapping the way forward to discussing key policy issues and planning priorities

Assessing the performance of neighbourhoods is vital for municipalities in order to understand the real shortcomings of in their own development paths. For example, CASBEE-City was designed specifically for the city assessment and developed in close cooperation with the central government and local governments in Japan (Kawakubo *et al.*, 2014:3). The main aim of the assessment tool is to back local governments and other stakeholders in identifying environmental, social and economic characteristics of their cities and quantifying the effectiveness of city policies (Kawakubo *et al.*, 2014:3).

In the light of this, the research has proven that SNM serves as a starting point in South Africa to engage three spheres of government (national, provincial and local) and other stakeholders into dialogue to adapt or develop South African version of city/neighbourhood sustainability assessment tool. As a guideline, this research has provided a detailed account of assessment tools – linking local approaches such as social facilities and service provision norms and standards define core criteria and provide the assessment framework in order to tackle various neighbourhood challenges such as public transport – access to destination and infrastructure in pursuit of neighbourhood sustainability.

Creating national dialogue and building consensus on the need of city/neighbourhood assessment tools – SNM as way of contribution encourages national level multi-stakeholders in preparing a comprehensive set of assessment criteria at the neighbourhood level. Of importance is that the criteria and factors will identify barriers that hinder disadvantaged/poor neighbourhoods to achieve sustainability such as issues that reduce quality of life, hinder economic prosperity and competitiveness and other related issues as determined by the methodology (norms, standards, principles, spatial phenomena, etc.).

Having gathered available research evidence – SNM is the first sustainability assessment tool (or applied integrated sustainability performance measurement) in South Africa that covers a wide range of neighbourhood planning issues offering a comparative review of sustainability between neighbourhoods using rating systems – scoring, weighting and ranking (each criteria and factor is scored and weighted) and assessment process. It also guides and assists urban

components (cities and neighbourhoods) to become more sustainable in response to rapid growth of cities, spatial imbalances, degrading neighbourhood areas and related city/neighbourhood challenges.

9.6 Recommendations for future research

9.6.1 Evaluate and monitor the processes and progress guiding principles of spatial planning transformation

Spatial planning and its associated processes are gaining importance – this is witnessed by its transformations in strategic spatial planning in theory and practice [transformation of spatial arrangements and spatial governance]. The spatial economy and socio-political context as internal driving forces are the increasing complexity of making plans. In the light of this, a new perspective on planning needs to be reflected. The reflections are needed to evaluate and monitor the processes and progress guiding principles for the transition. Academically, what is the state of readiness? Is there a need to develop curriculum in response to change?

9.6.2 Analysing strategic performance measurement to establish common-basis for policy implementation

This research highlights a gap in policy implementation although SNM and other mitigation instruments are proposed. As mentioned in the preceding section, this gap raises questions regarding the ability of urban and regional planners to meet contemporary changes in spatial planning certainly in ways which can address the city's spatial injustice and equity needs. Having carefully explored and exposed the array of conceptual issues and practical concerns – the policy environment is becoming more complex, taking into account a call for a strategic and more coherent and integrated policy approaches in South Africa tied to neighbourhoods/cities sustainability requirements.

Controversially, with a lack of policy implementation experienced in the past –SPLUMA 2013 is a solution to steer policy implementation and give effect to the overall municipality sustainability performance? As policy objectives have given effect to the quantitative nature of assessment – research is proposed to consider the importance of strategic performance measurement to establish common-basis for policy implementation plan to be used for different levels of urban areas.

9.6.3 Research feasibility of shopping malls as part of urban revitalisation projects

The current planning practice is deeply grounded in enhancing spatial interaction within cities to enable a high level of integration into the existing economic networks. Shopping malls have appeared to be part of the urban revitalisation projects. However, the locational settings in some cases in this research have comprised an inclination to criticise. This research adopts Kocaili's (2010:159) viewpoint that shopping mall regeneration reasons, strategies, and solutions are very extensive and multi-dimensional, that these topics can be examined in physical, social, economic, environmental, and/or managerial aspects; one by one or together.

9.6.4 Investigate methods of deciding on suitable neighbourhood sustainability target levels

Having successfully developed SNM as a means of assessment for neighbourhood sustainability, there are opportunities for further work. Besides comparing neighbourhoods against each other to determine the level of sustainability – specifications of the target sustainability levels is required. As a step towards defining such targets, research is proposed to investigate methods of deciding on suitable target levels and setting targets as a basis for action.

9.6.5 Incorporation and alignment of SNM in municipalities strategic planning

SNM should be incorporated in municipalities as a strategic planning instrument to highlight issues of concern, provide measures of progress and stimulate discussion for future actions in order to ensure that sustainability is considered at an early stage and primary level (neighbourhood) of cities building blocks. However, the guidelines or the manner in which to incorporate SNM in the municipal functional structures [department(s)] fall outside this research scope, necessitating further research. This might require reorganising departments and/or developing new departments to ensure conformity to assessment framework needs.

For example, the Australian government created the Department of Sustainability and Environment (DSE) in 2002 that manages water resources, climate change, public land, forests, biodiversity and ecosystem conservation (DSE, 2013). In the U.S., the Department of Energy (DOE) (2013) established the Sustainability Performance Office (SPO) to oversee departmental sustainability efforts such as outlining DOE sustainability goals, requirements, and greenhouse gas reduction targets. Substantive guidelines are therefore required to be researched to determine recommendation feasibility. As guidelines to define, review and adjust at national systems – the guidelines should then subsequently be translated at the sub-national level – province and municipality.

9.6.6 Investigating viability of cultivating SNM to develop national assessment tool

With the acclaimed success of SNM application in real local-specific sustainability issues, the foundation is laid to establish a holistic assessment tool at the national level, such as Japanese CASBEE-City which was designed by a cohort of experts in close cooperation with the central government and local governments. The bases for more research and discussion of comprehensive sustainability assessment tool lie in the reality that urban areas are subject to interpretation from very different viewpoints and there are variations across different locational practical issues. Therefore key issues to research include the viability of:

- Coordinating cross-disciplinary team of academics and practitioners related to urban and regional planning and urban sustainability.
- Proposed national urban areas assessment tool to refer to and take account as widely as possible of all different realities as they are perceived by different stakeholders.

9.6.7 Comparing SNM to other neighbourhood assessment tools

Although the main aim of this research has been to develop a model for assessing the sustainability of the neighbourhood developments has been met, one of the few researchers that have focused on the neighbourhood sustainability assessment and its efficacy in improving the decision-making for sustainable urban development – Ayyoob Sharifi (2013) has indicated room for a comprehensive neighbourhood sustainability assessment – having critically analysed the sustainability assessment tools such as BREEAM Communities, CASBEE-UD, LEED-ND and others highlighting the strengths, weaknesses, successes and failures. One of Sharifi's (2013) research findings is that there is no single, best method for assessing the sustainability of the neighbourhood developments. As a result further research is needed to compare SNM with other neighbourhood sustainability assessment tools and also to confirm those findings.

9.6.8 Investigating ways in which promote active transport structured along spatial dimensions

Recommended future research directions to further promote active transport structured along spatial dimensions. Identifying the role of distance or time to destination in order to define, review and adjust norms and standards for social services and determine the extent that it will assist planners to make decisions about the size of a neighbourhood to support active transport.

9.7 Conclusion

Explored and exposed in conclusions in this research is that the city and a neighbourhood coexist whether it be a neighbourhood adjacent to a city or a spatially separated neighbourhood. The comprehensive assessment criteria are critical in evaluating neighbourhood performance and play a contributory role in sustainability of cities as the dimensions of urban systems are complex and sustainability as a term proliferates.

A better understanding of a neighbourhood's contributory role in sustainability discourse was effectively articulated in this research utilising theory and empirical conceptions of neighbourhood sustainability. In this research neighbourhood unit has proven to create the basis for a more sustainable urban areas – facilitating the consideration of synergies between complex urban systems and activities. Perhaps more important for this discussion is neighbourhood ability of scaling-down sustainability discourse and activities to the neighbourhood level to enable planners and decision-makers to account in detail for the dimensions of urban systems tied up together and those likely to interact to intensify the achievement of sustainability. This prescription for scaling-down is meant in part to suggest scaling-up sustainability aspects to fit specifics of city and/or the entire urban area situation.

Not undermining all contributions that capture the essence of a neighbourhood's efforts to achieve sustainability – sustainability performance measurement has provided a better understanding of neighbourhood level sustainability dynamics. This includes utilising the assessment tools rating systems to provide comparative review of neighbourhoods' sustainability aspects. As a result this thesis has successfully managed to emphasise the contributory role neighbourhoods can make to the achievement of urban sustainability and provide strategic performance measurement.

Chapter 10: Recommendations: dissemination of knowledge

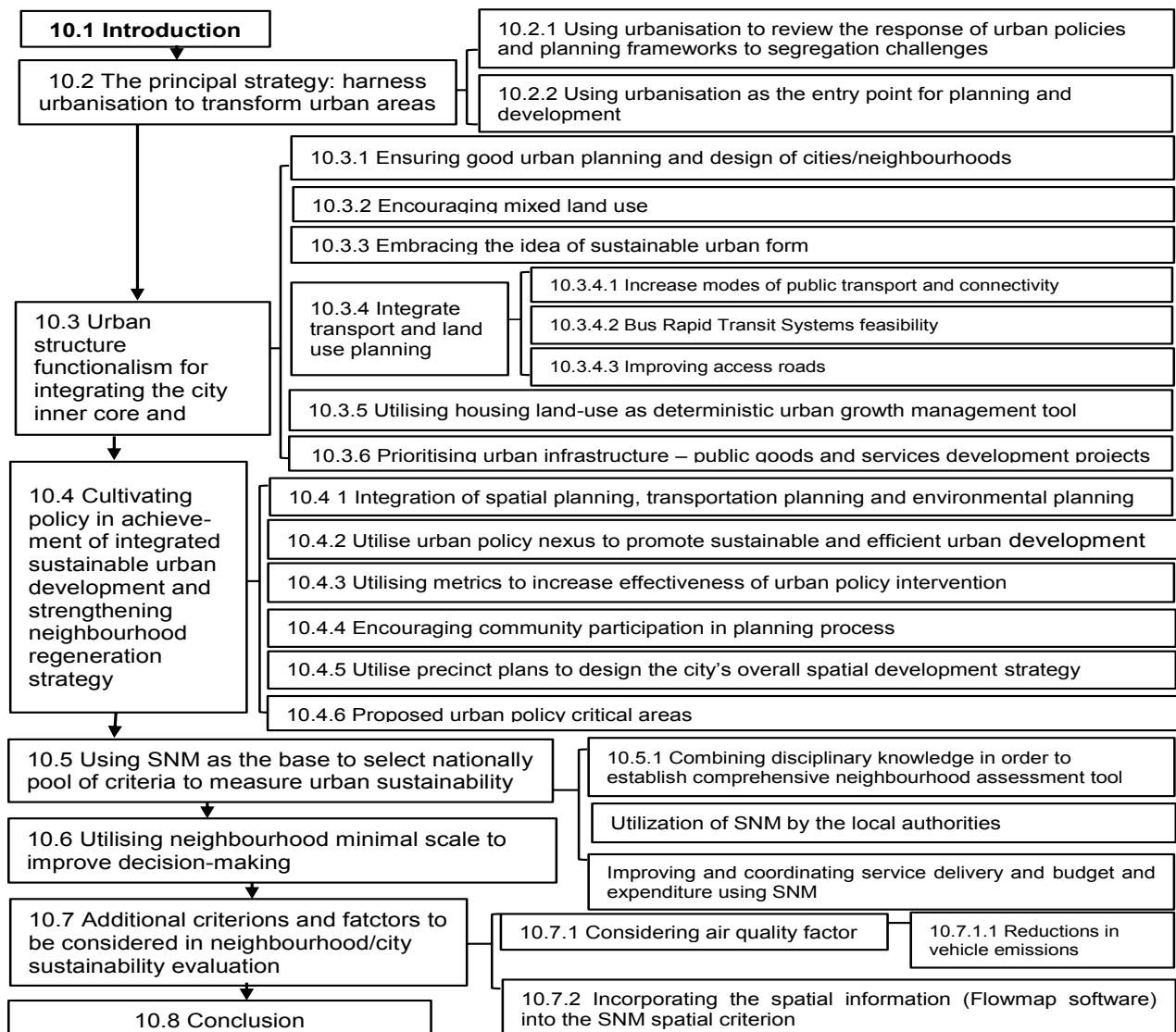


Figure 10.1: Structural components of chapter 10

Source: Own construction (2015).

10.1 Introduction

This chapter outlines potential implementation opportunities and solutions to challenges discussed in previous chapters. This will be done by compiling necessary theoretical

foundations and empirical conceptualisation such as transferability of SNM to other contexts and recommending policy objectives that might support the urban sustainability.

10.2 The principal strategy: harness urbanisation to transform urban areas

Urbanisation is a key step in attempts to combat challenges that cities are faced with and reasserting spatial structural transformation. The overall understanding of urban areas is that urban transition is brought about massive changes in spatial distribution of people (UN-Habitat, 2013b:7). Although the population phenomenon takes precedence over structural transformation and is bound to the future of the city – it cannot be approached programmatically in isolation. Besides the consequent use and consumption of land – it is linked to social, economic, environment and political dimensions of sustainable urban development. Based on these synergies, sustainability will require urbanisation to be supported by policies and frameworks in order to harness it for increased development benefits or perhaps attain sustainable urbanisation. In turn, urbanisation has to be cultivated as a vital practical support and influence on urban policy as illustrated in Figure 10.2 below.

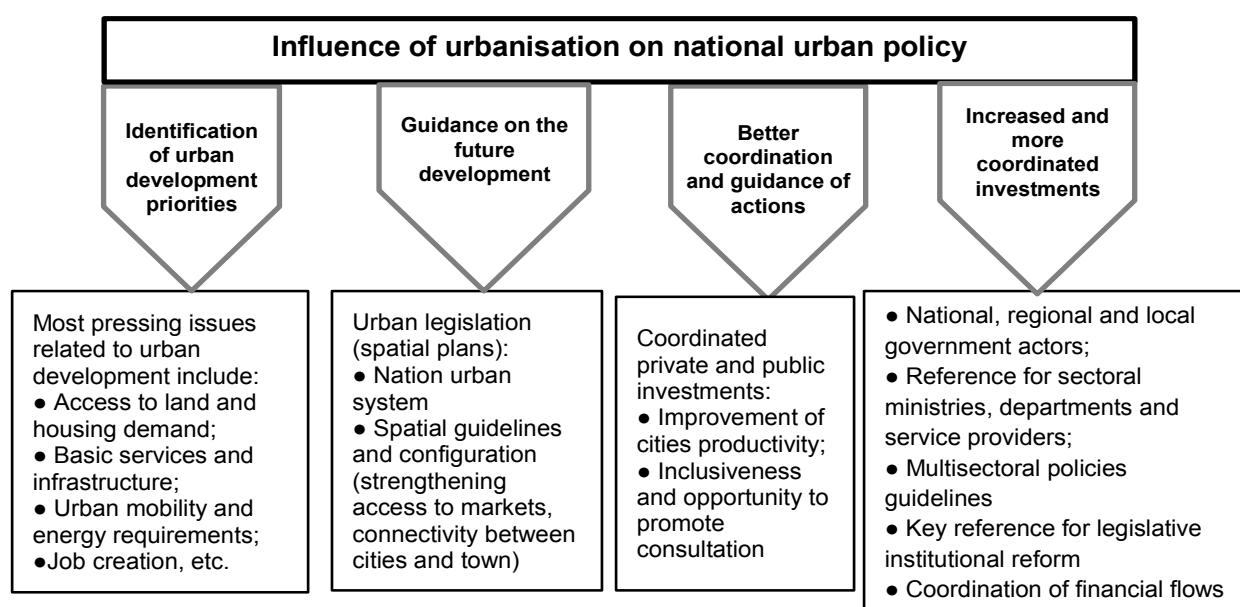


Figure 10.2: Comprehensive toolkit to guide the formulation of Local Strategic Plans

Source: Own construction (2015) – from UN-Habitat (2014b:5-47), UN-Habitat (2013d:9-32).

10.2.1 Using urbanisation to review the response of urban policies and planning frameworks to segregation challenges

Rapid urbanisation can be used to review efficiency and effectiveness of new planning instruments and approaches (IUDF 2014, SPLUMA 2013, NDP 2012, NTLST 2014) in a concerted effort to tackle old and new challenges related to exclusion, socio-economic inequality and poverty inter alia. Considering major shifts and stringent measures underway in land management principles and urban governance – a series of UN-Habitat publications reviewed and referenced in this thesis regard local governments fundamental to review of urban policies preparedness to ensure timely integration of emerging issues in planning framework. Due to the scale of the local government, particularly its cities and neighbourhoods – the review of urban policies could be comprehensive or, better still, oriented to the realities, interests, emerging issues of urban inequalities and could be replicated on a broader scale (national level). The proposed model for timely integration of new arising urban issues in the planning policies, legislation and instruments is illustrated in Figure 10.3 below.

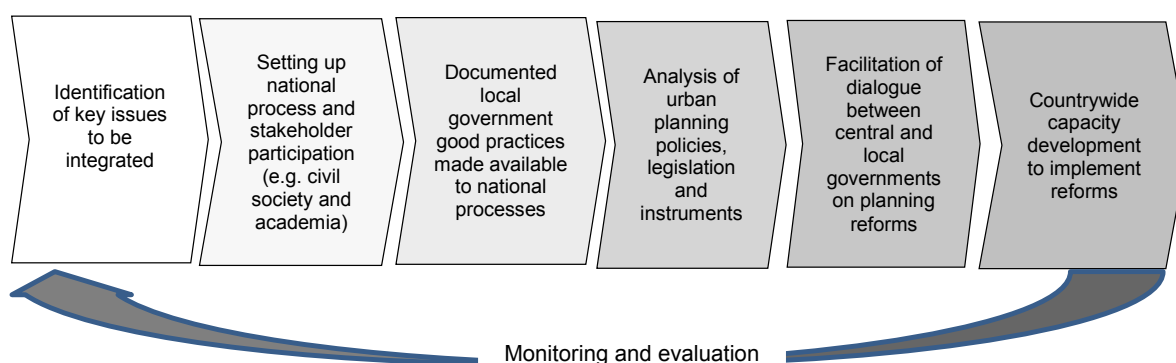


Figure 10.3: Urbanisation as a measure of policy efficiency and process of policy reform
Source: Own construction (2015) from UN-Habitat (2013b: 7).

It is expected that the urban policy reform process would provide technical assistance to streamline urban planning and development policy to local realities.

10.2.2 Using urbanisation as the entry point to urban planning and development

In terms of urban planning and development which is inclusive of urban (economic and spatial) growth it is obvious that the core of this spatial feature is urbanisation – it is an essential spatial feature that dictates neighbourhoods/cities patterns. This kind of urbanisation should be embraced as it can give ways to discuss and plan the urban future. The futuristic scope can be harmonised to produce liveable and competitive neighbourhoods/cities – orientating or directing growth/expansion of cities to the realities – integrating low-income neighbourhood and take advantage of their demographic threshold to actualise the integrated sustainable urban development.

10.3 Urban structural functionalism for integrating the city inner core and periphery

Although solutions to spatial disparities and gross socio-economic injustice in South Africa are premised on land – it is also a limited natural resource. In various reviews and reflections offered (Royston, 2003:198-217; Todes *et al.*, 2003:414-420; Van Wyk, 2008:49-280) empirical conceptions demonstrate in clear and unambiguous terms how excessive land consumption, rising transport costs and the social marginalization of the poor have intersected because of poor urban policy implementation and a capital subsidy that incentivised development for low-income housing on cheap (and therefore marginal) land. Therefore, in respective pursuit of sustainability the following are recommended:

- Encourage interplay between urban policy and urban sustainability;
- Municipalities should commit to a set of sustainability values and principles;
- There should be the immediate adoption of spatial planning (SPLUMA 2013) based on its comprehensiveness, flexibility, timeliness and people-oriented approach.

10.3.1 Ensuring good urban planning and design of cities/neighbourhoods

Combined with urban planning and management expertise, good planning and design should provide opportunities to improve livelihoods and lead cities to prosperity. Planning and design should ensure provision of adequate infrastructural development as it is a key to unlock or operationalise economic growth.

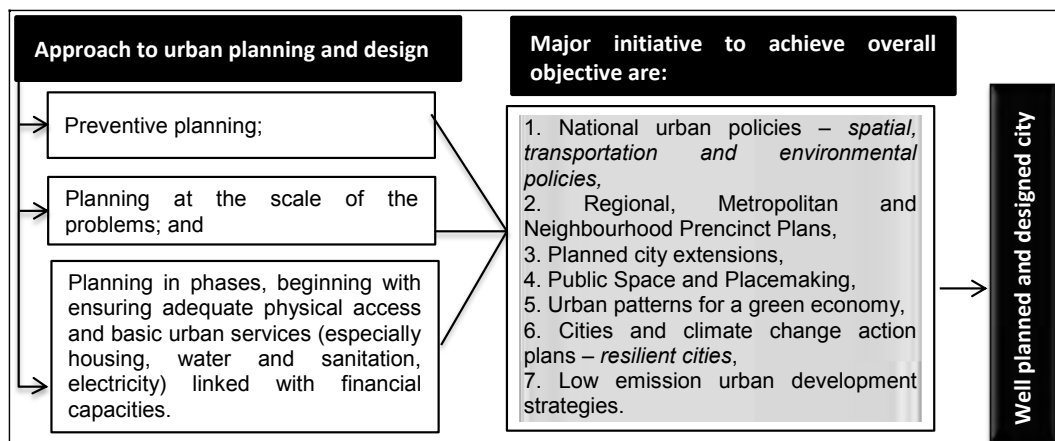


Figure 10.4: Approach to urban planning and design

Source: Own construction (2015) from UN-Habitat (2013g:1-13).

10.3.2 Encouraging mixed land use

Urban planning should focus on increased population densities and encourage the development of mixed use areas. This implies a shift away from strict zoning regulations that have led to a physical separation of activities and functions, and thus an increased need for travel. Instead, neighbourhoods/cities should be built around the concept of streets and mixed use as they can serve as the focus for building liveable communities as demonstrated in Figure 10.5 below.

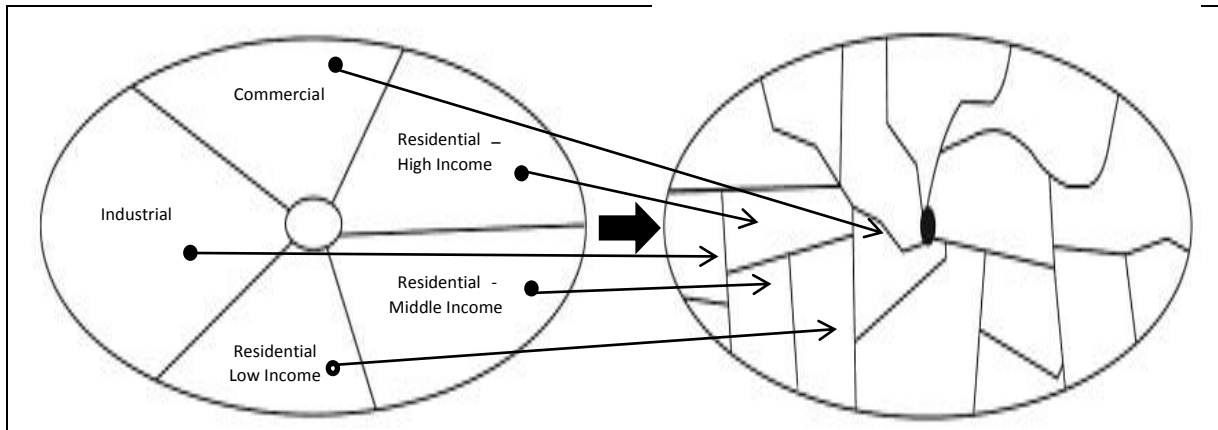


Figure 10.5: Streets connectivity and mixed land use

Source: Own construction (2015)

Cities should therefore encourage mixed land use, both in terms of functions (i.e. residential, commercial, manufacturing, service functions and recreational) and in terms of social composition (i.e. with neighbourhoods containing a mixture of different income and social groups).

10.3.3 Embracing the idea of sustainable urban form

The current urban form and functionality of urban components (city-neighbourhood relations) increase the need to travel to coordinate physically separated activities and functions. The theoretical recommendations for cities (inclusive of all its neighbourhood) to function as integrated and interconnected communities, cities should be more compact, encourage mixed land use and prioritize sustainable modes of mobility such as public and non-motorized transport. Housing, land-use, transport and environment policies should constitute a significant part of this recommendation.

10.3.4 Integrate transport and land use planning

Townships in CMLM are located in peripheral areas, widening the relative distance between homes and workplace. This means that many of the urban poor are located in peripheral areas as townships constitute majority of a city population. On this basis, it is recommended that transport issues should be ranked higher on the list of priorities, especially taking into account that road access in some parts of the townships is deficient. Integrate transport planning and land use in order to ensure that cities are built to encourage environmentally sustainable transportation modes while stressing the need to reconfigure urban form to enhance accessibility.

- Increasing connectivity via integrative transportation systems;
- Encourage high residential density around public transport nodes and economic activity centres.

10.3.4.1 Increase modes of public transport and connectivity

Having strong empirical evidence that CMLM has taxis as the only mode of public transport for workers and scholars, the recommendation is to increase modes of public transport and encourage non-motorised transport modes (walking and bicycling). This will increase reliability and efficiency of public transport services while providing alternatives to passengers to make a decision on which mode to use based on affordability, safety issues, accessibility and service infrastructural facilities.

The easing and connectivity that in turn determine the quality of access to public transport needs to be adjusted for provision of various types of transportation system to accommodate needs of various end-users. The implications of this recommendation are quite clear – it is expected that high accessibility will soon take effect due to various types of transport systems

which will proportionally extend to informal settlements by so doing forging the spatial configuration outside the urban edges.

10.3.4.2 Bus Rapid Transit Systems feasibility

Public transport policy options such as Bus Rapid Transit systems (BRT) with their own dedicated lanes need to be considered in CMLM to increase transport choices. CMLM has viable density to support BRT systems in order to offer efficient public transport systems and increase integration of city and townships.

10.3.4.3 Improving access roads

In CMLM townships access to poor and low-income residential areas needs to be improved by upgrading secondary and tertiary roads.

10.3.5 Utilising housing land-use as deterministic urban growth management tool

Housing has become an important strategic planning tool (Housing Sector Plans) for local governments in ensuring efficiency and effectiveness in policy design and implementation, including for infrastructure (Jordan & Infante, 2012:539). From its embryonic status, the main objective should be to assist decision-makers and planners to identify and prioritise actions that lead to socially, economically and environmentally vibrant human settlement. Clustering of houses should be seen as a means not only to convert or bridge physical disconnect in urban areas but also to regenerate the economy of both the city and the local region – maximize alternative interpretations and relationships of the nature of housing clustering. This will include optimizing empirical processes as much as possible to determine the role and influence of residential spatial classification and various land-uses.

10.3.6 Prioritising urban infrastructure – public goods and services development projects

Urban infrastructure development is recommended to drive economic growth and competitiveness, increase employment opportunities, contribute to poverty alleviation, improve quality of life, enhance energy security, improve the environment and also avoid future costs and risks, and assist governments maximise precious financial resources. It is also attractive for the private sector and can assist leverage private investment in CMLM. In essence, the results revealed the townships need aggressiveness in infrastructure development to bring new business ventures into their regions. Economic development is supported by proper infrastructure development – in this case this is reflected in the CMLM regeneration strategies, NDP 2030 and IDA 2014 advocacy. In poorly structured parts of the townships lack of economic activities surfaced as formidable obstacle to pursue sustainable human settlement framework and related activities.

10.4 Cultivating policy in achievement of integrated sustainable urban development and strengthening neighbourhood regeneration strategy

- It should be noted that in South Africa the constituted Bill of Rights serves as a central theme for integrated planning;
- The urban regeneration strategy must be aligned and uphold Section 26 of the Constitution [Act 108 of 1996] for its strong provision of human and socio-economic rights that is inclusive of access to sufficient food, water and shelter as basic social right;
- Integration of Spatial Planning and Land Use Management Act 2013 [SPLUMA] Housing Development Agency Act 2008 and Infrastructure Development Act 2014 framework in order to gain access to development land; and the broad content as included to the link the plan to other national, provincial and local plans such as National Development Plan 2030 (NDP), National Spatial Development Perspective (NSDP), Provincial Spatial Development Framework (PSDF), North West Provincial Growth Development Strategy (NWPGDS),

Integrated Development Plan (CoM IDP) and the National Breaking New Ground Housing Policy (BNG) to ensure integrated development;

- The strategy must reflect on national development agendas as contained in the National Development Plan (NDP) and its implementation framework presently serving as a proactive development input in ensuring its purported mandate are in line with set goals;
- The strategy must apply IUDF to respond and transform human settlements and the national space economy taking into account vision and objectives of Chapter 8 of the NDP;
- The strategy must apply appropriate instruments to guide urban development aligning its implementation plan on CHP and Outcome 8, which its main goal is to introduce suitable techniques to promote and improve livelihood;
- The strategy must conform to the national funded programmes to reach the delivery targets as set in the five year plan and IDP of Municipalities;
- On the requirement of guiding and setting of budget priorities the strategy must ensure the incorporation in the IDP of municipality as its status is prescribed in the Municipal Finance Management Act (MFMA) of 2003;
- To invest in infrastructure or transport systems in ways which satisfy social, economic, or strategic investment criteria;
- As contained in NLTA 2009 subsidise public transport to assist currently marginalised users and those who have poor access to social and economic activity;
- Utilise the Gauteng Integrated Master Plan 2013 to provide subsidised housing: affordable, mixed-income and mixed-use developments along priority public transport corridors;
- The strategy must ensure mobilization of communities and community-based organizations to engage more effectively with the preferred development of their settlements;
- The strategy must prioritise, mobilise, sequence and implement sectoral plans that are consistent with each other;
- The strategy must determine if the CMLM have the organizational capacity to deliver on its objectives and its supportive role in the municipality regeneration project;
- Ensure appropriate surveys and consultation processes – this includes effective interdepartmental and intergovernmental coordination measures.

10.4.1 Integration of spatial planning, transportation planning and environmental planning

The urban policy focus should be on the integration of land-use, transportation systems and environmental management as a way to improve the efficiency of cities. A well-planned and integrated land-use and transportation system can limit land-use development while reducing greenhouse gas emissions (UN-Habitat, 2012e:102). The integration strategies must be understood as a failure to address the dynamics of integration can have negative impact towards sustainability of city's as illustrated by Table 10.1 below.

Table: 10.1: Dynamics of integration strategies

Policy implementation expected results	Implications of failure to implement policy
(a) Timely integration of emerging issues in urban and regional planning frameworks; (b) Updated roles of different spheres of government, civil society and the private sector to ensure effective urban and regional planning (c) The identification of urban development priorities towards socially and economically equitable and environmentally friendly urban and national development; (d) Guidance on the future development of the national urban system and its spatial configuration concretized through national and regional spatial plans for territorial development; (e) Better coordination and guidance of actions by national actors, as well as lower levels of government in all sectors; (f) increased and more coordinated private and public investments in urban development and consequent improvement of cities' productivity, inclusiveness and environmental conditions	(a) Lack of national urban policies uncoordinated with regional and local regulatory frameworks that neglect nexuses between land use and transportation planning including investment in basic infrastructure, protection of the public realm, and tenure security; (b) Reluctance or inertia in taking into account emerging issues and local needs; (c) Lack of clarity of roles and in institutional arrangements regarding planning and its link with other legislation and provisions affecting it (including sectoral legislation); (d) Weak capacities for implementation and enforcement (e) Reluctance or inertia in taking into account emerging issues and local needs;

Source: Own construction (2015) – theoretical construct from various UN-Habitat publications listed in Table 4.2.

10.4.2 Utilise urban policy nexus to promote sustainable and efficient urban development

In order to achieve integrated sustainable urban development – urban sustainability dimensions in this context are mechanisms nexus for alignment and integrated planning as shown in Table 10.2 below.

Table 10.2: Sustainable urban dimensions mechanisms nexus for alignment and integrated planning

Sustainability dimensions	Integrated nexus approaches
Economic sustainability	Economic efficiency (creating more with less) - integrating areas/regions through policy and trade.
Social sustainability	Accelerating access - integrating the bottom of the urban structure.
Ecological sustainability	Access to resources – integrating the ecosystem services and investing to sustain ecosystem services
Physical sustainability	Access to socio-economic opportunities Integrating through infrastructure and spatial development planning; investing in infrastructure to support local economy.
Political sustainability	Relations of various territorial scales (e.g. municipality and city; city and neighbourhood; city and precinct; etc.) Institutional structures for coordinated planning and decision making.

Source: Own construction (2015).

10.4.3 Utilise metrics to increase effectiveness of urban policy intervention

The issues of physical separation of activities between a city and township that still exist in urban areas necessitate a substantive change to urban policy implementation plans and commitment to sustainability practices. It is deduced and acknowledged that urban policy trajectory is not forging integration between cities and townships as it would be expected. Considering performance evaluation methods discussed – urban policy intervention needs to commit to sustainability measurement frameworks and/or metrics that will hold them accountable to more integrated processes for planning and decision-making.

10.4.4 Encouraging community participation in planning process

Consider community participation to be a key structuring element in an effort to realize conscious strategic planning – integrated development planning. This reflects the assumption that community will be the fundamental element of a hierarchical structure of an urban area, highlighting the appropriateness to consider addressing sustainability at the scale of community development. Essentially, this means that residential local action should be regarded as the first most suitable scale of urban operation – utilising its local knowledge, which is embedded in socio-spatial networks.

10.4.5 Utilise precinct plans to design the city's overall spatial development strategy

The precinct plans should be used to increase residential and economic densities with compact communities while guiding new redevelopment to areas better suited for urbanization. The precinct plan should be supported by the LUMS in order to regulate land use change and protect the development right over existing individuals and group's property. The precinct plan crystallises in the SPLUMA (2013) wall-to-wall approach to land use management and regulation. In Table 10.3 the possible outcomes are outlined for successful implementation of precinct plans as well as consequent negative effects if the strategies not successfully implemented.

Table 10.3: Plans for intermediate cities

Policy implementation expected results	Implications of failure to implement policy
1) It will outline, guide and design the city's overall spatial development strategy as long term strategy based on the following: a) the identification in each city of space required for population growth, and expansion of services and infrastructures – enhance the potential live/work quality b) the creation of improved management solutions for rapidly growing centres; c) the integration of rural areas and their economic base and market functions; and the design of balanced solutions between natural resources and economic opportunities, d) enhanced connectivity and accessibility within the precinct and	1) Cities will continue to consume land at an alarming rate to accommodate new developments; 2) The consumption of urban land will grow much faster than the urban population, resulting in less dense and, in general, more inefficient land use patterns; 3) There would not be viable spatial structure to guide expansion of services and infrastructure, integrating cities and neighbourhoods as well as integrated rural and urban areas; 4) Unsafe and unsecure environment

between the precinct and the rest of the city e) improved public transportation and pedestrian circulation within the city	that discourage outdoor activities and social interaction between residents

Source: Own construction (2015) - theoretical construct from UN-Habitat (2013g:1-40).

10.4.6 Proposed urban policy critical areas

The proposed functional areas should be prioritized in the implementation of urban policy and/or incorporated in new policy as the expected results will enhance the role of intermediate cities/small towns/neighbourhoods/precincts within the national urban system.

Table 10.4: Proposed functional areas for empowering local governments/urban areas policy and regulations

Proposed functional areas	Functional sub features/ planning tools	Strategic objectives	Policy implementation expected results	Implications of failure to implement policy
Spatial planning	*Functional sub features/planning tools *Planning and design of cities *Urban densification – densification plans *Mixed use compact *Urban renewal which incorporate infill	*To create spatial structures in order to support urban development and attract investments	1)-Well planned and designed cities can generate higher levels of wellbeing, better employment opportunities and financing; 2). Availability of large areas of land for development, thus reducing land prices and speculation; 3). Increase in urban densities, accommodating population growth more efficiently – additional benefits of increased density include: (a) economic agglomeration advantages, including lower costs of providing infrastructure and services; (b) strengthened social interactions and reduced mobility demand; (c) mixed use of land that increases social heterogeneity and generates economic densities; and (d) minimisation of the cities ecological footprint with more compact cities; 4). Compact mixed-use	1)-Poor spatial planning may negatively impact on cities abilities to attract investment and on new industries ability to establish themselves in these areas; thereby negatively impacting on economic development prospects in these locations; 2). Poor planning and short-termism can result in slums and informal settlements lacking public goods and services; 3). Irresponsible land use and construction yielding spontaneous urban sprawl vulnerable to natural and human-made disasters such flooding; 4). Loss of urban identity

			neighbourhoods that integrate various urban sustainability principles such as urban renewal which incorporate infill, densification and mixed-use solutions such as enabling efficient public transport and thresholds to support concentrations of economic activity, services and facilities; 5). Pedestrian friendly streetscapes and facades, and attractive neighbourhood recreational centres and parks; 6). More inclusive communities and increased social cohesion among city residents; 7). Increased access to services and infrastructure for urban dwellers living in these neighbourhoods.	caused by the destruction of cultural heritage, local biodiversity, and public space; 5). Uncontrolled rapid urbanization, slum proliferation, rural to urban migration and land shortages.
Transportation planning	*Public transport *Transport infrastructure *Transport corridors/ networks	*To establish sustain-able mobility systems; *To create equitable access to transportation services, better economic productivity and lower negative environmental impacts	1)-More compact settlement patterns for travel reduction and reduced energy consumption; 2)-Integrated transport policies and planning for better access to housing and employment opportunities; 3)-Mobility management and intermodal network for seamless urban transport systems; 4)-More accessible and efficient public transport systems; and better infrastructure for pedestrians and cyclists allowing for greater safety and liveability in cities	1)- The traffic congestion created by unsustainable transportation systems; 2)-Increase of green-house gas emissions and a cause of ill-health due to air and noise pollution from urban transport; 3)-Increase of economic and productivity costs for commuters and goods transporters; 4)-Inadequate infrastructure and planning of infrastructure to cope with growing populations in cities; 5)-Increased traffic and commuting times; 6)-Difficulties with the timely access of essential services and administrative difficulties
Economic development	*Investments *Employment *Collaborations/ partnerships *Inclusiveness *Social development	To provide a comprehensive strategy for enhancing and managing urban economic growth as well as optimizing economies of agglomeration	1)- Sound economic development, planning and implementation; political legitimacy; and confidence with business and development partners – promoted social inclusiveness, equity, human rights approach to urban economic development, and design investment and financing strategies for urban economic development; 2)-Increased and more coordinated	1)-Insufficient employment opportunities, high-level of poverty, low-level of entrepreneurship and weak social security; 2)-Weak market mechanisms and lack of new competitive economic sectors; 3)-A large amount of poor

		and urbanization	private and public investments in urban development and consequent improvement of cities productivity, inclusiveness and environmental conditions; 3)-Strong urban economies will create wealth and enhance competitiveness of cities to drive economic growth and job creation; and articulating asset-based strategies to optimize the endogenous growth factors and to improve policies, planning, resource allocation, service delivery, livelihood and governance.	housing and basic services.
Urban management	*Capacity development *Collaborations/ partnerships *Public participation	*To develop a comprehensive legal and institutional framework that will deal with key functions of urban management and governance *To increase capacities and integration between spheres of government	1)-Updated roles of different spheres of government, civil society and the private sector to ensure effective urban and regional planning; 2)-Increased institutional efficiency and affordability in service provision to foster cross-sectoral planning at different levels, facilitate partnership and dialogue among various stakeholders, different administrative levels and partners and through promotion of decentralized decision-making improved land management systems: (a) better managed urban systems; (b) safer communities; (c) more accountable local government; 3)-Enhanced collaboration between local government and stakeholders; 4)-Increased capacities of national and local authorities and partners to formulate and implement evidence-based, equitable programmes promoting sustainable urban development; 5)-Improved knowledge of sustainable urban development, local issues such as urbanization 6)-Improved monitoring of urban conditions and trends; 7)-In the medium to long-term, improved occupational skills as well as improved employment opportunities; 8)-Better coordination and guidance of actions by national actors, as well as lower levels of government in all sectors	1)-Mismanagement by all actors and tiers of government leading to inefficient and wasteful public services; 2)-Inadequate infrastructure, serious urban environmental pollution, insufficient water sources and energy supply, irrational use of land and poor living conditions and low productivity; 3)-Lack of understanding among national or city decision makers of the challenges facing urban areas; 4)-Adoption of a unclear and non-implementable urban strategy.

Urban resilience	*Eco-efficient – green economy, green buildings *Economic resilience *Social resilience	*To build the resilience of the cities *To create green urban spaces *To contribute to climate change mitigation efforts by lowering the ecological footprint *Focus government investment on areas that will stimulate the greening of economies	1)-Reduced consumption of resources; 2)-Reduced environmental impact; 3)-Increased service value; 4)-improved urban food security; 5)-Income and job creation; 6)-Enhance climate change adaptation efforts by increasing vegetation cover and reducing surface water run-off, while at the same time conserving biodiversity; 7)-More durable and resilient housing; 8)-Green jobs – contributing to urban economic development; 9)-Improved quality of life, poverty alleviation, environmental protection and improved health and safety; 10)- Create a virtual circle of economic and social development lifting populations out of poverty through self-sustaining and resilient economic growth and shared prosperity.	1)-Dependency on food imports; 2)-Land available for ecosystems and food production will be diminished – reducing the ability of city-regions to support themselves; 3)-Destabilize development and deepening inequalities between rich and poor.

Source: Own construction (2015) – theoretical construct from various UN-Habitat publications listed in Table 4.2.

10.5 Using SNM as the base to select nationally pool of criteria to measure urban sustainability

It has been established that neighbourhoods claim differences in orientation. On this basis it is recommended that to achieve a more balanced assessment framework that provides the most exhaustive possible list of criteria for assessing a neighbourhood (and/or city/municipality) sustainability – a pool of criteria must be decided on nationally in order to develop South African version of assessment framework.

This includes crafting national dialogue on the need of city/neighbourhood assessment tools. SNM as way of contribution encourages national level multi-stakeholders in preparing a comprehensive set of assessment criteria at the neighbourhood level. Because of various contextual differences and the proliferation of sustainability as a term or in operation version it

is important to have customized benchmarks for assessment. Of importance is that the criteria and factors will identify barriers that hinder disadvantaged/poor neighbourhoods to achieve sustainability such as issues that reduce quality of life, retard economic prosperity and competitiveness and other related issues as determined by the developed criteria and factors.

To allow differences in orientation the following features need to be considered:

- ✚ Collection of baseline data has to be the first step;
- ✚ Community engagement in selection of factors;
- ✚ The assessment tool has to be flexible but caution must be taken to preserve the basic developed framework.

10.5.1 Combining disciplinary knowledge in order to establish comprehensive neighbourhood assessment tool

Neighbourhood sustainability assessment demands a more expanded approach. It is recommended that combined disciplinary knowledge has to be cultivated to broaden perspectives— allowing disciplines to complement each other in order to establish comprehensive neighbourhood assessment tool.

10.5.2 Utilization of SNM by the local authorities

Utilise SNM for assessment of neighbourhood regeneration projects. Selections of the relevant criteria and assignment of weights to different sustainability criteria should be based on the local priorities and the opinions of the stakeholders of the development.

10.5.3 Improving and coordinating service delivery and budget and expenditure using the SNM

The SNM urban governance index should be used to coordinate IDP service delivery and municipal/provincial budget. This recommendation comes amid growing National Treasury concern about some municipalities' lack of service delivery while there is adequate funding as reflected by under-spending of municipal infrastructure grants. For example, the third quarter provincial year-on-year budgets and expenditure report for the 2014/2015 financial year, Mpumalanga was ranked one of the lowest spending in various areas, even on services such as health, education and housing. It is indicated that a total R4.2 million and R3 million allocated to the Department of Education and Department of Health respectively were left untouched (*Sowetan*, 2015:7).

In addition, there was another R9 million, which was part of the allocation for salaries of public servants of the Departments of Health, Department of Human Settlement and Department of Education that was not utilised by a province and its municipalities (*Sowetan*, 2015:7). This is happening despite the fact that Mpumalanga is one of the provinces in the country battling serious backlogs in the provision of drinkable water and flushing toilets.

It is recommended that the use of urban governance index will serve as a guideline to define, review and adjust municipalities' service delivery and capacity with budget and expenditure in order to achieve desired sustainability in neighbourhoods. Lastly, urban governance index will improve the database of the municipalities and keep them up-to date.

10.6 Utilising neighbourhood minimal scale to improve decision-making

Undertaking the neighbourhood sustainability assessment and neighbourhood planning would retain the city fabric by effecting change incrementally and affiliating with the basic needs. Within this framework the first priority will be to evaluate activities and recommending basics

to neighbourhood level. The local context for each neighbourhood must determine its needs. This will provide planners and decision-makers with better understanding of neighbourhood fabric types and performance to improve the decision-making for integrated sustainable urban development.

10.7 Additional criteria and factors to be considered in neighbourhood/city sustainability evaluation

10.7.1 Considering the air quality factor

Air quality is an important factor that needs to be included in the pool of factors to deal with sustainability performance evaluation in neighbourhoods. For sustainability requirements the focus is on reduction of pollutants such as vehicle emissions and exploring alternative practices. Air quality is of utmost importance and in this research the plea is that CMLM as a mining town should be aware that air quality is most likely to become an issue due to fine airborne particles from mining activities. Fine particles in the air can travel long distances between regions (World Health Organisation, 2004:15) and it is said that such airborne particles from mining activities are significant in influencing concentrations of fine particles in some areas close to mines.

As a means of assessment the indicator ought to have been included so that it might be used to permit comparisons to the situations. However, the air pollution monitoring points were not neighbourhood-specific, therefore, would not be providing accurate performance benchmarks. On the basis that mining activities result in local deterioration of air quality it is recommended that this criterion should be included for comparative review of sustainability when rating neighbourhoods and cities.

10.7.1.1 Reductions in vehicle emissions

Continuous analysis of outdoor air suggests that mining and local transport plans should be integrated to develop air quality action plan such as air monitoring and assessment of local air quality. To increase air quality vehicle emissions reductions play an important contributory role. Vehicle emissions are an important criterion that needs to be considered when evaluating sustainability performance in urban areas especially if the focus is poor and township neighbourhoods as they represent the worst group of vehicles from an emissions perspective. In CMLM old cars represented a very big proportion of vehicles – implying a significant role in the emissions. In U.S the Department of Energy Consumption has introduced regulations to stimulate increases in vehicle emission reductions – retiring old vehicles and issuing, amongst other things, credit incentives that will equal the savings associated with replacement of the older vehicles (U.S Department of Energy Consumption, 1992:3).

The case in point is that the regulation was introduced to lower cars' fuel consumption – the old cars are said to consume more fuel than new cars. Equally importantly, this regulation benefits air quality and the environment in general.

10.7.2 Incorporating the spatial information (Flowmap software) into the SNM spatial criterion

Based on the inconsistency and lack of current up-to date data – Flowmap software is recommended to optimise location of service points. It can also be used to generate accessibility statistics. The Flowmap software package developed by the Faculty of the University of Utrecht in the Netherlands has a Location-Allocation Model that can be used to do accessibility modelling and an add-on package called Spatial Analyst that allows accessibility modelling or distance analysis to be done (CSIR, 2012:26).

10.8 Conclusion

Regarding the significance of having comprehensive sustainable urban development, this research emphasises the importance of strategic performance measurement to provide suggestions for improvements in neighbourhoods and cities. In the simplest terms, the research has resulted in recommendations that are expected to provide solutions in the real world if the end-user responds to the actions and initiatives of this research. On this basis, authorities can build upon sections of the research recommendations for measuring and analysing sustainability within neighbourhoods and cities.

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Annexure A: City of Matlosana household questionnaire

QUESTIONNAIRE

Questionnaire number: _____

Date of Interview: _____ Location: _____

1. **Sex:** Male

1
2

 Female

2. **What was your main reason to decide to locate here?**

1) Born here	01
2) Married here	02
3) Job opportunities	03
4) Low crime rate	04
5) Has all I wished for	05
6) Opportunity to save	06
7) Close to amenities	07
8) Nowhere else to go	08
9) I don't know	09
10) Other (specify)	10

3. **How long have you stayed in this neighbourhood?**

1) Less 1 year	1
2) 1-5 years	2
3) 6-10 years	3
4) Over 10 years	4

4. **Would you say that this is a neighbourhood you enjoy living in?**

1) Yes definitely	1
2) Yes to some extent	2
3) No	3

5. **To what extent would you agree or disagree that people in this neighbourhood (within 15/20 minutes walking distance) pull together to improve the neighbourhood?**

1) Definitely agree	1
2) Tend to agree	2
3) Tend to disagree	3
4) Definitely disagree	4
5) Don't know	5
6) Nothing needs improving	6

6.

To what extent do you agree or disagree with each of the following statements					
	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
1) People in this neighbourhood are willing to help their neighbours	1	2	3	4	5
2) This is a close-knit neighbourhood	1	2	3	4	5

3) People in this neighbourhood do not share the same values	1	2	3	4	5

7.

How worried are you about the following crimes					
	Very worried	Fairly worried	Not very worried	Not at all worried	Don't know
1) Having your home broken into and something stolen	1	2	3	4	5
2) Being mugged and robbed	1	2	3	4	5
3) Being subject to a physical attack because of skin colour, ethnic origin or religion	1	2	3	4	5
4) Being a victim of all types of crime in general	1	2	3	4	5

8.

How satisfied or dissatisfied are you with these different types of services						
	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know
1) Local schools	1	2	3	4	5	6
2) Housing	1	2	3	4	5	6
3) Local street cleaning	1	2	3	4	5	6
4) Local policing	1	2	3	4	5	6
5) Local health services	1	2	3	4	5	6
6) Local public transport	1	2	3	4	5	6
7) Parks and open space	1	2	3	4	5	6
8) Variety of shops	1	2	3	4	5	6

9. How would you rate your level of involvement in public participation activity?

- 1) Excellent
- 2) Good
- 3) Fairly poor
- 4) Poor

1
2
3
4

10. How would you rate your trust your local council?

- 1) Excellent
- 2) Good
- 3) Fairly poor
- 4) Poor

1
2
3
4

11. Do you or anyone else in your household at the present, own or have continuous use of any car, van or motorbike?

Yes	1
No	2

How do you usually travel to work?

1
2
3
4

- 1) Bus
- 2) Minibus - taxis
- 3) Bicycle
- 4) On foot (more than ten minutes at a time)
- 5) Scooter/motorcycle
- 6) Own car
- 7) Car sharing
- 8) Other (please specify)

5
6
7
8

12. How long does it usually take you to travel from your home to your destination using public transport (taxi or a bus)?

- 1) Less than 15 minutes
- 2) 15-30 minutes
- 3) 31-45 minutes
- 4) 46-59 minutes
- 5) 1 hour to 2 hours
- 6) Over 2 hours

1
2
3
4
5
6

13. How long does it usually take you to walk to the nearest bus stop/taxi rank from your home?

- 1) Less than 15 minutes
- 2) 15-30 minutes
- 3) 31-45 minutes
- 4) 46-59 minutes
- 5) 1 hour to 2 hours
- 6) Over 2 hours

1
2
3
4
5
6

14. How long do you usually wait for public transport (taxi or bus) from home?

- 1) Less than 15 minutes
- 2) 15-30 minutes
- 3) 31-45 minutes
- 4) 46-59 minutes
- 5) 1 hour to 2 hours
- 6) Over 2 hours

1
2
3
4
5
6

16.

How much does it usually cost you per day travelling from home to work					
Less than R5.00	R5.10-R7.00	R7.10-R9.00	R9.10-R11.00	R11.10-R13.00	Over R13.10
1	2	3	4	5	6

17.

To what extent are any of the following a problem in your area?			
	Not a big problem	Fairly a big problem	Very big problem
1) Crossings	1	2	3
2) Road	1	2	3

Annexure B: SNM alternative measures

Urban growth	
Demographic profile	0 - 4 age group/Total neighbourhood population
	% of 0 - 4 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	4- 9 age group/Total neighbourhood population
	% of 5 - 9 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	10- 14 age group/Total neighbourhood population
	% of 10 - 14 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	15 - 19 age group/Total neighbourhood population
	% of 15 - 19 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	20 - 24 age group/Total neighbourhood population
	% of 20 - 24 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	25 - 29 age group/Total neighbourhood population
	% of 25 - 29 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	30 - 34 age group/Total neighbourhood population
	% of 30 - 34 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	35 - 39 age group/Total neighbourhood population
	% of 35 - 39 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	40 - 44 age group/Total neighbourhood population
	% of 40 - 44 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	45 - 49 age group/Total neighbourhood population
	% of 45 - 49 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	50 - 54 age group/Total neighbourhood population
	% of 50 - 54 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	55 - 59 age group/Total neighbourhood population
	% of 55 - 59 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	60 - 64 age group/Total neighbourhood population
	% of 60 - 64 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	65 - 69 age group/Total neighbourhood population
	% of 65 - 69 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	70 - 74 age group/Total neighbourhood population

	% of 70 - 74 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	75 - 79 age group/Total neighbourhood population
	% of 75 - 79 age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
	80+ age group/Total neighbourhood population
	% of 80+ age group annual growth rate = $(P_{t1} - P_{t2})/P_{t2}$ where P_{t1} =Current year & P_{t2} =Current year lag 1
Neighbourhood size	Large $\geq 15\ 000$ people
	2 999 people < small < 15 000 people
	Total population living in neighbourhood/Total City population = % of neighbourhood population per city population
Urban density/ urbanisation	
Population density	Neighbourhood population density= Neighbourhood population/Amount of land in neighbourhood use= # persons per ha.
	5-year neighbourhood population growth rate = $[\text{Neighbourhood population}_t - \text{Neighbourhood population}_{(t-5)}]/\text{Neighbourhood population}_{(t-5)} = \%$
Dwelling unit density	Neighbourhood housing density= Number of dwellings in neighbourhood/Amount of land in neighbourhood use= # of dwellings per ha.
	5-year neighbourhood density growth rate= $[\text{Density}_t - \text{Density}_{(t-5)}]/\text{Density}_{(t-5)} \times 100 = \%$
Urban governance	
Ward councillors	Total # of ward councillors in the neighbourhood/Total # of ward councillors in the municipality
Social services	
Availability of open space and parks	Total # of neighbourhood community gardens/Total # of City community gardens = % of neighbourhood community gardens per city
	Total neighbourhood open space/Total neighbourhood land area = % of open space per neighbourhood

Annexure C: Factor value for each neighbourhood

Criteria & factor(s)	Ala	Jou	Kan	Khu	Tig
Spatial and environment					
Locational advantages/ opportunities	10.00	10.00	6.00	16.00	3.00
Residential land use	0.16	0.22	0.22	0.23	0.17
Urban density: Unequal distribution of urban population in the different neighbourhoods					
Concentration index (CI)= Devation of the Lorenz curve from the line of equal distribution	See Table 7.6 & Table 7.7				
Cultural and social capital					
Inclusive planning and implementation	0.12	0.22	0.18	0.20	0.28
Social capital	0.00	0.30	0.20	0.20	0.30
Visitors	0.03	0.03	0.00	0.00	0.00
Connectivity and public transport					
Public transport usage	0.19	0.21	0.17	0.20	0.22
Accessibility	0.23	0.18	0.27	0.23	0.09
Affordability and payment	0.27	0.25	0.26	0.18	0.04
Road infrastructure	0.00	0.23	0.19	0.19	0.19
Traffic convenience	0.24	0.17	0.21	0.20	0.17
Economic					
Economic characteristics	0.44	0.17	0.14	0.11	0.14
Human capital	0.14	0.21	0.20	0.23	0.21
Economic vitality and market	0.19	0.20	0.20	0.20	0.20
Smart growth					
Multiple transport options	0.29	0.07	0.14	0.14	0.36
Range of housing opportunities	0.13	0.22	0.25	0.22	0.19
Sense of place	0.17	0.22	0.20	0.19	0.23
Services (i.e. parks/sport fields/education/scholar transport/housing services) for residential neighbourhoods					
Housing services coverage	0.08	0.33	0.24	0.20	0.15
Accessibility index (see Table 7.12)	0.61	0.37	0.39	0.53	0.76
Food security					
Availability	0.00	0.25	0.25	0.25	0.25
Urban governance* (see Table 7.14)					
Housing backlog per neighbourhood	0.06	0.23	0.25	0.17	0.15
Liveability					

Cost of living	0.28	0.22	0.20	0.17	0.13
Security and safety	0.25	0.53	0.10	0.08	0.05
Stability	0.07	0.05	0.03	0.02	0.02
Living environment and health care	0.07	0.36	0.21	0.21	0.14
*Housing backlog per neighbourhood is the only information different for the different neighbourhoods. Therefore only these values were used to determine the urban governance.					

