HUMAN SETTLEMENT SCIENCE:

Perspectives, Issues and Cases

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CHAPTER 1: Overview of Issues, Scope and Dimensions in Human Settlements Science

Abstract

The chapter seeks to explore and discuss various aspects of human settlements by revealing some of the elements that help shape them when faced with changing cultural needs in trying to solve some of the urban challenges caused by increased urbanisation such as the sprawling of cities, increased traffic congestion and increased pollution in the urban sphere. The background of the argument emanates from the observation that human settlements have continuously evolved, hence the need for effective planning to promote sustainable development of present and future cities. The study engaged a desktop review of literature and results indicate that planners and various interested stakeholders can use city designing studio and the studying or urban and regional morphometrics to positively influence city growth to reduce crime. It is concluded that disasters have become an unavoidable part of most human settlements. It is recommended that planners be able to utilise city designing skills to influence the rate of crime in cities and the rate of climatic changes and disaster occurrences in cities. The study also recommends a well-defined disaster risk management framework that can be used as a yardstick. Local solutions can be crafted to avoid and reduce the impacts of disasters on the environment and human lives.

INTRODUCTION

Human settlements have continuously evolved over the years and have changed to accommodate the ever-changing needs and cultural aspects of people. Urban and regional challenges caused by increased urbanisation and climatic changes have resulted in problems such as traffic congestion, pollution, global warming and the clearing up of urban green spaces in favour of settlement areas. This has prompted planners to be more innovative in dealing with these challenges. It is imperative to increase the study of urban and regional morphometrics, climatic-shifts trends and the advantages of learning and improving skills in city studio designing to formulate designs that appreciate nature and reduce some of the current city challenges such as traffic congestion and pollution. This chapter aims at appreciating various

aspects that human settlements endure such as issues to do with climate changes, crime and transport logistics issues, among others.

URBAN AND REGIONAL MORPHOMETRICS

Defined as a branch that deals with the systematic understanding and measurements of the urban form, urban morphometrics aims at defining the constituent urban elements (Dibble *et al*., 2015; Dibble, 2016). Urban morphometrics can be used by planners and other interested stakeholders to better understand city and regional forms and the character of cities and towns hence the need to understand the branch of "systematics". Systematics refers to the ability to group and organise the external world to classify together objects/organisms that are similar. This in turn helps in urban and regional designing.

TRANSFORMING CITY STUDIO

Cities have evolved and most of them compete to be attractive and become creative places that represent secure investments with the green vision (Lehmann, 2010). As a result, cities have thrived to be innovative in solving urban challenges such as traffic congestion, increased rate of urbanisation in cities, the increased consumption of green spaces and the formation of squatter camps.

TRANSPORT AND CITY LOGISTICS

Defined as the means of freight distribution in urban areas, city logistics involves the engagement of various strategies aimed at improving efficiency while mitigating externalities such as emissions and congestion (Rodrigue and Dablanc, 2020). Freight distribution involves the delivery and collection of goods in urban areas and improvement in city logistics through transportation methods, waste and returns, the handling and storage of goods, management of inventory and home delivery services (Baxter, 2021). Crainic *et al*. (2009) also regard city logistics as movement and consolidation of loads of several customers in the same environmentally-friendly vehicles. As a result, transport inefficiencies and costs are reduced and transport efficiency maximised.

Urban freight has become a vital part of urban planning and due to challenges that currently characterise most urban landscapes such as congestion, environment and energy conservation. Various city logistics can be utilised in solving these problems, including the use of advanced information systems, cooperative freight transport systems,

load factor controls and the use of underground freight transport systems (Taniguchi and Van Der Heijden, 2000). Advanced transport systems involve rationalisation of existing logistic operations, while cooperative freight transport systems deal with the reduction in the number of trucks used for collecting or delivering several goods. Underground freight transport systems deal with the formulation of innovative transport solutions for urban freight transport challenges (*ibid.*).

Reliable delivery services are required to support the urban economy from the local planners' and transport operator's sides. As such, it is expected that vehicles making deliveries should impose a few environmental and social impacts (Allen *et al*., 2010). Two European cities, Amsterdam and Copenhagen, introduced the certification system for freight carriers who deliver or collect goods in city centres in the year 1998. Copenhagen allowed vehicles with a certificate/green sticker to use public loading/unloading terminals in the inner city in what was referred to as the 'controlling load factor'. The certificate could be issued only to vehicles with a load factor greater than 60% and on vehicles less than eight years old (Taniguchi and Van Der, 2000). Pollution levels in the two cities were reduced, with cleaner urban spaces. Zimbabwe recently banned the importation of cars older than 10 years to reduce the levels of pollution on the road.

Most of the early applications in city logistics were done in Japan and Western Europe as these cities were constrained mainly by the lack of available land up to the 21st century. The consideration of urban freight distribution within the planning profession remained limited (Rodrigue and Dablanc, 2020). It has also been noted that urban planning usually concentrates on activities that involve mainly the public sector such as public transit and land zoning, while freight distribution is regarded as a predominantly private sector endeavour associated with externalities (*ibid.*).

CRIME, PLACE AND SPACE

The study notes that design plays an important role in influencing the crime rate of an area. A place encompasses three elements, including a location that defines a position in place, material form representing a physical presence and meaning and value. Space is defined as anything with an area and volume, alternatively referred to as absolute space but does have cultural meaning (Vilalta, 2013). Vilalta (*ibid.*) also

notes that place matters in crime analysis, especially when relationships between correlates are conditional upon the place. Important to note also is that as cities grow, transport efficiency ought to be improved (Rodrigue and Dablanc, 2020) through the introduction of environmental-friendly vehicles (Crainic *et al*., 2009) and the use of underground freight transport systems (Taniguchi and Van Der Heijden, 2000). In Copenhagen, only goods with a green sticker are allowed into the city centre (*ibid.*). Such measures cut on pollution, congestion and underground transport tunnels are utilised.

In Zimbabwe's gated communities such as the Borrowdale Brooke, in the low-density suburb of Harare, stricter measures are employed as people cannot enter or leave the neighbourhood without well-defined intentions. Due to such strict measures, guarded gated communities can be deemed safer than unprotected areas such as Mbare and Mufakose, high-density residential areas.

CLIMATE AND HUMAN HABITAT

Climate change has become a normal part of humans since for years as it has come to be characterised by various forms from natural disasters such as volcanic eruptions and earthquakes, to human-induced actions that have at times resulted in negative effects such as global warming and pollution. While natural causes may not be controlled by humans, human-induced factors can be controlled (Nwankwoala, 2015). Some of these human-induced factors include deforestation, emission of greenhouse gases and densification, among other factors (*ibid.*) and these all affect people's health and the way they live.

TOWARDS A FRAMEWORK FOR SUSTAINABLE DISASTER RISK MANAGEMENT

Both natural and man-made disasters have become a norm. Countries must, therefore, formulate measures aimed at risk reduction and the impacts on people and move towards a well-defined framework for disaster risk management. The Great East Japan earthquake and tsunami showed that both the developed and the developing countries are vulnerable to disasters (ISDR, 2015). There is need for countries to prepare for disaster possibilities at international, regional or local levels to prevent loss of lives.

METHODOLOGY

The study made use of the desktop review of literature by appreciating selected cases from the international, regional and national scenes. This was meant to appreciate developments from the international, regional and local levels. It aimed at appreciating the various facets of human settlements and how they get affected by various aspects such as climate changes, transport need changes and how city studio designing can be manipulated to produce sustainable present-day cities and cities of the future.

DISCUSSION

Human settlements continuously evolved as evidenced by changing culture and people's needs. Apart from having the same characteristics as shown by main and local roads to constitute urban blocks, settlements have not had the same footprint across space as they have been characterised by various urban and regional forms. These have been characterised by differences in culture and the existence of different building materials. As cities grow, challenges caused by urbanisation, such as the increase in traffic demand, the increase for settlement areas have been experienced. As a result, it becomes profitable for planners to have an appreciation of city studio to design settlements that have fewer transport challenges whilst promoting sustainable development through the increased appreciation of nature by the creation of green spaces and walkways to reduce traffic in the city centres.

Strategies to revitalise city centres include the creation of zero-carbon cities that are denser and more agriculture-oriented (Lehmann, 2010). In this regard, it becomes possible to accommodate more people on a limited space of land (probably through the construction of high-rise flats). Such developments reduce the sprawling of cities and traffic congestion problems as walkways and pathways are promoted instead. City studio can also be tempered to boost the economic activities of an area as evidenced by the construction of a casino in downtown Springfield in the USA (Alpay *et al*., 2018). The redesigning of downtown Lubbock in Texas in the US has shown that public opinion matters as consultations were conducted before embarking on the redesigning of the downtown area (Elliot and Driskill, 2016). In this regard, the public voice is heard and resistance to change by the public is reduced.

It becomes critical for planners to understand that no single solution is universal as countries come up with home-grown solutions aimed at greening their cities to promote sustainable development. The chapter also notes that criminal acts in neighbourhoods can either be promoted or avoided by a city's design and zoning. Studies have shown that burglary incidents are more prevalent in clustered settlements (Rengert and Wasilchick, 1998), while a study in Chicago revealed that crime was more concentrated in areas dominated by liquor stores and taverns (Block and Block, 1995). This shows that city designing plays a pivotal role in influencing the crime rate of an area.

The chapter also notes the impact that climate change has had on human habitation and provides an appreciation that some of the causes of climate change are not only natural, but man-made as well. In this regard, people must mind their actions (such as deforestation and the creation of greenhouse gases) to reduce the negative impacts that may result from climatic changes. Because of the increased occurrence of natural and man-made) disasters on the earth's surface, man ought to formulate a well-defined framework towards sustainable disaster risk management. This would, in turn, enhance the level of a country's preparedness towards known and unforeseen disasters reducing the loss of lives and property.

CONCLUSION

It is concluded that planning plays a pivotal role in shaping human settlements, hence the need for planners to appreciate and acquire city studio skills and appreciate and study various urban forms and the role of culture in forming sustainable settlements that suit the needs of the local people. The study recommends that:

- Designers must know that the way they design places and spaces can influence the crime rate of an area, therefore, they must have the skills necessary to effectively zone land uses in such a manner that reduces crime rates in human habitats.
- Humans must mind their actions as it has the potential to influence climate change, which may, in turn, harm people's livelihoods and their health.
- Planners and interested stakeholders must appreciate transport and city logistics to cut on congestion and pollution of the urban sphere because as cities grow, the transport demands of urban areas also increase.

- Both developed and the developing countries must have a framework for sustainable disaster risk management. In this regard, the preparation and creation of safety nets helps in reducing the impacts of these disasters on people and the environment.

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CHAPTER 2: Environment Systems Analysis for Human Settlements Establishment and Management

Abstract

The vulnerability of human settlements to climatic and environmental changes has recently increased. Most cities in developing countries are poorly prepared to counter crises and disasters. Due to poor resilience and preparedness, most people are being displaced from their settlements each time a disaster appears. Weak institutions existing in many cities have continued to resort to post-crisis planning and do not consider the need for futuristic planning that ensures community resilience before a disaster. There seems to be a competitive relationship between human settlements and the natural environment. Where the environment has not been considered of uttermost importance, human activities destroy the vibrancy of nature yet, humans depend on nature for their survival. Thus, the study explores environmental systems analysis as an imperative tool for enhancing human settlements viability. The chapter uses desktop research using literature document review to establish the relationship existing between human settlements and the environment.

INTRODUCTION

Environmental systems analysis has one of the most recommendable approaches to effective and sustainable settlement establishment and management. Before the development of a settlement, environmental analysis should be affront. Moberg (1999) highlights that environment analysis incorporates various tools including 'environmental impact assessment' (EIA), 'strategic environmental assessment' (SEA) and cost-benefit analysis (CBA). These tools facilitate assessing environmental impacts from a certain system, e.g. a project (Noviks, 2015). The vulnerability of human settlements to climatic and environmental changes has recently increased, calling for more assessments to ensure human safety. The UNHABITAT (2010) argues that most cities in developing countries are poorly prepared to counter crises and disasters. Due to poor resilience and preparedness, most people are displaced from their settlements after every disaster. As observed by the UNHABITAT (*ibid.*), weak institutions existing in many cities have continued to resort to post-crisis planning and do not

consider the need for futuristic planning that ensures community resilience before a disaster. Environmental analysis and planning lack prior development and this results in the siting of many informal settlements in disastrous and vulnerable areas due to unsustainable settlement planning. Understanding the concepts of the environment in settlement development helps in land-use planning before disasters occur. The UNHABITAT (*ibid.*) denotes that poor governance in many urban centres with obsolete master plans, worsen the vulnerability of human settlements to environmental hazards.

Human settlements have been established without much focus on the importance of environmental processes. There seems to be a competitive relationship between human settlements and the natural environment. Where the environment has not been considered of uttermost importance, human activities destroy the vibrancy of nature, yet humans depend on nature for their survival. Thus, the chapter explores environmental systems analysis as an imperative tool for enhancing human settlements viability. The study uses a desktop research analysis using literature and policy documents to ascertain the relationship existing between human settlements and the environment.

BACKGROUND AND OVERVIEW

Population increases in urban areas have seen massive expansion beyond city boundaries, consuming natural rural land. Winchester (2005) reveals that urban governments are challenged with balancing the habitability and functionality conditions favourable in many poor regions. Most of the poorly planned informal settlements in cities face imminent climatic and environmental challenges including landslides and flooding. Such settlements have very limited resources to withstand the pressures due to substandard dwelling units and poor infrastructural developments to enhance their resilience (UNHABITAT, 2019). Due to poor resilience and preparedness, most people are being displaced from their settlements at every disaster occurrence. Understanding the concepts of the environment in settlement development provides an alternative to land-use planning before disasters occur. Thus, the urgent need for environmental systems analysis and approach in settlement planning is imperative.

Environmental systems analysis provides better means to manage settlements effectively in a favourable manner for the environment.

Failure to recognise the importance of environmental analyses poses many threats to the environment that affects humans and their settlements. The environment is multifactorial in nature, making it a complex web. Noviks (2015) denotes that the environment is composed of natural (biosphere) and artificial (technogenic sphere) systems existing in the same space, thus creating a complex system. The autonomous and heterogeneous elements with no unitary control make up a complex system. The interactions of such components demand the application of an environmental systems analysis that focuses on communicating, simulating and analysing complex environmental challenges. Environment analysis improves decision making by analysing the environmental impacts of various anthropogenic activities (Moberg, 1999).

The development of settlements should not be focused on the general development of the built environment but on sustainable environmental planning that promotes responsive built environments (Allen, 2003). Human settlement establishment focus should be placed on the physical aspects alone. USAID (2020) defines a settlement as a place for human habitation that ensures people meet their sociocultural, eco-political and environmental needs. All these facets bring in complex challenges that need a comprehensive systems analysis to bring sustainable solutions. While cities are regarded as engines of economic prosperity for nations, it is imperative to note that cities drive climate change and disturbances and are vulnerable to consequences thereof (UNHABITAT, 2019). Some of the settlement challenges result from high urbanisation and frequent natural disasters causing human displacement. When the environmental analysis is carried out efficiently, resilient and well-equipped settlements are developed. Effective settlement management relies on the availability of environmental knowledge acquired by residents through continued learning and capacity building (UNFCCC, 2017).

CONCEPTUAL FRAMEWORK

Environment systems analysis on human settlements requires the understanding of the primary concepts of ‘environment, environment analysis and human settlement’ that build up the basis for the discussion.

Larsson and Assia (2019) define the environment as a representative of the natural ecosystem, including flora and fauna covering such

elements with their inter-relationship and complexity forming the conditions suitable for humans. An environment is the total of all surroundings of a living organism. This includes natural forces and other living things that provide conditions for growth and development (Shamim, 2016). The study of the environment balances the components of biota and abiotic components (Gallopin, 2008). Humanity depends on the biosphere for support as it involves various ecosystem processes that enhance ecological interactions. Due to population increase, the natural environment has been encountering challenges from human activities that lead to pollution and degradation. Gallopin (*ibid.*) reveals that man's efforts for economic survival have led to the ecosystem and ecological disturbances. Such modifications of the environment speed up climatic changes that affect humanity (Shamim, 2016).

A system is a group of different components that are interconnected and work together as a complex whole. It encompasses a set of controlling principles that influence various actions (*ibid.*). An environmental system thus shows the interrelationship and interconnectivity among different components such as landscape and drainage factors. When the existing relationships are determined, it becomes easier to note the possible impacts that can arise from the interactions (Sydow, 2017). There are various types of environmental systems and these include the cascading systems where elements are connected by flows such as the hydrological and solar systems. The concept of environmental systems is understood from two basic elements of 'behaviour' (how responsive environmental components are to a given disturbance) and 'environmental unity' (the interconnectedness of environmental elements) (Leguizamon, 1975). The existence of various components and their interactions results in a complex web that requires a systems approach and thinking to understand components' interactions and interdependence. As observed by Sydow (2017), understanding systems operations helps to analyse the existing complexity in the interaction of different parts bringing transparency.

The UNHABITAT (2019) defines a human settlement as a town or city where people work and live. Human settlements are as the study of how humans utilise natural resources, their population patterns and growth (*ibid.*). The main thrust of settlement geography is to understand and appreciate human sustenance within a specific

geographical location. Human settlements are clusters of population dwellings of different sizes. Thus, for sustainable habitation and safety, humans erect dwelling structures. Balasubramanian (2015) highlights that settlement planning involves a grouping of people by providing specific territories from hamlets to large metropolitan cities. As settlement size grows, the economic and ecological characteristics of an area changes. Settlements vary in sizes and defining characteristics with sparsely populated and small settlements termed villages whose primary economic activities involve agriculture (UNHABITAT, 2019). Those with fast-paced growth and dense population are urban settlements that depend highly on manufacturing and service industries for their livelihoods (Balasubramanian, 2015).

CLIMATOLOGY AND HUMAN SETTLEMENTS

Climate change impacts including severe floods and droughts, are affecting most settlements located in vulnerable areas. The UNHABITAT (2019) reveals that most settlements are located close to seaports and other vulnerable areas as people are drawn by economic opportunities presented by the regions regardless of their lack of resilience to climate impacts. As observed by McBean and Ajibade (2009), many settlements and urban centres are situated along cyclone paths that cause substantial destruction each time cyclones occur. Climate change impacts are contributing to the loss of life, property and livelihoods in many human settlements. Sea-level rises have been affecting Alaska and some islands such as Tuvalu, and people have been forced to migrate to New Zealand and Australia for safety (*ibid.*). Climate change impacts are among the factors that cause displacements and migration of people from their settlements (UNHABITAT, 2019).

Urban settlements are also affected by the urban heat island effect that makes the areas warmer compared to surrounding rural areas due to the tarmac surface developments in the cities (*ibid.*). This results in a continuous occurrence of heatwaves. Climate sensitive planning is of huge importance in the management and design of settlements. Poorly planned informal settlements and slums experience severe challenges resulting from their physical location, poor economic vibrancy, poverty and institutional marginalisation due to their non-recognition. This results in poor risk-reduction and resilient measures against climate change impacts. All climate change challenges continue to recur, demanding a better approach to managing and developing settlements

in a more resilient manner that promotes human safety and livelihood protection.

The poor location of human settlements exposes inhabitants to disastrous challenges. Urban centres face contesting issues of trying to protect the sensitive environment, solving housing shortages and ensuring human safety. In the end, decisions that favour the majority vote of housing provision gains popularity regardless of the possible dangers. Such is the case that faced Bolivia. As observed by the UNHCR (2015), Bolivia La Paz has an estimated population of 1.6 million and has 70% of the houses built in sensitive areas that experience recurrent flooding. It is important to note that the decision to relocate people is difficult and costly but unavoidable when the consequences are fatal. As such, environmental analyses need to be carried out before settlement establishment. The UNHCR (*ibid.*) reveals that the municipality of Bolivia La Paz developed a monitoring tool to ascertain unsafe settlements and evacuate the families to temporary but safe shelters. The timely evacuation saved the lives of the people as a landslide hit the high-risk areas and destroyed at least 5 000 houses. Natural hazards are a danger to settlement sustainability and an important issue to consider in planning to ensure human safety.

HYDROLOGY AND HUMAN SETTLEMENTS

Salas *et al*. (2014) explain that hydrology encompasses water movement, storage and occurrence in an earth system. With human interactions with the hydrological processes, the quality and quantity of water have been affected. The general process of water circulation has been heavily influenced by human activities (Salas *et al*., 2014). Gumindoga *et al*. (2014) argue that the continued rise in rural-urban migration in most developing countries has seen changes in the hydrological processes as urbanisation has influenced water resource management and planning. Some of the settlements are located very close to the ocean affecting the sustainability of their houses (UNHABITAT, 2019). Various measures can be put in place to counter drainage challenges. The UNHABITAT (*ibid.*) suggests the creation of containment basins, seepage drainage systems and runoff structures that comply with better adaptation principles. Climate change effects may worsen challenges experienced by the affected areas as they have impacts upon the hydrologic cycle.

Adual, Jewitt and Toucher (2017) recommend the need for carrying out impact assessments on the potential influence of land-use changes on the hydrological processes. Land-use changes and the development of hard tarmac surfaces have a huge contribution to hydrologic changes. After impact assessments, the Bonsa catchment in Ghana (1482 km^2) revealed that precipitation levels were affected by heavy human activities that modified hydrological activities. Deforestation is one of the major contributors to hydrological changes that affect stream flows (*ibid.*). Saint Louis is a city in Senegal with about 250 000 population size. As observed by the UNHABITAT (2019), it is situated in a wetland as it is an island surrounded by water. The city is vulnerable due to its location on the borders of the Senegal River estuary and faces massive erosions from the Atlantic Ocean (*ibid*.).

GEOLOGICAL AND GEOMORPHOLOGICAL ANALYSIS FOR HUMAN SETTLEMENTS

Price *et al*. (2011) regard humans as geological and geomorphological agents that affect landscape evolution from settlement, urbanisation and industrialisation. From the past, humans have modified the landscape, at first digging up rocks for sculpture instead of using loose materials. In the location of settlements, various factors are considered, including the geology of an area, economic and environmental factors. Various geological and geomorphological factors affect human settlements. Ballabh, Pillay and Hariram (2018) reveal that the Alakhanda River mountain watershed close to the Lesser Himalayas in India contains various geomorphic landforms and landscapes that affect construction activities in nearby settlements. The Himalayan areas often incur mass wasting and flash floods that affect settlement location.

Hajissani *et al*. (2011) allude that the increasing populations have resulted in high demand for settlement location and this requires the provision of infrastructural services such as water and sewerage tunnels. However, where geological factors do not allow, settlements are affected as there may be difficulties in controlling underground movements. Most human settlements are located in alluvium areas and this is the case with the Shiraz Subway tunnels in India (Ballabh, Pillay and Hariram, 2018). Geological factors are important to consider providing essential services such as water supplies. This often requires the drilling of boreholes and where the underground surface does not allow it, it becomes difficult. Also, some geological conditions allow for

the provision of building materials that enhance settlement development through building construction. As observed by Margottini and Spizzichino (2014), rock weathering tends to provide the much-needed sand and clay that is moulded into bricks for housing construction**.**

Earthquake occurrences are some of the geologically motivated hazards that affect many settlements, especially in earthquake-prone areas. Nepal and Haiti's settlements are situated in high-risk areas. The UNHCR (2015) reveals that an earthquake shook the central part of Nepal and affected the Pokhara and Kathmandu cities resulting in 8 786 deaths and 2.8 million people were left homeless. For Haiti, a high impact earthquake led to more than 200 000 deaths and a displacement of 1.5 million people. The devastating impacts of these disastrous earthquakes are worsened by poor planning and location of settlements that lead to high vulnerability (*ibid.*). Whenever natural hazards occur, the most affected areas are those informal settlements and slums and this poses serious expenses of relocating people to safer places, rather than provision of before disasters.

ECOLOGY AND HUMAN SETTLEMENTS

Environmental management is of huge importance to the protection of socio-economic and ecological functions in human settlements (Allen, 2003). Balasubramanian (2015) denotes that it is imperative for a specific approach that balances human-ecological processes in lightight of global warming and vulnerability. The planning of human settlements needs to be highly comprehensive, placing the needs of the human population at the front. Kustysheva (2017) emphasises the need to create favourable living conditions for people when planning settlements as this protects the proper functioning of ecological systems. It is imperative to appreciate that there is more to be considered in the planning of settlements than the basic industrial factors. Kustysheva (*ibid.*) highlights the need to encompass air quality and natural landscapes that enhance the protection of natural resources sustainably.

As observed by Shamim (2016), ecology is the study of human-nature interactions in an environment. Man is the steward of the natural environment with the intelligence to manage natural resources. Various methods are used in the management of the natural environment through policy development that enhances the maintenance of

ecological balance. The study of ecology promotes the sustainable management of natural resources to ensure a balance and not overexploitation (Preisendorfer and Diekmann, 2021). Curitiba in Brazil is one of the most common examples of cities that have witnessed a successful implementation of a local development plan that encompassed environmental, ecological and socio-cultural factors comprehensively (Winchester, 2005). The development plan for Curitiba emerged from a more visionary plan that produced the desired population density for specific and available land resources.

ROLE OF ENVIRONMENTAL PLANNING IN SETTLEMENTS ESTABLISHMENT AND MANAGEMENT

Environmental elements directly influence the way urban settlements operate and impact the level of safety for the population. This makes environmental planning an integral part of the effective management of human settlements. Kustysheva (2017) denotes that settlement planning and management should target the improvement of the ecological environment. Most cities experiencing climate disasters are often vulnerable due to initial consideration of environmental issues (*ibid.*). It is imperative to develop adaptive climate-resilient initiatives. The UNFCC (2017) recommends bringing nature to the cities as an essential means to enhance the urban environment. Environmental planning promotes the revitalisation and maintenance of nature sustainably within urban areas. The existence of vibrant environmental planning boards serves to create environmental policies that enhance the protection of the natural environment (Sadeghi and Khakzanf, 2016). It is the mandate of environmental planning to preserve the natural environment with the help of communities, either in rural or urban centres.

The continuous growth of urban settlements is an inevitable process that requires well planned and conscious environmental consideration. Although urbanisation brings various benefits such as better access to health and educational facilities, many disadvantages that affect the environment are inclusive, especially where there is a lack of proper planning. Sadeghi and Khakzanf (*ibid.*) denote the lack of ecologically sensitive areas in urban centres as natural landscapes and vegetation are destroyed to accommodate human settlements. Environmental problems seem to be solved better by bringing back the lost environmental look of the city. Vibrant and sustainable settlements require efficient environmental strategies that protect the settlements

from future environmental and climatic hazards (Lekwot *et al*., 2014). Environmental planning helps to solve environmental problems. However, the effectiveness of this demands the active participation of all communities from various settlements, as many of the challenges are human-induced.

As observed by Lekwot *et al*. (*ibid.*), environmental planning is a process that allows for participation and stakeholder interaction in finding solutions to environmental problems. This is a very interactive bottom-up approach making communities fully aware of the possible environmental impacts that may arise from mismanagement. There are contentions between humans and the natural environment as human economic activities fight against the thriving of the natural environment (Kustysheva, 2017). The scramble for economic prosperity leads to environmental degradation that is exacerbated by massive increases in human populations that see more expansion in human settlements. Environmental planning thus seems to be a solution to environmental protection. Lekwot *et al*. (2014) reveal that environmental planning is the modern way of organising ideas on effectively mobilising resources, taking action and tackling environmental and development issues. The process is flexible, interactive and dynamic, encompassing all environmental challenges. This makes it very imperative to adopt environmental planning in physical planning and development. Settlement planning should not be deemed necessary in the absence of environmental planning *(ibid.*).

- ***ENVIRONMENTAL IMPACT ASSESSMENT***

Environmental impact assessment (EIA) is one of the procedures taken before development takes place to ascertain damage or promotion to the natural ecosystem. The process, to be well effective, is done to ensure damage is avoided before any costs of development are incurred. As observed by Calgunner (1999), EIAs become an inventory procedure to ascertain whether the chosen location for a certain development is sustainable. EIAs ensure enhanced quality of life in a developed area and complements land use management sustainably. However, despite the relevance of EIAs to environmental protection, many developments have taken place without paying any attention to the sensitivity of the area, due to corruption in urban development and management. A lot of governments consider monetary profits more than the protection of the environment. As

observed by Lawrence (1992), EIA is a mandatory procedure to be taken before the development of any settlement.

- ***STRATEGIC IMPACT ASSESSMENT***

Strategic impact assessment (SIA) is another important pillar in environmental planning. As highlighted by Shepherd and Ortolano (1996), SIA analyses the impacts of environmental policies, programmes and plans to promote sustainable environmental planning and management. Through SIA, it is easier to blend in environmental plans and physical development plans as it weaves principles of sustainability into urban plans effectively. SIA is of uttermost importance to sustainable planning. As observed by Culguner (1999), SIA can be effectively blended into physical plans leading to considerations in settlement development. It also acts as a better way of implementing environmental plans, providing better institutional development and cooperation.

In the face of massive population growth and increasing urban challenges, environmental and settlement planning is inevitable towards the achievement of sustainable development. As climate change is taking its toll, resilient measures are needed for the urban environment. The UNHABITAT (2016) highlights that effective settlement and environmental planning contribute to solving water scarcity, biodiversity losses and the changes in the nitrogen cycle and such should be considered as planning issues. The safety of human populations is important and achieving that comes from well-planned environments. Climate change disasters require stricter planning and environmental considerations due to the uncertainties they pose on human habitations and the natural environment.

DISCUSSION

Population increases globally are said to be the contributing factor to environmental damage as human activities are harming the environment (Larsson and Assia, 2019). The nature of environmental challenges change over time and this is directly related to population activities. Most cities in developing countries are poorly prepared to counter crises and disaster. Due to poor resilience and preparedness, most people are being displaced from their settlements each time a disaster appears. As observed by the UNHABITAT (2010), weak institutions existing in many cities continue resorting to post-crisis planning and do not consider the need for futuristic planning that

ensures community resilience before the occurrence of a disaster. Environmental analysis and planning lack prior development and these result in many informal settlements being situated in disastrous and vulnerable areas due to unsustainable settlement planning (Noviks, 2015). Understanding the concepts of the environment in settlement development provides a briefing to land-use planning before disaster occurrence. The UNHABITAT (2010) denotes that poor governance in many urban centres with obsolete master plans, worsens the vulnerability of human settlements to environmental hazards.

The UNHABITAT (2019) recommends the need to carryout vulnerability assessments in human settlements that helps cities to monitor environmental management. The UNHCR (2015) reveals that there has been an increase in the rate of population displacement over the years with an estimated 1.6 million people displaced between the years 2000 and 2014 and 65.3 million as of 2015. Considering the increasing natural and environmental disasters occurring without resilient settlement development and management, more displacements are expected. This requires immediate action, including the appreciation of the importance of carrying out environmental assessments before and after settlement development. It is imperative to understand that shelter is a human right and that it is more than building walls and roofs. It is needless to say that many development officials consider this 'physical' structure with uttermost importance, rather than equalising it with the social and economic aspects.

Environment analysis provides various tools for site assessment including EIAs and SEAs (Moberg, 1999). When carried out efficiently, this helps to make informed decisions regarding the sustainability of the settlement location. However, due to the corrupt vices and bypassing of safety protocols regarding settlement establishment, a big number of development professionals consider only the economic value of development projects and less the potential hazards threatening the location. As observed by Noviks (2015), the huge costs incurred when carrying out environment analysis and the time-consuming nature of the processes, make many decision-makers bypass the evaluation stages and carry on with settlement development.

CONCLUSION AND FUTURE DIRECTION

Settlement planning and management require the need to verify plans in the field. Effective resource management is of importance to improve the vibrancy of human settlements. This includes the preservation of flora and fauna species, ecological corridors and wetlands. All planning should centre on improving human needs and should be people-centred. For recovering settlements, it is imperative to ensure recovery plans are formulated under the local context to ensure site-specific solutions. It is imperative to have a comprehensive understanding of the 'environment' in all its facets. The concept of 'environment' is multifaceted in that it is complex and the emanating challenges resulting from the interactions make it even difficult to solve except when the 'environment systems approach' is incorporated. Due to the increasing environmental hazards being worsened by climate change, improperly planned settlements become more vulnerable and this places even human lives in danger. Sustainable settlement planning places the safety of people at the front and as such should consider precautionary safety measures.

RECOMMENDATIONS

- Making environment analysis a mandatory procedure before the establishment of any settlement to improve decision-making.
- Ensure a high level of preparedness for all settlements, the presence of early warning and evacuation systems.
- Climate change adaptation strategies should be incorporated to improve housing conditions and environmental restoration.
- Improve capacity building in the management and preservation of the natural environment to enhance climate adaptation.

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CHAPTER 3: Urban and Regional Morphometrics

Abstract

The chapter explores the evolution and change in the understanding of the city and regional forms overtime. Social, economic and political dynamics that affect the characterisation of city and regional forms are highlighted. The chapter explores how city and region forms have adapted to current rapid urbanisation, urban poverty and principles of sustainability and resilience. It is suggested that the forms of cities and regions in the contemporary era are the key to the achievement of sustainability. Hence it is imperative to fuse traditional factors determining different forms of cities and regions as influenced by social, economic and political dynamics with modern sustainable design concepts such as compactness, sustainable transport, density, mixed land uses, diversity and greening, among others. These concepts have a great potential in creating sustainable urban forms such as the compact city and the eco-city and these are measurable through sustainable development indices and matrixes.

INTRODUCTION

The chapter focuses on aspects of urban and regional forms with a core understanding that cities and regions evolve through different forms. The development of cities and regions throughout the world has followed well laid fundamental theories and factors influencing different forms. Current cities are fascinating and regional forms were influenced by the forms of the past. It is, therefore, imperative to track city and region form, to their origins and explore some social, economic and political dynamics that affect the characterisation of these forms. With the changing urban landscape and the crafting of fundamental concepts like sustainability and resilience, forms of cities and regions have also changed and this study interrogates the adaptation of city and region forms. This research is important in bolstering a city in history, understanding of the reader and informing possible work on urban and regional morphometric in the wake of rapid urbanisation, urban poverty and principles of sustainability and resilience. Cities and regions have been crafted into three major functional categories, that are central places, break-of-bulk and specialised function. Most cities and regions represent a mixture of

these types, with each factor assuming varying relative importance for each city.

BACKGROUND AND CONTEXT

Urban form is a fundamental aspect of the built environment. Barke (2018) regards the townscape as the 'objectivation' of the human spirit. This means the urban environment carries with it the efforts and aspirations of residents in the past and present and this is reflected in its physical form. The term 'urban form' is used to describe a city's physical characteristics. As observed by Živković (2019), this refers to the size, shape and configuration of an urban area or its parts. Barke (2018) highlights form including street layout, buildings and the use of the space and the physical form that encapsulates the spirit of place. This chapter realises that these aspects of city and region form develop over time and the present city and region forms owe much to the historical events and work on cities and regions. Thus, this chapter pays attention to the development of cities and regions, factors influencing, theories and the adaptation of cities considering the contemporary urban planning dynamics that include rapid urbanisation, urban poverty and principles of sustainability and resilience.

The history of cities and regions as important centres of human activity, extends back thousands of years to the dawn of civilised life. Throughout the world, cities and towns or regions, differing in size and character are found and in regions known presently as China, Egypt, Israel, Iraq, Pakistan, Greece and Turkey where we find some fundamental aspects of the background of cities and towns. The origins of these places in those ancient times are understood largely as religious and administrative centres or defensive sites. The Multnomah County Planning Commission (1967) also provides that the development of urban societies is determined by the socio-cultural organisation, climate, topography and economic development. The early civilisation of Indus (Mohenjodaro, Harappa), Tigris-Euphrates (Lagas ur, Uruk), Nile (Memphis, Thebes) and Hwang Ho (Chen-Chan An Yang) are examples of the earliest cities of the world that originated near river valleys.

These early developments of urban settlements evolved with changing technology and human needs. The Multnomah County Planning Commission (*ibid.*) further attributes such evolution to trade and commercial activities and settled agriculture as major facilitators.

Present cities are shaped by some of these fundamental activities and are viewed as places where markets, governments, religious and cultural centres exist. King (2020) also provides that other cities in these same regions and other parts of the world in Europe, Asia, the Americas and Africa began as important locations for trade and commerce and in this role, they grew and flourished over the centuries.

Barke (2018) observes a brief description of the three types of cites. Central place cities are described as cities that serve as trade centres and social foci for a surrounding tributary area whose shape has been demonstrated to approach that of a hexagon, under ideal conditions. These central places approach a uniform distribution in hexagonal patterns and a hierarchy of size and functions performed when such factors as the physical base, climate, transport network and socio-political considerations are constant. Then, the break-of-bulk cities develop at transportation junctions or where goods in transit must be transferred from one means of conveyance to another. The last category is the specialised function cities that locate near sites of natural resources or amenities and they develop specialised commercial or industrial functions that serve extremely large tributary areas. From this background information, cities had complex spatial layouts reflecting the multiplicity of human exchanges. These historical cities have been alive with the richness of patterns and symbols that fulfil many psychological and spiritual needs. One good example is the sense of enclosure and spatial definition provided by medieval walls that satisfied more than a need for defensive protection.

As observed by Lozano (1990), features of historical cities such as medieval walls also provided psychological stimulation and physical comfort. However, in present times, it is imperative to talk about the changing form of the city that has seen cities and regions transform from relatively contained to widespread urban sprawl. This has been a worldwide phenomenon. Jenks and Dempsey (2005) observe that the strengthening of international capital has led to the concentration of economic power in many global centres of finance and highly specialised services such as London, Frankfurt and New York.

DEFINITION OF KEYWORDS

Morphology can be used in the study of urban areas to create what is known as ‘urban morphology’. Urban morphology is the study of the built form of cities and it seeks to explain the layout and spatial

composition of urban structures and open spaces, their material character and symbolic meaning, in light of the forces that have created, expanded, diversified and transformed them' (Conzen, 2012).
Morphometrics refers to the study of shape variation of organs and organisms and its covariation with other variables (Pares-Casanova, 2017). In respect of human settlements, morphometrics means a process of characterising urban form through utilising a vector of measures that quantify individual aspects of its constituent elements and their relationships in space. The elements of urban form thus include the street, the block and the natural area.

Urban Morphometrics is the study of the measurements of urban form. The urban form describes a city's physical characteristics. The main aim of urban morphometrics is to extract indicators and rules from urban morphology principles and theories. Dibble (2017) observes the indicators as density and built volumes, permeability and urban coverage, urban block descriptors, urban form descriptors: surface to volume ratio, compactness index, urban canyon ratios, the prevailing orientation of facades, and sky view factor.

Regional Morphometrics is the study of the measurement of regions form and structures. The concept of regions is linked with space and it has spatial dimensions. In urban planning, regions may mean a part of a district, a village, a district, a state or a group of states. Mukhopadhyay (2010) defines a region as the total of its physical and human elements. Regional morphometrics measures the dimensions of regional morphological elements, their parts and aggregated structures, quantifying shapes of geometries representing a wide range of morphological features, capturing the spatial distribution of elements of regions, density, diversity of various aspects of regional form, connectivity of urban street networks and generating relational elements of regional form.

THEORIES UNDERPINNING THE STUDY

As observed by the Multnomah County Planning Commission (1967), there are three basic theories of urban pattern or form of cities or regions, the concentric zones, sectors and multiple nuclei. These theories buttress this study and assume that the arrangement of the use of the land within a city or region is fashioned largely by market forces and as all theories must, minimise or ignore the influences of other factors that are considered to be of less significance.

The *concentric zone model* was propounded by Ernest Burgess in 1923 to explain the structure and growth of the city. This theory hypothesises that cities grow and develop outwardly in concentric zones. The theory suggests that cities grow by expanding radically from their centres to different concentric circles or zones. As observed by McDonagh (1997), the development of the concentric model was a development of Von Thunen's explanation of rural land uses and values, put forward in the early part of the last century and based on the concept of a medieval village design. This theory was developed using Chicago as an example as Burgess viewed that as cities expand outwards, the interaction among people relating to economic, social and political organisations also creates radical expansion outward and form a series of concentric zones. Multnomah County Planning Commission (1967) understands the concentric theory as based on a process of invasion and succession. Invasion is a process that necessitates the continual expansion of inner zones into outer zones, due to the natural aggression of the migrant into the city, while succession occurs when an area becomes dominated by the activity invading that zone. It is important to note that there is competition in the city among people for limited space and only those who can afford to pay get the desired location for their businesses and homes. Therefore, the concentric zone theory reflects the ongoing conflict between city dwellers and periphery villages.

The *concentric zone theory* has five major zones, i.e. the commercial centre, the zone of transition, the working-class residence, middle/higher class residence and the commuter zone. The following is a brief description of the five major zones of the concentric zone theory:

Commercial centre: this is also called the Central Business District (CBD). This zone is characterised by high intensity of commercial, social and civic amenities. This is the heart of the city, including departmental stores, office buildings, shops, banks, clubs, hotels, theatres and many other civic buildings. The morphological structure of this commercial centre includes buildings, roads and infrastructure and, as observed by Burgess, this structure is always changing rapidly with the changing people's needs.

Zone of transition: this zone houses light industries and slums and is visible in American cities. This is also the home of

numerous first-generation immigrants who usually live in low-income houses, retrogressing neighbourhood conditions, among other poor conditions. This zone is largely believed to be the chief breeder for crime, gambling, sexual vice and other social deviances. It is also characterised by physical deterioration and social disorganisation that leads to concentration of poor housing, poverty, juvenile delinquency, family disintegration, physical and mental diseases.

Working-class residence: this is a planned residential area, close to places of economic activity that often shift and move to the outward rings. This is a residential area with all the modern amenities of civic society. The houses are spacious in a pollution-free zone. Sanitation, health facilities and all other requirements of a good quality of life are found here. There is proper transportation, communication and parking facilities.

Commuter zone: it is located in the uttermost concentric zone, beyond the area of higher-class residence. This is a ring of encircling small cities, towns and hamlets that constitute the commuter zone. People from these areas commute daily towards the CBD or commercial centre for employment and business purposes but live in their small cities, towns and hamlets. These places are largely low-density, isolated and located in suburbs and satellite towns.

The *concentric zone theory* was based on a study carried on in Chicago in the US. Thus, this may not be a reflection of all cities form and structure in the world. The theory is unable to explain the structural pattern and growth of cities in developing countries. Scholars, such as Hoyt, refute this concentric model and argue that the growth of cities does not always form a circle completely. It is often rather distorted by major transport and topographical features.

The *sector theory* incorporates the effect of a radial street pattern into the system. Under this theory, similar types of land uses are located in certain wedge-shaped sectors that radiate from the CBD. The various activities move progressively outwards along access corridors as urban growth takes place. The sector theory represents an improvement over the concentric zone theory as it provides a more satisfactory explanation of the influence of improved access and residential growth

dynamics. However, the model has been criticised because it is ambiguous and oversimplified.

The third theory is known as the *multiple nuclei concept* that recognises many land uses located and around several nuclei in the city. The primary focus is the CBD, but other economic activities are located in nucleated patterns because of mutual profitability of agglomeration, or the attracting or repelling force of land rents, or mutual disaffinity, whereby activities attempt to locate away from other activities whose actions are detrimental to their own. The multiple nuclei theory illustrates the effect of the manifold locational factors on the urban area and how these factors acting independently, and together cause the particular pattern of land uses that may be observed in and around all cities within the country.

APPROACHES TO UNDERSTANDING THE SUBJECT

Cities all over the world evolve in a process developing over centuries that needs to be read and analysed to be able to assess the scope of future possibilities, that at best could lie beyond our current dependencies. It is on this background note that Malfroy and Caniggia (2020) argue that a prerequisite to understanding the subject of urban morphometrics is a certain curiosity for urban history and willingness to deal with those grown structures. This also come hand in hand with a proper education system where literature and theoretical underpinnings of urban development and planning are well explained and delivered.

GLOBAL CASES IN THE STUDY

The world has entered an age of urbanisation, a metropolitan century that is one-third complete. This influences the dynamics in cities as far as urban and regional morphometrics are concerned. Europe has not always been so urban. In the past 50 years, there have been far-reaching changes to the way the European urban system is organised. Europe shifted from an industrial and primarily rural continent to an urban and metropolitan continent. Nabielek *et al*. (2016), provides that the continent's 828 cities accounted for 37% of the population in 1961, growing to 40% in 1981 and remaining constant from thereon, until more recent growth in the urban cores.

The urban and regional landscape of Europe is characterised by a large diversity of small, medium-sized and large cities. Compared to

other parts of the world, many urban regions in Europe have a polycentric structure. This is where multiple towns and cities are near one another. In some cases, there are situations where a single large city may typically be a country's capital, dominates its surrounding region resulting in a more monocentric pattern. There are also other regions with a linear urbanisation pattern, such as areas bordering the Mediterranean Sea and Italy's Adriatic coast. The urban form of Europe is a result of many underlying factors. As observed by Nabielek *et al*. (*ibid.*), some settlements date back to the Roman Empire, where they functioned as administrative centres. Other towns and cities developed during the Middle Ages as regional marketplaces at strategic locations along trade routes often close to a river or harbour. Because of political, demographic and economic developments, towns and cities flourished and, therefore, expanded in some periods, whereas other periods were characterised by a decline (Benevolo, 1995; Rutte and Abrahamse, 2016). Nabielek *et al*. (2016) indicate that over the course of the 20th century, cities spilt over into their surrounding regions. Some of the examples highlighted by Nabielek *et al*. (2016) include Milton Keynes in the United Kingdom, Almere in the Netherlands and Nowa in Portland. These city expansions are said to have injected new and highly planned urban and suburban centres into the historical European urban structure.

In the contemporary world, Europe's city and regional forms can be characterised into four main types: monocentric urban regions, dispersed urban regions, linear urban regions and polycentric urban regions. Monocentric urban regions are found in France, Spain, Portugal and countries in the northern and eastern parts of Europe where cities are distributed over relatively wide areas. In terms of the dispersed urban patterns, these are formed by scattered or sprawling cities, towns and suburbs with relatively low densities. Nabielek *et al*. (*ibid.*) observe that these can be found in parts of Belgium, in northern Italy and the south of Poland. Cities and regions that follow the linear patterns emerged mostly along some of European's coastlines, for instance, in Portugal, in the southern parts of Spain and France and the east of Italy. Linear urban regions are also present in mountain valleys in Switzerland Austria. Polycentric urban regions have multiple cities lying near one another. These kinds of regions can be found in the Netherlands, the western part of Germany and the southern half of the United Kingdom.

From the 11th to the 15th centuries, there emerged different categories of medieval European towns. Some of the outstanding urban regions in Europe followed the concentric-ring type of urban form development. Morris (1994) observes an example of Florence as an example of the concentric-ring type of city development. Sun (2013) further provides that in Europe, medieval towns had similar determinants in social, economic and political contexts. Both the planned new towns formal gridirons and the informal uncontrolled layouts were made up of the local vernacular buildings and the medieval towns were composed of the wall, streets, marketplace, church and town buildings. Another example of a different city form was Nijmegen, that remains important in urban form discourse for its historic development of multi-nuclear origins and successive fortification systems.

The coming in of the renaissance period was taken from Italy and the new architectural style spread quickly from Florence. At this time, the population and extent of European cities were remarkably increasing. Five broad areas for urban planning during the renaissance period were the fortification systems, partial regeneration of the cities, reconstruction of existing cities, extensive addition of new districts and the layout of some new towns (Morris, 1994). Sun (2013) observes that the primary straight streets could determine the existing city's growth. It is important to note that during this time, the main factor determining urban form was a fortification. This is the reason some towns boast of a purely strategic military origin and some examples include Naarden in the Netherlands, Neuf Brisach in France and Palmanova in Italy. These towns had geometric layouts for military reasons.

Sun (*ibid.*) observes that European countries have different forms of urban settlements. Cities have their characteristic patterns. For modernisation, this city is developed with their history, culture, population and many other aspects.

REGIONAL CASES IN THE STUDY

Africa today is labelled as a chief beneficiary of other continents' urban planning theories. Cities and regions in Africa are largely seen and discussed in the context of European, American and even Chinese concepts. However, it is of paramount significance to highlight that although largely destroyed by war and plunder, ancient Africa had cities of grand scale that were extensively planned. Some of the oldest urban settlements in Africa include the El-Lahum that is also known as

Kahun or Ro-hent in Egypt, perhaps the oldest master-planned urban settlement currently known in Africa. Its walls, as observed by archaeologist's reports have date up to 1897 BC (Mazzone, 2017).

Some of the outstanding urban forms in ancient cities and regions in Africa showed a high level of gridded street patterns that suggest authoritative planning, rather than a spontaneous generation and also pre-colonial Senegalese cities including Diakhao, Kahne and Maka are organised along orthogonal grids (Ross, 2015). There are also medieval planned African cities such as Songo Mnara, Tanzania, a 15th-century Swahili stone town, that had highly developed social welfare systems, craftsmanship and political organisations (Patel, 2014). Archaeologists continue to discover remnants of African cities designed with geometric and programmatic spatial divisions that suggest coordinated planning such as Harlaa, Ethiopia, a 9th century cosmopolitan trading city identified in 2017 (Gaffey, 2017). As far as archaeology is concerned, these identifications highlight rapid construction and massive investments of coordinated planning efforts in Africa.

The colonial period (starting in the 1880s up to the 1980s) is one such important period in the life of African cities that saw cities and regions taking different shapes and also being established for different reasons. As observed by Keeton and Nijhuis (2019), the colonial period, understood as the period between the Berlin Conference of 1884 and 1960, largely inverted the concept of urban life in Africa. Africa had centuries of old trading cities that dominated inland Africa and this all changed with the coming in of colonisation when the colonial occupiers replaced (and often destroyed) these centres of commerce with coastal port cities that facilitated the export of natural resources (Coquery-Vidrovitch, 2005: 25). This entails a change or transition of urban forms in Africa. However, this change was not uniform as the colonial models differed or varied greatly among the respective colonial occupiers. Keeton and Nijhuis (2019) observe that each colonial occupier government brought in its design theories, planners trained in specific academic traditions and underlying goals with specific spatial implications. Other scholars, like Njoh (2009), however, argue that regardless of the diverse urban forms created in African cities and regions, all these colonial governments that engaged in urban planning used it as a tool to enforce racial segregationist policies.

Keeton and Nijhuis (2019) further highlight that as colonial planning in Africa was gaining ground, influential people like Howard Ebenezer were proving to be profoundly influential on contemporary European town planning. With their success stories in the European contexts, the garden city model was subsequently reinterpreted around the world in master-planned new towns that linked spatial design to social motives (Galantay, 1975). Thus, in the period between 1898 and 1960, the European occupiers introduced new town planning ideas influenced by Howard Ebenezer Garden city model in British, French and Portuguese colonies, among others. Some of the outstanding examples as described by Myers (2003) and Bigon (2013) include S.D. Adshead's plan for Lusaka, Zambia, from 1931 and A.J Thompson's 1920s plan for Pinelands, South Africa.

As observed by Njoh (2007), the Adshead's plan or the land use plan for Lusaka was designed to accommodate 13 000 people comprising 8 000 Europeans and 5,000 Africans. The plan provided for a shopping and business district, semi-official buildings, clubs and hotels. It had a colonial government house designed about 2.4 to 3.2 km from the government centre. The government house was surrounded by residencies of senior colonial government officials. Adshead also envisaged that the town would develop in the direction of the railway line and station with factories developing in the area bordering the railway. The plan also had a major street of 37m wide, linking the new capital and the old village of Lusaka. There was also a 122m wide avenue designed to run along the ridge, forming the backbone of the new capital city. Keeton and Nijhuis (2019) further indicate that other European colonising powers employed similar design principles, like the radial or grid compositions, low-density residential areas, monumental public buildings and functional zoning, but these were not called garden cities. The most prolific and common planning practise during this period was the planning of racially exclusive spaces that divided cities into areas for colonial residents and areas for indigenous populations (Silva, 2015).

When African countries started to gain independence even in the 1960s, there was a new move to build new towns and new capitals. As observed by Keeton and Nijhuis (2019), these were mainly spatial assertions of nationalism and identity. Some of the described examples of the 1960s include Dodoma in Tanzania that is said to have been built on the African socialism ideology of President Julius

Nyerere, while Abuja, Nigeria, was envisioned as a democratic capital that could help move Nigeria towards a national consciousness. In terms of urban form, these cities and regions were largely central places, especially Abuja, that was located in the geographic centre of the country to provide a message of perceived ethnic and religious neutrality. Gaborone, Botswana, was located because of her environmental advantages and lack of tribal affiliation. Keeton and Nijhuis (*ibid.*) argue that most of the new towns built during this period were state-led and embedded in prevailing political movements, such as unity, nationalism and identity and these were also central tenets of their design and development.

DAR ES SALAAM, TANZANIA

Dar es Salaam is a rapidly growing city in sub-Saharan Africa and has been experiencing substantial changes in its spatial pattern and land cover over the years. As observed by Mkalawa (2016), these changes have been driven by many factors, including transport and communication, internal and international migration, high natural growth rates of urban populations, public policies and agglomeration economies. Mkalawa (*ibid.*) further indicates that unluckily, urban expansion has taken the form of "peripheralisation" that is characterised by large peri-urban areas with an informal or illegal pattern of land use, combined with lack of infrastructure, public facilities, lack of services and often accompanied by lack of public transport and adequate access roads. He) further indicates that this process is leading to new urban forms as the countryside began to urbanise.

The city of Dar es Salaam is clustered from the city centre and unevenly dispersed following the four major roads. The clustering of settlements and economic activities along the major roads radiating from and connecting separate metropolitan areas leads to gradual building-up of the urban fabric along the metropolitan core, arranged in a linear fashion making a four-fingers pattern. This shows that the city of Dar es Salaam urban cover and spatial pattern has been shaped by transport networks. Mkalawa (*ibid.*) indicates that from the colonial era to the current, the city has been extending following these four major arterial roads. There is an increased intensity of city growth from 1981 to 2009. Mkalawa (*ibid.*) also provides that this ribbon-shaped four-fingers pattern structure, has stretched for a long distance mainly in four major roads of Morogoro, Bagamoyo, Kilwa and Pugu. Urban

growth in Dar es Salaam is extending in perpendicular directions. There are new nodes in areas where highways are intersecting such as Mwenge, Ubungo, Buguruni and Tabata. Mkalawa (*bid*) argues that these developments of the city are dominated by a fragmented pattern that is characterised by high-density residential areas that are single-use and result in patches of mono-functional, dense built-up areas.

The urban form of Dar es Salaam is influenced by the networks of transportation since economic activities require high levels of accessibility to the cluster along main roads or nodes close to major intersections of highway systems. Residential developments also seek accessibility, therefore the developments of new routes and transport system provided important ways of structuring the city in the long term.

NAIROBI, KENYA

Nairobi is home to more than 3.14 million people, making it the second-largest city by population in the African Great Lakes Region, after Dar es Salaam. Nairobi is a centrally located capital and a major hub for commerce, transport and regional development. As observed by Antos *et al*. (2016), roughly 60% of its population lives in slums and these slums are strategically situated close to the CBD to provide cheap and local labour. There is a high proportion of unplanned and crowded housing units in areas close to the CBD. In terms of the general layout of the city, there is a mixture of highly irregular and regular residential developments and commercial/industrial land throughout the city. The city is dominated by land covered with commercial, industrial and transportation structures. The irregular neighbourhoods are predominantly found around 3-8 kilometres from the city centre and the closest identified near Kariokor in the northeast (Pumwani, Mjengo estate and Kitui Village). This is in sync with the provisions of the concentric theory that places zones of transitions out of the city centre. These zones are characterised largely by urban decay and occupation by some of the poorest urban people.

The development of the City of Nairobi is described by Kingoriah (1983) and one of the important points is that no settlement of any kind existed in the area occupied by the City of Nairobi before its formation. Thus, the development of the City of Nairobi, together with its urban form, is a result of railway construction and encampment. This city has, however, developed to be a modern metropolis and one of the biggest in eastern Africa. Kingoriah (*ibid.*) goes on to argue that the land use

pattern or, rather, an urban form of Nairobi or the city structure, has not been so much the result of economic variables operating over the distribution of land resources, but has been mainly the result of government policy since the city was founded. Kingoriah (1983) describes models of city structure and tries to fit Nairobi and the general agreement is that not only does Nairobi resemble some of the modes like the concentric zone model, but also does resemble developments that fit into other models of city structures. As highlighted above, most residential developments in Nairobi are outside the city centre and they also follow some irregular patterns that show a mixed urban form as far as the theories of urban form are concerned.

ADDIS ABABA, ETHIOPIA

Addis Ababa is one of the oldest and largest cities in Africa and it has an estimated population of about 2.7 million people and this number has been doubling every decade since 1984 (Antos *et al*., 2016). As observed by the UN-Habitat, it is estimated that the rapid growth of the population will continue and reach 12 million people by 2024. Population growth in Addis Ababa has triggered a boom in construction, especially of condominiums, office buildings and infrastructure projects breaking ground almost simultaneously throughout the city. Antos *et al*. (2016), however, provides that these developments have not always followed government regulations and this has resulted in some projects cut off and creating an ill-functioning urban form where major road intersections are built without pedestrian considerations and lacking coordination and support of a strong transport system. Because of such misnomers, neighbourhoods are mostly medium density and possesses an urban village type environment, where residents are within walking distance to all their amenities.

Like most African cities and urban regions, residential settlements are highly concentrated in and around the city centre. Addis Ababa is prone to irregular settlements as well. Antos *et al*. (*ibid.*) indicate that there is a significant portion of land in the city centre that is occupied by irregular residential developments. Within the first four kilometres from the city centre, about 26% of the built-up land is residential and irregular, with this number dropping off dramatically around 8% and 6 kilometres outside of the city centre. There are pockets of irregular residential developments that continue to appear towards the city's

periphery. One outstanding difference with cities and regions Dar es Salaam and Nairobi is that Addis Ababa's industrial and commercial land is found in small pockets throughout the city, rather than concentrated in large zones as in the mentioned cities. As observed by Antos *et al*. (*ibid.*), this pattern of small pockets of land cover might be indicative of the 'urban village' environment that is a localised type of development in Ethiopia.

DAKAR, SENEGAL

Dakar is located on the Cap-Vert peninsula and is home to about one-third of Senegal's population. The majority of Dakar's economic activity is concentrated in the huge industrial zone that stretches from the Port of Dakar to Rufisque, along Hann Bay. Antos *et al*. (*ibid.*) indicate that the population of Dakar has tripled since the 1970s with much of this growth occurring near the periphery of the city. The urban structure of the City of Dakar is different from other cities in Africa. Due to land constraints from its geographical location, the spatial distribution of the land cover in Dakar is decidedly different from the African cities discussed in this chapter. Mainly, commercial and industrial uses are primarily concentrated directly at the core and along the south coast of the peninsula. Regular residential land is located north of the city centre and extends west. There are also irregular residential developments. These are found in small pockets scattered throughout the city, particularly near the airport and near Rufisque.

LOCAL CASES IN THE STUDY

Urban development in Zimbabwe is directly related to or influenced by colonialism. There were human settlements in Zimbabwe before colonialism and these remain important in the study of human settlements in Zimbabwe. However, they lived long before any urban development commenced in Zimbabwe. These human settlements were entirely scattered and sparsely populated rural settlements and of notable significance are the states of great Zimbabwe, Khami and Dlodlo states. The development of the urban atmosphere in Zimbabwe, like many sub-Saharan countries, is attributed to colonialism and its impacts. As observed by Munzwa and Jonga (2010), colonialism brought with it a new social-political and economic dispensation. He further describes that the mission of the settler was to take occupation of the land and make it his home by exploiting all the available resources to the best advantage. This, in terms of the subject of the matter, best explains the overall assertion that colonial cities and

regions, especially in Africa do resemble urban forms or rather urban characters of their host colonisers.

In Zimbabwe, urban development first came through the development of military forts that were established along the route of entry followed by an expeditionary force called the Pioneer Column that was under the British South Africa Company. Some of these urban areas include Fort Tuli (near present-day Beitbridge), Fort Victoria (now Masvingo), Fort Charter (now Chivhu) and Fort Salisbury (now Harare). At first, the settlers were not interested in staying permanently as their main focus was on the exploration and mining of various minerals. However, since there was an agenda to colonise, the settlers had to consolidate their power or the colonisation process through the establishment of supportive infrastructures, including roads, railway lines and telegram lines and urban and mining towns. This is the period between 1890 and 1939 that centres such as Kwekwe, Redcliff, Kadoma, Chegutu, Chinhoyi, Bindura, Shamva and Marondera, were developed.

The second stage of urban development, as indicated by Wekwete (1994), is between 1940 and 1952 where urban development transformed to high levels of building and construction, especially because of the boom in exportation or primary products and the manufacturing sector. Kwekwe and Redcliff were transformed in that era into industrial towns as the iron and steel industry received immense investment improvement. It is important to note that some urban and regional centres of that time were developed out of a direct response to the core-periphery connectivity. During that time, urban expansion was highly notable and concepts such as the garden city and the Redburn were adopted in Zimbabwe through the establishment of settlements. These stages were later followed by urban development during the Federation epoch of 1953 to 1965. It is in this era that Zimbabwe witnessed major urban development.

As highlighted above, Zimbabwe owes much of its current urban form to the colonial period. The spatial form and structure of Zimbabwe's towns and cities as they appear today were, by and large, created by the inception designers (Munzwa and Jonga, 2010). Munzwa and Jonga argue that more than 95% of central business districts (CBD) of these centres was laid out on a gridiron pattern. The alignment of roads had streets and avenues running in a north to south and east to west direction respectively. These urban forms, especially found in

cities such as Harare and Bulawayo, were adapted to the respective site conditions and topography they have. Most industrial cities and regions are located to the south-west of the CBD, with low-density (high income) areas to the north and high density (low income) areas to the west. Munzwa and Jonga (*ibid.*) argue that this type of urban form complied with the prevailing south-easterly winds.

EMERGING DEBATES IN THEORY, POLICY AND PRACTICES

The study of urban morphology has evolved and many professions and schools of thought have treated the field differently. What remains valid and essential is a new movement calling for the integration of different, often isolated, urban form research and teaching approaches through pedagogic innovation and information and communication technology. This movement comes from the realisation that the field of urban morphology has disintegrated through multiple numbers of professionals who argue through the history of urban development the world over and the changing situations of urban areas and the emergency of interested and relevant professions to be involved at the current period. Thus, debates emerging in terms of theory, policy and practice point to the need to develop an innovative, open and inclusive system of teaching and training in urban form from a multidisciplinary perspective. This should be capable of enabling the current and future generation of planning and design professionals to address comprehensively and effectively the variety of issues and challenges faced by contemporary cities.

It is on this background note that contemporary cities require different handling of the whole urban morphology issue. Krieger (2009) indicates that contemporary cities are characterised by a variety of forms of socio-spatial patterns and increasing social, economic and political fragmentation strongly related to their urban form. In this regard, urban municipal authorities, policymakers, urban designers and scholars are called to respond to such challenges and a variety of approaches on understanding urban form in terms of theory and how it operates are being developed. However, there seem to be few aspects of convergence between separate schools of thought as each tends to focus on its dimensions and belief systems over urban morphology. One of the outstanding challenges over the years is the shaping of cities and regions in the mid-20th century that focused on the sprawling of cities and decay in ageing central places.

As observed by Elrahman and Asaad (2020), the goal was to find common ground among the design disciplines, namely architecture and urban planning, for dealing with the kinds of exasperating problems that are beyond the mastery of any single design discipline. However, most agree— some enthusiastically and others with reservations — that urban form has been largely the domain of architects interested in urbanism.

Proponents of the above school of thought argue that since giving shape to urban space and settlement is an essential task of urban design, it requires an architect's training. The planning profession, on the other hand, increasingly reengages physical planning and it argues that urban form is their prerogative as they claim an urban design grow in their professional practice. The central argument from the physical planner's side is that urban form carries spatial implications that are not, at heart, architectural, so an architecture dominated approach to urban design is limiting. Krieger (2009) also provides a counter-argument from the emerging generation of designers calling themselves landscape urbanists who questions the supposition that urban design insight is the prerogative or architecture form-making sensibilities alone and probe the question, "Isn't the landscape the real glue of the modern metropolis?" While these schools of thoughts are still growing and grabbing their share on the table, it is important to note that the promise of landscape urbanism in urban morphology is powerful since it promotes logical integration of land use, environmental stewardship and place-making.

In light of the above, it is of importance to pursue any city, regional or neighbourhood development through a highly collaborative mind of a myriad of actors beyond professional circles. Urban form is a critical aspect of the urban fabric and can be greatly improved from the initial tactics of the Mohenjodaro developments to new urbanism and the current modern planning and design phases. Some of the key factors include, among others, public agencies, investors, financial institutions, regulators, built environment professionals and residents. Krieger (*ibid.*) underscores that navigating the shoals created by cadres of stakeholders is perhaps the greatest challenge to pursuing sophisticated ideas about goals for urbanism. The morphometrics of cities and regions of today may greatly benefit through processes and forms of urbanisation than we acknowledge or deploy from our memory bank of good cities.

LESSONS DRAWN

The first fundamental lesson drawn is that the field of urban and regional morphometrics is a dimensional field that provides rich information and knowledge on the evolution, structure and future of urban areas. The gateway to the understanding of the field of urban and regional morphometrics is looking through the past and histories of the grown cities. These provide fundamental information concerning theories regarding urban form and factors that led to varying urban forms throughout the world. In this chapter, it has been highlighted that different urban and regional forms formed the basis of current and past urban forms in the world.

Three categories of urban forms, cities and regions as central places, break-of-bulk and specialised function, are discussed. It is understood that cities and regions do not necessarily follow one of these categories but may have traits of all of these urban forms. Some of the theories that support this subject matter are the concentric zone theory, the sector theory and the multi-nuclei theory. These theories do not determine the spatial structure of every individual city but, rather, they can be generalised to explain the arrangement of activities, land uses and structures that would result from the actions of factors responsible for the establishment of the cities or urban regions.

Another important take away from the chapter is that urban and regions are created out of a process of 'human objectivation'. This is when the aspirations and needs of certain people are responsible for the type of urban area they establish and its urban form. From the chapter, it has been highlighted that from Europe to Africa, urban areas started as a small collection of human settlements that grew over time to become some of the outstanding metropolitans of the world. In the past, especially in the 19th and 20th centuries, most urban regions had fewer people that determined the level of development in cities and their urban forms. Early civilisation of Mohenjodaro or Harappa originated near river valleys because of the needs and locational advantages that suited the people of that time. However, urban areas are dynamic and they transform over time. This is also one of the lessons that even urban form transforms over time and sometimes it transforms due to physical factors or due to other man-made factors.

The subject of urban and regional morphometrics remains under the purview of professionals who can explain the transformations of urban

regions from the early civilisation cities. However, it has been seen that there is a born of contention over the schools of thought that consider themselves creators and protectors of various urban forms. Professions such as urban planning, architecture and urban designing have shown great motive over the subject matter and sometimes their effort has gone to waste due to lack of coordination and collaboration over urban and regional morphometrics.

CROSS-CUTTING THEMES

The study of urban and regional morphometrics has been discussed in this chapter and it remains important to note that many cities of today are because of the processes of planning that happened in the past. Studying this subject in the contemporary era requires an understanding of cross-cutting themes of urban and regional morphometrics to ensure the relevance of the subject matter. Some of the fundamental cross-cutting themes of this chapter include the following:

URBAN MORPHOLOGY

In terms of urban morphology, the major focus is on the science that is used to assess the generation process of ideas and tendencies that base the form of cities to focus on the tangible impacts of social, economic and environmental forces. With time, the elements of urban morphology such as buildings, gardens, streets, parks and statues change and evolve but they remain the key elements of morphological analyses. It is on this background that Fathi *et al*. (2020) argue that the physics of the city reflects the impact and footprint of human tendencies and activities and that form can be related to a specific historical period or can be caused by their designed events. This makes urban morphology an important theme in this chapter or the subject of urban and regional morphometrics. Studying the physical aspect of urban and regional spaces is the most proper basis for delineating the overall image of character since the physical nature and organisation of cities and regions are the most tangible and sustainable aspects.

The main elements of urban morphology thus include:

- Form, city structure, proportions and deformation of objects and their components;
- Economic and social structures, time and its effect on city form;
- Use of buildings and human activities and interactions;

- Form, cultural factors and urban components and landscape;
- Historical and social factors, form and spatial factors;
- Physical for of the city, form and space;
- Form and time: implementation, extension and spatial interaction.

These concepts of urban morphology emphasise the physical-functional aspects of the city, such as street and building patterns and the social, economic and political factors and the passing of time that significantly affect the formation of the artefact texture of the city. Urban morphometrics describes urban form via the systematic and comprehensive measurement of its morphological characters. The morphological characteristics of urban areas include their physical characteristics such as the street, the block and the natural area. In terms of measurement, the main focus of urban morphometrics is on indicators of urban morphology such as density and built volumes, permeability and urban coverage, urban blocks descriptors, urban form descriptors: surface to volume ratio, compactness index, urban canyon ratios, the prevailing orientation of facades, and sky view factor.

SPACE SYNTAX MEASURE

The space syntax measure is an important theme in the study of urban and regional morphometrics. This is an indicator of street connectivity and is done through an analysis of the configuration of a city, that is, the pattern and order, among others, to analyse the potent relationship between form, space and social forces. Fathi *et al*. (*ibid.*) indicate that space syntax measure entails dividing the city into a discrete system, including the longest visual-motor channels where audiences move in and perceive city structure. The intersection of these lines is evaluated based on graph and mathematical analyses and the intersection of two lines represents their relationship and a line having more intersections with other lines is related with higher elements in the network and is more accessible. As observed by Fathi *et al*. (*ibid.*), this method of space syntax measure allows researchers to analyse the relationship between spatial configurations and the social and behavioural structure of space and recognise and analyse the effect of changes in urban networks on citizen mentality and behaviour. Space syntax is considered an attempt at how a spatial configuration situation expresses a social or cultural meaning, and predicting the amount of space used and its linkage with the daily life of people is possibly

based on this method. Fathi *et al*. (*ibid.*) further highlight that space syntax aims at describing how human-made places such as buildings and urban space networks, were formed, especially how they are articulated and aligned.

Some of the basic concepts related to space syntax measure include integration or interconnection. This is a principal concept in the space syntax approach. The integration index interprets an axial map, i.e. the spatial arrangement image of a city. The integration of a point in the map shows its relation with the overall structure. If space can be reached by travelling shorter spaces, that space is said to have more integration and vice versa. Another dimension or concept is connectivity. This refers to the number of paths and ways that are directly linked to the path being analysed. There is also depth distance, that is the minimum spatial distance, that must be travelled from one node or path to any other node or path. The lower the depth is, the higher the integration and connectivity would be.

CONCLUSION AND FUTURE DIRECTION

The chapter explored different forms of cities and regions across the world. It has been described that cities and regions have various forms that develop and transform over time due to various factors. Some of the described factors can be grouped into the physical such as topography; economic i.e. the availability of natural resources or raw materials and political reasons. These factors have been discussed in the context of urban forms of cities such as Addis Ababa, Nairobi, Dar es Salaam, Dakar and some European and American cities. The wake of rapid urbanisation has also been elaborated on, especially on how African cities have evolved and adapted to high rates of informal settlement development in their cities.

The following are some of the options to consider when trying to build a desirable urban and regional form:

- Respect the experience, identity and character of the surrounding context;
- Ensure the sustainability of natural systems and urban living;
- Protect the quality of life of residents, employees and visitors;
- Ensure the connectivity and integration of surrounding uses; and
- Require properties to develop in a manner that contributes to the overall vision of the city

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CHAPTER 4: Crime, Place and Space

Abstract

The chapter seeks to explore and discuss crime, place and space. The background of the argument emanates from the observation that crime is a result of socio-economic reasons. These include unemployment, poverty, social disparities, human weaknesses, lack of love and poor parenting. Crime has become an integral part of human society. Therefore, many strategies and efforts were placed towards the prevention of crime in human society. Efforts, such as increasing surveillance tools, such as CCTV, alarms and security response systems, police patrols and awareness campaigns on how to prevent crime were employed. Indeed, missing in the literature is the analysis that space and place also influence rates of crime within the society in which people live. For the methodology, the study engages the existing literature. Results indicate that crime is shaped by the external factors of the individual. The built environment also influences the rates of crime within the communities in which people live in.

INTRODUCTION

Crime has been an integral part of human society and many efforts were put in place towards the reduction of high crime rates, however, a gap remains. This is because of little attention that has been afforded in explaining and exploring the relationship between crime, space and the domicile of the people.. As a result, the strategies of crime prevention become feeble. In a way of giving well-balanced efforts towards crime prevention approaches in the cities, the concept of space and place should also be well-thought-out. The analysis that has been ignored is that the places and surroundings in which people are born, bred and live also influence positively and negatively the crime rates within societies. The causes of crime in the same country differ due to various reasons such as socio-economic and political structures. Some of the causes of crime within societies include poverty, unemployment, lack of proper education, the ineffective legal system, social disparities, alcohol and drugs, lack of love, human weakness and little public protection, security and poor parenting skills.

Crime has caused civil unrest in the communities and cities have become non-liveable places as the vice has become the order of the

day. The government and the legal sectors have made efforts toward crime prevention. These efforts include awareness safety campaigns, twenty-four-hour police patrol, neighbourhood watch, use of surveillance measures such as CCTV, alarms and security response systems. In all the efforts that were done, little was done to consider how place and space can affect crime. Crime is a concept that exists along with the creation of mankind. It is known as an act or omission of an act that causes harm to society as a whole and also causes disturbances and panic to societies. Such an act is punishable by criminal laws (Gregory, 2016). A place is a very small area, usually a street corner, address, building, or street segment. The place is a location with meaning, has a physical landscape such as buildings, parks, memorials, and infrastructures of transport and communications.

A place is also known as a particular constellation of material things that occupy a particular segment of space and have sets of meanings attached to them (Hägerstrand, 2016)). There is a deep association with place and consciousness of the places where we were born and grew up, where we live, or where we had particularly moving experiences. These experiences determine the rate of crime in society. Space is everything we can experience in daily life, sky, earth, water and land hamlet and city, street and square, a building itself from outside and inside (Brenner, 2017). Space also has some sense of influence on how people behave. Different places call for different behaviours of people, hence certain behaviours cause harm to society. There are certain elements within the society in which their absence, presence or the way they are designed encourages the occurrence of crime.

The chapter seeks to explore and discuss crime, place and space. Different sources were used to acquire data from the studies that were done in the past on crime. The data in this chapter was derivative of the secondary sources and it is desktop research. Many measures are to be set to combine or unleash how the domicile and space can be stimuli to crime. It is imperative to link the strategies of crime prevention and the spatial aspects. More must be done to understand how space and place can influence crime. The spatial planning itself, if well unified with the crime prevention methods, leads to peace within cities. It is important to engage the aspect of place and safer environs and space, along with the legal system, for it to be effective. This will create crime-free cities globally. In a bid to create crime-free societies,

it is imperative to assimilate the legal system into the spatial planning atmosphere. In light of this knowledge, the place and space will contribute to crime prevention in the cities through designing environments that are not conducive to crime.

The place and space can enhance crime prevention. The spaces and infrastructure within the cities should provide more security to the inhabitants. This is through the creation of roads and streets that are accessible and transparent. Facilities like public parks should provide some sense of security to the users, to avoid theft and rape. Streets should be well-lit to avoid pedestrians walking in the dark. This will reduce the crime rate committed during the night. The community should also be engaged to participate in crime prevention programmes. Buildings should discourage crime occurrence in terms of human comfort. Formalising the informal settlement can also reduce crime. Road infrastructure should also be improved to enable access to the vehicles, especially the police patrol vehicles. The streets should contain the street features, like bus shelter and benches to avoid unnecessary loitering.

BACKGROUND AND OVERVIEW

The world over, crime is one of the challenges that deter development and scares away tourists, hence crippling economies. Crime is a highly complex phenomenon that changes across cultures and time. Activities that are legal in one country, for instance, alcohol consumption in the United Kingdom, are sometimes illegal in other countries (Newton & Felson 2016). Globally, the world faced a high crime rate of sexual abuse of children under the age of 14 years in 2017. In 2005, one of the UK's largest shopping malls, Bluewater in Kent, banned customers wearing hoodies and baseball caps as part of a general clampdown on intimidating behaviour, swearing and shoplifting. In Eastern Europe, murder rates in 2015 were about one third what they had been in 2003 (United Nations Office on Drugs and Crime [UNODC], 2019). Violence is often blamed on deep social causes, but such causes do not change overnight.

In the United States of America, crime is believed to be a result of the occurrence of a gap between the cultural goals of society, for instance, material wealth, status and the structural means to achieve these such as education and employment (UN, 2017). This strain between means and goals results in frustration and resentment and encourages some

people to use illegitimate or illegal means to secure success. This places pressure on the individual to commit a crime. Property crime is much more common than violence. In 2019, the FBI recorded a total of 2 109, nine property crimes per 100 000 people, compared with 379, four violent crimes per 100 000 people. The crime records indicate that there has been a decline in the United States of America violent and property crimes since 1990. As observed by the FBI data, the violent crime rate fell 49%from 1993 to 2019 with large decreases in the rates of robbery (-68%) and aggravated assault (-47%) (Gramlich 2020).

In 2017, Asia experienced murder crimes that have 104 000 victims representing a rate of 2,%of the global population. Asia, with 60%of the global population, accounted for 23%of total homicide victims (UNODC, 2019). The development of market institutions in China highlights how changing cultural values generated new economic motivations for crime in this particular context. The weakening of traditional social institutions, including family, also contributed to the crime. This caused crime to increase as there was a lack of love and parental guidance within Chinese society. The societies ended up being the place where criminals are bred. This caused social instability within the cities of China. The concentration of too many people within a small space has raised the rates of crime in Shanghai and Hong Kong, where areas of the city may have up to 30 or more high-rise buildings, some with over 100 floors (Herrmann and Felson, 2015). India records the highest crime rates in urban areas as compared to rural areas. Murder cases are the most commonly committed crimes in the urban areas of India. The rates of crimes committed changes from place to place.

Crime in Chicago in the USA differs from drugs, robbery to burglary and vehicle crime. In New York, during school days, robbery crimes are at their peak and decline during non-school days. Daytime robberies in New York clusters are high in places close to schools and subway stations, while night robberies concentrate near bars. The Afghanistan Human Rights Report (2019) argues that most commonly recorded in the cities of Afghanistan are crimes of sexual abuse of children and violent abuse of women. This is caused mostly by drug abuse, unemployment and early marriages. As a result, peace within the cities has been disturbed.

In response to the high rate of murder cases, the Ministry of Justice in Brazil, presented PRONASCI, Brazil's National Programme for Public Security with Citizenship. The programme was initiated in 2007 with the overall aim of reducing the high rate of homicide in Brazil. The programme involves structural investment to improve the criminal justice and correctional system, increase access to justice and strengthen the capacities of the police and other professionals (Jonah and Mansor, 2017). It also introduced a series of targeted funding programmes at the local level that support interventions to strengthen families and reduce community conflict and youth violence.

In the developing world, researchers noted that increases were a natural result of modernisation. It is argued that nations become more affluent but at a cost. Inequality and social dislocation increased owing to inadequate job creation, particularly in rural areas, resulting in rapid rural to urban migration and a reduction in the perceived legitimacy of social institutions. This was commonly witnessed in Uganda (Blaustein *et al.,* 2018). The inadequacy of social facilities in the cities of Uganda causes more frustration to the people, hence they opted for illegal changes showing how crime evolves within the places at an increasing rate. Though strategies were placed to control the increasing crime rate, the measures were outpaced. The crime rates continued to evolve as property rights increased, increasing official crime rates as people turned to theft and other property offences as a way of contending with anomie and a lack of legitimate opportunity in urban areas lacking informal social control. Uganda was experiencing a period of rapid economic growth that was accompanied by a near threefold increase in crime rates. The United Nations (2019) argues that in West Africa drug trafficking is the most committed crime. Between 2005 and 2007, a series of more than 20 major seizures were made in the West African region, involving thousands of kilograms of cocaine.

Crime in South Africa remains a serious challenge and there is a general feeling in the country that the situation is worsening. Though attempts have been made to reduce crime through the implementation of mechanisms that respond specifically to particular contextual problems and involve, to some extent, a local interpretation of international experiences. crime is indeed a matter that is constantly on the minds of most South Africans. A recent survey indicated that almost 40%of the population know someone who has been a victim of

crime over the past six months. It has been suggested that the high crime levels could be related to the transition from authoritarian rule to democracy. South Africa faces serious challenges because of the high levels of poverty and extreme inequalities and disparities in income, wealth and opportunity in the country. It is estimated that 57% of the South African population lives in poverty. The transition to a democratic, elected, non-racial government that was set in motion in early 1990, stirred a debate on the course of economic policies to accomplish sustained economic growth, while remedying the poverty and other socio-economic discrepancies generated by the apartheid government. Carrington (2017) argues that these include inequality and unemployment, particularly among black South Africans. corruption, rash in conflict and the most horrible – high rate of crime. Statistics show that recorded levels of all crimes increased absolutely for the period 1990 to 1994. Most crimes increased phenomenally during this period: assault increased by 18%; rape by 42%; robbery by 40%; vehicle theft by 34% and burglary by 20%.

In Zambia, the ineffective legal system has contributed to high crime rates. This is because of the police response to the cases reported by the complainants (Currie 2015). Police officers lack funding to enable them to make to respond to people's reported concerns. Zambia has tried to place many efforts such as awareness campaigns and police patrols to deter crimes, but it is still increasing. Police within the country were also engaged in primary approaches to prevent crime that involves the reduction of opportunities for crime and also strengthening community and social structures. The Zambian police are being affected by corruption within the country, long delays in the decision-making system and sometimes slack of the investigations, rich and powerful convicts being bailed out. This easy-to-get-away-with-it feeling encourages more crime.

In Zimbabwe, crime increased by 10-20% across most sectors in the past few years (2010-2020). Causes of the high crime rates are due mainly to a crippled economy. Economic challenges in the country have caused many citizens to indulge in illegal activities to earn a living. The Chivhu District experienced high crime rates of unlawful entry from 2016 to 2017. The district records an average of 58 cases of burglary out of an average monthly crime rate of 378 cases. As observed by statistics maintained at the Operations Office at Chivhu District Headquarters (DHQ), the district had a total of 21% detection

rate of Unlawful Entry cases received during the year 2015 and a total of 20% in 2016. The Zimbabwe Republic Police (ZRP) National Inspectorate Team report on Chivhu for the year 2016 and 2017 respectively reveals that the district is not performing as per national standards of 25% that is the benchmark ZRP (Featherstone Station Service Plan Document, 2018).

Chivhu has been managing crime in the Mashonaland Province but the situation suddenly changed because of the high rate of corruption and lack of financial support (Dlamini, 2017). In Masvingo, where people are steeped in poverty most are unemployed, and it is getting even harder for people to find jobs. With no jobs and no means to earn a living, they resort to illegal alternatives. Poverty is true evil for society as it provides rise to not one but a large number of problems.

In Harare, there is a high unemployment rate that has caused many to indulge in street money changing. The country is relying mostly on an electronic currency called the Real Time Gross Settlement (RTGS). Most of the citizens are chasing after the United States dollar for external markets. This becomes the motivation for crime. The ZRP Featherstone Station Service Plan Document (2018) argues that the country is facing an increasing rate of informality, hence more informal activities are prone to occur. For instance, in Hopely, Harare, there have been high rates of robbery as people try to earn a living. Many crimes are committed mostly when people are under the influence of drugs.

The ZRP) lack proper funding and training. Officers find it difficult to respond to a call for mobile assistance (Zimbabwe, 2020; OSAC Crime and Safety Report 2020). Often, a complainant must go to the nearest police station and pick up an officer to assist. Another possible reason for crime in Zimbabwe is lack of proper education. This is so because people without education fall into the criminal trap easily. Lack of education leads a person to choose the wrong path for earning money easily. Many efforts have been made towards crime prevention by the governments, but they have been failing to reduce crimes although sometimes they succeed but not for long, As a result, it is imperative to understand how place and space influences crime.

CONCEPTUAL FRAMEWORK

Crime investigation has many facets that evolve around it. The attention of this study is centred on how place and space can influence crime within societies. It is possible to reduce the rate of criminal activities occurrence by changing the surroundings.

CRIME

Many countries have used common law and defined crime as a highly complex phenomenon that changes across cultures and across time place and space. Crime happens in places where offenders and victims live and spend time (Cornish and Clarke, 2016). It is known as an act or omission of an act that causes harm to society as a whole and also causes disturbances and panic in societies. Crime is triggered by different factors, including the environment in which people live. The idea of crime alludes that it evolves from place to place and from time to time. Crime rates depend on the structures and features of the surrounding in which the crime is taking place.

PLACE

It is referred to as a meaningful site that combines location, locale and sense of place. Places are often recognised in terms of their material structures that come to stand for a place (Dlamini, 2017). Places are continuously enacted as people go about their everyday lives – going to work, shopping, spending leisure time and hanging out on street corners (Creswell, 2016). The notion of place alludes that people perform best when they are at a place they belong and weaken as they are removed from it. The place lies at the centre of geography's interests and places are practised. Materiality, meaning and practice are all linked (Gregory, 2016). The material topography of the place is made by people doing things as observed by the meanings they might wish a place to evoke. Practices often conform to some sense of what is appropriate in a particular place and are limited by what particular material structures offer (Creswell, 2016). In this study, the concept of place mentions that it shapes the behaviour of its inhabitants. Bad behaviour is more weakened if the places where it is taking place is removed and changed. The physical designs and layouts of urban living environments are a principal factor that determines why some places are more vulnerable to crime than others. The structures that are found within the locations, encourage or discourage good

behaviour. Places that are well-built are invulnerable, hence vulnerable places are prone to depraved activities.

SPACE

Space becomes a place when it is used and lived. Space is regarded largely as a dimension within which matter is located or a grid within which substantive items are contained (Zewolde *et al.,* 2020). It involves the structures shaping society and it must work to make them fairer and more equitable for the users. Each space has its own internal rules of conduct – breaching these rules can create a potential for deviance. Spaces can also be defensible. This means that there are physical spaces outside of a house that the residents of that house understand as their own private space that they may occupy and interact with accordingly (Fisher *et al.,* 2013). Geographers argue that these spaces are not simply the 'backdrop for our social interactions but that by contrast, they help to shape the very nature of our social interactions' (Green, Harvey and Knox, 2018). They argue that space is an area in which people live. The features within different spaces determine the rate at which illegal activities take place. They also determine what type of behaviour occurs in space. The improvement of human space also means improving the way they think. Spaces also determine the type of people who are being raised from it. The way the spaces are developed determines the type of people who live within that location. Structures and facilities that are sited in different spaces define the character of the people who live within it. Social facilities, including bars, clubs and pubs, sited at certain places, tell the behaviour of the people who live there.

THEORIES UNDERPINNING THE STUDY

The social disorganisation theory argues that crime is shaped by external factors of the individual. Crime can be influenced by the environment in which one is living. The experiences within the neighbourhood, the peer group, the structures and the family can affect the behaviour of the individual. The theory postulated that high crime rates are higher in areas characterised by poor housing and infrastructure, poor health facilities, socio-economic disadvantage and transient populations. These impoverished settlements cause depression and frustration to the people. This leads to residents believing that crime is a function of neighbourhood dynamics and not due to individuals and their actions. It shows that in areas where there are few schools and people lack proper education and have few

chances of getting a job, people will resort to illegal paths. One-way places matter is that different types of facilities increase or decreases crime in their immediate environment. The theory links crime rates to neighbourhood ecological characteristics. An individual's residential location is a substantial element shaping the chances in which the individual becomes involved with illegal activities.

The theory shows that among determinants of an individual's later illegal activity, residential location is more responsible for that than the individual's characteristics. The way societies are built and developed plays a crucial role in criminal activities. The arrangement of these places also causes the dislike or fear of places by the inhabitants that is referred to as topophobia. It includes all negative emotions people have about certain places. Topophilia is all about the pleasant experiences of places (Trigg, 2016). Certain places cause depression, resentment and frustration. If infrastructure is in a dilapidated state, people behave negatively within society. The everyday challenges of survival and the anxiety of inhabitants seems to force one into this vicious cycle. Dilapidated educational infrastructure and housing facilities are not enjoyable. These conditions compel people to indulge in wrongdoings, hence committing a crime. Depressed and frustrated people rarely think sensibly. For instance, they may opt for illegal ways of solving problems they are encountering within their society.

Places that lack facilities like libraries, sports grounds, churches, neighbourhood centres and museums encourage residents to indulge in illegal activities like drug abuse, sexual abuse, robbery, violence, murder, among other crimes. Due to unemployment in the area, the places develop informal settlements and businesses that will cause high crime rates. Provision of better infrastructure to ensure pleasing experiences in places in which people live will help to reduce crimes. People like the pleasure which they gain when they encounter the environment. Those pleasing experiences or exciting emotions gained from certain places are to be kept forever. This could be because of the designs, social facilities and economic structures of the community. The only way to change the behaviour of human beings is to change the environs in which they live by improving the facilities they use daily. Changing the infrastructure around them means change of lifestyles and behaviours. This can be done by improving the places that breed criminal minds.

Open parks and open spaces should provide security to both female and male residents, old and young. The parks are meant for different activities except for criminal activities, hence in designing them they should discourage the occurrence of illegitimate activities.

It is imperative to consider the hot spots for crime and then alter the spaces to reduce. Factors like the causes of crime in a certain area must be considered. For instance, if the criminal activities are because of the absence of lights, then the alterations should consider the provision of streetlights. Most social life is conducted within the social spaces like parks, so the absence of security within these parks is the root cause of illegal activities, hence there is need to put in place security measures.

Sampson *et al*. (1997) argues that there are inequalities in the places where people live. These inequalities in life lead to structural barriers and cultural adaptations that undermine social organisation hence lack of control over crime (Dlamini, 2017). The theory postulates that the rich and elite do not commit street crime. For those who live in places that are well built, in terms of infrastructure and economic status, the chances of indulging in criminal activities are very slim as compared to the poor people who live in deprived neighbourhoods. People living in these neighbourhoods commit crime such as burglary and mugging, as they are not employed and have no source of income. Being disadvantaged means the people are not able to access basic needs such as schools, proper shelter and jobs. The creation of better places that will offer them proper education, shelter and activities to earn a living will give the disadvantaged group a better life and they will discontinue the criminal activities. This will enable the police to manage the crime as a few crime spaces are left unoccupied.

The defensible space theory argues that defensible space is a model that can inhibit crime in residential environments (Donnelly and Newman, 2010). These environments may be specific buildings, projects or the entire neighbourhood. The space theory also states that more of the spaces where crime is committed are vandalised and dirty as compared to the private ones that are better maintained. It is possible to create physical spaces in a way that will reduce crime by affecting the behaviour of both the residents and the offenders. This leads to a lower crime rate. More layouts should be created in a way

that allows the residents to have better control in the areas and deterring the potential criminal. The theory outlines the four concepts: territoriality, surveillance, image and milieu. It is imperative to create spaces that provide some territorial influence to give residents a sense of responsibility. The image and milieu concept explains that vertical housing projects should not be built in areas with high crime rates. A space within or outside of a building is considered defensible space when the residents or occupants of a building extend their control into that space (Fisher *et al.,* 2013). Such control may include both resident appropriation and surveillance of the space. Most urban areas that are designed with defensible spaces promote positive social dynamics while also deterring negative ones such as personal and property crime. Areas that are isolated, dark, closed-off spaces foster street crime, while visibility acts as a deterrent. A housing community's physical design is a primary determinant in whether outdoor private spaces are defensible spaces or not. How the physical and artificial features are arranged determines how vulnerable the places are to crime and illegitimate behaviour.

APPROACHES AND METHODS OF UNDERSTANDING CRIME IN PLACES AND SPACES

There are sociological approaches to understanding crimes. Anomie or Strain Perception is one of these approaches. It helps in understanding crimes in places and spaces as it explains the breakdown of social norms that often accompany rapid community change. Sociologists argue that crime occurs when there is a gap between the cultural goals of a society. Examples of the cultural goals include wealth, materials and status within the society. In the circumstance where people in a certain place fail to attain the desired living standards legally, they opt for other easy and illegal ways of earning better living standards. This approach argues that the surroundings in which people live put pressure on individual citizens to commit crimes. If the surroundings in which people live discourages them from achieving desired success, they commit a crime. The structural and economic disparities between the poor and rich neighbourhoods explain why people commit crimes.

Studies have noted that burglary does not happen by accident with incidents being more dominant in clustered settlements (Rengert and

Wasilchick, 1989). Figure 1 shows the various Hypothetical Spatial Patterns that may be used to describe the behaviour of burglaries.

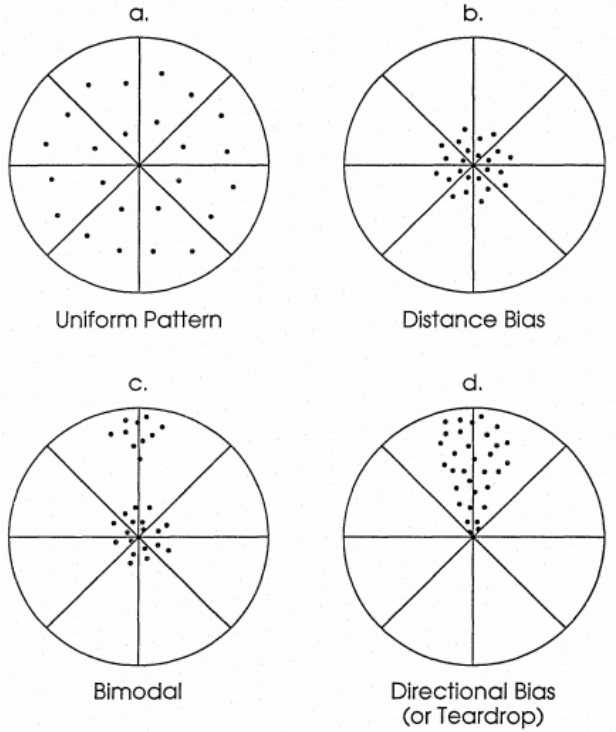

Figure 1: *Hypothetical Spatial Patterns* (Rengert and Wasilchick, 1989)

Theoretically, it is expected that non-drug dependant burglars are more concerned with risk as opposed to gain maximisation and as a result, choose clustered sites while casual drug users are expected to exhibit a bimodal configuration focused on home and drug supply area as shown by Figure1 (Rengert and Wasilchick, 1989). One may, therefore, argue that the arrangement of settlements can either deter or promote criminal activities in the neighbourhood. In another study, it was observed that areas dominated by liquor stores and taverns in Chicago recorded more crime rates (Block and Block, 1995). This shows that the designing of neighbourhoods to determine where to

place what can either promote a neighbourhood's safety or make it more unsafe.

Another approach to understanding crime in places and spaces explains crime in terms of crime opportunities that happen in daily life. Three elements should converge in time and space for a crime opportunity, i.e. a motivated offender, a suitable target or victim and the absence of a capable guardian. A guardian at a place like a street could have security guards or even ordinary witnesses to the criminal act and possibly intervene or report it to police. The absence of parental guidance within families to societies encourages crime to happen. This is because the children, both male and female, are growing under a lack of supervision. Crime occurs in places where the victims are vulnerable. This helps in understanding that in places where there is no public protection, the area tends to be prone to high crime activities. Crime is not random, it is planned. Crime happens when the activity space of the victim or target intersects with that of an offender. The path is the route that the individual takes to and from typical areas of activity in everyday life. Edges are the boundaries of an individual's awareness space. The areas that people use determines the occurrence of crime in places.

Crime in places can be understood through economical approaches. The approach explains that most potential criminals are normal individuals. They commit a crime if the expected net benefit from committing a crime exceeds the benefits derived from legitimate activity. The people within the societies are rational in some sense as they compare the benefit of violating the law with possible cost and severity of punishment. If people benefit or gain much in committing a crime than from legitimate activity, they opt for the former for their survival. In any community, if the benefits earned from indulging in wrongdoings outweigh the right doing, the people commit more crime. Design approaches help to understand crimes in places where people live. The environmental designs with help to prevent crime or encourage illegal activities (Willcocks, *et al.,* 2019). How the buildings and roads are arranged promote hotspots for crime and become the hiding places for robbers. This approach argues that residential areas with designs that involve more cul-de-sacs reduce criminal activities. This is so as the residence will easily notice someone who is not supposed to be in that place. This reduces criminal activities within the areas as the offenders are deterred.

The behavioural approach also helps in the understanding of crime in places. It is a psychological approach that explains that human behaviour, including violence and criminal behaviour, is acquired through interaction with the social environment (Bartol, 2002). People in different places are not born with a violent and criminal disposition. Rather, they learn to think and act criminally because of their day-to-day experiences. People who live in bad communities learn to model the destructive behaviour of their neighbours. They believe that violent activities are rewarded, hence commit a crime in their societies.

Personality and violence are other approaches that help in understanding crime in places. It is known as a stable pattern of behaviour and actions that outline the differences of people in a certain place. Certain personalities are prone to criminal behaviour, or instance, personalities that have traits like egoism, self-centeredness, jealousy, lack of empathy and hostility. In a community with such personalities, high crime rates are always recorded as the people get easily frustrated and immediately feel like attacking if there are any visible threats.

RESEARCH METHODOLOGY

Different sources were used to acquire data from studies that were done on crime in different countries. Sources used include textbooks, the internet, newspapers, magazines and some government documents on crime in African and European countries. Published materials were used and other sources include the national and world crime reports.

RESULTS

The way the places are built determines the type of crime committed within certain areas. Deprived neighbourhoods cause frustration to the dwellers and they turn to doing wrong things. The absence of social facilities such as libraries, playing grounds, museums and churches within the places in which the people live is the reason for crime. This is so as people grow up and spend time in areas where they are not supervised and get exposed to bad behaviours. Most of the crimes committed in the cities are a result of unemployment. For instance, a 36-year-old black man was convicted in the UK for selling drugs because that was all he could survive on, though illegal (Peace, 2012). The absence of livelihoods within the areas forced people to survive on means that are not always legitimate. It is noted that the increase in informal settlements leads to a rise in crime rates. Most of the people

in these settlements are rural migrants lacking skills and unemployed and, therefore, are driven. to indulge crime. In places where there are few or no schools at all that offer proper education to people, criminal minds tend to manifest. In a case of a 24-year-old male in Uganda who was convicted of robbery and being violent to the community, confessed in an interview that he left school at the age of eight because there were no proper school facilities in his area (Blaustein *et al.,* 2018). Corridors that are not transparent and well-lit corridors tend to be hideaways for robbers and murderers. Areas that have insufficient street fixtures encourage unnecessary wandering. It is noted that the environmental designs in the cities trigger or reduce crime. This calls for governments, legal systems, local authorities, spatial planners and architects to understand that place and space are stimuli to crime in different nations.

DISCUSSION

Crime within the world cities has increased, hence necessary actions should be taken to address this situation. Many causes of crime have been identified and how they are affecting the living standards and social life of the people. Understanding the contribution of space and place to crime is very crucial in the social life of the people (United Nations, 2019). Cities have been experiencing unemployment, poverty, economic disparities, corruption, little public protection and security and deprived neighbourhoods. All countries have struggled to ensure safety and security for their citizens and to increase the quality of their lives. Although place and space can influence crime, it is imperative for to develop sustainable facilities and space. The changes in facilities and development should be monitored for a sustainable result. In the altering of spaces and development of new places, more funding from the private and NGOs should be channelled to the development. Many ideas and policies must be created to enable crime-free cities with better public services.

The knowledge that place and space affect crime occurrence will enable the reduction of illegal activities in the cities leading to the creation of secure spaces. It is imperative to provide streets well-lit and well-used and bus stops and car parks ought to be located near places of activity for better surveillance. The street fixtures such as benches and bus shelters should also be provided to avoid unnecessary loitering within the corridors. City authorities should create more facilities such as playing grounds, churches, neighbourhoods centres,

libraries and museums that discourage criminal minds. They should provide security within the streets and parks.

Considering the greening of the cities, the setting of taller trees and shrubs should be discouraged in the paths and streets for shorter trees and shrubs. City authorities should encourage more public participation in neighbourhood patrols and watches and other security measures. This will help in identifying and eliminating trouble spots in the neighbourhoods. Strict rules should be enforced to govern human behaviour in different kinds of spaces. It is imperative for increased use of CCTV and other surveillance equipment and in different areas not within the buildings to reduce and monitor wrongdoings. Creation of more educational facilities like schools from early child development schools to tertiary schools will provide proper education to the people. Encouraging folks to engage in different affordable livelihoods so that they will earn an honest living will discourage them from indulging in illegal activities. Planners and architects should take part and guarantee that the correct designs are produced and implemented within the cities to prevent crime.

CONCLUSION AND POLICY OPTIONS

It is concluded that in a bid to make the world cities favourable places to live in for all humans despite class and race, it is imperative to know that place and space can influence the occurrence of crime within communities. This knowledge will help in achieving the main goal of close to crime-free cities. Urban safety and security play a crucial role in improving the quality of life of citizens and sustainable development of urban cities. It is noted that many efforts were made towards crime prevention by the different cities. This was through the provision of security measures but these measures do not last long because of different factors in different nations. These factors include political instability, corruption and lack of funding. This chapter will help the government towards the development that should be taken within the communities. Understanding that space and place can influence crime will enable the transformation of lifestyles within communities. The developments should strongly encourage defensible spaces and strict rules. This will also enable peace and reduce civil unrest within the cities. More funding is needed to make such developments within societies. The private sector is also encouraged to invest in terms of technology and innovations.

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CHAPTER 5: Public Transport Systems and City Logistics

Abstract

With half of the world's population living in urban areas and the developed countries rapidly urbanising, patterns of movement and consumption in cities are changing. The movement of people and goods within cities becomes a critical urban and transport planning concern to build sustainable urban economies and reduce the externalities such as congestion and pollution. City logistics ensure that freight distribution within urban areas is done efficiently and sustainably. It provides innovative responses to customer demands at a local, regional and international level. This chapter recommends widespread implementation of the green agenda in the transport and logistics sector to bring positive environmental benefits to the sector, while at the same time promoting other pillars of sustainable development in transport and logistics such as economic sustainability.

INTRODUCTION

This chapter maintains that the smooth functioning of cities without efficient transport and efficient logistics is currently impossible. It realises that transport and city logistics are key to the achievement of sustainable urban economies. The key elements of transport and city logistics as to be discussed in this chapter include the movement of people and goods within cities and the reduction of externalities such as congestion and pollution. Cities in the modern era are more crowded and, as a result, logistics activities must be adapted to the requirements of sustainable development and allow for an increase in the efficiency of the flow. Another takeaway of the subject area is that city logistics ensure that freight distribution within urban areas should be done efficiently and sustainably. This manner should also be innovative enough to cater for local, regional and international customer demands so that sustainable development can be realised.

BACKGROUND AND CONTEXT

Transport and city logistics are critical aspects of the sustainable development of cities across the world. This chapter is based on the theoretical underpinnings of sustainable development, hence it is

important to highlight that sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987). The three main components of sustainable development are economic growth, social equity for meeting the needs of today's generation and environmental protection for the ability to meet today's and future generations' needs. Thus, a transport system in a sustainable society is very important and this transport system has a direct impact on human health and safety. Including issues of safety in the transport discourse, it is important to highlight that half a million people in developing countries die each year from transport-related air emissions and a similar death toll results from traffic accidents. In the developed world, there is a 75% urban population such that designing sustainable transportation systems is considered one of the most pressing issues faced by modern cities (Kennedya *et al.*, 2005). This supports the focus of this chapter and its focus on the innovative aspects of transport and city logistics.

Urban transport and logistics are complex systems in which freight is moved in the same transport system as that in which passengers travel (Russo and Comi, 2010). Thus, a sustainable transport system contributes to economic growth and social equity without systematically increasing concentrations of substances in the atmosphere and degrading the natural environment. Sustainable urban logistics and sustainable transport are important subjects of interest in the built environment. Some of the vast challenges facing city logistics are connected with the rapid growth of the urban population and its ageing. Changes in the spatial structures of trade affect the amount and type of the flow of goods in urban areas, Supplies are becoming more frequent and include small parts of goods. This, in turn, determines the effectiveness of the means of transport use and it appears likely that shortly demands on the flexibility of the supply is even greater. These urban dynamics present new challenges for transport and logistics that aim at the uninterrupted supply of cities while caring about the quality of life and striving to reduce the negative impact of transport on the environment. In light of the above, cities should try to improve or maintain the quality of life for their residents.

CONCEPTUAL FRAMEWORK

The subject of public transport systems and city logistics is important in the realisation of contemporary urban planning agendas. The main

agenda being the new urbanism or, rather the concept of smart growth that is supported by the sustainable development theory. This section finds a clear and strong relationship between transport, circulation, public transport, public transportation system and city logistics. The following are the explanations and descriptions of the components of this chapter's conceptual framework.

- *Transport:* Transport refers to the activity that facilitates the physical movement of goods and individuals from one place to another. In business, it is considered as an auxiliary to trade, supporting trade and industry in carrying raw materials to the place of production and distributing finished products for consumption.
- *Circulation:* This is how people and vehicles flow through a given area or in the transportation system. As observed by Wan *et al*. (2012), traffic circulation is defined as ways of controlling and managing accesses to proposed development and connections to the adjacent roadways. Three types of traffic conflicts and developments include the conflict between a motor vehicle and non-motorised vehicles, the conflict between motor vehicle and pedestrians and conflicts among motor vehicles.
- *Public Transport:* may be defined as any form of passenger or freight transport that is available for hire and reward. As observed by Preston (2009), in practice, it usually refers to land-based passenger transport and in particular bus and train services and variants thereof.
- *Public Transport System:* includes a variety of transit options such as buses, light rail and subways. These systems are available to the general public and may require a fare and run at scheduled times.
- *City Logistics:* The process for totally optimising the logistics and transport activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, the traffic congestion, the traffic safety and the energy savings within the framework of a market economy (Taniguchi *et al.*, 2001). This definition highlights the total optimisation of logistics activities of private companies, rather than local optimisation. It also incorporates the social issues of the environment, congestion and energy savings and economic issues relating to urban freight transport within the framework of a market economy.

THEORIES UNDERPINNING THE STUDY

SUSTAINABLE DEVELOPMENT THEORY

Sustainable development has become a fundamental strategy to guide the world's social and economic transformation. As observed by the Brundtland Report, sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Goniadis (2015) argues that to fulfil human needs and to ameliorate the quality of human life, development is of vital importance. To perceive sustainability, one must take into account three main areas of influence. These are called the pillars of sustainability in the aspects of social, economic and environmental. The achievement of sustainability means that the natural resources are preserved, the environment is protected, the economy is not harmed and the quality of life of people is improved or maintained. Environmental sustainability entails that the natural environment retains its total functionality and utility for a long period. Goniadis (*bid.*) observes that actions taken should encourage a balance in our natural environment while simultaneously promoting positive growth rates. Actions that disrupt the balance of the environment should be avoided and if they occur, they should be limited. Any development envisaged in the built environment should be thought of in terms of its environmental impacts. In the context of transport and logistics, there are varieties of issues within environmental sustainability such as pollution and environmental sustainability aims to minimise such impacts to the environment.

Another dimension of a component of sustainable development is economic sustainability. This is the ability of an economy to support a defined level of economic production indefinitely. As observed by Goniadis (*ibid.*), economic sustainability refers to decisions that are made in the most prudent way possible concerning other aspects of sustainability. The last of the pillars of sustainable development is social sustainability. This relies on the decisions and projects that promote the general improvement of society. The social aspect of sustainability supports the concept of intergenerational justice, which means that future generations are entitled to the same or greater quality of life as current generations. This pillar also speaks to other socially related issues such as community development, resilience and human adaptation. This dimension is equally important to other

dimensions of sustainability and if not taken seriously, can lead to the collapse of the whole process of sustainability and the society itself.

In light of the above, sustainable transportation is the capacity to support the mobility needs of a society in a manner that least harms the environment and does not impair the mobility needs of future generations. In this chapter, it is believed that transportation is a core component supporting the interactions and the development of socio-economic systems. Rodrigue (2021) indicates that sustainable development applied to transport systems requires the promotion of linkages between environmental protection, economic efficiency and social progress. Under the environmental dimension, the objective consists of understanding the reciprocal influences of the physical environment and the practices of the industry and that environmental issues are addressed by all aspects of the transport industry. Under the economic dimension, the objective consists of orienting progress of economic efficiency. Transport must be cost-effective and capable of adapting to changing demands. Under the social dimension, the objective consists of upgrading standards of living and quality of life.

THE RATIONALE FOR STUDYING PUBLIC TRANSPORT SYSTEMS AND CITY LOGISTICS

This subject of study is critical in the built environment as indicated by a widespread freight transport contribution to deteriorating the urban environment that has been duly noted across the world. The growth of trucks in urban areas not only worsened the roads and highways and created traffic congestion, but also contributed to an overall deterioration of the urban environment. Traffic management schemes and measures restricting truck movements in urban areas such as truck ban and similar vehicular volume reduction schemes, have been implemented. Though such schemes seem to curtail truck movements, they have negative economic consequences and can become a regulatory impediment for the development of an intermodal logistics network system in urban areas. It is, therefore, imperative to formulate a holistic framework, addressing the environmental issues related to the intermodal logistics system in urban areas.

EVOLUTION OF PUBLIC TRANSPORT SYSTEMS AND CITY LOGISTICS

Since the 1820s various forms of public transportation have come and gone throughout the world, impacting general structuring of cities. Wallace (2017) provides that technological advances gave way to an

evolution of public transit systems that started with horse-drawn cars and developed into cable cars, heavy and light rail systems and eventually electric and self-driven cars. Since the 18th century, mechanisation allowed each transportation mode to experience an evolution in motive methods and vehicles. As observed by Rodrigue (2020), new engine technologies offer the ability to be used across several modes with specific adaptations. The first most meaningful innovation was the steam engine that improved the performance of the maritime and railway modes at the end of the 18th century. The bulk of a steam engine made it impractical to be applied to road transportation.

The internal combustion engine (ICE) in the late 19th century brought about the large-scale mechanisation of transportation modes, especially road transport (Rodrigue, *bid.*). It was followed by the diffusion of cars, buses and trucks supported by the construction of vast highway networks. For rail, diesel locomotives replaced steam engines, improving power and range. However, the development of high-speed rail (HSR) relied on the electric motor due to its capacity to generate a velocity that an ICE would be unable to.

For air transport, the ICE (piston engine) allowed heavier planes and the emergence of the first commercial services in the 1920s (Rodrigue, *ibid.*). Innovations in air propulsion led to jet planes that could quickly transport a large number of passengers over long distances. Then, wide-body jets (such as the B747) enabled to improve further the scale at which air transportation could carry passengers and freight. The technological evolution of maritime transportation impacted more substantially vehicles than their speed, particularly their economies of scale. Metallic hulls and fuel propulsion enabled the growth of ship size and their specialisation (oil, freight, containers). The introduction of the containership in the 1970s allowed a versatile cargo carrier that continuously benefited from economies of scale and supported the rapid development of the global economy.

In the 21st century, the automation of transport systems is unfolding, including its terminals. This improves their reliability and performance while reducing their operating costs. Self-driving vehicles and drones are starting to be introduced. Figure 1 is a diagrammatical illustration by Rodrigue (*ibid.*) outlining the evolution of the public transportation system since the 18th century.

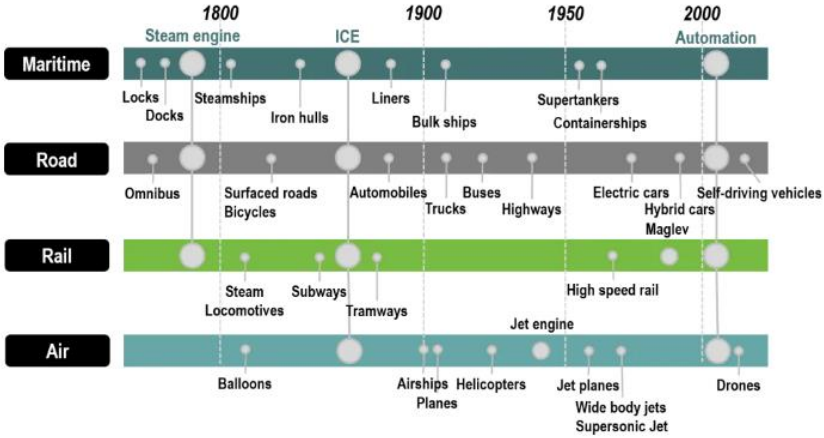

Figure 1: Evolution of Transport Technology since the 18th century.

TECHNIQUES AND APPLICATIONS IN PUBLIC TRANSPORT SYSTEMS AND CITY LOGISTICS

The understanding, analysis and implementation of transportation and city logistics are done through several techniques and processes. Some of the fundamental techniques and processes in transport systems and city logistics include scheduling, timetabling, traffic assignment, trip generation and cordoning. These techniques and processes are defined and described below.

Scheduling: refers to determining the optimal allocation of vehicles in a given transportation schedule based on the execution of all trips (Shang, 2019).

Timetabling: is the creation of a schedule for vehicles to operate the transportation service. The inputs of timetabling include the frequency of service for the given route and the expected travel times between stops on the route. The travel times can be determined either by historical experience or through estimates based on traffic conditions, vehicle acceleration and deceleration characteristics and expected dwell times.

Traffic assignment: the process of allocating a given set of trip interchanges to the specified transportation system (Tom and Rao, 2007). The fundamental aim of the traffic assignment process is to

reproduce on the transportation system, the pattern of vehicular movements which would be observed when the travel demand represented by the trip matrix, or matrices, to be assigned is satisfied.

Trip generation: a trip is usually defined in transport modelling as a single journey made by an individual between two points by a specified mode of travel and for a defined purpose. Trips are often considered as productions of a particular land-use and attracted to other specified land-uses. The number of trips that arises in unit time, usually for specified zonal land use, is called the trip generation rate. Trip generation is estimated in three ways which are by linear and multiple regression, by aggregating the trip generating capability of a household or car and aggregating the total as observed by the distribution of each selected category in the zones and by household classification method through a catalogue of the characteristic mean trip rates for specific types of households.

Cordoning: Vehicle and person surveys that provide time-series data of traffic flow across a given set of screen-lines.

SMART URBAN TRANSPORT SYSTEM

Public transportation systems include a variety of transit options such as buses, light rail and subways. These systems are available to the general public and may require a fare and run at scheduled times. Bandauko *et al*. (2016) provide that a smart urban transportation system is a transportation system that creates walkable communities, provides a range of transport choices and access to a wide range of origins and destinations. They further indicate elements of a smart urban transportation system that includes a dense, frequent public transit service; a variety of street types that provides both access and mobility and sidewalks and bicycle facilities that provide direct, safe travel routes. A smart urban transportation system should be closely related to land-uses such as residential and commercial, in a specific environment to support quality transit services and to reduce trip distances. Some of the principles of the smart urban transport system are the design of roadways which should respect the character of communities and the currently planned land-uses by transitions from one area to another, transportation projects should be planned through ongoing partnerships with local communities, considerations of the needs of pedestrians, bicyclists and transit users in designing all roadway projects and sidewalk networks that should be well connected

with opportunities for regular, safe street crossings and finding transportation solutions that can be executed in a sensible phase (New Jersey and Pennsylvania Departments of Transport, 2008).

TRANSPORTATION, GREENISM AND NEW URBANISM

Transportation is a process of moving whatever comes out of one location to the next location. As highlighted above, transportation systems evolved and have been influenced by different planning approaches or concepts coined by scholars over the last two centuries. This section of the chapter will dwell on greenism and urbanism in the context of transportation. New urbanism aims at reforming the constructed cities as it seeks to create new and complete cities (Kakhki and Shokouhi, 2017). As observed by the Victoria Transport Institute (2015), new urbanism is also called smart growth, new community design, neo-traditional design, traditional neighbourhood development, location efficient development and transit-oriented development. New urbanism is thus a set of development practices to create more attractive, efficient and liveable communities. These can significantly improve accessibility and reduce per-capita automobile travel. In terms of transportation, the design features of new urbanism include the following:

- Most dwellings are within a five-minute walk (a quarter-mile) from the centre. Streets are designed for walking and cycling, with sidewalks on both sides, bike lanes where needed, good crossings, traffic calming features used to control motor vehicle traffic speeds and other features to encourage non-motorised travel.
- Networks of highly connected roads and paths provide multiple routes between destinations, increasing accessibility and reducing problems if one route is closed. Access points into neighbourhoods may be highlighted with a gateway or signs.
- Thoroughfares are relatively narrow and shaded by rows of trees that slow traffic and create an appropriate environment for pedestrian and bicyclist.

New urbanism and transit-oriented development reflect neighbourhood and local level planning, while complete streets, streetscaping and access management apply these concepts for specific roadways, location-efficient development reflects these principles at a regional level. New urbanism increases transportation options, emphasises high-quality transit services and stations and sometimes provides

priority to walking, cycling and transit. As observed by the Victoria Transport Institute (*ibid.*), new urbanism supports the development of a more connected street network, often using a modified grid pattern. This provides multiple routes and more direct travel between destinations compared with a disconnected street network with many dead-end roads that result in more circulation routes and funnel traffic onto a few roadways. Increased street connectivity has been shown to reduce per capita vehicle travel and reduce traffic volumes on major roads.

The Victoria Transport Institute (*ibid.*) also outlines the travel impacts of the application of the new urbanism principles on transport in the design and planning of cities. They argue that new urbanism improves accessibility, improves transport choice and reduces traffic speeds which reduce per capita automobile ownership and use. NEW (2001), however, postulates that although most individual design features have modest impacts on total travel, their effects are cumulative and synergistic, resulting in significant total reductions in vehicle use. Residents in well-designed New Urbanist neighbourhoods with good walkability, mixed land-use, connected streets and local services, drive 20-35% less than residents in automobile-dependent areas. Vehicle travel reductions may be possible if New Urbanism is coordinated with other travel demand management (TDM) strategies such as Transit Improvements, Car sharing, Road Pricing, Parking Management and Commute Trip Reduction programs (CMHC, 2010).

Greenism can also be regarded as green urbanism. It is regarded as the implementation of green infrastructure attempting to ensure the incorporation of environment and urban planning. Viviers *et al*. (2017) provide that green urbanism emerged internationally as a way of understanding, how green assets and ecological systems function, as part of the infrastructural fabric that supports and sustains society and builds resilience. Viviers *et al*. (*bid*.) further argue that green urbanism theory focuses on adjusting the relationship between urban and nature and has emerged as a conceptual and theoretical basis for a new planning paradigm. This brings into context the multi-disciplinary approaches to urban planning such as sustainability plans, environments that are quiet, clean and effective, compact communities and green transport, ecosystem services, urban greening, gardens and green roofs, city farms and urban agriculture, renewable energy projects, sense of place and lifestyle. In this respect, Nilsson *et al*.

(2007) explain that urban greening embraces the planning and management of urban vegetation on streets, parks, playgrounds, local gardens and the urban periphery, also aiming to add value to the local community. In terms of transportation, green transportation or sustainable transportation, comprises those modes of transportation that do not depend on diminishing natural resources, like fossil fuels. These transportation modes rely on renewable energy sources. They also have a very low impact on the environment as these modes produce minimal or no greenhouse gas emission.

APPROACHES TO UNDERSTANDING PUBLIC TRANSPORT SYSTEMS AND CITY LOGISTICS: GLOBAL CASES IN THE STUDY

Transport and logistics are the lifeblood of societies and a strong association exists between growth in overall economic activity and growth of transport. All over the globe, the movement of people and goods creates wealth and prosperity. A look into the European transport and city logistics highlights a system of open borders and affordable transport that has given the European continent unprecedented levels of personal mobility. Goods are shipped rapidly and efficiently from factory to customer often with localisation in different countries. All these transport and logistics processes happen between a wider human settlement sphere, with cities as the most important players. As observed by the European Foundation for the Improvement of Living and Working Conditions (2008), the European Union (EU) has contributed to this dynamic by opening national markets to competition and by removing physical and technical barriers to the movement of people and goods. Transport is essential for the competitiveness of European industries and in the words of the European Commission, mobility is also an essential citizen right.

Since time immemorial, mobility has greatly improved in the world, from an African village to the megacities of the developed world. This steady increase in mobility also comes with social costs such as air pollution, noise, congestion, safety difficulties and health problems and even premature deaths as prescribed by Krzyzanowski, Kuna-Dibbert and Schneider (2005). In other dimensions, climate change poses challenges of a new dimension to modern society and the transport sector contributes substantially to the continuing growth in carbon dioxide (CO_2) emissions in the European Union. It is on this background note that the European Foundation for the Improvement of

Living and Working Conditions (2008) argues that today's transport patterns and growth rates are unsustainable.

In Europe, the transport and logistics sector encompass the transport of people and goods by rail, road, water and air, including support activities such as warehousing. Access to transport by road, railway, sea and air is crucial to the mobility of passengers and hence crucial to economic development. As observed by the European Foundation for the Improvement of Living and Working Conditions (*ibid.*), in 2003, the average EU citizen travelled 12 092 km on land, 81% of this by car. Some 44% of all goods measured in tonnes travel on road, while 90% of international freight transport is done by ship. In 2006, 13.3% of consumer expenditure went to transport. Most transport consists of road transport.

URBAN LOGISTICS SYSTEMS IN ASIA

Studies across the globe have shown the impacts of the transport system on the environment, especially in urban areas. Urban logistics or, rather, city logistics, including physical distribution and supply chains in urban areas, is a promising subject that can be looked at. Lidasan (2011) argues that measures involving transport planning and logistics in urban areas called city logistics have promised to solve many traffic and transport problems. The concept of city logistics is thus not a new one but only recently has the concept caught the attention of transport planners and experts for its potential contribution to meeting the objectives of logistics from the efficiency, economic and environmental standpoints. This section of the chapter shows how logistics initiatives in cities of the Asian communities have helped in developing a framework that contributes to alleviating the negative impacts of freight transport on the urban environment and promoting good passenger movement in their urban areas.

A study of city logistics in the Asian context done by the Japan Institute of Highway Economics for Organisation for Economic Co-operation and Development (OECD) highlights how several Asian cities considered city logistics policy objectives and initiatives. The study was done in 2003 and it remains useful in the subject of study today as it highlighted some important aspects of city logistics, like efficiency and economy, safety and environment and infrastructure and urban structure objectives. The study highlighted that there are differences in the priorities of cities concerning city logistics policy objectives. The

cities that set higher regard to safety and environmental objectives were Seoul, Tokyo and Osaka. Manila and Jakarta placed more emphasis on economic and efficiency objectives. This was favourable mainly because these cities were still in the developing stages such that their aim was at improving their economic support infrastructure and services. Bangkok and Kuala Lumpur, were considered on the verge of joining developed cities of Asia, regarded safety and environmental objectives as more important due to the gravity of air pollution problems and high accident rates.

METRO MANILA: CASE STUDY

Like any other metropolitan area in Asia, Metro Manila faces several challenges. Its logistics policies are consistent with that of the country. At the local level, Metro Manila is focused on reducing traffic congestion, alleviating environmental and social impacts and improving the economic and technical efficiency of the transport system. At the national level, the policy objectives aimed at improving an efficient intermodal transport system that serves as the backbone of the country's intermodal logistics network system, supporting economic development and regional economic cooperation in South East Asia. A closer look into these strategies in the transport and city logistics sector highlight that the policy objectives are consistent with city logistics and following this premise, Metro manila prioritised city logistics policy objectives are as follows:

- Efficiency and economy;
- Safety and environment; and
- Infrastructure and urban structure.

In light of the above Metro Manila policy objectives, the following city logistics initiatives were introduced.

a. Travel Demand Management Schemes (TDM) that consisted of a Unified Vehicular Volume Reduction Programme and Truck ban at major thoroughfares;
b. Application of Information and Communications Technology, such as Electronic Toll Collection and Customs facilitation at major ports;
c. Land-use controls;
d. Development of terminals; and
e. Development of economic and industrial zones at urban fringes.

As indicated above, the major or primary objective of Metro Manila in terms of transport and city logistics is attaining efficiency and economy. Other Asian cities have an underlying problem related to urban freight transport congestion. To address such problems and at the same time meet efficiency and economic objectives, the priority measures should include the provision of road links, development of terminals and development of information systems. The provision of road links is aimed at building the country's economic infrastructure backbone. Intermodal logistics corridors such as the Subic/Clark-Metro Manila-Batangas corridor have been improved through the upgrading of a high standard highway system. Lidasan (2011) observes that completion of the limited access highway network in the corridor will provide the vital link from southern Luzon to central Luzon, where major international ports and airports are located. The corridor will also enhance the access of production areas to the markets and improve the mobility of people in the two regions.

The truck ban scheme is meant to illustrate the implications of city logistics policies in Metro Manila. The truck ban has been in force for several years. The common issues, both positive and negative, related to the traffic ban in Metro Manila, are summarised below:

a) It is the most commonly utilised vehicle restriction in developing countries.

b) Banning trucks is perceived as a practical form of reducing traffic during peak hours;

c) Government usually enforces truck restraints so that public transit modes would not compete for limited road space;

d) Viable measure during construction periods, when road capacity is greatly reduced, ensuring better traffic movements; and

e) Truck restrictions can present problems, if not fully understood.

A truck ban is considered a powerful traffic management scheme; however, it affects urban freight transport operations. As mentioned, the truck ban has impacts on the urban transport system. The most important are economic impacts, which are summarised below:

a) Changes in truck operating characteristics
    i. Shortened delivery schedules and reduced delivery hours
    ii. Reduced quantity of products delivered during banned hours
    iii. Increased travel time

b) Reduced truck delivery frequency
    i. Decreased truck trip frequency per day

c) Reduced production/supply chain efficiency

i. Decreased rate of production due to delays in delivery schedules

d) Increased transport costs

i. Increased costs due to poor productivity are passed on to consumers.

REGIONAL CASES IN THE STUDY

City logistics property is currently scarce across much of Africa. As observed by Knight Frank (2016), there is a growing need for high-quality new development in logistics property in sub-Saharan Africa. This is driven largely by the growth of Africa's middle classes and the associated expansion of its consumer markets. There is a high demand for high-quality logistics space from retailers and consumer goods manufacturers seeking to expand their African operations and improve distribution networks and supply chains. With this need in mind, it is important to note that poor transport infrastructure is an inhibitor to the growth of many African logistics markets, with road and rail links between key economic hubs remaining patchy. Knight Frank (*ibid.*) observes that although there is a Trans-African Highway Network, first conceived by the United Nations Economic Commission for Africa in the 1970s, large parts remain unbuilt and many sections in disrepair and essentially unusable as trade routes.

The cost of moving goods in Africa is, on average, estimated to be two or three times higher than in developed countries and transport costs can represent as much as 50-75% of the retail price of goods. Most African countries have poor quality of roads and rail networks and in some cities, facilities, such as railroads, are non-functional or non-existent, this forces even logistics companies, such as DHL Express, among others, to transport the majority of its cargo by air. Some of the major challenges with the city and transport logistics in African cities include traffic congestion within major cities. This impact logistics operations. In Lagos, Nigeria, there are restrictions on lorry movements during the day, forcing deliveries to be made at night. This situation also contributes to the locational advantages of industries and commercial centres to be located well away from busy city centres. Knight Frank (2016) also indicates that congestion around seaports and competition for limited warehouse space has also led to a trend towards the development of inland dry ports.

ZAMBIA: A CASE STUDY

Zambia has been chosen to represent the regional case study on transport and city logistics because of its geographical position. It is located at the intersection of Southern, Eastern and Central Africa and this makes it one of the promising logistics locations in Sub-Saharan Africa. Lusaka, the capital of Zambia, is a key logistics hub at the crossroads of trans-African transport corridors running from north to south and from east to west. Major routes through Lusaka include roads connecting it with ports in South Africa, Mozambique, Tanzania and Namibia. Zambia is reliant on its road and rail connections with other countries, but its transport and city logistics are relatively good compared with some of its neighbours.

Lusaka is currently undergoing major road improvements, including the construction of an Inner Ring Road, the first phase of which was completed in 2014. Logistics and industrial market activity have historically been concentrated in the industrial area to the west of Lusaka, which compromises mostly older units lacking modern design features, such as cross-docking and intermodal facilities. Traffic congestion has made access to the industrial area increasingly difficult and there is little land available for new development, pushing developers to seek sites elsewhere in the city. Knight Frank (*ibid.*) indicates that the most significant current logistics development in Lusaka is York Commercial Park, located 6 km south of the CBD on Kafue Road. This project is under construction by Actis in conjunction with Improvon, a leading South African warehouse and logistics developer.

LOCAL CASES IN THE STUDY

Zimbabwe's modern transport system developed concomitantly with the colonisation of the country in the 1890s. Hence the country's external trade and transport links and the transit traffic from other countries and between cities has undergone a series of radical changes. Linkages of Zimbabwe's transport and transit system highlight a high-level political hand since the colonial period. From the 1950s, Zimbabwe then Rhodesia, developed protectionist policies against South Africa; then the international blockade during the unilateral declaration of independence (UDI) government (1965-80) forced Southern Rhodesia to foster closer links with South Africa and led to the counter-blockade of Zambia, that reduced Zambia transit traffic through Southern Rhodesia. Mozambique, being at war again in

the 1970s, closed Southern Rhodesia's access to its most important ports and the civil war in Southern Rhodesia/Zimbabwe itself, that together with the blockade, reduced the economy and started a process of decay in the transport system, especially the railways and finally independence in 1980 that led to a new expansion of the road network into the district service centres and a few towns.

The current condition of the transport and logistics network or system is not known , but it is clear that it has declined significantly since the mid-1990s. The transport networks such as the railway and road networks have declined because of a lack of funding for routine and periodic maintenance. Most of the deterioration has occurred on urban roads and the unpaved rural road network. This does not support the fact that the efficiency, reliability and safety of transport services for various kinds of freight is a key issue for the transport sector. The poor condition of a large part of the road network in Zimbabwe has had a direct and indirect impact on the transport service industry. Pedersen (2002) argues, however, that rehabilitation of the road network is not a sufficient condition for a strong and competitive road transport and logistics industry.

Some of the problems that are notorious in Zimbabwe's urban transport system are argued to have stemmed from the implementation of public transport policies and services. One such popular problem policy was the Structural Adjustment Programme (ESAP) which was blamed to have caused the deregulation of urban transport in Zimbabwe. This policy is said to have affected both the movement of people and goods. In terms of passenger transport, by the year 2000, public transport services in urban areas of Zimbabwe had been on a declining trend. The decline in these services has resulted in high transport costs and an inadequate and unreliable public transport system. Most of the public transport vehicles that were acquired following the deregulation in 1993, had reached the end of their economic life and needed to be replaced. However, the replacement programmes of private operators were adversely affected by the deterioration in economic conditions and by erratic fuel supplies. Moreover, the Zimbabwe United Passenger Company (ZUPCO) bus fleet has been depleted and its services reduced drastically. As a result, peak periods are once again characterised by long queues of passengers and excessively long waiting times. People are compelled to walk long distances and travel in all sorts of vehicles, including

lorries and pick-ups, a practice that has compromised the safety of travellers. In terms of the road freight industry, the policy had a large impact on the patterns of both trade and transport in Zimbabwe.

The problem in Zimbabwe in terms of transport and city logistics is summed up by Mbara (2015), who argues that in Harare, there are challenges which include an increase in population and the number of motor vehicles, a deteriorating transport infrastructure, severe congestion and an inefficient public transport and a high rate of accidents. All these fundamental challenges in the transport and city logistics subject indicate that like any other African cities, Zimbabwean cities have their fair share of transport and logistical issues. Mbara (*ibid.*) goes further to argue that all the shortcomings of Zimbabwe's transport sector have implications on achieving sustainable transport, hence the need to raise the question on the requirements of achieving sustainable transport for the cities.

EMERGING DEBATES IN THEORY, POLICY AND PRACTICES

The subject of transport and city logistics is a critical aspect of the fabric of cities, towns and rural areas across the world. As indicated in the preceding sections, transport and city logistics deals with the movement of people and goods from one point to the other, either in cities, across cities, countries and continents. Several important issues have been highlighted as cities are facing unprecedented challenges in moving goods and people. Most of the challenges, such as traffic congestion and environmental pollution, have been seen to be major issues in the developing world while in the developed world, issues of importance are to do mainly with the efficiency and effectiveness of the transport and logistics systems.

Some of the key issues include the relationship of cities with aspects such as freight volumes, nature of freight distribution, environmental issues, social issues and policy and regulation. In terms of freight volumes, the main challenge is on the capacity of urban freight transport systems, especially looking at congestion, lower driving speeds and frequent disruptions caused by the movement of goods in the cities and distribution sprawl that deals with the space consumption associated with freight movement in cities. The nature of freight distribution issues includes smaller volumes and time-sensitive freight and this touches on issues of frequency and repetitiveness and also the issue of e-commerce, that is home deliveries. Those aspects seem

to divert transport and logistics debates and challenges from the traditional aspects.

Environmental issues deal with the mitigation of environmental externalities such as emissions and noise, the growing demand for reverse logistic flows that is waste and recycling. Social issues must do with the mitigation of social disturbances that is safety and health and passengers/freight interference. Policy and regulation deal with the competition and conflicts of land-use, access, that, is allowable vehicles, streets and time windows and zoning, i.e. land-use, freight distribution clusters and urban consolidation clusters.

The growth of the freight circulating within urban areas has exacerbated congestion as goods movements and passengers contribute to congestion. Urban freight distribution commonly accounts for the last mile in contemporary supply chains, but this takes place in a setting where many constraints are exacerbated. The propensity of large urban areas to have high congestion levels challenges a key issue in logistics, i.e. the reliability of distribution. This is particularly the case for the disruptions and lower driving speeds that urban congestion imposes, making urban freight distribution prone to inefficiencies.

LESSONS DRAWN

The movement of people and goods is fundamental to economic and social activities in a city. Effective transport and logistics are essential to support economic development and engagement in the global economy. The difference between transport and logistics is such that logistics deals with the management of the flow of things between the point of origin and the point of consumption and transport are the mechanism by which and services get from one point to another. The relationship between transport and logistics is essential for the development and functioning of cities across the world. When cities ensure that their transport and logistics systems run efficiently and effectively, there is a guarantee of a good business environment and functioning economy and healthy and happy people.

Transport is strongly linked to cities and it is affected by planning related to their-day-to-day and future operations. Issues such as population growth and ageing, liveable cities, infrastructure resilience and changes in land-use patterns, are reshaping how people and

goods move across urban areas. In such an instance, stakeholder operations, perspectives and attitudes do matter in the future of transport and city logistics. Regardless of this increased awareness of the importance of the movement of goods and people in cities, most responsible authorities, especially at the local level, have neglected or shown less interest in city logistics solutions (Van Duin and Quak, 2007). This calls for an improved understanding of the link between urban freight and cities (Cui *et al.*, 2015).

Freight distribution is one of the principal users of urban space and is a central element in the complexity of mobility and accessibility planning. In recent decades, there has been a tremendous change in freight distribution and logistics which, in turn, has affected urban and suburban areas. The shift to containers that carry goods over long distances, globalisation of production, just-in-time production and inter-modality have all had considerable implications for transport demand (Cidell, 2011). Additionally, we have observed the fragmentation and dispersal of freight flow due to e-commerce, smaller shops and an increased logistics sprawl, whereby terminals have been located further away from city centres and there have been increases in the numbers of last-mile deliveries (Morfoulaki *et al*., 2016). Urban development and land use are being transformed by new supply chain organisations, logistics network designs and consumer-based economies through modern logistics (Goodchild and Ivanov, 2018; Hesse, 2016). Suburban areas are attractive for freight activity, specifically warehousing because of the availability of 'low-cost land' and transportation infrastructures that connect to more complex systems of regional and national flows (Dablanc *et al*., 2014; Dablanc and Rakotonarivo, 2010; Rodrigue *et al*., 2016).

The sector of transport and city logistics has also been identified to carry a large significance of stakeholder perception, attitudes and behaviour in city transport networks, the most relevant stakeholders in urban freight being authorities, carriers and receivers. Authorities are responsible for transport infrastructure systems, law and enforcement and governing policies at three levels, i.e. local, regional and national. This, in short, is the city administration. They are mostly responsible for making the city attractive for residents, visitors and businesses and minimising the negative effects of transport and logistics in the city. Carriers are mostly private stakeholders responsible for transport from distribution terminals and aim to collect and deliver goods as efficiently

as possible by optimising load capacity, co-loading and delivery routes. Receivers are the final link in the supply chain and their main task is related to commissioning and receiving deliveries.

CONCLUSION AND FUTURE DIRECTION

Urban areas throughout the world are rapidly changing and so are the patterns of movement of goods and people. In light of sustainable development, this movement is key to building sustainable urban economies with limited externalities such as congestion and pollution. The concepts of transport and logistics then speak to the efficient transportation of freight. As highlighted, this sector is facing many challenges regardless of the wishes and aspirations of the planning arms of either cities or countries of the world. Thus, it is important to find solutions that help cities and regions throughout the world to attain sustainable transport and city logistics.

The chapter exposed that most considerations in transportation focus on passengers, leaving freight issues somewhat neglected. However, it is the position of this chapter to ascertain that logistics is at the heart of the operation of modern transport systems and implies a degree of organisation and control over freight movements. This chapter realises that “greenness” is the code word for a range of environmental or sustainable concerns and is usually considered positively in the aspects of the built environment. The chapter supports the combination of greenness and transport and city logistics that suggest an environmentally friendly and efficient transport and distribution system.

This study calls for green transport and logistics that speak to practices and strategies that reduce environmental and energy footprint in the movement of people and goods while having high regard for other principles of sustainability such as economic sustainability. Governments across the world are recommended to implement the green agenda on the transport and logistics sector.

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CHAPTER 6: Climate Change and Human Habitats: Towards a Framework for Sustainable Disaster Risk Management

Abstract

The purpose of this chapter is to review the interplay between human habits and climate change-related disaster management. This is against the background that disasters are increasing both in intensity and frequency in most parts of the world and these disasters are influenced by climate change. Heatwaves, storms, floods and droughts are negatively affecting communities, resulting in loss of lives, livelihoods, infrastructure and overall socio-economic development. The study reviewed academic and development literature to understand global and regional experiences on the existence and responses to climate-related disasters. Disaster risk reduction includes deliberate efforts that are initiated to minimise vulnerabilities and disaster risks throughout. Key emerging issues point to the need to put local communities at the centre of disaster risk management. The actions of locals are important, both in adapting and mitigating climate change. Disaster risk management needs to be coordinated at the international, national, subnational, local, household and individual level. People at a local level have their own traditional and indigenous ways of responding to disasters and these may need to be integrated into scientific evidence.

INTRODUCTION

Climate change disasters have frequented many countries across the globe. The IOM (2017: iii) observes that:

> natural disasters are increasing in both frequency and intensity, exacerbated by climate change and posing threats to lives and livelihoods and development progress made thus far.

This is evidenced by the occurrences of cyclones, floods, earthquakes, droughts and rising of the sea level (Davis-Reddy and Vincent, 2017). Climate change is defined as:

> a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable periods (UNFCC, 2012: 12).

A disaster occurs when extreme events such as cyclones, heatwaves and storms, strike a vulnerable society (UNECA, 2017). The risks associated with climate disasters are increasing and affecting countries, regions, cities, rural and peri-urban areas. The most vulnerable people and communities are hit hard by the impacts of climate change-related disasters (Faye, Ribot and Turner, 2019). Responding to climate change calls for certain habits that influence both mitigation and adaptation to climate change. This study uses desk review to evaluate climate change disasters and human habitats in response to the disasters. This is done to influence possible solutions for sustainable disaster risk reduction.

BACKGROUND AND OVERVIEW

Human habits are defined as regular tendencies or practices that are engrained in people and which are influenced by several factors including culture, attitudes, emotions, values, ethics, authority, rapport, hypnosis, persuasion, coercion and/or genetics (Marien, Custers and Aarts, 2019). These factors are key in influencing people's actions and pursuits, both in causing and responding to climate-related disasters (Beckage *et al*., 2018). Climate is defined as the average of the weather conditions at a particular point on the earth and is expressed in terms of expected temperature, rainfall and wind conditions based on historical observations (Werndl, 2016). Climate change is seen through changes in temperatures, rainfall patterns and the frequency and distribution of weather events such as droughts, storms, floods and heatwaves and sea-level rise (Werndl, *ibid.*). Climate and weather are different as weather describes the state of the atmosphere; the degree to which it is hot or cold, wet or dry, calm or stormy, clear or cloudy (Beckage *et al*., 2018). Weather events are described as extreme if the weather events have reached unexpected, unusual and high or the highest degree (African Centre for Biodiversity, 2020). An extreme event describes the occurrence of a value of a weather variable above (or below) a threshold value near the upper (or lower) ends of the range of its observed values in a specific region (IOM, 2017; Godfrey and Tunhuma, 2020).

Since time immemorial, mankind has been learning to adapt to the occurrence of disasters and hazards and practising mitigatory

measures to reduce the occurrence of human-induced disasters (NARRI, 2016; Godfrey and Tunhuma, 2020). Climate change has emerged as one of the causes of disasters and hazards in many countries across the globe (NARRI, 2016; IOM, 2017). The recurrence of climate-related disasters "is empirically traced with incidents including death, asset loss, food and water insecurity, lack of access to health services, disruption in access to market services and above all disrupted livelihoods" (NARRI, 2016: 1). Table 1 presents the climate-related disasters that affected the largest populations between 1995 and 2015.

Table 1: Climate-related disasters between 1995 and 2015 *(IOM, 2017)*

Disaster	Number of people affected	Number of people dead
Flood	2.3 billion	157 000
Drought	1.1 billion	22 000
Storm	660 million	242 000
Extreme temperature	---	164 000

Whilst the statistics presented in Table 1 are reliable, some sources argue that these statistics reflect only figures of reported deaths and the number of people affected (NARRI, 2016). There are chances that the statistics even go high because there are some impacts of climate change disasters that are not reported. In addition to the disasters highlighted in Table 1, cyclones have been affecting and killing many people mostly in low- and middle-income countries (Godfrey and Tunhuma, 2020). The impacts of climate-related disasters are not uniformly distributed (UNFCC, 2012). Low- and middle-income countries have high vulnerability levels and this increases their vulnerability. Brown *et al.* (2012) observe that low- and middle-income countries are the worst affected because of the following reasons: limited adaptive capacity at a national, sub-national and local level, location of settlement in areas prone to disasters, lack of social protection policies, the dependence on natural ecosystems and the availability of disaster frameworks that are not mainstreamed to policies and practices in different sectors. Climate change poses a

major threat to sustainable development at the micro and macro levels (African Centre for Biodiversity, 2020).

Disaster risks emanating from climate change is increasing both in intensity and frequency. As IOM (2017: 9) puts it,

> disaster events often lead or contribute to additional associated catastrophic events – compound disasters – where multiple vulnerabilities reinforce each other and create a secondary disaster event.

This is true considering disasters that emanate from the impacts of climate change. For instance, communicable diseases and epidemic outbreaks such as cholera and waterborne diseases have been reported in victims of cyclone Idai in countries like Malawi and Mozambique who were temporarily located in tents (African Centre for Biodiversity, 2020). In addition to that, food crisis in most countries in southern Africa is a result of erratic rainfall patterns and droughts (UNECA, 2017). This adds to new vulnerabilities to mankind and calls for new measures to both adapt and mitigate the effects. Social-economic, environmental, political and spatial vulnerabilities in disaster-prone areas determine the impacts of disasters on people (Wenger, 2017). Ultimately, this results in disaster frameworks that are integrated and comprehensive. The resilience to disasters and the ability to anticipate, cope, recover and adapt to disasters reflect the presence and efficiency of disaster risk management and governance structures (UNISDR, 2015).

CONCEPTUAL FRAMEWORK

Minimising the risks associated with climate change-induced disasters should be considered in all sectors at an international, regional, national and local level (IOM, 2017). This study looks at the interplay between climate, climate change, human habitats and disaster risk management. Disaster risk reduction remains important as studies and experiences reveal that climate disasters are increasing in frequency and intensity (Wenger, 2017). This study looks at the trends, experiences and impacts of climate change across various countries and how the disaster risks can be reduced. Disaster risk reduction is viewed as a deliberate effort that is initiated to minimise vulnerabilities and disaster risks. This avoids and limits the adverse impacts of hazards and contributes to the realisation of the sustainable

development agenda. Whilst a growing number of countries, non-governmental organisations (NGOs) and research organisations are engaging in adaptation, mitigation and development activities using a variety of approaches (UNISDR, 2015; Wenger, 2017; UNECA, 2017; African Centre for Biodiversity, 2020), little emphasis has been put on human habitats in response to climate change. Human habitats are key in mitigating and adapting to climate change. They are instrumental in framing disaster risk management frameworks and this should be emphasised in all spheres (NARRI, 2016). Human behaviour is instrumental in reducing the causes of climate change such as reducing greenhouse emissions and also in limiting the impacts of climate change on humanity (*ibid*.).

THEORIES UNDERPINNING THE STUDY

RESILIENCE THEORIES

Resilience is defined as the ability of a system to bounce back and continue functioning after a shock. Major forms of resilience are engineering resilience, ecological resilience and evolutionary resilience (Folke, Colding and Berkes, 2003; Davoudi and Porter, 2012; Peters *et al*., 2019). The work resilience emerged from the engineering resilience to describe the ability of a system to return to equilibrium or steady-state after a disturbance. In this context, resilience is measured by the system's resistance to disturbance and also the speed at which the system gets back to equilibrium (Folke, Colding and Berkes, 2003). In the 1960s, the concept of resilience increased in recognition and entered the field of ecology. In this context, resilience was used to describe "the ability to persist and the ability to adapt" (Davoudi and Porter, 2012: 300). This differs from engineering resilience as there are many equilibria to which a system will adapt (Folke, Colding and Berkes, 2003). Evolutionary resilience has emerged to challenge both engineering resilience and ecological resilience (*ibid.*).

The evolutionary resilience approach considers that a system changes with or without a disturbance over time. What this means is that after a disturbance, a system will not necessarily need to bounce back to its original form but will must transform to adapt to the expected future

change (Davoudi and Porter, 2012). German Development Cooperation (2017: 15) defined disaster resilience as:

> the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses such as earthquakes, drought or violent conflict – without compromising their long-term prospects.

Over the decades, the concept of resilience has been evolving (Hamilton, 2012). The concept has found its way in almost all sectors (*ibid*.). There are key principles that are adopted in this study. Figure 1 illustrates the key factors that comprise resilience.

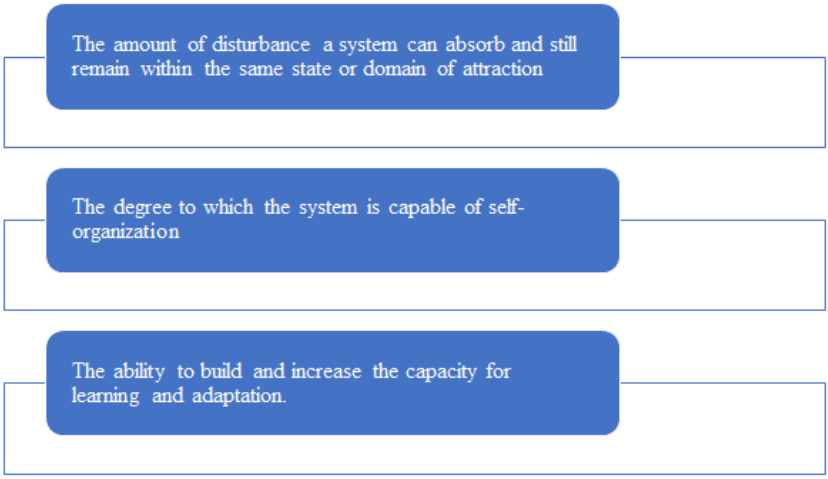

Figure 1: Three crucial characteristics of resilience *(Peters et al., 2019)*

Figure 1 indicates that resilience is a multi-faceted concept. It addresses both recovering after disasters have occurred and learning from past mistakes and avoiding future damages (Lavell *et al*., 2012). A system needs not only recover from stress and shocks, but also needs to be able to learn and adapt to future disasters (Wenger, 2017). This implies that a system needs to self-organise in response to the social, economic, environmental and political circumstances surrounding it.

The resilience theory has its limitations in its applicability. The first limitation emanates from the lack of consensus in defining the concept of resilience (Davoudi and Porter, 2012). This creates various interpretations and uses in different contexts. In addition to the limitations, the theory of resilience has been criticised, that it is only outcome-based and ignores explanations as to how the desired outcome is reached (Folke, Colding and Berkes, 2003). Processes of reaching the desired outcome are critical in reaching the outcome. However, the theory is silent about the processes of reaching the outcome.

RISK THEORIES

The IOM (2017) defines risk in the context of the following variables: hazard, vulnerability, exposure and resilience. Disaster risk is defined as:

> the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period, determined probabilistically as a function of hazard, exposure, vulnerability and capacity Jiang *et al*., 2017: 4).

A risk occurs after the occurrence of the hazard phenomenon. In this context, a hazard is defined as:

> a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation" (UNOOSA, 2020: 1).

A hazard is a dangerous incident that occurs and a disaster happens if dangerous incidents affect people negatively (Jiang *et al*., 2017). This study adopted the Cultural Theory of Risk (CTR) to explain the linkages between disaster risk and people's habits that are contextually influenced. The CTR holds that risks are framed by people's cultures and this influences people's responses to climate-related risks (Mcneeley and Lazrus, 2014). How risks are framed corresponds to different types of worldviews and these worldviews are embedded in people's values, beliefs and habits (Hamilton, 2012). The four worldviews are presented in Figure 2.

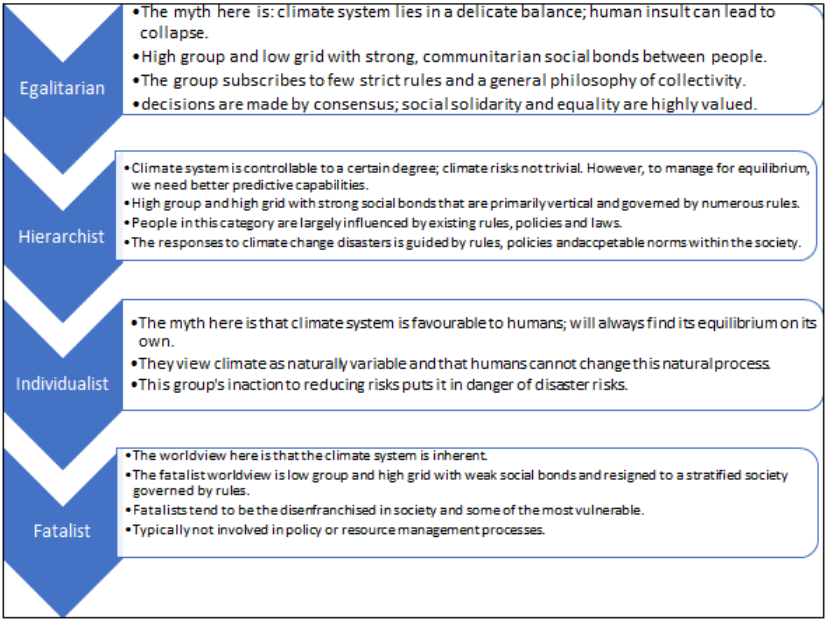

Figure 2: The CTR's four competing worldviews (Mcneeley and, Lazrus, 2014)

The CTR has its limitations that are worth reviewing. The theory has been criticised based on the complexities and ambiguities associated with it (Hamilton, 2012). This has invited a diversity of conceptualisations among cultural theorists (*ibid.*).

APPROACHES TO UNDERSTANDING DISASTER RISK MANAGEMENT TO HUMAN HABITATS

Different interpretations and understandings about climate change and disaster management exist. These are mainly influenced by context factors such as social, economic, environmental and political factors (NARRI, 2016). In addition to that, there are also institutional factors that influence the understandings and perceptions about disaster risk management (IOM, 2017). There are experts in formal institutions who rely on science to model and understand disaster risks (Lavell *et al.*, 2012). This group of people use mainly quantitative approaches to estimate the probability of risks and the consequence of risks (Godfrey and Tunhuma, 2020). Complex climate models are used, for instance,

to predict climate variables such as rainfall, temperature and cyclones. This is reflected by weather updates at a national level (African Centre for Biodiversity, 2020). On the other hand, some non-experts use intuition and experience to interpret, understand and predict disaster risks (Brown *et al.,* 2012). This group mainly uses:

> more readily available and more easily processed information such as their own experiences or vicarious experiences from the stories communicated through the news media and their subjective judgment as to the importance of such events (Lavell *et al.,* 2012: 47).

Past experiences with disasters are referred to by non-experts in responding to disasters. Disasters, however, vary in intensity and recently they have increased in frequency (Godfrey and Tunhuma, 2020). This increases the risks to non-experts whose responses are limited to past experiences. Deviations of disasters from past patterns of disasters result in the mismatch between people's behaviours and reality and this creates high chances of risks. The variations in understanding disaster risks point to the need for accurate information about current and future climate and climate-related disasters and risks. Integrating knowledge from experts and non-experts is important in bridging the gap. Despite noting this, Lavell *et al.* (2012) point out that accurate predictions about future disasters are highly uncertain and this means that they sometimes fail to influence people's actions. There are some instances where people are informed about imminent disasters, but nothing happens.

It is acknowledged that the risk of climatic shifts to human health and survival is diverse, with risks being more dominantly felt in the most vulnerable or poor regions as they are usually amplified by the pre-existence of high rates of climate-sensitive diseases (McMichael, 2014). Some areas become more vulnerable because of a combination of factors, including the availability of financial resources such as savings, the extent of infrastructural quality and the ability of government structures and community organisations, to provide safety nets and social capital to people (UN Habitat, 2011).

Figure 3 shows some of the impacts that climate change has on human health.

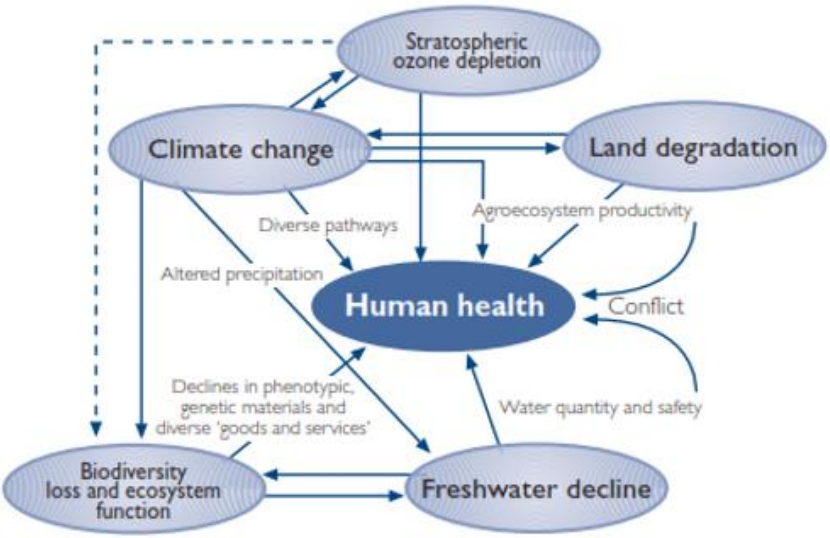

Figure 3: Interrelationships between major types of global environmental change, including climatic change *(McMichael et al., 2003)*

It can be noted that some of the human actions such as land degradation have resulted in climatic changes that would, in turn, cause the depletion of the ozone layer, leading to the rise of atmospheric temperatures on earth. Climatic changes have also altered the amount of safe drinking water as it has declined from groundwater aquifers through altered or reduced precipitation levels. All these factors affect human habitats as they are forced to adapt to the negative effects caused by climatic changes.

In Bangladesh, for instance, the area is prone to tropical storms, whose intensity have increased throughout the years. In1991, a hurricane killed at least 138 000 people and left 10 million people homeless (UN Habitat, 2011). Through massive efforts by government and international organisations to reduce risk, early warning signs have been developed and public shelters to host the evacuated have been erected and in 2007, when 8-10 million Bangladeshis were exposed to the Sidr Cyclone, a 32-fold reduction in the death toll was recorded and Bangladesh's capacity for learning and adaptation was proven (Paul 2009 in UN-Habitat, 2011). At a regional level, the recent cyclone Idai

of 2019 affected Mozambique, Malawi and Zimbabwe. Many people were left homeless in most parts of Zimbabwe's Manicaland province of Chimanimani and Chipinge areas. Such disaster occurrences need African governments to plan on evacuating populations in case of any future cyclone disasters. In creating sustainable human settlements, countries need to move towards a framework for sustainable disaster risk management and this shall be highlighted.

Emerging disaster risk management seeks to reduce society's vulnerability to extreme events. This approach acknowledges that extreme events occur but prioritise reducing the impacts that emanate from those extreme events (Godfrey and Tunhuma, 2020). This is achieved through addressing the social, ecological, political and economic characteristics that define a society (Lavell *et al.,* 2012). Reducing the vulnerability to disasters means addressing the underlying factors that both cause a disaster and those that create the vulnerability (German Development Cooperation, 2017). Two factors are, therefore, critical in understanding disaster risk, and they are the likelihood of the disaster and the vulnerability to the disaster (Godfrey and Tunhuma, 2020). The interaction of these two factors results in different risks to society. Figure 4 presents disaster risks emanating from the interaction between disaster likelihood and vulnerability.

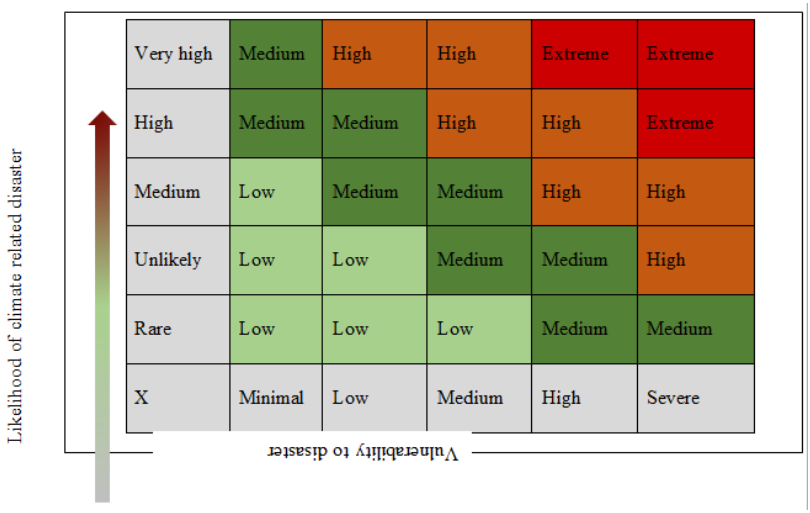

Figure 4: Disaster risk matrix *(Adopted from the German Development Cooperation, 2017)*

GLOBAL, REGIONAL A LOCAL CASE STUDIES

Sometimes people have the habit of overlooking theoretical risks. Risks are considered to be theoretical if the disasters are yet to be experienced, but predictions are suggesting high probabilities of disaster occurrence (Peters *et al.,* 2019). Current risk concerns may be driven by recent experiences rather than underlying loss potential. This usually results in complacency until the actual disaster occurs (German Development Cooperation, 2017). Risk perception drives policy and action at the national, sub-national and local level (Godfrey and Tunhuma, 2020).

Context and the locals are important in framing disaster management approaches. As Peters *et al.* (2019: 7) put it, disaster risk management,

> strategies must be tailored to the context to 'ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and the context.

Responding to disasters is linked to the traditional, indigenous and local practices that people are subjected to (Godfrey and Tunhuma, 2020). These factors are critical in shaping human habitats either in support of or against good disaster risk reduction measures (Peters *et al.,* 2019). Factoring in those traditional, indigenous and local knowledge and practices is a major step towards eliminating disaster risks.

Efforts are, however, being made at all levels to improve disaster response. For instance, Figure 5 presents international frameworks on disaster reduction and climate change that have been launched since 1988.

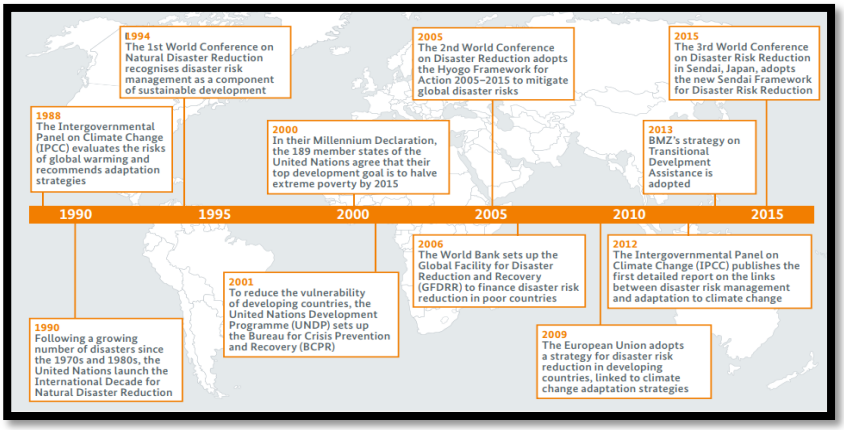

Figure 5: Historical development of international disaster reduction approaches *(German Development Cooperation, 2017: 21)*

GLOBAL CASE STUDIES

Whilst efforts are being made to improve responses to disasters, Wenger (2017) posits that many countries are lacking long-term resilience strategies. The responses to climate-related disasters are maladaptive because of the following: settlements developed on vulnerable areas, weak capacity for learning from past disasters, international frameworks not mainstreamed in national policies and practices, the neglect of locals in policy planning, to mention but a few (Brown *et al.,* 2012; Faye, Ribot and Turner, 2019). Efforts, including locals in reducing disasters associated with climate change, are gaining traction. Synergy, collaboration, coordination and development of multidisciplinary and multiagency schemes are increasingly seen as positive attributes for guaranteeing the implementation of disaster risk reduction and disaster risk management in a sustainable development framework (Wenger, 2017; African Centre for Biodiversity, 2020; Godfrey and Tunhuma, 2020).

All over the world, people are at risk of being affected by climate-change disasters owing to the increase in the occurrence and extreme weather events (Godfrey and Tunhuma, 2020). The German Development Cooperation (2017) predicts that in the next 15 years, over 350 million people are at risk of disasters from extreme events and climate change. The predictions are even expected to get worse if the disaster risk management approaches are not improved both at the

international, national, sub-national and local level (UNECA, 2017). Experiences from the Philippines (see Box 1), however, point out the key benefits derived from programmes that influence the habits of local in responding to disasters. Locals are at the focal point because they are the ones directly impacted by disasters. So it is important to make sure that they participate in all levels of disaster management (Davis-Reddy and Vincent, 2017).

There are also interesting disaster management experiences that can be observed in countries like Bangladesh, Haiti and El Salvador

Box 1: Disaster management in Philippines

Philippines is one of the countries prone to a number of climate-related disasters. For instance, the country faces, on average, 30 major floods within a year. People in the islands are unable to adequately protect themselves and the infrastructure from the extreme events that occur. The disasters have been resulting in social, economic, and environmental losses. In response to this, the Government of the Philippines prioritised disaster risk management. Key issues that remained unaddressed include the lack of early warning systems, disaster plans and precautionary measures. Up until 2005, there was weak coordination between central government, local authorities and local communities in responding to disasters. In 2005, this gap was rectified by programmes that accommodated the participation of local authorities, non-state actors and local communities. For instance, Local Flood Early Warning Systems were established in 10 provinces in the country and the public could benefit from the information and adjust behaviours and attitudes. By 2014, there were 18 LFEWS that were being functional and local populations were directly participating. Simple but effective means of communication through mobile phones are used to interpret flood levels or increases in water levels in upstream rivers. This trigger influences the spheres of government to make evacuation plans well before disasters struck and also the locals will have the opportunity to prepare for floods. This program perfectly works well because it influences the habits of locals in anticipating, reporting and recovering from disasters.

Source: German Development Cooperation (2017)

(German Development Cooperation, 2017; Peters *et al.,* 2019). The populations of the countries have insufficient coping and adaptation capacity, hence extreme events are resulting in humanitarian disasters. Experiences in these countries however indicate that cooperation between spheres of government, non-state actors and the general public is key in improving disaster responses (Godfrey and Tunhuma, 2020). Participatory processes put the locals at the centre to improve risk assessment and individual responses to events like droughts, floods and cyclones (German Development Cooperation, 2017). Self-help measures, including bank stabilisation, dykes and

erosion control, are being implemented by locals in response to extreme events (Peters *et al.,* 2019). Figure 6 highlights soil erosion control measures by community members in North-East Haiti as evidence of the community's active local participation in disaster risk management.

Figure 6: Soil Erosion control in North-East Haiti *(German Development Cooperation2, 017: 27).*

METHODS AND TECHNIQUES FOR DISASTER RISK MANAGEMENT

Major guides for disaster risk management are derived from international frameworks which are: Hyogo Framework for Disaster Risk Reduction 2005- 2015 and the latest is the Sendai Framework Disaster Risk Reduction 2015- 2030 (UNISDR, 2015). Key gaps that the Sendai Framework acknowledged in the techniques are over-emphasis on institutions and less on national and subnational policies and strategies and locals not adequately included in international frameworks. As of 2016, the UNISDR (*ibid.*) observes that there were only 147 countries that had clear disaster risk reduction legislation, policies and strategies. However, some of the disaster risk reduction

legislation, strategies and plans were not implemented because of weak disaster governance structures at national and local levels (UNECA, 2017).

Comprehensive strategies, including locals, were not put in place in many countries. Some countries (51) did not even have any kind of national-level document for implementing disaster risk reduction. At a regional level, there were frameworks, like the Arab Strategy for Disaster Risk Reduction 2020, the African Strategy for Disaster Risk Reduction 2006-2015, the Strategy for Disaster Risk Reduction and Emergency Preparedness and Response in the Asia Pacific Region 2009-2015 (Wenger, 2017; UNECA, 2017; African Centre for Biodiversity, 2020). Disaster risk management used to be mainly a function of the state. However, the global and regional frameworks on disaster reduction are emphasising mainstreaming disaster risk reduction at the district, provincial and national levels (UNECA, 2017). This targets the long-term vulnerabilities that result from the social, economic and environmental factors (Faye, Ribot and Turner, 2019). As a result, the number of actors participating in disaster risk reduction are increasing and this is more effective. Individual responses are a critical factor of consideration in risk management.

Efforts have been made on building community awareness and mobilisation. These include public awareness campaigns, dissemination of policies and plans to communities and sensitisation of communities to disaster risk (Davis-Reddy and Vincent, 2017). These activities are done to influence action at a local level. The basis of these initiatives is that information is key in influencing the right action before, during and after the disaster. Early warning system measures are being implemented to influence actions such as planting of drought-resistant crops, the development of evacuation houses, the development of resilient infrastructure and for the community to implement local disaster reduction measures (African Centre for Biodiversity, 2020; Godfrey and Tunhuma, 2020). However, the challenges emanating from these initiatives are that sometimes the language used to disseminate information is not all-inclusive enough to accommodate all groups of people (Lavell *et al.,* 2012). More so, the communication channels used sometimes leave other groups of

people without access to this important information (Godfrey and Tunhuma, 2020).

Risk identification and assessment is another technique that is used to manage risk. This can be done both before and after the disaster (Faye, Ribot and Turner, 2019). Pre-disaster risk assessment and post-disaster damage estimation are more linked presumed. On pre-disaster risk assessment, the focus is more towards appraising the probabilistic or deterministic damage forecasts (Heather, 2014). On post-disaster risk assessment, the emphasis is on analysing the disaster that occurred to develop risk models and influencing disaster recovery measures (Davis-Reddy and Vincent, 2017). In many instances, disaster risks are complicated. However, understanding the risk is important in influencing measures that protect societies and the environment. Proper risk assessment methodologies are needed. These may include trend analysis and modelling and many other qualitative and quantitative risk analysis methods. There is no risk identification method that is 100% accurate (NARRI, 2016). However, the risk identification methodologies are critical in influencing policy options and actions for the protection of citizens and society (Lavell *et al.,* 2012).

THE QUESTION OF SCALE IN HUMAN HABITATS IN MANAGING DISASTER RISK

The extent of damages that result from climate-related disasters is dependent largely on how people are prepared to face the risks. This includes human perception and behaviour towards responding to disasters. Heather (2014: 10) states,

> how people perceive climate change risk is informed by their social interactions and cultural worldviews comprising fundamental beliefs about society and nature.

However, current disaster risk management practices do not fully consider human behaviour, habits and perspectives (UNECA, 2017). This is evidenced by experiences in many developing countries where people ignore early warning systems up until the disasters such as cyclones strike (Davis-Reddy and Vincent, 2017). For instance, such experiences have been noted in Southern Africa. Some people were affected because of defying evacuation orders from governments

(African Centre for Biodiversity, 2020). This reflects the importance of personal human behaviour, habits and perspectives at the advent of disasters.

The behaviour and habits of people before, during and after the disasters, is critical in both limiting the impacts of the disaster and recovering from the disasters (Faye, Ribot and Turner, 2019). However, this personal behaviour requires support from national governance structures. For instance, there are traditional and indigenous knowledge systems about climate change that local people usually have. This indigenous and traditional knowledge that people have influences their habits and behaviour before, during and after the disasters (Godfrey and Tunhuma, 2020). For instance, local people have early warning systems about rainfall patterns that influence the types of crops. However, new evidence emerging points out the need for integration of traditional and knowledge systems with scientific evidence, bearing in mind the changes in climatic patterns (African Centre for Biodiversity, 2020). Some of the traditional knowledge systems that used to apply might not be relevant or may need to be updated.

Integrating knowledge of how people deal with disasters and disasters themselves is important in managing disaster risks. In many instances, however, more emphasis is given to the scale of disasters and not the scale of people's perceptions, habits and behaviours (German Development Cooperation, 2017). It is what people do before, during and after disasters that matters most (Brown *et al.,* 2012; NARRI, 2016; Godfrey and Tunhuma, 2020). This raises the issue of disaster information dissemination. The disaster information needs to be prepared in a manner that recognises what local people know (Davis-Reddy and Vincent, 2017). More emphasis needs to be on influencing people's habits at all stages of disaster occurrence (Hamilton, 2012).

At the international level, various strategies for disaster reduction have been implemented and these are shown in Figure 7.

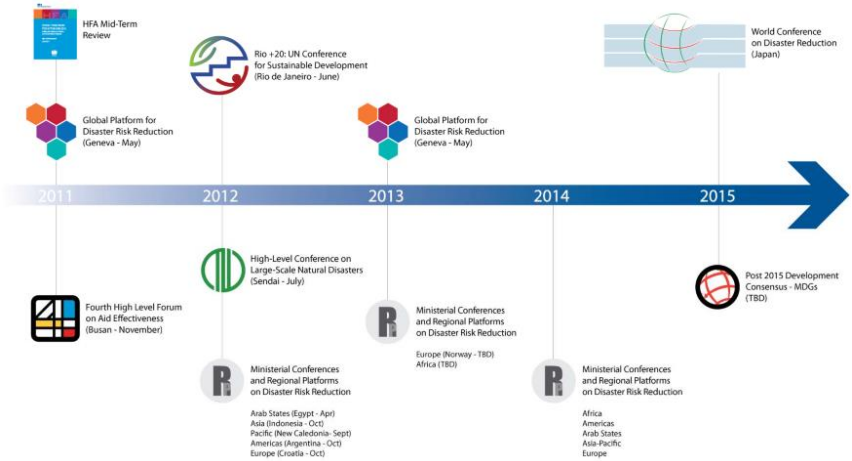

Figure 7: Timeline of main events for post-2015 Framework for Disease Risk Reduction *(ISDR, 2015)*

These events represent some of the milestone events done at the international level for disaster risk reduction from 2011 to 2015. The post-2015 framework on Disaster Risk Reduction (DRR) was a comprehensive strategy that cascaded to the regional and local levels from the international level where focus was mostly on the setting of standards and guiding priorities, the establishment of accountability framework and the development of protocols to enable information sharing, among other measures (Kellet *et al.*, 2014). After the occurrence of an earthquake in Morocco's remote regions, the El Manal Association for women's activities mobilised the youths and women to facilitate emergency response and work together with non-governmental organisations to prioritise the needs of the vulnerable (*ibid.*). In this regard, the needs of the vulnerable are heard and safety nets are then created in favour of the most vulnerable.

DISCUSSION

Comprehensive approaches that accommodate all actors are important in framing disaster risk management that is effective (Davis-Reddy and Vincent, 2017). Many state and non-state disaster risk management initiatives are beginning to encourage an expanded, bottom-up, grassroots approach, emphasising local and community-based risk management in the framework of national management systems (Peters *et al.,* 2019). This approach is important as it accommodates

the habits and behaviour of people at all levels. Whilst national and subnational policies, strategies and plans are important, their effectiveness is sometimes limited by operational challenges if those on the grassroots level are not actively participating. Cooperation between spheres of government, non-state actors and the general public is key in improving disaster responses (Faye Ribot and Turner, 2019). Participatory processes that put the locals at the centre to improve risk assessment and individual responses to events like droughts, floods and cyclones are required.

People need to participate both in policy/strategy formulation and the implementation stage (African Centre for Biodiversity, 2020). They also need to participate at an individual level through disaster identification and adjustment of actions that suit expected disasters (German Development Corporation, 2017). The difficult transition to more comprehensive disaster risk management raises challenges for the proper allocation of efforts among disaster risk reduction, risk transfer and disaster management efforts. At a local level, risk perception is influenced mostly by social, economic and environmental past experiences (African Centre for Biodiversity, 2020). People on their own have their means of assessing disasters and have indigenous ways of responding to disasters. Integrating expert and non-expert knowledge is key to disaster risk reduction (Wenger, 2017). This means that both traditional and indigenous knowledge systems that influence human habitats are integrated with scientific knowledge systems to build comprehensive disaster reduction responses (Lavell *et al.,* 2012).

CONCLUSION AND POLICY OPTIONS

Climate change disasters have frequented in many countries across the globe. Climate change is manifesting in the form of rainfall variability and extreme events such as heatwaves, floods and droughts (Davis-Reddy and Vincent, 2017). The costs of climate change disasters affect mostly the vulnerable populations (the poor and those in marginal areas) who have weak coping mechanisms (UNECA, 2017). However, disasters are not new and since time immemorial, disasters have been happening. What is evolving, however, are the disaster risk management approaches that try to reduce the impact of disasters on society. Climate change is contributing to the increase in frequency and intensity of disasters. Disaster risk management approaches are needed for both adaptation and mitigatory measures

to climate change-induced disasters. Comprehensive disaster risk management approaches that accommodate the grassroots levels are important in improving the effectiveness of disaster risk management approaches. The study recommends mainstreaming international and national policies, strategies and plans for various sectors at the national and local level. Support for community, household and individual measures in fighting climate change disasters is important.

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CHAPTER 7: Urban Data Science for Smart Settlements

Abstract

This chapter seeks to explore and discuss how urban data and science can be used in the development of smart cities. The background of the argument emanates from the observation that in recent years, the development of smart cities has proven to be the best solution in dealing with different problems faced by urban areas. Indeed, missing in the literature is the analysis that how can urban data be useful in the development of smart cities and how can it be implemented together with scientific methods that can be used to develop and manage smart cities throughout the universe. There is a void that needs to be filled as previous studies on the development of smart cities have left out the necessity of using urban data and science that is explored by this chapter. Both qualitative and quantitative methods were used to extract information used to compile this chapter. Results indicate that the use of urban data and science can bring quick and more sustainable smart cities throughout the whole components of the urban structure.

INTRODUCTION

In recent years, the world has developed the idea of smart cities that has far been implemented in the developed countries in Europe, Asia and some parts of the United States of America. It is noted that the development of smart cities takes different strategies with regards to the city and the available problems to be addressed. This chapter, therefore, seeks to explain the question of how urban data and science can be useful in the development of smart urban settlements that are known as smart cities (Kurcheeva and Klochkov, 2019). It also unveils the type of data that is regarded as urban data, also known as urban informatics, and how it is extracted and what scientific methods can be applied in the development of these cities. There are four categories of urban data that Space Syntax (2018) puts forward: the data concerning the people, urban form, resources and the environment. The study intends to fill the gap that exists in the techniques used in the development of smart cities as many policies, theories and strategies have been put forward but little attention has been raised in how urban data and science can be useful in the creation of these cities around the world.

Recent studies were used to dig the information used in this study with several research methods such as data mining, triangulation, among others. Secondary and tertiary data were been gathered to justify the problem that is intended to be solved in this chapter. The results indicate the cruciality of urban data in the development of smart settlements as it exposes all the dimensions of the urban sphere that needs attention and to be resolved for the successful implementation of this idea. Conclusively it can be said that urban data form the basis of smart settlements as there is so much information contained in it that can be used to develop and manage smart settlements around urban areas.

BACKGROUND OF THE STUDY

The development of smart cities has been a result of adverse circumstances faced by cities, including the rise of urbanisation, environmental issues and resource management in these urban areas. It is argued that smart settlements are oriented to solve specific problems of an urban area and these strategies differ from one city to the other due to the differences in the problems being solved, hence there is no single technique in the creation of smart settlements worldwide. Though there are policies and strategies that have been used before, not every one of them suits all situations. Rumi (2016) affirms this discovery, explaining that the development of smart settlements is meant to formulate and apply smart resolutions to the various problems faced by urban areas such as service delivery, provision of shelter and environmental stewardship as implemented in India. It is believed that the development of smart cities is one of the strategies that has gained popularity in recent years as it is used to resolve the structure and outlook of the city and innovating it with new technologies.

Smart cities are identified as all urban settlements that make a conscious effort to capitalise on the new Information and Communication Technologies (ICTs) landscape strategic ways that aim for environmental sustainability, quality of life of urban dwellers, urban system functionality, community-driven developments and knowledge-based developments (Angelidou, 2014). In this case, smart cities are places where innovation into new smart technology and the participation of the people is advocated for with the effort of increasing the educational standards of the city's citizens, protection of the natural environment and the provision of quality services. It is also defined as

a city with smart people, smart living, environment, economy, government and mobility (Anthropolous and Vakali, 2012). This implies that for a city to be identified as smart, all its characteristics should be standard. A smart city is also regarded as an urban setup with smart inhabitants who are well educated and full of information technology (Giffinger *et al.*, 2007).

The smart settlement has been described as a settlement that is convenient for the life of the population. As observed by Giffinger *et al.* (2007), the phrase “smart city” does not have a distinct meaning but its definition varies with different circumstances. Therefore, the idea of smart settlements should be an overall view of that particular settlement where the focus is on all aspects that formulate that settlement. Worldwide the idea of smart cities is still new and fresh with lots of strategies being put in place to formulate and define what is the basic outlook of a smart city. It is acknowledged that there have been efforts to create smart settlement throughout the world using different strategies as said above.

CONCEPT FRAMEWORK

The notion of smart settlements has gained massive popularity, especially in developed countries, where it has been implemented. From previous studies, it has been discovered that smart settlements have been created using several strategies and policies put in front of different planning authorities, stakeholders and governments. Some of these strategies include strategic planning. Urban data are defined as a resource that is the basis for an informed decision in daily administrative business on optimising urban processes, the usage of urban resources in strategic decisions on urban development (Lammel, Scieferdecker and Tcholtchev, 2016). It is in understanding urban data that the development of smart cities is effective because it is the tool for the decision-making process. Data management is the crust of smart cities.

The purpose of this study is to explore and discuss the usefulness of urban data and science in the development of smart urban settlements. It seeks to fill the gap that exists between previous studies with regards to the information that can be used to formulate techniques and strategies be used in the development of smart cities in both the developing and developed countries that is more suitable in all circumstances. The use of data, though has been applied before, using

GIS for instance in the City of Ayang in Korea where it has been used to identify dangerous and accidents prone zones that have been used to create safety maps for the citizens. Urban data are an important data type that is vital in all spheres of urban development. This chapter sought to reveal how each type of urban data and science can contribute to the development of policies, strategies and other decisions to be followed in developing smart settlements in urban areas throughout the whole universe. In the precedent studies, it is noted that much focus was on the development of information and technology. This study also seeks to explain the connection that exists between urban data and science together with urban development. Therefore, the development of smart settlements is linked to urban data and science since it provides basic knowledge on the ground that guides the policies and strategies employed in the development.

There is no agreed definition of smart settlement (Dhingra and Chattopaudhayay, 2016). Therefore, this chapter describes the smart settlements as the urban living space produced through the analysis of existing urban data and science that is the core information to development and management as it simply unveils the lagging and well-developed areas of the settlement. Therefore, urban data helps find a conclusion on how to reach the expected indicators of smart settlements and the way to develop and manage these settlements.

THEORIES UNDERPINNING THE STUDY

There are several theories related to this study. A theory, by definition, is a model used to represent a real-world phenomenon. Theories linked to this study are the theory of organisation, a theory of communication, a theory of spatial functionality, a theory of modernisation and a theory of connectedness.

THEORY OF ORGANISATION

This theory is used to study organisational behaviour and has four schools of thought (Lydman, 2001). One of the schools of thought developed by Taylor (1880), suggests a framework for improving labour efficiency and production. It sees human beings as machines that deliver the outputs which are Scientific Management. As observed by this school, human beings were meant to be efficient and productive. This was dismissed due to its lack of consideration for humans. Another school of thought is the Administrative Theory in which a top-down approach to the organisation is advocated for the

success of the organisation (Krenn, 2017). Taylor developed this theory and argues that this hierarchy will result in quality management of the organisation. The third school of thought is the Bureaucratic Management Theory by Weber which describes how organisations can become ideal bureaucratic entities (*New World Encyclopedia*, 2017). In this case, the theory applies to both the private and public sectors in their operations. The last school of thought is the Administrative Behaviour put forward by Herbert Simon. This theory argues how organisations can move on in the direction of their goals with multitudes of decision-makers.

The Theory of Organisation clarifies how organisations operate daily. This theory has been used in many organisations to assess the relationship between co-workers and to analyse the direction the organisation is taking in delivering its outcomes. Though this theory reveals the way the organisation operates, it still lacks an explanation of how different organisations are linked to other organisations operating around them and their connection with the real world, the environment and the society in which they are operating. It is imperative to formulate a path in which the organisation theory addresses the issue of how it is connected with other factors around it and how it can be used in addressing the development of smart settlements throughout the whole universe. This theory is related to this study in a way that it analyses and explains how different organisations are working towards development through its hierarchy and other factors that are considered in them, hence the information contained in these organisation can be used in the development of smart settlements as the theory equips directors of different organisations with ideas that lead to sustainability, thus the smart operation of the organisation and the city at large.

THEORY OF COMMUNICATION

The Theory of Communication helps in the understanding of how things look like in the real world of communication. Communication describes a process by which people interactively create, sustain and manage to mean (Conrad and Poole, 1998). This theory is used to clarify, observe, predict communication behaviour and generate both social and personal change. This theory has been implemented in a business organisation to study the communication patterns within the organisation and with the outside world in making better communication decisions. The theory is applicable in the development

of smart settlements in the real world as communication is a key factor used in the implementation of strategies and their formulation.

THEORY OF CONNECTEDNESS

The concept of connectedness is characterised as a sense of keeping in touch, being involved and updated with others within ongoing social relationships (Romero, Markopoulos, Baren, Ijsselsteijn, 2007). It is a sense of having company, a feeling of belonging. This theory argues that everyone is an individual, but every person is also connected to others and his or her environment. It focuses on things that bind people together in time and space. Connectedness is experienced in three ways, which are physical connection, emotional connection and cognitive connection. Superable (2014) used this theory in her study to investigate the effects of digital and non-digital forms of social connection on senior citizens. It has been discovered that connectedness is very crucial in human life both face to face or via social networks. The theory of connectedness has been used in the field of communication to understand how people relate to one another. It can be argued that understanding the Theory of Connectedness is beneficial to the creation of smart settlements as the connection is one of the key factors that determine the smartness of a city.

The use of smart technologies to connect with people from different parts of the world is a fundamental to smart settlements. This connection can not only be linked to different individuals but also the connection of different businesses and other economic sectors, leading to the development of an urban area. This connection is crucial in bringing together people's ideas expeditiously, thus prompting quick responses and decision-making. In some scenarios, lack of vibrant technology such as access to the internet, emails and other social media platforms, limits the connection of people mostly in the developing world where internet data are still expensive. The Theory of Connectedness is a key factor to this study as we understand that the successful collection and management of urban data are through the connections that exist between people of different sectors within an urban sphere as it allows for the compiling and proper management of information as there are frequent updates. Therefore, it can be noted that the Theory of Connectedness does not apply only in casual connections, but is also a main player in the gathering and preparation

of urban data used in the analysis and development of urban smart settlements in both developed and developing countries.

THEORY OF MODERNISATION

The Theory of Modernisation explains how an economy grows over time, going through a number of different stages. It is believed that it explains the development of societies. This theory was put forward by Rostow (1960) who believed that for modernisation to be realised, the economy starts as a traditional society in which the community relies more on agriculture in which technology is far backward. The second stage is the precondition to take-off stage, where the conditions for this are met through appreciation of technology and the development of surrounding societies using different techniques and innovations. The third is the take-off stage which breaks the bridges that act as barriers to the modernisation of the society and its economy due to new investments and innovative technology. The following stage is the drive to maturity in which the economy starts to flourish and older industries fade and are replaced with new industries. The last phase is the age high mass consumption and at this stage, the development is at its full capacity.

As observed by this theory, for full development to be attained, it is imperative to go through all the stages laid down in this concept, following each stage as it is, up top. This theory has been used to determine the development of regions and also in the field of planning, for instance, in the development of the African continent. However, the theory is more Western, suiting the developed world, hence some of the facts laid in it do not apply in the African context. This theory is ideal for the development of smart settlements. Because of its nature, explains the stages which an area goes through for it to be well developed. Apart from that, the theory does not explain how these stages are reached and how development takes place in them. Tracing this theory's stages is of great value as they are linked to a certain city in which smart development is to be implemented. This helps in indicating the stage in which the city is and hence the formulation of the steps to be taken to reach the ultimate goal.

NOTE: TEXT **ON THEORY OF FUNCTIONALITY** IS MISSING

EVOLUTION OF SMART CITIES

The origin of smart settlements is linked to the development of ICT in most developed countries that were later implemented in urban space (Anthropolous and Vakali 2012).

LITERATURE REVIEW

On a global scale, the development of smart settlements in many developed countries has been through smart cities. The idea of creating smart settlements has been adopted by the European Union Ten-Year Strategic Plan of 2010 to 2020. It has been noticed that the European Union has developed a partnership in the implementation of smart cities through the European Union Partnership (United Nation Economic Commission for Europe 2014-2015). It is noted that in Europe, the use of development sustainable goals, indicators as the guideline for the development of smart cities, was effective during the housing development project that was set to bring about smart settlements (UNECE, 2015). Austria adopted the smart cities development programme to eliminate the causes and effects of climate change, thereby developing clean energy provision, resulting in smart environments (Backhouse, Karuri-Sebina and Guya, 2020). It is noted that the European Union, through the program has managed to set its smart settlement goals by tuning into background data to guide them produce their research guidelines.

In Asia, this idea has also been adopted by Singapore, China and India. In India and China, national plans were introduced as strategies to guide the development of smart urban areas with the aid of industrial policies put in place by the governments (Vu and Hartley, 2018). India as a country has launched a Smart Cities Mission that ran from 2015 to 2020 in that the selection and development of cities have been done to reach this goal of urban smart settlements (Aijaz, 2016). Dhingra and Chattopaudhayay (2016) argue that the idea of smart settlements was done in India by first studying and analysing the environmental, social and economic planning paradigms of the old cities within the country. It is noted that some cities in the United States of America have welcomed the idea of smart settlements and have started to implement them.

The City of Ayang in the Republic of Korea is one of smart settlements, as it has managed to curb the crime rate in the city by using recent technologies, setting up CCTVs around the whole city through the

Intelligent Transport System Programme as a way of limiting blind spots and securing the safety of its citizens. This was also done in Glasgow, Scotland, where CCTV cameras were installed in all public space to increase safety within the urban area. In Barcelona, Spain, the development of smart settlements has been achieved through public participation, whereby people within the city identified the areas where there was the need for development and renovation, thus achieving a smart settlement in the city (Backhouse, Kariri-Sebina and Guya, 2020).

Regionally, the concept of smart settlements has been adopted by few countries. This is a result of lack of financial support in the region of Africa. It is believed that Nairobi, Kenya, and Cape Town in South Africa are the top smart cities in Africa. In South Africa, the issue of smart settlements has been adopted with a different agenda from that of the whole world that not focus on the use of technology and global competition, but rather their main focus is value-driven and focuses on smart city principles. It has been noticed that urban data has been used also in the South African context where the government examined urban data as the foundation for the building of smart cities (Academy of Science of South Africa, 2020). This has worked in the shaping of the country's cities governance and decision-making.

Locally, Zimbabwe has taken steps to make its cities smart by the year 2030. This has been done through presidential campaigns such as the clean-up campaign, which aims at creating smart urban environments and liveable cities. Though the idea of smart settlements is a noble one, the situation in Zimbabwe is an obstacle in the implementation. The prevailing backwardness in technology and the economic crisis are the major effects that affect the implementation of smart settlements as there is a lack of funding for projects. Apart from that, the increased rate of urbanisation and informal settlements have resulted in so many unplanned settlements, hence there is a lot of work that needs to be done to provide good services for the growing urban population.

RESULTS

The results indicate that urban data and science are very crucial in the development of smart settlements as they give a guideline to the type of technique, strategy and policies that must be taken to develop and manage this smartness of the settlement in all aspects. As argued by

some scholars, smart settlements require ITC and the availability of urban data for a particular settlement can help identify the strategy to be used to develop and manage a fully smart city with full information communication technology capacity. Acquiring information about the people and their social life is also important in the development of smart cities as this helps to know the welfare of the people hence the services needed to maximise their standards of living in terms of health, education, leisure and recreation, among others. Aijaz (2016) argues that the understanding of the notion of the city is reached through the study of the demographic patterns, economic and social structure of that urban settlement. The information on the employment rate of the people residing in the city is very crucial as it aids the creation of policies to be used to boost the economy through job creation, investment in new technologies and innovation. This also helps to understand the lifestyle of the people and gives clues on how to set strategies and policies that transform it.

The understanding of urban data concerning the people helps to develop and manage settlements patterns, taking into account the current patterns. It is noted, therefore, that the use of urban data and science through understanding the demographics of the urban settlement rewards the planning authorities and policy-makers with only favourable results. This will help them reach the definition put forward by Kurcheeva and Klochov (2019) in that they describe it as a certain system of communicative and information technologies. The purpose is to improve the living standards of citizens and reduce the costs of workflow through automation that does not require the use of analytical skills. This simply means that for one to increase these standards of living of the urban settlers, one must understand the current situation and where it is lagging, to know what needs to be improved.

It is noted that obtaining information about urban form is a key factor in the development of smart settlements in both developed and developing regions. Urban form is one of urban data type that contains information regarding the transport system, land use, infrastructure, among other components. The results from this study show that the creation of smart urban settlements has a connection to the set of the city. This guides the development of infrastructure. Mobility is a key aspect of urban smart settlements, hence knowledge of the state of the transport infrastructure, connectivity from one place to the other and

the frequency of movement within the urban settlements, helps bring a reasonable smart solution that can solve the transport problems around the settlement. Besides mobility logistics, the availability of urban data on the urban form also results in the designing of the urban settlement, whereby land-use, layout of the settlement and housing programmes are done in such a way that they follow the standards and policies prepared by the urban planner leading to smart settlements. This is important because it provides the layout of the city that can be used to amend the existing outlook and transform it into a new and more attractive design that is more sustainable and delivering the best quality of life for the people of the area.

The results indicate that urban resources are vital to the development of smart settlements. This provides information on food production in that urban settlement and is used to identify the gaps that need attention and further development for a balanced diet and also help eradicate hunger and starvation. Knowing food chains helps the manufacturing industry within the settlement. Knowing the way, an urban settlement is set up and the type of people occupying different parts of it, is important as it helps to identify the quantity and quality of different goods required in the settlements and again helps in the management of resources such as freshwater supply, the importation of additional goods if local suppliers fail to reach the required quantities. Thus, results indicate that the availability of urban data are vital since it is used in resource management and services provided within a settlement through analysing the available resources and how to distribute them among the dwellers in such a way that all benefit and reach the standards of life that are considered to be smart.

The creation of a smart environment is one of the goals of smart settlements. Green infrastructure has become the key issue of development due to the rise of climate change. It is believed that air quality, landscape and climate, among others, are the key components to the smart environment. It has been recognised that available information on the state of the environment regarding waste management, both solid waste and wastewater, has given a start pointing in that strategies could be formulated to reach the standards of smart environments where urban settlements have zero litter and clean.

CASE STUDIES

MASDAR CITY

Masdar is located in the United Arab Emirates, in the Middle East. This is believed to be one of the first smart cities in the world with a zero percent emission rate, thus the use of clean energy and waste management, whereby recycling and re-use have been done to reduce and monitor waste disposal around the city. Smart city strategies were used to increase the quality of life in the urban space by improving the environment and service delivery using technology. GIS and GPS technologies have been used in the development of transport systems.

AMSTERDAM

The City of Amsterdam, Netherlands, is one of the most popular smart settlements around the world. This city used smart cities strategies to achieve its goal of becoming a smart city. The strategy applied in this city was the Amsterdam Smart City Programme in which several phases were developed to guide the process. This strategy was developed in 2007 and has been successful through the support of political personals (Baron, 2012). The use of technology became common in solving environmental problems and climate change adaptation and mitigation (Brinkman and Meuwissen, 2010). It is noted that there has been cooperation in the development of this city between different stakeholders such as the planning authorities and the climate sector. Therefore, strategic urban planning principles were used to attain a smart city of Amsterdam and the indulgence of the stakeholders and their participation were the key factors that lead to the success of this development.

DISCUSSION

Though the use of urban data might be effective in the development of smart settlements, it should be acknowledged that in some cases the data is inaccurate. This is more profound in data regarding people where migration continues to be a cause of changes in the informal settlements. Though the data are available, other factors that may affect the proper implementation of smart cities financial incapacitation may fail to meet the standards of smart settlements, especially in the developing world. In some cases, the absence of valid data (and their collection) results in the development of similar areas while others are left out. there are some areas without updated information due to lack of resources for data collection and also distorted data due to some

political reasons and other reasons hence the development of smart settlements in such areas becomes difficult due to biases.

Economic instability may work as a barrier for development even with the availability and understanding of urban data. lack of modern technology and investing in these technologies, may hamper the creation of smart urban settlements regardless of the availability of urban data, especially in many developing countries where they cannot afford recent technologies that speed up the growth of the economy. Though the availability of urban data can be considered as the first step towards smart settlements, other factors need to be considered as they also contribute to a successful implementation of smart settlements in both the developed and developing countries. Data alone cannot lead to the achievement of the goal.

CONCLUSION AND POLICY OPTIONS

Urban data and science are the key contributors to the development of smart cities, therefore policy-makers should acknowledge the available data and science in that the settlement is developing, before they formulate policies and strategies used in developing smart settlements. Urban policy-makers and developers, together with the planning authorities, must assess the proper collection of urban data and introduce other methods of data collection that are more reliable in providing valid information that is used to assess the state of the city. It is noted that though there are a lot of policies that have been introduced to create smart settlements, some of these are not applicable in some cases, hence the understanding of urban data for that particular urban settlement or country can be useful in formulating strategies that result in the specified development.

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CHAPTER 8: Transforming City Studio

Abstract

This chapter equips the reader with skills to develop concepts, spatial structures, programmes and design rules and creatively integrate all these into robust urban design and architectural proposals. The leitmotif of this studio is to design liveable, beautiful and open urban spaces. The reader is expected to gain knowledge and skills in reconciling the dynamic forces of urban transformation with architecture and planning. In this manner, high-quality urban spaces that are responsive, yet specific to their context, contributing to a sustainable balance of our urban environment, can be created. The areas covered in this chapter are based on contemporary urban themes, such as design and densification of urban nodes and quarters, revitalisation of former industrial and harbour areas and sustainable transformation of the city landscape.

INTRODUCTION

This chapter aims at proffering skills for the overall development of robust urban design and architectural proposals in the planning and design of cities. This is done through discussing concepts, spatial structures, programmes and design rules that can transform cities into liveable, beautiful and open urban spaces. The evolution of cities throughout time has meant their design considerations should change to suit the prevailing conditions and human needs. Thus, city studio must be manned with a responsive agenda of urban design that is specific to context to create a sustainable balance in the urban environment. The major aspects of this chapter are based on contemporary urban themes such as design and densification of urban nodes and quarters, revitalisation of former industrial and harbour areas and sustainable transformation of the city landscape.

BACKGROUND AND CONTEXT

Urban spaces have been created throughout the world because of varying factors and theories of development. This chapter emphasises buildings that Lossifova (2017) argues define cities and space.

Historically, large parts of the built environment have been and continue to be created without the help of formal professionals. This means that in the past, professions such as architecture and urban design, were not there but cities existed. This qualifies the saying "architecture without architects" as highlighted by Lossifova (*ibid.*). With time, humans began to formalise knowledge through oral histories and inter-generational tradition of knowledge and practices, such that fields like architecture, became formalised and later, urban designers. This chapter thus looks at the transformation of city studio that is understood as the "design room" for cities, responsible for the structuring and development of cities of today. Some of the fundamental aspects include what "urban" means for architecture and urban design, the changing architectural and urban design professions and how they relate to the city. Cities are, however, subject to continuous transformation as new components appear, disappear and reconfigure space over time. The type and characteristics of cities are further subject to changes in the social and economic organisation of a society. This means that cities have existed to serve various and different needs specific to a time.

The period of industrialisation was a major driver of urban transformation, especially in terms of their qualitative change and enlargement of cities around the globe. Beginning in mid-18th century, smaller towns and mercantile centres saw enormous expansion, triggered by new means of transportation and communication such as ship canals and railways. Lossifova (*ibid.*) argues that in old city centres, huge factories and warehouses replaced old merchant housing and reduced de facto available open space, leading to overall environmental deterioration. Accordingly, the concept of affordability came into play where those who could afford to move out of the inner cities, moved out to leafier areas along railway lines. Those who could not afford, had to remain behind in the factory towns that had no appreciation of basic human needs.

The conditions in industrial towns, characterised by overcrowding, lack of sanitation and adequate provision of water, air and light, triggered the emergence of a whole new system of public responsibility and social enterprise. It was during this time that minimum standards were

slowly introduced to ensure adequate provision of space and a variety of services in low-cost housing. Formal architectural training began with the birth of the Industrial Revolution. It is at this time that architecture shifted in perception as equal to art, rather than science or craft. The major shift emphasised emotional experience over objective reason and inspiration over common sense (Lossifova, *ibid.*). This saw the production of beautiful drawings, rather than the context and feasibility of a project. On this background note, Lossifova (*ibid.*) argues that although architects and urban designers are often associated with the development of visions for built spaces, it is impossible to consider their activity a purely artistic exercise. Lawrence (1993) thus argues that buildings are shelters that can act as a filter between the private and the public, they can be symbolic and they can carry economic and environmental implications. The illustration above serves to provide the basis that architects and urban design came to be of importance in the creation of today's robust urban environments.

Present architects and urban designers have their spaces of activity and influence frequently overlapping and converging and they set parameters for specific design briefs and designing for the client's intention and goals. Although issues associated with costs are critical in this regard, there are concepts such as robustness, resilience and sustainability that play a critical role in determining the types of designs and the skills required in city studio. Lossifova (2017) argues that when shaping urban space, architects and urban designers deal with its social content. Some schools of thought, such as the modernists, assume that the work of architects and urban designers in the form of spatial designs could change society and this happens in the name of the concept of environmental determinism. However, other schools of thought reject this thinking by suggesting that there is a relationship between people and their environment as one of mutual exchange. As observed by Lossifova (*ibid.*) urban design is understood as the socio-spatial management of the urban environment using both visual and verbal means of communication and engaging in a variety of scales of urban socio-spatial phenomena. With these background aspects of the city studio, it is important to note that the processes are dynamic and needs specific such that the 21st century requires an upgrade of the traditional ways of determining urban form and structure. Thus, this chapter tries to proffer the skills required in the creation of robust and sustainable cities.

THEORIES UNDERPINNING THE STUDY

SUSTAINABLE URBAN DESIGN

This theory of urban development connotes a new relationship between the natural environment, urban form and structure, economic and institutional processes and social livelihood. The relationship assess above requires a transformation of the existing socio-economic, environmental and urban design settings. As observed by Atkinson and Ting (2002), sustainable urban design is an attempt to recognise the complex and hitherto-neglected relationship between the natural environment (sustainable) and the city as an artefact (urban design). One important goal is to enable the natural processes that sustain life to remain intact and to continue functioning alongside initiatives for the improvement of individual quality of life and the well-being of society. Wheeler (1998) also argues that sustainable urban design adopts a systemic and synergistic reorganisation of environmental, economic and socio-economic goals that enhance the long-term health of natural systems and the vitality of urban communities.

Linked to this chapter, the theory of sustainable urban design calls for a comprehensive framework of new urban design ethic to promote sustainable cities. This is the aim of this development of literature to influence the development of liveable, beautiful and open urban spaces. The application of this theory, however, is not a straight-jacket process or approach; it is determined by the context in that the principles are applied that determines the form of sustainable urban design (Aina, *et al.,* 2013). The local context remains key in the development of urban design guidelines for a particular local area.

This theory argues for sustainable communities as places where people want to live and work, and in the future. These communities meet the diverse needs of existing and future residents and are sensitive to their environment and contribute to a high quality of life. These settlements should be safe and inclusive, well planned, built and run and offer equality of opportunity and good services for all. The pillar of environmental sustainability aims at maximising the efficiency of land use through the conservation of energy and of natural terrain, the minimisation of pollution, creation of parks and green areas,

securing of open space and the maximisation of land-use efficiency through multidimensional and complex development.

THE INTEGRATIVE THEORY APPROACHES

The integrative theory approach was suggested by Sternberg (2000). The effort was much to do with the establishment of the theoretical foundation for urban design. Sternberg (2000) observed that urban design had been relying on techniques and ideas that have no clear theoretical basis and suggested an integrative approach to defining the foundations of urban design. He argued that "the ideas that inform urban design usually coalesce around contending approaches" and shared principles of these approaches should be integrated to establish a general theory of urban design. There are four elements of integrative urban design, including good form, legibility, vitality and meaning. For this chapter, there are concepts related to these four elements such as liveability, beautification and sustainability that have been referred to. Sternberg (*ibid.)* went further to provide some set of criteria that the integrative theory should have, including highlighting the underlying principles of contending approaches, addressing substantive urban design issues, awareness of the "constituents of the human experience of the built form", unifying economic and architectural traditions and being realistic and practical. These criterions are key in the integrative framework for sustainable urban design.

SYSTEMS THINKING

Systems thinking is a perspective of seeing and understanding systems wholly. As observed by McFadden (2018), systems thinking is a web of interconnections that creates emerging patterns over time. Cities across the globe face unprecedented social and environmental sustainability challenges. The problems they face are intricate and complex. They are products of interactions that vary with time and space involving multiple actors and disciplines composed of interconnected relationships often with nonlinear effects. Thus, the application of systems thinking is strongly considered in the subject of cities to acquire an understanding of urban problems through the study of urban interactions. Voulvoulis (2012) argues that problems can be viewed as products of the interactions within a city, and also argues

that systems thinking embraces the union of interdisciplinary, integrated and holistic principles to create the mindset that addresses problems wholly.

Understanding a city as a whole and finding pathways to more sustainable futures, means integrating urban design, architecture, planning, strategic thinking and economic analysis, among others. It requires an appreciation of complex interactions between different urban systems. Hard and soft elements of city systems and the way they exist and interact should be considered. The built environment considers the hard systems that have easily quantifiable elements. An example may be a new railway urban design project which can reduce journey times in a city. This is measurable, but how are other elements of the city system measured, like community engagement, multi-cultural diversity or city liveability? This means systems thinking is a necessary tool in the subject of city design and liveability. It is imperative for informed dialogue and collaboration between professions in the built environment and civil and government engagement to produce sustainable cities.

CONSTRUCTIVISM

The constructivism theory provides a broad theoretical foundation at a high level of abstraction which could give professionals in the built environment a better understanding of their role. The theory is a result of a general acceptance of the insufficiencies of the systems theory. Constructivism is a set of assumptions on the nature of human learning that guide constructive learning theories and teaching methods. Merriam and Caffarella (1999) provide that constructivism is about how people make sense of their experiences. The constructivist epistemology emphasised that people generate their own “rules” and “mental models” that they use to make sense of their experiences (Kurt, 2011). Learning, therefore, is accepted as the process of adjusting their mental models to accommodate new experiences. In urban design and architectural education, the learning environment is based on the structure of design studios and these should provide the following:

1. Provide experience to students for construction of design knowledge,

2. Facilitate students to find alternative solutions to their design problems through multiple perspectives,
3. Present learning activities in a realistic and relevant context,
4. Make learners feel ownership of the process and feel responsible for their learning,
5. Create process-oriented learning strategies,
6. Practise the learning as a social activity,
7. Promote the students to use various representation modes
8. Generate self-awareness of the students
9. Form self-motivated and self-reflective students,
10. Encourage to use strategies, and
11. Make students respectful to multiple perspectives and world views.

Principally, the constructivist approach in architectural and urban design instruction combines the constructivist education basics and the information technology, intending to provide essential improvement in architectural and urban design education (Kurt, *ibid.*). The positive impact of technological developments on architectural and urban design education can be obtained by the implementation of hybrid educational systems which provide unification of traditional and constructivist attitudes in a studio environment. Constructivist principles in design education accomplish the idea of constructing knowledge to create meaning by doing and that the resulting knowledge 'creation' is unique unto the individual. For this reason, in architectural and urban design education, each student's level of learning gained from the studio process has a different value and the design products have unique characteristics. The learning environment in constructivist education is designed to foster intensive use of digital technology in the design process.

CONCEPT MAPPING

Concept mapping is the process of creating concept maps or diagrams that organise, represent and create knowledge. Concept mapping can be utilised by individuals or small groups with the latter referred to as collaborative concept mapping. Wheeldon (2011) also indicates that concept maps are further delineated depending on the author's theoretical and methodological orientations. The concept map demonstrates how an individual or group builds on previous knowledge to incorporate new concepts into a mental schema. Concept maps

have been used quite differently across the world and disciplines, but in the context of urban design and architecture, they can be used to organise and document city design ideas that can facilitate the achievement of sustainable cities. In terms of city studio, educators can use concept mapping to present new ideas and students can use concept mapping to demonstrate new learning (Yelich Biniecki and Conceição, 2016).

THE RATIONALE FOR STUDYING TRANSFORMING CITY STUDIO

Urban design and architecture are forces to reckon with in the development and liveability of cities. In other words, urban design and architecture are important in as much as the multidisciplinary study of cities and regions is concerned. These subject areas focus on the city as an agent of change and on the role of design in re-defining the 21st-century urban landscape, advancing new paradigms of research, practice and pedagogy to meet challenges of climate change, rapid urbanisation, among others. As an ever-changing dynamic place, cities are places where there is no need to wait for the next day or next week to play a part in their development and orientation. Thus, it is important to study the dictates of urban design and architecture, especially focusing on how to design liveable, beautiful and open urban spaces.

Transforming City Studio as a subject matter of transforming the design of human settlements through urban design and architecture is a key learning area in the built environment. It argues the fundamentals of how communities are shaped, focusing on their physical form. Urban design and architecture address the functional and aesthetic qualities of the physical environment at a range of scales, from the individual streetscape, park, or block to the larger community, city or region (Owen, 2020). Some of the important points to note in this instance are that Transforming City Studio matter is responsible for addressing the sensory environment where it affects how people perceive and use their environment. It is of great importance to note that people care about the look, feel and liveability of their communities and urban design and architecture argues that aspect to the built environment.

APPROACHES TO UNDERSTANDING TRANSFORMING CITY STUDIO

Understanding Transforming City Studio requires an engagement to real-world scenarios and skills necessary to creatively formulate design problems in cities. It is imperative to reintegrate the inherent complexity of urban systems and employ design operations that identify and cultivate networks, correlations, dependencies and interactions while simultaneously exploring multiple agents and avenues of transformation. To understand transformation city studio also requires an understanding of multiple approaches to urban design, many of them originated, tested and applied by morphosis throughout history. Examples of influential urban developments informed by experimental and analytical studies in urban design, architecture and society, broaden the horizons of understanding transforming city studio.

Designing and redesigning the city through effective studio designing can be used as an effective tool to give places new meaning with limited challenges. The designing and redesigning of city space can, therefore, be viewed as an important factor in not only promoting the sustainable development of cities through the creation of green spaces, but also as a way to boost the economic status of cities. Strategies for transforming the city can include engaging the conceptual model of green urbanism through the creation of zero-carbon cities that are supported by urban agriculture, densification and urban renewal strategies (Lehmann, 2010) and these measures usually revitalise the city centre. Another example is that of Downtown Springfield, which is changing urban fabric with the most visible example being the construction of the MGM Casino Resort with some project objectives encompassing the designing and creation of pedestrian-and-bicycle friendly corridors in East and West Columbus to allow for slow traffic movements and the creation of small social places to sit together (Alpay *et al.*, 2018). Such developments do not only improve the area's attractiveness, but improve the vitality and economic activity of the area.

The redesigning of downtown Lubbock (Figure 1), Texas, in what was termed the urban Courtyard Project, that drew upon the courtyard traditions of Spain to restructure urban alleys into a series of interconnected courtyards, was done after getting feedback from the

public, industry professionals and the civic leader after engaging in a series of small charrettes and feedback sessions as this aimed at promoting the needs of society as opposed to private needs (Elliot and Driskill, 2016). This shows the importance of incorporating the needs of the people in development as it also helps inducing resistance to change.

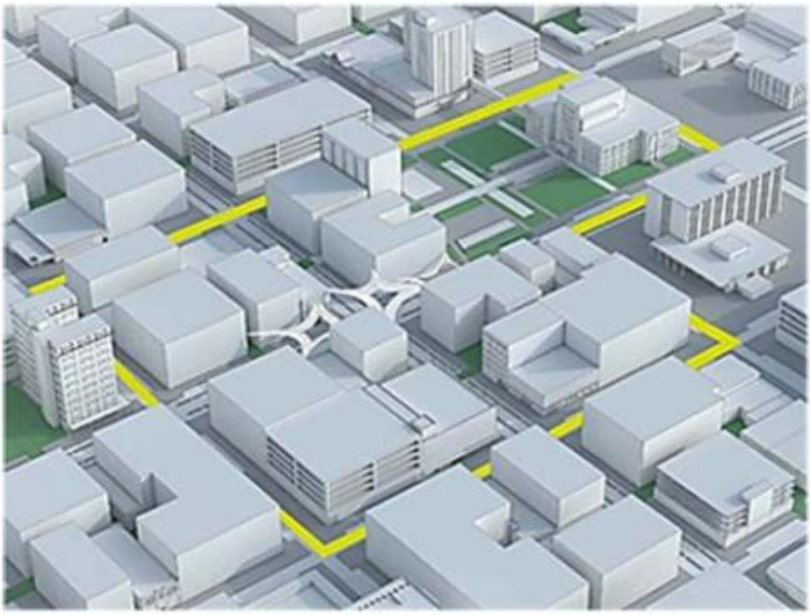

Figure 1: A digital model of the urban courtyards' projects applied to the centre of Lubbock Central Business District including the proposed plaza with the Lubbock County Courthouse *(Elliot and Driskill, 2016).*

It is, however, argued that although many of Green Urbanism strategies are universal and transferable, no single formula is applicable everywhere (Lehmann, 2010) and hence the need for innovativeness by planners in different regions/countries/cities to formulate on home-grown solutions for the greening of their areas. In improving city functionality, the transport system of a country must also be operating smoothly.

GLOBAL CASES IN THE STUDY

Cities have undergone a myriad of transformative phases throughout their history. Owing to rapid urbanisation and globalisation, the smart sustainable cities initiative has been launched across the world to provide the necessary skills and direction for the development of liveable and environmentally sensitive cities. Kim and Kwon (2018) argue that achieving successful transformation towards smart sustainable cities constitutes a significant challenge for policy-makers and one such challenge is the inclusion and collaborative framework of professions of the built environment such as urban design and architecture. Cities are significant in terms of development, they provide a platform for people to live and work, establish services and operations for citizens in a wide range of ways and facilitate close contact between local government officials and citizens.

.In an international context, the theories and ideas that dominate today's urban design discourse have been defined and categorised in various ways resulting in differing categorisations and definitions such as "territories of urban design", "images of perfection", "urban design force fields", integrated paradigms in urbanism", "urbanist cultures and approaches to city making", "new directions in planning theory", "a model of good design" and "typologies of urban design". As observed by Haas (2008, 2012), the three dominant ideas that stand out are new urbanism, post urbanism and sustainable urbanism. There are other important categories such as everyday urbanism, ecological urbanism and landscape urbanism. Kim and Kwon (2018) then argue that in the end, all these paradigms share a concern with shaping and composing public spaces and creating liveable and healthy places of variation, interest, familiarity, interaction and contrast.

These differentiate paradigms in terms of urban design and architecture as some work in the traditional way of advocating public squares and perimeter blocks as integral to the shaping and composition of cities based on historical and proven principles (new urbanism and sustainable urbanism), while others turned to vanguard approaches referring to globalisation, mediatisation as a theory that argued that the media shapes and frames the processes and discourse of political communication and the society in that that communication takes place and contemporary architectural transformation (post urbanism, city marketing and place branding schemes).

Some looked for narratives and hidden dimensions in the micro-sphere of the public realm (everyday urbanism) and others turned to solutions connected to urban ecological design and systemic landscape design schemes (ecological and landscape urbanism). This chapter pays much attention to the open urban spaces that have a profound history in the study of urban areas in the world. As observed by Kim and Kwon, (*ibid.*) historically public space originate from long-established community characteristics similar to the ancient Greek Agora and the Roman Forum, was a reflection of the social solidarity and community life of the citizens. Publicing spaces were an aggregate of the elements that defined its character such as traffic, history, culture and physical elements. In this same sense, Kim and Kwon (*ibid.*) argue that the interest and necessity of sustainable design can be found in the macroscopic change of the global environment, each country's trends in the process of global agreement change and implementation, and thus urbanisation and increase in the desire for public space improvement.

Kim and Kwon (*ibid.*) indicate that as the physical boundaries between cities have been broken down, the environment has become an important variable in urban design. European countries, in particular, share similar cultural and ethnic backgrounds but show prominent regional differences. Therefore, the architectural, landscape and urban devices based on the public urban space, are divided into northern, middle and southern regions, as observed by regional characteristics.

This has a bearing on how cities are planned for or, rather, designed. A look into the middle region of Europe that consists of Austria, Germany, France, the UK, Hungary, Latvia, Netherlands, Romania, Serbia and Slovenia shows that the design of cities is affected by the visual ground that is effective because it is suitable for architectural form as scenery. In the middle region, the focus of urban design and architecture is on the physical ground that people use directly. It emphasises environmental sustainability by enabling people to maintain a pleasant environment during use. The southern region has a ground that combines natural resources such as water or wood to cope with high temperatures.

In light of the above, city studio that is understood as the platform for urban design and architecture should take into account the priorities of each region. Cities continue to grow and it is nearly impossible to

imagine the scale that they will come to reach. Hence the design of cities oriented towards urban sustainability is a task that should be carried out by the millennial generation.

REGIONAL CASES IN THE STUDY

Urbanisation in Africa is rapid and it is safe to argue that Africa is catching up and African cities are growing fast. As observed by the World Economic Forum, Africa's population is expected to double by 2050 with the majority of growth happening in slums. Thus, Lucchese (2017) argues that it is time to act to avoid uncontrolled and random urban expansions and consequently unsustainable and vulnerable urban landscapes. However, Lucchese (*ibid.*) poses a question that asks on the relevance to talk about urban design in a continent where major issues are access to basic needs such as water, food, sanitation and electricity. It, thus, points to the fact that the approach taken on urban design outside Africa is not suitable in Africa, a continent bedevilled with many development challenges. In this regard, Lucchese (*ibid.*) argues that the reality of urbanisation in Africa is that it is less about aesthetically pleasing schemes, which are often conceived in isolation and only for the privileged few and more about access to basic infrastructure, education, jobs and housing and all that makes for thriving urban living. Many foreign developments are based on an aspirational vision, but typically cater only for a wealthy segment of society, leaving the majority in poor conditions. Instead, visions that residents can relate to and experienced practitioners that are sympathetic to local needs are required to build resilient and sustainable urban environments.

Urban areas have evolved over time in Africa and the potential for African cities to grow exponentially become dense as urban metropolis have always deeply fascinated people. The Urban Design Group (2017) indicates that the idea of massive cities, containing bustling millions has filled science fiction for decades. Mega cities are fairly a new phenomenon in terms of urbanism and the growth of Africa's megacities is still managing to take place in a unique context. Lucchese (2017) posits that African cities are growing incredibly rapidly, in many cases without the supporting industrial development that has accompanied it elsewhere. These cities and mega cities are bedevilled with challenges such as food security, lack of clean drinking water, poor sanitation, energy challenges and poor health services. Beyond the challenge of basic needs are those of a more complex

socioeconomic nature: housing, transport, environmental protection and job creation. Globally, the solution to these problems has been to leverage public-private partnerships. But in these environments, often defined by poverty, conflict and political instability, how is the private sector to be encouraged to engage in a supportive and not exploitative way? Yet all of the wicked problems being faced are equal opportunities for innovative urban planning solutions, finding approaches that end in more sustainable, equitable and liveable cities.

An examination of Kinshasa in the Democratic Republic of Congo (DRC), one of the fast-growing cities in Africa, highlights that Kinshasa is gaining 555 000 people a year with the vast majority moving into informal settlements and living well below the poverty datum line. This development trajectory represents the growth pattern for almost all of Africa's cities and megacities. Thus, planning for a change on this scale represents a major undertaking. This change requires long term planning and the creation of organisations that can only respond rapidly to present problems and better equip the continent's urbanists to face these challenges. Thus, the scale of urban design and city planning means it has traditionally been large and slow, or strategic and cautious. Jackson (2017) argues that this can represent a complete disconnect between the designer and people's daily lived experiences. Hence facing challenges on this scale is going to require a flexible and ambitious approach, with interventions that are small and fast and yet still contributing to an overall strategy of development and sustainability.

In light of the unplanned or informal nature of the growth taking place in African cities, the role of the urban professional, i.e. the urban designer, planner and architect needs to be viewed differently. When the vast majority of people are operating outside official systems, either due to economic barriers, socio-political reasons or the conceived illegality by which they inhabit space, then the top-down and authoritative techniques traditionally used for designing and building cities, might no longer be appropriate. People flooding into Africa's cities are almost universally young and coming from the rural areas. This indicates an opportunity to rethink how cities engage people in inhabiting and building their environment allowing for a more human centred design approach. All of this shows that there is exciting potential for African cities to be at the forefront of development and innovation as far as the design studio is concerned. As observed by

Jackson (*ibid.*), the work to be done and the solutions being developed in Africa's megacities can help shape more than a purely local body of knowledge. They can contribute to the global discussion on how future cities should be made.

Urban design and architecture in the contemporary period have largely been influenced by the new urban agenda. For Africa, this remains valid and a target so that liveable cities are created. The United Nations Sustainable Development Summit on 25 September 2015 adopted the 2030 Agenda for Sustainable Development, including a set of 17 Sustainable Development Goals (SDGs) to replace the previous Millennium Development Goals (MDGs). A notable addition to the new list of goals is number 11, the Urban Goal, entitled Sustainable Cities and Communities: make cities inclusive, safe, resilient and sustainable. However, noble as the new urban agenda sounds, Africa is taken further from the vision as the new genre of plans emerging in the last few years are seen by other schools of thought as "urban fantasies". These new plans are usually compiled by international architectural and engineering companies and suggest an urban future echoing Dubai, Singapore or Shanghai. An argument raised here is that these plans largely depart from the reality on the ground and are equally, if not more, excluding of the poor than the older colonial plans. Watson (2017) argues that they assume either that the existing informal city is cleared away to be replaced by the new, or that brand new satellite cities will rise on green-field sites. They are often branded as smart cities or eco-cities.

A key example of such scenarios in the design of cities in Africa are the new satellite city visions such as Nairobi in Kenya and Hope City in Ghana, promising a modernised and sanitised living environment for the middle classes far removed from the squalor and congestion of existing cities (*ibid.*). Hope City, designed by an Italian architect who was evidently inspired by African beehives, is a particularly futuristic conception of buildings that contain all of the facilities needed for their resident and working populations and removes the need to go outside at all. Other cities are creating large land areas through infill to create new urban extensions. Kinshasa is one of Africa's largest and poorest cities, yet a major land infill of the Congo River will support up-market retail and residential developments and in the process, many small farmers along the banks of the river will have their livelihoods destroyed. Eko-Atlantic is on an artificial island, off the coast of Lagos,

the island stretches for over 10km and will allow some 250 000 people to disengage themselves from the congestion and pollution of existing Lagos. These plans propose future cities that are unsustainable in the extreme and are inappropriate in terms of climate, available infrastructure (particularly power) and affordability ().

LOCAL CASES IN THE STUDY

Human settlements in Zimbabwe evolved from entirely scattered and sparsely populated rural settlements with no cities and towns except the long-deserted pre-colonial city states of Great Zimbabwe, Khami and Dhlodhlo. The coming in of the urban front because of the colonial era that saw white settlers establishing towns for several reasons in their endeavour to colonise Zimbabwe. Munzwa and Jonga (2014) argue that one cannot discuss urbanisation without making reference to colonisation and its impacts. They indicate that the mission of the settler was to take occupation of the land and make it his home, by exploiting all the available resources to his best advantage. One can argue that the design of cities and towns in Zimbabwe was influenced mostly by foreign standards and innovations that tried to make the settler comfortable in Zimbabwe. Of notable development in Zimbabwe is the City of Harare that was originally called Fort Salisbury.

The City of Harare was established as a small administrative centre by the Pioneer Column in 1890 at the foot of a kopje called Harare. As observed by Machakaire (2015), the prefix, “Fort” appeared on the city’s name because fortification was a notable and necessary element of the early colonial towns because of the perceived need to protect the white settlers from both physical attack and disease epidemics presumably from potential hostile and disease-carrying natives. With this in mind, the key design parameter of the early colonial city then was segregation and it was underscored by racial theories. Machakaire (*ibid.*) goes further to argue that such a parameter immensely contributed to the current form of the city that turned and set the tone for current planning practices and frameworks. Njoh (2009) also indicates that the exclusivity of the colonial towns was further strengthened by urban design standards that aim at matching the standards in the colonial power’s country, Britain.

EMERGING DEBATES IN THEORY, POLICY AND PRACTICES

Cities have long been centres of cultural, political and economic dynamism. Kinkead and Johnson (2019) argue that as we looked to

2020 and beyond, urban density in many parts of the world was predicted to continue escalating at unprecedented rates. Thus, city leaders, urban planners and designers are challenged to address a broad range of environmental, systemic, infrastructure and socio-economic issues related to the design of cities. Kinkead and Johnson (*ibid.*) indicate that global population estimates are forecasted to reach 8.1 billion by 2025. As density increases, many communities will struggle to mitigate harmful environmental consequences that stem from unsustainable and inequitable growth models. Problems in the cities will rise and they are seen mostly through deteriorating air and water quality issues, diminishing food and water supplies, soaring energy consumption, increased pollution, chronic health crises and more. Hence within architecture and urban design fields, there is an expectation to see a shift in focus from improving building-scale performance to rethinking systems and networks, safeguarding against infrastructure breakdowns that often cause increased inequalities for most vulnerable citizens. Kinkead and Johnson (*ibid.*) argue that the practice of urban design authorities will shift as “cities, institutions and communities will turn their attention away from building-scale sustainability to focus on adaptation and implementation of more equitable support structures within communities”.

The emerging difficulties envisaged in cities of tomorrow calls for a massive adaptation strategy at all scales. Baumgartner (2019) argues that the management of the emerging difficulties of cities requires city planners, urban designers, systems engineers and policy strategists to develop robust solutions together. Thus, the design of urban areas must be broadened to include issues of inclusivity and opportunity, while creating a richer context of urban districts, neighbourhoods and infrastructure. Built spaces designed for a single purpose will increasingly be adapted or re-used to accommodate a more robust mix of purposes with thoughtful design and redevelopment strategies. In case of abandoned uses like factories, defunct rail corridors, alleyways, outmoded industrial and waterfront infrastructure and underutilised office parks and shopping malls will transform into sustainable urban systems that address a variety of evolving community needs.

Mobility is essential to the success and liveability of our cities, facilitating access to workplaces, educational opportunities, healthcare, goods and services that are foundational to thriving urban centres.

King (2019) presents that for the better part of a century, the way cities were planned and experienced, they were dictated largely by the automobile. However, unintended impacts on communities came, including unsustainable sprawl, congested roadways, unsafe and unattractive streets, concentrated poverty and inequality. Transport remains a significant impact on the environment and urban design and architecture technologies and innovations will pave way for more resilient transportation solutions and alternative multimodal transit systems. Johnson (2019) also argues that autonomous and connected vehicles will force planners and designers to think about new ways of street right-of-way and use, leading to more flexible and equitable forms of mobility.

The design industry (urban design and architecture) are called to educate municipal and institutional leaders on the impacts that changing technologies, human behaviour, fiscal constraints and regulatory structures bring to bear on the built environment. This means that the design community must be active in establishing initiatives that drive the development of more resilient, sustainable communities. The design of cities needs to be comprehensive to ensure that environmental, systemic, structural and socio-economic viability for future generations. This can be realised through data-driven design and planning in the built environment, and coupled with inclusionary and innovative engagement, will ensure the successful design of cities. Kinkead and Johnson (2019) suggest that it will take progressive leadership combined with compassionate and data-driven design to create the change required for cities to continue to grow and thrive.

A Practical Approach to Transformative Studio

Urbanisation is changing the face of the planet and some may argue this change to be for better and for worse. The transformation of cities calls for a transformative city studio which means the way cities are designed should change to put cities on a sound footing as far as sustainable development is in context. Increasing urban challenges points to the need for urban transformation, yet it is not clear to many how to spur and sustain such required change. Transforming city studio cannot be achieved through a single conceptual lens. It is imperative to explore the multidimensional nature of the city and factors that affect their quality, that design ideas and management process that shape the cities and influence urban design practice must

be fully addressed. To transform city studios, planning authorities should not only concern themselves with how many public spaces they create but also consider the unique requirements of different places, avoiding a one-size-fits-all policy. City studio can be transformed only if a holistic approach to urban quality is applied, to avoid over-simplified planning regulations and homogenised standards (Gehl and Svarre, 2013).

Robust and liveable cities do not depend on design concepts but, more importantly, on how such spaces are created, safeguarded and maintained by public authorities and other stakeholders. Lang (2017) says the focus should be on how spaces should be designed and the integration of design quality within implementation strategies. Discussing the integration of urban design into government policy, Hall (2008) highlights the importance of a proactive urban design approach in connecting spatial fragments, creating better development outcomes and ensuring design quality.

To improve physical quality, planning authorities should express spatial planning policy and detailed guidance for developers. Global experience indicates that the number of published policies and the extent of their prescription has created good architectural quality, while promoting numerous public realms (Hall 2011, 91). The proactive urban design adds value by creating better and more attractive spaces, thereby enhancing urban functionality. This provides a clearer understanding of the influences that impact how urban spaces are used, providing more accurate predictions of its appropriateness for users and its broader context and establishing guidelines and policies to transform public realms (ICCPP, 2016).

LESSONS DRAWN

Cities are increasingly dynamic, complex and global in their impact. The chapter looked at the processes of city transformation through urban design and architecture to satisfy urban planning principles and paradigms such as sustainability. Some of the fundamental lessons drawn from this chapter include the realisation that urban spaces have been created throughout the world because of varying factors and theories of development. This means that for each city in the world, there is a story to be told and an example is that of colonial cities in Africa that developed because of political and defence reasons. These factors affect how these cities were designed and those colonial marks

are still visible even in the 21st century. However, it was also realised that cities are subject to continuous transformation as new components appear, disappear and reconfigure space over time. Architects and urban designers play a paramount role in changing the face of cities as they follow certain design parameters based on their client's intention and goals in the built environment. The chapter also assessed that the design of cities is also dependent largely on concepts such as robustness, resilience and sustainability that play critical roles in determining the types of designs and the skills required in city studio.

From the cases presented in this chapter, it has been observed that there is general agreement towards the future of cities as every case is pointing its future to the achievement of smart cities. However, literature suggests that there is no universally accepted definition of a smart city and that the conceptualisation of smart city varies from city to city and country, to country depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. However, it is agreed that the objective of smart cities or, rather, smart urban design is to promote cities that provide core infrastructure and give a decent quality of life to their citizens. Global, regional and local case studies presented agreed that urban design and architecture as the most city studio professions and practices, can transform existing areas into better-planned ones, thereby improving the liveability of cities. Urban design and architecture are also important in the development of greenfield areas. Thus, smart solutions enable cities to use technology, information and data to improve infrastructure and services and these, in a way, improve the quality of life in the cities.

CONCLUSION AND FUTURE DIRECTION

Transforming city studio is of importance in the planning of sustainable cities. This chapter aimed at proffering skills for the overall development of robust urban design and architectural proposals in the planning and design of cities. Concepts, spatial structures, programmes and design rules were elaborated on and how they can transform cities into liveable and sustainable places. Urban design plays a vital role in fostering sustainable cities as urban spatial structure and form have considerable influence on the social, economic and environmental processes in the urban area. Thus, this chapter has proved that urban design and architecture offer an opportunity to guide city development towards sustainability. This

chapter recommends the establishment of appropriate guidelines and frameworks for making the city studio (urban design and architecture) sustainable. It is also recommended that liveable cities can be achieved only if the procedural, substantive, institutional, policy and methodological aspects of urban design and architecture are interlinked and guided by sustainability principles.

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CHAPTER 9: Local Governance and Human Settlements

Abstract

This chapter unpacks practices, scope and experiences in local governance systems and the impact of these issues on the attainment of sustainable human settlements. It appears there is reluctance to fully exploit the ability within the local government to shift in the institutional, policy and legislative frameworks that will open up avenues for investment in urban councils. Sustainable human settlements should ideally be pursued through good local governance that emphasises citizen participation, accountability, transparency, enterprise development, investment promotion and small business development. It has been observed that good governance plays a key/leading role in enhancing the development of sustainable human settlements.

INTRODUCTION

Local governance seeks to plan and promote integrated and sustainable human settlements and ensure quality service delivery through cooperation and good governance with local authorities (Madumo, 2015). It is the role of government to ensure that development does not promote the urbanisation of poverty and the continued proliferation of informal settlements. Development should be industrialisation, coupled with other forms of economic development that enhance the quality of life of all citizens.

Jonga and Munzwa (2009) argue that the role of local government is to look at all the interests of the population, plan and coordinate activities of the city, supply services such as water and transportation, deal with municipal finances and regulate the behaviour of the major actors and urban markets and focus on the major issues identified by the population, paying attention to the further development of the urban economy (Munzwa and Wellington, 2010; Jonga and Munzwa, 2009). Local government and other local stakeholders, play a key role in ensuring access to goods and basic services, including the most marginalised communities. Globally, the role of local government in ensuring access to goods and services is increasingly recognised. Many of the United Nations Sustainable Development Goals (SDGs)

have targets that are directly or indirectly related to the work of local actors. SDG16 emphasises the importance of effective, accountable and inclusive institutions at all levels. SDG11 (Make cities and human settlements inclusive, safe, resilient and sustainable) highlights the importance of local solutions and a bottom-up approach to achieving the 2030 Agenda for Sustainable Development. The 2016 World Humanitarian Summit further emphasised the importance of respecting, supporting and strengthening local leadership and capacity in crises.

BACKGROUND AND OVERVIEW

Human settlements are created to be places where people can stay, play, pray and work. They should be green, landscaped communities-pleasant places where people live, learn and have leisure. It is the role of local government to be aware that communities require a specific paradigm shift if they are to go beyond housing (Tokyo-Sexwale, 2010). It is not about a change of name from housing to human settlements; it is about a change of mindset, taking us from a new concept to concrete reality. This shift in understanding is not applicable only to conceptualising and planning at the national or provincial level, it is also required in the way they rollout policies, programmes and plans;– in preparation, provision and maintenance of new integrated human settlements.

Local governments are mandated to undertake the enabler and facilitator role in the achievement of inward investment within their local governments. Local authorities have been failing to attract investors due to outdated by-laws, side-lining by the central government in engagements with potential investors, the demise of the manufacturing sector and the after-effects of the 1990s Economic Structural Adjustment Programme {ESAP} in most African countries (Makunde *et al.,* 2018; Wilson, 2016).

In this regard, the inconsistent enunciation of some socio-economic policies by the incumbent government appears to be one of the key drivers of de-investment within most urban councils. Another reason for the continued lack of investment in urban councils is a minimal effort by the central government to open up platforms for local governments to meaningfully engage international investors within their local government due to stringent and unfavourable investment laws existing within the country's legal framework. This has a direct bearing

on the discharge of public service provision to the local communities. In the same context, while these trajectories of economic development are increasingly embedded into systems of local and central governance in other low-income countries, the extent to that such systems have been established to maximise economic development processes in Zimbabwe is yet to be fully explored.

It appears there is reluctance by the centre to fully exploit bilateral investment arrangements or there is a minimal commitment for a paradigm shift in the institutional, policy and legislative frameworks that will open up avenues for investment in urban councils. Local Economic Development (LED) should ideally be pursued through market-oriented strategies that emphasise enterprise development, investment promotion and small business development. It has been observed that infrastructure plays a key/leading role in investment attraction and its maintenance. Local areas are as important as regional areas in contributing to economic development, hence the need for local government to invest in road infrastructure to enhance local investment.

CONCEPTUAL FRAMEWORK

Local governance refers to the way local decisions are made and implemented, including the delivery of services. A local governance approach recognises that local needs and priorities may differ across communities and neighbourhoods, particularly in context with high disparities (Bovaird and Löffler, 2002). Challenges and bottlenecks to local service delivery and provision of public goods can be technical but also financial or political in nature. Multiple actors including local government, service points, ministry departments, the private sector and civil society play a role in the production and delivery of local goods and services (Geddes, 2006). The delivery of local goods and services is shaped by formal national, regional and local government policies and procedures and also by informal interactions and (power) relationships between various levels of government and other local actors (e.g., local elites, private sector). Participation by children, adolescents and their families and bottom-up accountability is critical for equitable delivery of goods and services at the local level. This includes a strong focus on the equal participation of girls and boys, women and men.

Local governance refers to the way local decisions are made and implemented. This includes decisions regarding the prioritisation, availability and delivery of local goods and services and ultimately, whether explicit or implicit, the beneficiaries (Gaventa, 2004, Stoker, 2011). Local governance is shaped by formal national, regional and local government policies and by informal interactions and relationships among various levels of government and local actors (e.g., local government, private sector, civil society, communities, traditional or religious leaders).

Local governance ensures that urban planning offers a unique opportunity to rethink past development practices, improve the sustainability of human settlements and effectively prepare communities against risks (Gaventa and Valderrama, 1999). Human settlements ought to respond to social, economic or political issues, which however, was not seen as the task of planning to intervene (Williams, *et al.*, 2018). Human Settlements, places inhabited more or less permanently, include buildings where people live or use and the paths and streets over which they travel. Settlements may consist of a few dwelling units called hamlets or clusters of buildings called urban cities. Vibrant human settlements are defined by meeting demand from a variety of users, cultures. Sustainability can be applied to human settlements through extending the metabolism approach to human settlements (Hamann, *et al.*, 2005) so that settlements can be defined as sustainable if it is reducing its resource inputs which are: land, energy, water and materials and waste outputs, i.e. air, liquid and solid waste while simultaneously improving its liveability i.e. health, employment, income, housing, leisure activities, accessibility, public spaces and community.

THEORIES UNDERPINNING LOCAL GOVERNANCE

THE PRINCIPLE OF SUBSIDIARITY

Subsidiarity is one of the most important principles applicable in the analysis of the functional division between central and local governments. As observed by the principle of subsidiarity, government functions should be performed at a lower level unless local government fails to cope with them and the performance of said functions at a higher level would be more efficient (Drew and Grant, 2017). It is thus essential to identify criteria for determining function elevation to a higher level of government.

The principle of subsidiarity is oftentimes stipulated in national legislation. Yet, its implementation framework is not always clear (Spicker, 1991). The concept of subsidiarity, that has withstood the challenges of time in the Christian, economic and political discourse, has been analysed in the Lithuanian discourse for some time, thus, its meaning can be fully clear to any user of the word. As the objective of this research, namely local self-government and local community, falls within the domain of public administration based on management theoreticians, the application of the principle of subsidiarity is fully appropriate to their activity that is also confirmed by the fact that this principle is enshrined in the Law of Public Administration of the Republic of Lithuania and the Law of Local Self-Government of the Republic of Lithuania (Fabbrini, 2016). The content analysis of the legal acts considered by the Committee on State Administration and Local Authorities revealed that the term "subsidiarity", even after being entrenched along with other principles of local self-governance in the Law on Local Self-Government in 2016, is not used, thus, it has merely a declarative effect in the process of making decisions related to local self-governance and local community (Kondratienė, 2012).

DECENTRALISATION

Decentralisation is a political and a technical process. Effective decentralisation brings decision-making closer to citizens and can yield programmes and services that better address local needs and demands. A general description of decentralisation involves shifting a combination of political, fiscal and administrative responsibilities from central to sub-national governments and civil society and the private sector (Halvorsen, 2019). Decentralisation is often described as part of democratic governance. It should enhance the roles that decentralised authorities play in local development and be conceptualised in terms of its impacts on the capabilities, accountability and responsiveness of local governance.

Central governments around the world are decentralising fiscal, political and administrative responsibilities to lower-level governments and to the private sector (Breuer, *et al.*, 2017). In Zimbabwe, for example, since independence, the country has embarked on a process of decentralisation through legislative and institutional initiatives in a bid to strengthen and democratise local government and to improve service delivery. Decentralisation involves the transfer of power and resources from the centre to sub-national units or local units that

exercise power and function with a significant degree of autonomy (Hope, 2000). Through decentralisation, communities are empowered to elect representatives, influence decision-making and participate in development.

Decentralisation is a broad concept that often takes a specific form, depending on the context where it is applied. There are, however, certain aspects of decentralisation that are considered to be standard, irrespective of application. Decentralisation is defined as the transfer of responsibility for planning, management and resource raising and allocation from the central government and its agencies to field units of central government ministries or agencies, subordinate units or levels of government, semi-autonomous public authorities or corporations, area-wide, regional or functional authorities, or non-governmental private or voluntary organisations.

Decentralisation has widely been accepted as a key feature of the public sector reform programme and is associated with democratisation, development and good governance. At the international level, this is manifested in the United Nations Guidelines on Decentralisation and the Strengthening of Local Authorities and the requirements of institutions like the International Monetary Fund (IMF) and the World Bank. At the regional level, most African countries have adopted some form of decentralised government. A properly designed decentralisation programme has the potential of reaping several benefits (Kasim and Agbola, 2017; Helmsing, 2002). The policy intent of decentralisation in Zimbabwe is explored against the background of both pre and post-colonial local government initiatives. Decentralisation can be categorised into four main forms, namely deconcentration, devolution, delegation and privatisation (Anaafo, 2018). It is important to note that countries that have implemented decentralisation have adopted two or more forms of decentralisation and the result is often a mixture of these forms of decentralisation (Guha and Chakrabarti, 2019).

ACCOUNTABILITY

Accountability is a principle of good governance. At local level, accountability is often seen in terms of service delivery. Citizens are concerned with service availability, relevance and appropriateness, or whether there is sufficient space and support for agricultural production and other economic aspects (Mees and Driessen, 2019).

There is a disconnect between state and citizens or, rather, these relationships are ritualised, with people going through the motions of meetings, participation and voting, without changes and they do not believe anything will change (Gabriel, 2017). In that situation, accountability remains an empty shell, unless the connection can be built and strengthened. In its core meaning, accountability refers to actors, organisations, leaders, etc. being called to account to some authority for their actions as observed by some set standard (Mdee and Mushi, 2020). It is historically and semantically related to 'accounting' in the meaning of bookkeeping ((Dyzenhaus and Cheeseman, 2018). Accountability is connected with the discourse of 'good governance' in which case accountability is seen as a virtue, rather than tied with financial administration and bookkeeping.

PUBLIC PARTICIPATION AND LOCALISM

Many countries are embracing participatory local governance models – various forms of state decision-making processes that mandate local representatives to include and consult with citizens. These provisions are increasingly enshrined in policy and law, as many countries pursue ambitious decentralisation agendas. Governance and local community's participation refer to the citizens' capacity of engaging in public management affairs by taking part in decision-making, ultimately responding more proactively to citizen concerns (Nickson, 2019). These views consider the citizens' role in local governance from the logic of representative democracy. Citizens participate in and contribute to achieving greater equity and poverty reduction through electing more representative and accountable residents into local government. There are other approaches, however, that perceive a more active role for citizens, through direct participation in public matters. Such approaches are concerned with transformations that go beyond the traditional notion of the public sphere and representative democracy and challenge the boundaries between the public and private in favour of more direct forms of democratic engagement (Jingen, 2017).

Citizen participation becomes a concept and practice reaching beyond the traditional liberal notion of political participation as limited to electoral campaigning and voting. The practice of direct democracy extends citizens' political participation beyond the electoral process and draws on traditions of community participation - in identifying local priorities, planning and implementing programmes - to position the

citizen as a key decision-maker and implementing agent and beneficiary in local governance processes. The importance of the 'local' is that through processes of decentralisation, the local level can provide opportunities for state and citizens to engage that in some cases, are evolving into new, participatory forms of governance.

Citizenship participation thus defined, broadens the agenda around which people can mobilise and make demands (Fu and Ma, 2020). As clients or beneficiaries, people can question the quality or cost of a service, but they are excluded from participating in the formulation or reform of the policies that underpin service delivery and their privatisation. As citizens, people can exercise their right to propose or oppose social policies that affect them. Tracing the history of participation from the 1970s to the present day, Cornwall distinguishes between induced and invited participation (through user groups, 'consultation' etc.) and a form of citizen participation through that 'people come to create their own spaces and enact their own strategies for change (Cini and Felicetti, 2018). Furthermore, re-conceptualising citizenship as the exercise of agency, rather than the liberal notion of a national identity that entitles citizens to a bundle of rights, creates the basis for a more inclusionary approach and with it a re-casting of rights - rights as created by citizens themselves (*ibid*).

Citizens are engaging with local government in the interface between representative and participatory democracy. Rules and mechanisms for this direct engagement need to be established for new relationships of trust and cooperation to develop. This can be particularly implemented if sectors of society are to be included that have ‘historically been denied access to the public policy realm’ (Wang, *et al.*, 2018). While government needs to establish the mechanisms for participatory local governance, their efforts is most effective when they coincide with citizens’ demands. Thus, the challenge is to build capacity on both sides of the equation for good, participatory local governance.

Promoting citizen participation in local governance or state-civil society partnerships means opening up space for civil society organisations (CSOs) to engage with the state. As CSOs compete to occupy this

space, issues of representation and legitimacy need to be recognised. Chaskin and Garg (1997) studied several neighbourhood governance structures in the United States and found that representation and participation varied enormously, as did the relationship of each structure with local government. Efforts to connect 'strong, recognised neighbourhood organisations' to the government may lead to co-optation, 'in which case the fates of neighbourhood organisations and governance structures are so tied to the structure of authority that they are unable to advocate a minority position effectively'.

A central idea in community localism is the notion of participatory devolution; that citizens ought to be engaged, supported and included in local decision-making. Community localism views participatory engagement as a vital ingredient in the quest to empower communities and enliven local democracy. Yet, critics argue that in practice, many participatory initiatives inspired by community localism fail to empower citizens because they represent one-off consultation exercises with limited devolution of responsibility or control (Wang, *et al.*, 2018). The use of a participatory mechanism has received little attention in localism debates, the delegated citizen committee. These are committees composed of volunteer citizens who have formal devolved power to manage local assets such as public halls or sporting fields and, in some cases, to make decisions on broader policy issues.

Civic participation can help to promote good local governance, especially in countries where local governments must establish credibility. Such accountability mechanisms, however, can be mechanical. For example, participatory budgeting can be defined to meet normative principles, but if participation is token or non-inclusive, it is unlikely to bring about broad improvements in service coverage/quality and the associated impetus to pay local taxes (Fu and Ma, 2020). If these mechanisms are captured by political and economic elites – potentially including powerful but non-representative civil society organisations (CSOs) – their impact is limited or different than intended. In some cases, participation is mandatory or requires the involvement of under-represented groups (e.g. a certain percentage of women or disadvantaged groups), but such rules intended to broaden engagement do not automatically make participation meaningful.

TECHNIQUES IN LOCAL GOVERNANCE

PARTICIPATORY MODELS

Participatory approaches are more likely to have the greatest potential for influence if they can be strengthened by claims to participation as a legal right. Although much of the important work on deliberative democracy that has emerged in the United States focuses on the quality of "public talk" and dialogue, in many other countries, the emphasis has been first and foremost on inclusion i.e. in seeing participation as a way of addressing critical issues of poverty and social justice by enhancing the voices of those who are directly affected by public policies but who are often excluded from the process of making them (Rosilawati, *et al.*, 2018). Put more simply, approaches to strengthening citizen participation have often emphasised who gets to the decision-making table, while approaches to deliberation often focus on the quality of conversation that occurs around the table. Both approaches are important. It is not enough to increase participation unless the quality of the decision-making processes also improves. Conversely, better deliberation without the broader engagement of the poor and powerless may simply strengthen existing inequities in the status quo.

The concept of participation is increasingly being related to the rights of citizenship and democratic governance. This is apparent in the multitude of programmes for decentralised governance in both Southern and Northern countries (Buchenrieder *et al.*, 2017). Linking citizen participation to the state at the local or grassroots level raises important questions about the nature of democracy and how to achieve it. The widespread engagement with issues of participation and local governance creates enormous opportunities for redefining and deepening meanings of democracy, for linking civil society and government reforms in new ways and for extending the rights of inclusive citizenship (Waheduzzaman, *et al.*, 2018). The success of new institutional arrangements for more inclusive and pro-poor participatory governance will depend largely on existing power relations. Bringing more direct and empowered forms of participation into the local sphere can lead to democracy-building and pro-poor developmental outcomes (Da Cruz and Marques, 2017). This requires promoting pro-poor and social justice outcomes, developing new models and approaches where enabling conditions are not favourable,

avoiding an overly narrow focus on the local and guarding against co-optation of the agenda for less progressive goals.

The decline in civic participation and the distance between citizens and state institutions must be addressed by 'working with both sides of the equation' – focusing on the intersection of civil society and state-based approaches. Linking participation to the political sphere means rethinking the ways in which participation has often been conceived and implemented. A more active notion of citizenship is needed, whereby citizens are recognised as proactive protagonists in the policy-making process, rather than passive users. A number of mechanisms to enable new forms of citizen-state engagement are being implemented around the world. However, we need to learn more about how such initiatives work in practice, for whom and with what social justice outcomes. Spaces for participation are not neutral (Jordan *et al.*, 2018). They are shaped by power relations that both surround and enter them. Participation is not only the right to participate effectively in a given space but also the right to define and shape that space.

There are critical challenges to ensure that participatory governance initiatives promote pro-poor and social justice outcomes. Priorities for policy-makers and practitioners include: learning more about the outcomes of different forms of participatory governance (Buchenrieder *et al.*, 2017). More research is needed on the optimal conditions for enabling positive pro-poor and pro-democracy outcomes. There is need to ask questions about the possibilities for moving towards pro-poor participatory governance where such ideal conditions are absent. A willingness to adapt to different situations and develop new models and approaches under such conditions is needed. An overly narrow focus on the local and situating each participatory governance mechanism in a wider developmental context should be avoided. An effective way to describe a participatory governance model is to identify the different levels or degrees at that it expresses the openness of the decision-making process to the contribution of the citizens or their associations (Da Cruz and Marques, 2017). Afterwards, it is possible to cross the identified levels with the typology of actors involved, at different stages, in the process, ranging from the public bodies to the individuals or groups of individuals.

BUDGETING

All parts of a local government are interdependent on other parts of the system. There are many steps in the budget process, including development, approval, implementation and feedback. Every step is important for residents, elected officials and employees. Before a local government can establish and develop a budget, they need to finish their strategic plan because it will determine how the government can best allocate funds (Velinov *et al.*, 2019). Citizen input is an important part of the process as they are looking for assurance on the use of their hard-earned tax dollars towards the programmes and services they want and need most. They have the right to know why budgets are useful in the planning process (Oktavia, 2017). Technology for local governments is of great value in helping to engage citizens and keep them informed about what's going on within their communities.

The budget must account for the local government's operating environment, including the political, economic, social and legal environments (Krueger and Park, 2020). Elected officials have a great deal of control over the internal environment, but they have little control over the external. Many aspects of a local government's budget are affected by higher levels of government. Council members must consider the future budgetary constraints and needs of their cities (Chinnasri and Amornsiriphong, 2018; Musah-Surugu, *et al.*, 2018). When the budget is not aligned with the strategy, it significantly limits a government's ability to execute that strategy and achieve its goals. When the budget and strategy are linked and decision-makers can see how the two impact each other, funds are allocated more effectively.

JOHN GAVENTA MODEL OF POWER AND SPACE

Gaventa developed a theoretical and methodological approach to the study of community power that has radically transformed community power studies in political sociology and opened a path for the legitimisation of participatory research in mainstream sociology and political science. Borrowing from Lukes, Gaventa identifies three analytical dimensions that are the proper study of social power. Each subsequent dimension is increasingly difficult to empirically observe using traditional political science methodologies, forcing Gaventa to synthesise various understandings of socialisation into a cogent articulation of observable processes through that symbolic production is channelled within identifiable networks and communities (Gaventa, 2004). Empirically, Gaventa's contribution is to develop a method for

examining the various channels through that those in power transform concerns, claims and potential challenges about inequitable outcomes into non-decisions (Thorpe *et al.*, 2019). The third dimension, therefore, adds the capacity to influence expectations about social outcomes by manipulating symbols and ideology so that inequities themselves become non-issues.

Gaventa's articulation and empirical demonstration of the "three-dimensional" approach to the study of power have informed many disciplines and scholars about the nuances of social power and the processes of its legitimisation. It also lent to scholars and social change advocates who would find the sources and the solutions of social problems not in the dictates or preconceived notions held by social scientists, theologians and philosophers, but in the narratives of the affected alienated populations (Gaventa, 1999; Udayanganie, 2020). In Gaventa's theory, methodological subjectivity allows the framing of a social problem and a social solution, to arise from within the group, thereby empowering and better enabling the group to take collective action in the face of authorities' power to frame issues as non-issues in the public's mind.

The issues of power and its links with processes of citizen engagement, participation and deepening forms of democracy were always lurking. Building on these experiences, inter-relationships of spaces of engagement, the places and levels of occurrence and the forms of power found within and across, were taken into consideration. These three dimensions that bind and shape citizen action can be presented using the illustration of a ‘power cube’ that in turn can be applied to assess the ways in which power works and the transformative possibilities of participation in various spaces. Though these relationships are visually presented as a cube, it is important to think about each side of the cube as a dimension or set of relationships, not as a fixed or static set of categories. The notion of ‘space’ is widely used across the literature on power, policy, democracy and citizen action. Some writers refer to ‘political spaces’ as those institutional channels, political discourse and social and political practices through that the poor and those organisations working with them can pursue poverty reduction.

Other scholars focus on ‘policy spaces’ to examine the moments and opportunities where citizens and policy-makers come together and

‘actual observable opportunities, behaviours, actions and interactions...sometimes signifying transformative potential’. Others examine ‘democratic spaces’ in which citizens can engage to claim citizenship and affect governance processes (Thorpe *et al.*, 2019). On citizen action and participation, ‘spaces’ are seen as opportunities, moments and channels where citizens can act to potentially affect policies, discourses, decisions and relationships that affect their lives and interests. Space is a social product that is not simply ‘there’, a neutral container waiting to be filled, but is a dynamic, humanly constructed means of control and hence of domination, of power. Inherent also in the idea of spaces and places is also the imagery of ‘boundary’. Power relations help to shape the boundaries of participatory spaces, what is possible within them and who may enter, with that identities, discourses and interests.

GLOBAL, REGIONAL AND LOCAL CASE STUDIES

Local government reform programmes in most countries in Africa have focused on improving the efficiency and effectiveness of local governments as the prime players for delivery of basic services to the population. Some countries, however, have gone beyond this limited approach to provide local governments with a constitutional status and authority to manage their own affairs. Only a few have ventured into true empowerment of local authorities and other city stakeholders as joint policy and decision makers. The cases under study illustrate local government reform programmes initiated by national governments have achieved and other dimensions that need to be included in such programmes such as enhancement of transparency and accountability in local governments and effective participation of communities in local governance (Williams *et al.*, 2018).

In South Africa, the central government shares revenue with the local level using a specific formula. For local governments, the formula is based on household per capita income and for provinces, on household per capita income, augmented by a measure of the extent of the rural economy in the region. The system has eliminated ad hoc and inequitable fiscal transfers. Central Government has created a mechanism for grant funding for municipalities to expand their ability to buy, capacity for projects involving the private sector in the delivery and financing of municipal services.

In Namibia, the United States Agency for International Development (USAID) and the Namibia Association of Local Authorities Officers (NALAO), with the assistance of Management Systems International (MSI), initiated an integrity project for local authorities in 2001. In its initial assessment of areas that might be most vulnerable to corruption, the programme made use of the "municipal checklist", suitably adapted to the local context. Four towns were chosen to participate in the pilot phase of this project. The assessments in the four towns found that there were three major types of changes needed. These related to policies and procedures, public participation and relationships between the elected councillors and staff. The checklist appears to have been most useful for a self-assessment of the local authorities – enabling them to systematically go through and understand their own situation and develop an agenda for reform.

The local government system in Zimbabwe is two-tier and constitutes of urban and rural local governments. The local government system has the policy-making body elected from the various administrative wards within the various local governments and the administrative arm of council that is headed by the Town Clerk. The ceremonial Mayor, elected from among the councillors at the first sitting of council, heads the former policy-making body. However, Chapter 1 Part 5 of the 2013 Zimbabwean Constitution acknowledges that there are three tiers of government namely the central, provincial and the local government but these three constantly interact among themselves on governance and other related issues. The mayor's major roles include chairing ordinary full council meetings and represent the council in a majority of functions, including being the legal persona on institutional engagements such as cooperative arrangement (twinning of cities and partnerships and other business deals). Councils have two structures for service delivery: a policy-making component composed of elected councillors and an appointed executive.

Chakunda (2015) submits that the local government system in Zimbabwe is dualistic in nature, distinguished into urban local authorities (32 urban councils) that comprise local boards, town councils, municipalities and cities as provided for in the Urban Councils Act, Chapter 29:15, and rural local authorities (60 Rural District Councils (RDCs) as provided for in the Rural District Councils Act (Chapter: 29:13).

However, the relationship between the councils and the parastatals has not been at its best as the necessary funding to repair the roads. Chakunda (*ibid.*) further points out that the decentralisation of functions to local authorities also came with the institutionalisation of a package of control systems and supervisory mechanisms by central government to ensure that local authorities behave within the parameters set in the relevant Acts of Parliament. The President and Minister of Local Government are empowered by legislation to intervene where local authorities fail to provide some or all the services as provided for in the Acts. Musekiwa and Chatiza (2015) bemoan that the decline in service delivery in Zimbabwe has had an impact on public engagement and the development of associational life. The decline has been systemic to the extent that it requires systematic responses from citizens. To strengthen their voice, citizens have sought to act collectively and, in the process, institutionalised public participation.

DISCUSSION

In achieving a holistic and integrated human settlements development approach, it is unavoidable that local government and the department dealing with human settlements coordinate their strategies. This is also about synergies in respect of the national Department of Cooperative Governance and Traditional Leaders. In line with the enhancement of housing to human settlements, there is also a need for a common approach in respect of local government plans together with those of human settlements. This will help to avoid the mismatch and multiplicity of plans. That is why the new planning institution is considered to be vital. Regarding spatial development objectives, increased efficiencies are required from municipalities concerning the application of regulatory functions. This also applies to appropriate proclamations around development. The combined effect of this is to diminish or eradicate bureaucratic service delivery log-jams.

There is a necessity for a greater alignment of local government housing budgets with human settlements budgetary allocations. This is aimed at avoiding budgetary duplication. Local government land-use policies and practices should be user-friendly. This is more applicable to both rural and urban development policy implementations. It is crucial to the interests of human settlements that decision-making delays must be eliminated regarding environmental impact assessment studies to enable bulk infrastructure development such as electricity, water and sanitation, to be in tune with human settlements projects.

The essence of the principles of good governance at all levels can never be over-emphasised. All else could fail where the values of communities are not adhered to. If this is to be achieved, it enhances the development of human settlements that, ultimately, is also about the direct enhancement of LED, premised upon national economic development strategy. Municipalities stand to benefit directly from this approach. New human settlements with new tax bases. They mean new revenue streams in the form of utilities. They lead to the creation of local jobs in the construction of homes or the development of infrastructure in the form of roads, streetlights and electrical connections.

The multiplier effect should never be understated and its impact on the local economy must never be underestimated. The challenging economic conditions on developing human settlements should not be overlooked. Globally, economists are beginning to see “green shoots”, as the current phase of the global economic downturn is increasing in some developing countries. The local government lacks comprehensive information on the status of children within its administrative area. Local governments that foster participation also benefit as they can gain access to innovative ideas and solutions to pressing local challenges related to service delivery and the local environment.

Participation increases the visibility of the problems that children, adolescents and their families confront in their neighbourhoods and makes local government more aware of their responsibility to improve child-related services. Involving children and adolescents in local governance provides them with the opportunity to both learn about and practise responsible citizenship. Opportunities for constructive participation in political decision-making can strengthen state-society relations, and societies that offer such opportunities be less prone to violence. Local governments and urban development authorities in many developing countries rarely have the mandate and/or capacity required to undertake planning, let alone planning for sustainable development. Nor do they often have the mandate to plan or implement major items of strategic infrastructure needed to achieve such growth. While decentralisation has provided opportunities for local government to take greater responsibility for the funding and delivery of services, efficacy is often dependent upon the national

government providing appropriate enabling environments and supportive relationships to ensure they can operate efficiently.

CONCLUSION AND FUTURE DIRECTION

The chapter sought to unpack the concept of local governance and human settlements and how it can best be used to provide citizens with their needs and help attain the Sustainable Development Goals (SDGs). The chapter concludes that citizen participation and good governance are key success factors in achieving sustainable human settlements. Local government has the capacity and resources to develop and implement local plans and budgets that respond to the priorities of the public in an efficient, effective and equitable manner.

The chapter recommends:

a) Support local government and other stakeholders in the generation and analysis of geographically disaggregated data and evidence.
b) Strengthen local planning and budgeting processes and support resource mobilisation.
c) Empower communities to influence local decision-making and monitor local service provision.
d) Support local government capacity to coordinate and leverage expertise and resources across public, private and non-government service providers.

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CHAPTER 10: Planning for Urban and Regional Facilities

Abstract

The rising concerns over environmental and sustainability issues are a cause for concern in urban and land-use planning. The extremely changing climatic conditions resulting in flooding, are exposing the ills of poorly located facilities. Poor facility location has resulted in huge losses, especially when tested by natural occurrences. Rising population growths and urban challenges require efficient facility planning to save future generations from suffering disasters due to poor planning. Early scholars propounded various theories to aid the planning and location of facilities and these were relevant in the olden days but with the volatility of the modern world and the rising urban challenges, they seem to have failed to endure the test of time. Population growth and urban expansion demand the adoption of spatial and urban management plans that regulate infrastructure facility location. Facilities that meet and absorb the rising urban demands have become a huge necessity and this makes their location of great importance. The sustainability factor brings in the need for harmonious development that ensures facilities are not in conflict with the natural environment. Thus, the chapter discusses the urgency of proper facilities planning in both the regional and urban setups. The study uses desktop research exploring the previous works on facility planning and location models that have been dominant in the urban planning arena. The modern-day location systems that have proven to be of huge relevance in the facilities planning have been discussed and recommended in the study.

INTRODUCTION

The planning for facilities is one of the most important aspects to consider in urban development, from siting smallest land-uses to the most significant ones (Eterovic and Ozgul, 2012) and this has a bearing upon the success and sustainability of the community. Terouhid, Ries and Fard (2012) denote that methods applied in the location of facilities are crucial in determining optimal use of various facility types. With the changing climate and modernisation, sustainable facility location has become an imperative consideration.

Corruption is among the top evils that have resulted in the ill-location of facilities in urban and regional areas. Most land developers are after money more than sustainable development and have located vital land-uses in unsafe and sensitive areas that continue to cause challenges in cities. With the existing urban development bias, most rural areas continue to suffer poor accessibility to the most important facilities due to distance. Poor facility location has resulted in huge losses, especially when tested by natural occurrences. Because of poor facility planning, many uses have been misplaced with most residential units, for example, located in wet sensitive areas that are prone to flooding. However, with the changing climate conditions, floods and cyclone occurrences have become prevalent which has affected misplaced facilities, thus a call for effective facilities planning.

BACKGROUND AND OVERVIEW

The location of facilities is equated to location analysis which has been dominantly used before the introduction of the sustainability concept. With the changing environment in urban areas, climate and social arena, facilities planning had become one of the important issues to tackle in the decision-making process. Terouhid, Ries and Fard (2012) denote that facilities planning needs to balance moving facilities away from undesired areas and pulling them where demand is high to maximise usage. As observed by Allen (2015), amenities improve the well-being of communities as they are what makes the places welcoming and attractive, accommodating both working and living usages. Amenities such as open spaces, parks, shops and other specific facilities bring value to a community. As population growth continues to increase, many people migrate to the cities for various socio-economic reasons but resulting in a shortage of facilities in cities. Judyta (2016) recommends sustainable planning that promotes a quality standard of living. Providing proper access to infrastructure facilities is one of the important measures for managing urban problems (Strange *et al.*, 2008). Provision of urban facilities, including road networks, sewerage and water supplies, are of prime importance in promoting aesthetics and local investments in the area (Jalowiecki, 1992).

Terouhid, Ries and Fard (2012) argue the need for a more sustainable approach to the management and allocation of facilities in planning. Traditionally, the location managers have focused on economic factors primarily in the placement of facilities. But, with the growing need for

sustainable development, many factors, such as social and environmental considerations, need to be considered to foster sustainable facility planning. DeCoster (1998) defines facilities as general buildings and materials brought together to provide the desired service. Thus, in placing facilities in a certain area, it is important to consider various factors such as usability, accessibility and safety, among many other factors. Poor facilities planning tends to result in long-term costs in the future and even lead to the abandonment of services or ghost towns. Bieganska *et al.* (2011) argue that the lack of proper spatial and facilities planning is a detriment to sustainable urban growth as uncontrolled informal settlements and urban sprawling often expand in the absence of decent facilities. Where there is poor planning of facilities, there tends to be high emigration levels of local citizens as people seek well-planned developments that attract growth. Thus, to boost urban viability and retain residents, careful consideration is of necessity in the allocation of facilities in land use planning.

CONCEPTUAL FRAMEWORK

Various concepts that help inform the study include facilities planning, location, urban, rural and regional facilities. These bring an understanding and appreciation in the relevance of proper planning of facilities.

PLANNING FACILITIES

Tompkins *et al.* (2010) denote that contemporary planning of facilities acknowledges a:

> facility as an important and dynamic requirement to achieve successful, adaptable facilities that are flexible to a new use. Planning facilities is a relevant procedure that helps city planners to ensure they prioritise and optimise conflicting goals and land-uses within a given space while optimising resource usage (Benjamin, Ehie and Omurtag, 1992).

Dawal *et al.* (2010) explain the planning of facilities as the carefully considered decisions made to locate, distribute and arrange various uses and services to achieve optimal utilisation of the urban environment. Well planned facilities harbour the aspects of flexibility, adaptability, modularity, environmental/energy friendliness and upgradability, which are important aspects that promote sustainability (Tompkins *et al.*, 2010). However, it is imperative for a holistic approach to creating such facilities and this includes the absolute

integration of socio-economic and environmental aspects that enhance economic progression.

As observed by Kasilingam (1998), facilities planning focuses on two major aspects of location, which focuses on determining the most suitable location for a facility and layout which is concerned with proper design and arrangement of facilities within one major facility for optimal use. Valen and Buser (2018) denote the importance of organisational participation in the location of enterprise businesses as this also helps foster continued sustainable economic development. Successful urban design is not only about a unique built environment, but also about a facility that satisfies the purpose for which it was made.

URBAN FACILITIES

As cities are after achieving sustainability (Brebbia and Galiano-Garrigos, 2017), the presence of viable and vibrant urban facilities tops the measurable indicators of urban sustainability. Risova and Pous (2018) postulate that quality of life is a popular subject in geography and planning that is to a greater extent a determinant of facilities' availability. Urban facilities encompass various objects within an urban environment that are designated to provide supportive services to the urbanites. Salaj *et al.* (2018) emphasise the importance of facility management as a way of improving the quality of the built environment with well-placed residential, commercial and other facilities. The provision of urban facilities is crucial to the innovation of integrative public and private services that meet human needs. Urban facilities encompass the 'place, space and people that are relevant in the management of facilities' (Michell, 2013). Infrastructure facilities make up the urban precinct and require proper planning and maintenance to maintain optimal functionality and aesthetic value.

The emergent field of urban facilities management is seen as a flexible platform that enables new, innovative integration of private and public sector services to benefit society at the urban precinct scale.

In the same manner that the physical infrastructure at the singular building (micro) level, is a crucial aspect in the spatial experience of users of the building and therefore plays a significant role in the social processes between users of that building, the same is true at an urban precinct (macro) level. Hence in embracing the underlying concepts around space, place and people that underpin facilities management, it

can be argued that the physical infrastructure of an urban precinct is a critical feature in the spatial experience of the said urban precinct and, therefore, in the attainment of sustainable cities. Moreover, the relationship between space, place and people in terms of an urban precinct has a considerable role to play in the creation of sustainable cities. To date, the facilities management response to the sustainable cities agenda has tended to focus on the maintenance of resources and ecological support systems; the long-term sustainability of the profession; sustainable life cycle planning and management of facilities; the reduction of energy consumption in existing facilities; and the need to develop tools for monitoring building performance. It is imperative to have an improved understanding of the relationship between buildings, people and the urban precinct, thereby facilitating the development of an increased understanding of sustainable cities.

RURAL AND REGIONAL FACILITIES

Rural areas suffer various challenges depending on their location and environment. Jamshed *et al.* (2020) reveal that most rural areas are vulnerable to droughts and flooding such that they require imminent help that reduces their vulnerability and ensures maximum risk reduction. When it comes to facility accessibility, Brovarone and Cotella (2020) denote that rural areas have accessibility challenges to services because of scattered developments and poor infrastructural developments. This makes the accessibility factor the first and urgent need that should be met in facility planning in rural regions. Rural and regional facilities are less concentrated as compared to urban areas. Dijkstra and Poelman (2014) reveal that development facilities and infrastructure in rural areas are few because of population concentration. Accessibility is a crucial factor in the siting of rural and regional facilities. As observed by Brebbia and Galiano-Garrigos (2017), most facilities are not accessible, which lowers facility planning effectiveness. Most people in rural areas suffer from a lack of accessibility to important facilities as they are located away from residences. Most children have failed to attend schools due to long and unsafe distances. Thus, the need for proper facilities planning. Apart from poor facility accessibility in the rural areas, there are many challenges of poor maintenance and renovations of the existing facilities due to poor funding (Lawrence, 2001).

Research has shown that compatible facilities are usually located closer together, while incompatible facilities may be located further apart. Figure 1 shows the level of facility compatibility.

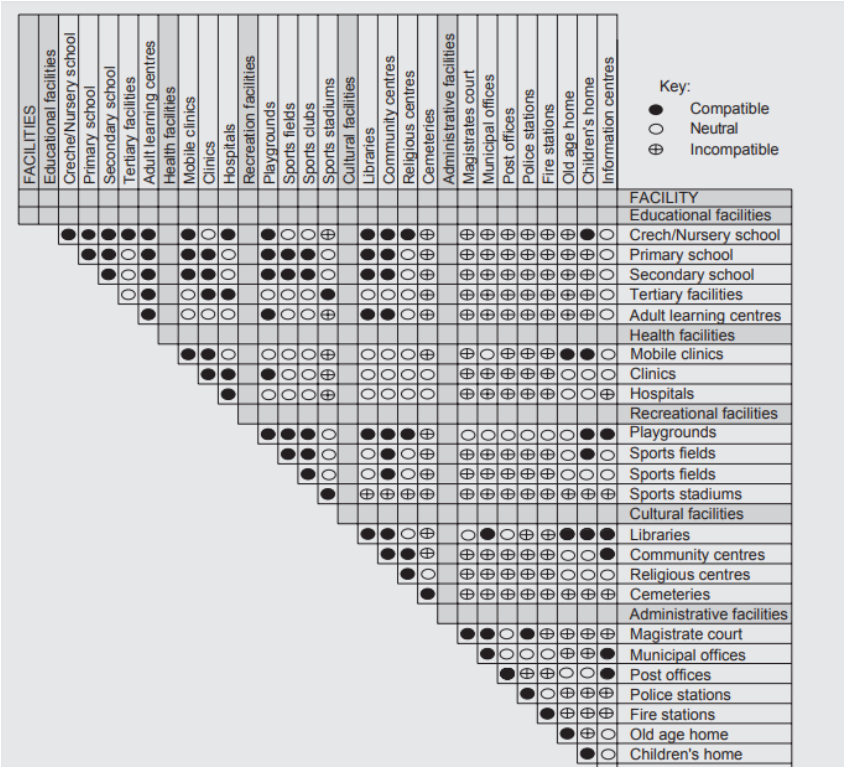

Figure 1: The facility compatibility matrix.

Key – Compatibility – interrelationships between facilities exist

- Neutral – no interrelationships between facilities
- Incompatible – facilities unsuitable to be located close

(https://www.csir.co.za/sites/default/files/Documents/Chapter_05_05_Vol_I.pdf)

Compatible facilities such as nursery and primary schools, share a close relationship and are usually located closer together. Fire stations are usually incompatible with many uses such as clinics and hospitals, schools and community centres and as a result, they may be located away from city centres and in Harare, a fire station is located in the industrial area of Workington, that is a bit out of the city centre. Leonardi (1981) further notes that factors such as taxation, pricing and expansion and reduction contribute to deciding where to locate facilities. Central Business Districts (CBDs)are usually characterised by

high rentals and this may deter facility location. Facilities that could cause pollution, like heavy industry, may be located out of town, and examples are the Workington and Graniteside industrial areas in Harare. Incentives and lower taxes may be introduced by the government to encourage investors to locate their shops out of town to stir economic activity. A good transport network also contributes to development as various public and private facilities may be located along major roads that may link the city centre and town.

It is, however, important to note that community involvement in the location of urban and regional facilities is critical. Lack of community involvement when it comes to the location and construction of new public investments of urban infrastructure may lead to protests by the locals as they resist new developments (Wesolowska, 2016). Also, since the 1970s, the development trend has been shifting from manufacturing to service industries that are usually located in or near urban areas (Farahani *et al.*, 2019). In this regard, people get affected as facilities get located near them. In such cases, public consultations become necessary, especially when developments involve or affect people.

Public consultations are necessary for the views of the local people to be involved in the development and by involving them, resistance to change is reduced. An example is that of the reconstruction of biodegradable Municipal Solid Waste treatment facilities in Zurich that took two years and this involved consulting designers and specialists, carrying out open days and festivals to explain the process and the publishing of newspapers and internet articles and after the consultations, the construction process took 12 months (Wesolowska, 2016). This shows that although they may take too long, public consultations and awareness are an important part of the citing and location of facilities, especially in or near people's locations.

LOCATION

As observed by the *Webster Dictionary,* location relates to the position marked for a given purpose to which a function is to be designated. Terouhid, Ries and Fard (2012) define facility location as the placement of facilities optimally through minimising costs and maximising benefits gained because of the placement. A location can be the city, countryside or any specific area within. Location decisions have changed with time. In the industrial era, economic agglomeration

factors were the dominant aspects that determined facility location (Asssink and Groenendijk, 2009). However, with globalisation and modernisation, "soft", socio-economic issues have replaced the former in facility location decision-making. With proper planning, locational benefits can be gained. Kasilingam (1998) reveals that location is of vital importance as it plays the role of minimising costs and transportation when the facility is located in a strategic position. Tompkins *et al.* (2010) define facility location as its placement in a specific area to which it can perform its intended functions and in proximity to the intended user.

LOCATION THEORIES

Location theories are concerned with the geographic location of economic activity in an urban area or a country. Location theories address questions of what economic activities are located where and why. They also answer the questions of why urban areas are located in the places they are and why they are spaced in a certain arrangement. Space and distance have a bearing on how a system, e.g. an economy, works and this affects how facilities are distributed spatially (Capello, 2011).

VON THUNEN

Since the early 19th century, decisions regarding the location of facilities have always been a concern with theorists trying to understand economic activities and their relation to space and distance (Capello, *ibid.*). Thus, location decisions have always oscillated around distance, rent and economic agglomerations to try and understand the reasons businesses locate in a specific area and not another. The major determining factor has been the optimisation of costs and profits. As observed by Legros, Brunelle and Dube (2016), Von Thunen was one of the early founders of location theories in around 1842.

Von Thunen introduced the bid-rent geographic-economic theory that explains the change in demand for land as observed by distance from the CBD. The theory was developed in the era when agricultural production was the dominant activity when no major technological developments had taken place. The notion behind this was that horticultural produce was located close to the centre where products would be bought before going bad. Cattle farms would be located on the outskirts as they walked easily to the market. Thus, the CBD has always attracted high prices and many customers, such that even in

modern times, businesses and retail outlets consider the CBD to be the most viable location for their outlets with heavy industries located on the outskirts in modern-day planning (*ibid.*).

ALONSO

Alonso expanded the model in 1964 to include the rent-distance relationship in the centre. As propounded by Alonso (1964), rent acts are 'a function of distance to the centre'. However, the relationship grows to be more complex with distance influencing cost and production. As observed by Alonso (*ibid.*), the costs are broadened into the transaction, cultural, transportation and opportunity costs. To that end production relates to distance towards the centre that contributes towards agglomeration economies (Legros, Brunelle and Dube, 2016).

The changing times, globalisation and modernisation have led to a need for sustainable location planning. Terouhid, Ries and Fard (2012) allude to the importance of sustainability aspects as a proposed model for location and facility planning. Figure 2 is a schematic diagram that summarises the sustainability aspects that ensure liveable environments.

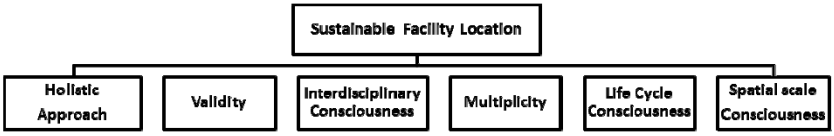

Figure 2: Sustainability aspects ensuring liveable environments *(Terouhid, Ries and Fard, 2012)*

The sustainable facility location model is a proposed model on the location that captures multi-aspects of comprehensive development. This is explained by its holistic approach in planning, interdisciplinary consciousness and multiplicity. The adoption of sustainability in a location of facilities promotes the functionality of facilities and prolonged lifetime.

TECHNIQUES FOR DETERMINATION OF FACILITY LOCATION AND SITING

Various techniques can be used in determining the location and siting of facilities. These include Geographic Information Systems (GIS), Global Positioning Systems (GPS), Threshold Analysis, Factor Analysis and Resource Base Analysis.

GEOGRAPHIC INFORMATION SYSTEMS

GIS is one of the popular systems used in the location of facilities and other land-uses as it provides detailed information through aerial photographs, charts, ground information and satellite images which are of significant importance in the allocation of facilities in planning. Garg (2008) defines GIS as a computer system designed for the collection, management and retrieval of spatial information taken from various sources. Schurle, Boy and Fritsch (1998) reveal that in GIS, the major focus is on managing and analysing existing spatial data which is relevant for facility location and management. GIS makes planning for urban and regional facilities an easy task as it is rich in information that pertains to land-use allocation through suitability analysis (Church, 2002). It provides an important aspect of location research. Such relevance has seen a rise in demand for GIS software as it plays an important role in location. The planning of facilities usually works with population numbers within an area and land availability (Yeh and Chow, 1997). However, such standards in planning focus on the space needed but seldom give specifics on where a facility must be located. Thus, GIS chips in through 'open-space planning' that helps in providing a better understanding of a specific problem by testing different scenarios, parameters and constraints (*ibid.*).

GLOBAL POSITIONING SYSTEMS

The US Department of Transportation (2000) explains GPS as a satellite-based navigation system, controlled by the US Department of Defence, that transmits signals on position, velocity and time. The popularity of the use of GPS has arisen due to various socio-economic challenges that are continuously increasing such as jail cases that require maximum supervision to which the software makes necessary. As observed by Brown, McCabe and Wellford (2007), GPS makes use of geographic coordinates that help in the identification of street locations. This enables facility allocation easier through place finding as the software provides the spatial jurisdictional information at the presently requested time (Marsh and Schilling, 1994).

THRESHOLD ANALYSIS

Threshold analysis, as observed by Hewings (1975), provides insights towards time-cost analysis in land development. Malisz (1972) highlights that threshold analysis was pioneered by B. Malis around the early sixties in Poland as an urban planning tool. There are at least two types of thresholds, which are 'grade (a result of site conditions) and

'stepped' (resulting from limitation in infrastructural services). Threshold analysis is used in various situations urban and land-use planning. In cities, it is used to formulate and compare different strategies necessary for the development of cities and making comparisons between various sites for residential uses. Threshold analysis takes three stages, which are problem identification, analysis and results in interpretation.

In the problem-setting, there is area definition and the identification of assumptions on a proposed area for locating a facility. In the analysis stage, crucial thresholds are defined and cost charts prepared. A structured plan is formulated that shows the results of the analysis. In planning, thresholds are the physical boundaries or limitations faced by expanding cities, and the costs encountered in overcoming the limitations are regarded as threshold costs. It is a tool for assessing development possibilities. Threshold analysis focuses on scarcity in determining the land available for development and that being utilised. In the occurrence of urban growth and expansion, threshold analysis enables the proper allocation of various facilities assessed on the level of demand and accessibility and service within a specified threshold to minimise costs and maximise gain.

FACTOR ANALYSIS

Balasundaram (2009) defines factor analysis as the collection of statistical ways to reduce correlated information to understandable dimensions. It is a procedure applied to simplify questions and classify them into variables (DeCoster, 1998). It analyses the correlations among the variables which are the factors. It is used for data reduction and the evaluation of various dimensions of given variables. Exploratory Factor Analysis (EFA) and Confirmatory Approaches are the two common types of factor analysis (Balasundaram, 2009). It is formulated to reduce data attributes to smaller dimensions. Through identification of 'factors' that describe the correlation, among many variables, decision-making is made effective as influential factors such as projected human behaviour towards a certain facility, is analysed before its placing. Factor analysis is another relevant tool in the placement of urban facilities.

RESOURCE BASE ANALYSIS

Madhani (2010) explains RBA as the assessment and interpretation of existing resources in a specific area before placing a facility to

determine the capabilities of sustenance for future facilities. RBA attempts to answer questions regarding the capability of an environment to provide inputs and resources that ensure a continued viable area. Usually, decisions on locating facilities are dependent on the endowed resources within an area. Many towns have developed where there were mineral deposits and this has continued to attract development. Comparatively, areas, where there are no resources, are left behind and suffer under development.

CASES AND EXAMPLES

There are various cases and examples where facility management has been considered a relevant tool in planning.

WARAW, POLAND

Warsaw is Poland's largest and capital city. Population growth in Polish cities has been swelling particularly in Warsaw (Central Statistics of Poland, 2014). This has been witnessed by large groups of people migrating to cities because of various socio-economic reasons. As a result, Judyta (2016) highlights that municipalities were pushed to ensure sustainable development that absorbs the large populations without compromising the existing facilities. As observed by Strange *et al.* (2008), the priority was to ensure equal accessibility to the facilities such as sewerage, water and road networks. Where there is a properly developed infrastructure in an urban system, more economic development is attracted. However, lack of it drives a lot of people away (Jalowiecki, 1992).

This justifies the migration to urban centres where there are more facilities than in rural regions. Finding the most suitable location for facilities has been difficult for Warsaw. There was the need to consult community members before the siting of facilities. Poor facility location usually has detrimental effects on people. Thus, for sewerage, transport and water facilities, there was a need to acknowledge the public contribution and consent as the facilities are in close vicinity to their residences (Fraczak, 2010). This usually takes time, but it is a worthy cause for future sustainability. Judyta (2016) argues that social factors need to be consider to make sure waste facilities are sustainable and thus he recommends the need to include environmental, social and economic factors. Petts (2000) recommends public participation in facilities planning as was done in Warsaw.

DISCUSSION

Understanding the importance of place, space and facilities are imperative in the creation of the intended urban art designed for social development (Moreira, 2014). Place and space is more than about 'where', but when, how, what and why this ought to be (Agnew and Livingstone, 2011). With the swelling up of the population in urban areas, more challenges arise that affect the quality standards of living for the people. Due to this, a more proper and convenient choice of location for a facility is of necessity. However, as the process is time-consuming, many cities are reluctant to carry out the proper strategy which then hinders future sustainable development. As revealed by Garg (2008), to enable such development, it is imperative to integrate sufficient spatial information using Geographic Information Systems (GIS) and other tools that enable the development of interactive and user-friendly rural development facilities (Ward, Lowe and Bridges, 2003).

Instilling development in rural areas requires sufficient motivation, especially to meet the needs of the societies to maximise the performance and viability of placed facilities such as schools and commercial centres (Biriescu and Babaita, 2013). With rising concerns for sustainability and equity, the issue of facility location calls for rural consideration rather the urban bias. Ward, Lowe and Bridges (2003) argue that the existing differences in needs between rural and urban needs do not give a reason for the urban bias. However, the concerns are the same and all to do with accessibility to essential services. With the understanding of spatial disintegration in rural development (with facilities so dispersed and distanced from people), the location of facilities needs to be approached in a manner that solves disparities and meets the needs of the people. There is a tendency to focus solely on agricultural facility development in rural areas. Although rural economies are backed up by agricultural activities, that should not be reason enough to focus only on the development of agricultural facilities. Ward, Lowe and Bridges (*ibid.*) argue that such planning and development is not enough, but rather should bring in comprehensive approaches that are multi-sectoral.

The adoption of IT in facility planning has become an important strategy to achieve sustainability. With the use of electrical devices and the development of building envelopes that lower the consumption of energy, climate change effects are retarded while protecting user

safety (Suriyarachchi *et al.,* 2018). Atta and Talamo (2020) argue that the use of ICT in facility management has eased a lot of challenges through improving management from the usual traditional processes. With data-driven mechanisms, it becomes efficient to monitor facility management. However, the world continues to revolve which may even render some infrastructural facilities of less importance. With the introduction of 'online learning and business' platforms, there is less need for people to meet physically as quicker channels are used. Also, the COVID-19 pandemic has proven to the world that being physical, e.g. in school facilities, is not the only way to learn. The many lockdowns that are being enforced are promoting the use of ICT. There remain some pockets in the world where physical facilities are still important. Rural areas suffer from poor, inadequate and inaccessible infrastructure facilities.

Apart from the shortage of facilities, the lack of proper maintenance and operations on the facilities is a forgotten important aspect that affects facilities seen by short lifespans (Ox and Murray, 2014). Oyadele (2015) argues that most developing countries decry poor facility design, availability and construction as their problematic situations. However, poor maintenance of facilities after their delivery is the major challenge as most facilities in developing nations are suffering decay, abandonment and disrepair. Where there is poor maintenance culture, the efforts put forward to promote facility development are fruitless (Adedokun, 2011). The demand for infrastructure facilities continues to swell uncontrollably. But, with poor provision and maintenance of facilities, sustainable development and achievement remain a mystery. Without proper management and maintenance, the lifespan of facilities is shortened. Abandoned infrastructure facilities are as good as the absence of infrastructure.

Zhang, Zhou and Mao (2019) highlight that the unequal distribution of facilities leads to spatial inequity. Sustainability is characterised by an equal distribution of primary facilities. However, the continued disparities in facility distribution may lead to failure to achieve sustainable development. With the rising population levels in most urban areas, the available facilities be overcrowded and, therefore, it is imperative to consider additional facilities. Several overcrowded cities are suffering waste disposal and water treatment challenges as the existing facilities are failing to cater for the increasing masses of the human population. It is imperative to break a balance between the

availability of facilities and their functionality. The poor distribution of facilities leads to either overutilisation or underutilisation. Okoroma and Enyoghasim (2012) denote that facility distribution requires all factors, like users and manpower placed in place. In the educational system for both rural and urban areas, the distribution of schools needs to consider the availability of teachers. With the high rate of rural-urban migration many teachers leave the rural regions for cities, still leaving the schools underutilised and less effective.

The poor and most difficult terrains have a huge contribution to the distribution of facilities in most rural areas. Aderamo and Magaji (2010) argue that areas of poor surface conditions are poorly connected and this results in less provision of public facilities such as hospital, school and road facilities. Improving road networks in rural areas is one venture that can aid their development. As compared to the urban areas, where many connections allow for infrastructural investments, rural areas still have a long way to go (Nnamdi, 2012). There is a strong relationship that exists between well-established road networks and the availability of facilities. The skewed development biased towards urban centres means fewer facilities in rural areas. Sedenui *et al.* (2016) argue that public facilities such as hospitals, are concentrated in developed areas than here they are most needed. Equal development needs to balance the distribution of facilities in the most needful areas and this case, rural areas need to be prioritised.

CONCLUSION AND FUTURE DIRECTION

The chapter sought to bring to light the importance of planning for facilities in both urban and regional areas. The previously developed models on location and facility siting made a huge contribution towards the understanding of reasons behind facilities locating certain places. With the changing trends globally, location approaches must become comprehensive to include all factors that solve real-world problems. One such approach is the inclusion of sustainability in facility location decisions. It is a general phenomenon that people find it better to have certain facilities located near their homesteads. This brings the ‘mixed-use approach into huge relevance as it goes in hand in hand with sustainable urban development. Facility location decisions have a mandate to consider future human needs of environmental, ecological, socio-cultural and economic factors into consideration.

Lessons learnt:

- Sustainability is a crucial factor in facilities planning and when incorporated, many facilities will not suffer abandonment and decay.
- Effective maintenance of facilities prolongs their lifespan and usability.
- Accessibility is a crucial factor in facilities planning and should be considered mainly in rural and regional areas
- The adoption of technology in facility planning is crucial in easing the process of 'proper location' finding as GPS and GIS, among other methods make it easier.

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CHAPTER 11: Local Economic Development

Abstract

The chapter seeks to make a nuanced discussion on the local economic development (LED). The study defines the notion of LED that happens to be the solution to the problems within different levels. It encourages the community to partner with different stakeholders as a way of solving problems. LED is principled at creating employment, eradicating poverty, creating better infrastructure by promoting places of businesses and using available resources. This becomes a solution to scarcity of jobs and shelter, poverty, inadequate public transport, poor infrastructure. Despite many types of research on LED, there is a dearth of knowledge of understanding the notion of the LED. The principles of LED are discussed. The chapter will also discuss the theories of understanding LED. LED is discussed at an international level, regional and down to the local level. This will consist of the experiences in the last level. Results show that LED creates job opportunities, makes uses of the available resources, creating better infrastructure and poverty eradication. It is concluded that LED, if well understood, will contribute to cities that provide adequate housing, promotion of places of performing businesses and eradication of poverty.

INTRODUCTION

The world has become predominantly urban and with the continuous increase in the population, resources have not been enough and shared equally. As a result, countries are facing a plethora of problems of seemingly unmanageable proportions. The problems include unemployment as the urban labour market is unable to absorb the exponential increase of jobseekers, soaring poverty within different places, insufficient shelter and infrastructure, inadequate sanitation, pollution, congested streets, overloaded public transportation and, above all, the community budget crisis. Some cities in low developed countries are poverty-stricken (Research Continental-Fonkom (RCF) and FinMark Trust (FMT), 2012). Hence, this calls for LED within different levels. Efforts, including food and financial aid, have been made towards the problems within the countries. At a national level, some efforts were made to address these macro-challenges. Several types of research have been done on economic development.

Although these efforts were made, more must be done to understand the LED so that it can be implemented well.

To address the challenges faced within local, regional and international levels, it is imperative to have a deep and clear understanding of the notion of economic development. Local-level micro-problems have a positive and negative impact on aggregate results. The concept of LED will enable the successful implementation and addressing problems in cities. The solutions to the problems are derived from the principles of LED. Using the available resources that the local people will have enough knowledge of, will create jobs in the community. Prosperity in the 21st century is based on creating and maintaining a sustainable standard of living and high quality of life for all. To meet this challenge, a comprehensive new model is emerging that recognises the economic value of natural and human capital. Successful LED focuses on enhancing competitiveness, increasing sustainable growth and ensuring that growth is inclusive (Rowe, 2016).

Local definition signifies that LED involves building the economic strength of a local area by optimising local resources and capacities. The prime movers or driving forces are economic stakeholders in communities, villages, municipalities and cities, individually or collectively, and it is territorial or area-based in its approach (Villanueva & Begin-Gillis, 2014). Although the focus is local, there are links to national, regional and international levels. The economic definition in LED drives home the importance of identifying and grabbing business prospects, supporting entrepreneurial initiatives, whether formal or informal, micro or large, facilitating market access and creating a climate conducive for investment and business activity. The development emphasises that LED is holistic, it does not cover only the economic dimension, but also includes social, politico-administrative and cultural aspects (LGSP-LED, 2011). The quality and direction of growth are as important as its quality and size. Sustainable development is at the heart of LED, which means satisfying the needs of the present generation without sacrificing the future of succeeding ones (*ibid.*).

This study seeks to discuss LED. Defining the concept of LED, understanding its experience at regional, international and local levels and the theories around it will enhance a clear understanding of the discussion. Different sources were used to acquire data from past

studies on LED. The data in this chapter was derivative of the secondary sources and it is desktop research. Many measures are to be made to understand LED at local, regional and international levels. It is imperative to understand that LED is a particularly important tool to reduce poverty. Local leaders need to understand the impact that the macro-issues may have on micro-economies, or LED efforts and what policies and strategies are possible to guide economic development at the local level. LED eradicates poverty as it supports the pursuit of inclusive economic development that provides for both the promotion of local wealth creation and poverty reduction (Rowe, 2016). Therefore, it is required to have an insight into the concept to put it into use and yield a favourable result. LED needs to provide sustainable changes to the areas. The way it is sustainable in development is market-driven, gender-sensitive, environmentally sound and economically viable (LGSP-LED, 2011). LED contributes to poverty reduction as it promotes cooperation and partnerships and responsibility and accountability in behaviour and relationships.

DEFINING LED

With the rapid changes in global national and local economies, definitions of LED are increasingly adding aspects of inclusiveness, sustainability and resilience. Many international development organisations see LED as complementary to other support measures such as improving governance, reducing inward migration and improving urban development. International development projects or national government projects can help to establish or enhance LED locally, but should not replace or displace local effort. The concept of LED is both contested and elusive, hence there are several definitions. LED is an approach to economic development, of note in the developing world, as its name implies, places importance on activities in and by cities, district and regions (Zhihua-Zeng, 2021). It combines economic development activities, urban planning, infrastructure development and social development activities to improve local conditions. It encompasses a range of disciplines, including physical planning, economics and marketing and all this to build up the economic capacity of a local area to improve its economic future and the quality of life for all.

Trah (2004) paints a wider canvas of LED as a territorial concept and part of local development or regional management, specifically aiming at stimulating the local economy to grow, compete and create more

jobs, in particular by making better use of locally available resources. American Economic Development Council (AEDC) defines LED as the process of creating wealth through the mobilisation of human capital, physical and natural resources to generate marketable goods and services. This is achieved using local resources. The development is achieved through a process that encourages partners from the community, public sector, private sector and non-governmental organisations (NGOs) to work collectively to create better conditions for economic growth and employment generation, to improve the locality economic future and quality of life (World Bank, 2002). LED involves a participatory growth process that encourages cooperation between the main private and public investors in a defined territory, enabling the joint and design and implementation of a common development strategy (Ndlovu, 2022). This is done by using local resources and competitive advantage in the global perspective, with the final objective of creating decent jobs and stimulating economic activity.

LED is when the different participators come together to design or find a common method of powering growth within the localities using resources available within the area. Different areas encounter different problems, hence require a different solution to the available resources. There happens to be four features of LED strategies that are needed for participation and social dialogue, territorial focus, mobilisation of local resources and local ownership and management. LED does not encourage the one-size-fit-all method but, rather, takes note of the nature of the glitches encountered within a certain region and addresses them accordingly. From all the above definitions, several core elements argue that LED takes place within a defined territory, has a strong bottom-up orientation, involves private and public stakeholders and it is undertaken to foster economic well-being. LED is about competitiveness it is about companies thriving in competitive markets and locations thriving in a competitive, globalised world (Malizia *et al*., 2020). It is about local activities making markets work better. LED aims at remedying market failures such as barriers to entry, information problems and high transaction costs. It is also based on projects, like those mentioned before. Another way of defining LED is through formulating its principles.

CONCEPTUAL FRAMEWORK

LOCALISM

Localism describes a range of political philosophies which prioritise the local (Ercan and Hendricks, 2013). Localism supports local production and consumption of goods, local control government and promotion of local history, local culture and local identity. The use of locally available resources means the locals' benefit. This is through the improvement of the local inhabitants as many pieces of training are conducted. The engagement of local people in the developments, of the community promotes sustainability. This is so as the local people care about most of their local resources. On a conceptual level, there are important affinities between localism and deliberative democracy. This concerns the mainly democratic goal of engaging citizens in decisions that affect them. As a result, localism encourages stronger democratic participatory fora and widening public sphere connectivity. Localism also promotes transactive planning in the different developments taking place within society. This enables long-lasting developments.

THE LOCAL AND REGIONAL ECONOMY

Local or regional economies are unique entities that are smaller and more open than the national economy (Clark, 2010). is the local economy is more specialised and less hampered by political, legal and cultural diversity? The factors of production flow more easily between regional and local economies than they do at national levels. The development within the regional and local economy is more of transactive development. The community is allowed to partner with the stakeholders, including external donors. The local and regional economy offers a bottom-up approach and the use of locally available resources. This makes the economies more specialised because the factors of production come from the region. The economic developments flow swiftly because of the non-existence of trade barriers. Their regional economy experiences low cost as the resources are readily available and the transport costs are low due to the shorter distances to the market. The cultural difference does not exist in these economies due to the equal distribution of resources. Actors and institutions in localities and regions across the world are seeking prosperity and well-being amidst disruptive shifts and transitions generations (Pike *et al*., 2016). Most developments that take place within the regions are successful because of the regional saving and the investment by the residents out of love for their region.

The region continues to make sustainable development because of community participation, resulting in employment creation.

DEVELOPMENTALISM

The structure of a nation may be suboptimal and may be improved with the help of active economic strategies, an economic policy concerned with improving the economy of an underdeveloped country. This is by fostering the development of dynamic internal markets and the existence of a certain type of national economic structure that is conducive to increased wealth (Tony 1985). The use of the bottom-up approach in LED is a better strategy for sustainable growth as a nation. Developmentalism targets the developing nations that propose the intervention of the state in economic and social institutions to achieve growth. It gives way to an ideology of development as the key strategy towards economic prosperity

LOCAL INITIATIVE

The local initiative is the ability of the local people or inhabitants in a certain area to make a decision and take action without waiting for external instructions on what to do. The local initiatives usually occur when the communities are connected to their resources. In a situation that a need arises in the community, the people engage local leaders, the community committee and neighbours to plan, set goals and measure progress. The local people can test ground-breaking ideas and adopt them. Local inventiveness allows the developments made locally to address the needs of local people. The people address their problems from healthy, educational houses and safety. This makes the communities better places to live because more people are employed and as a result the income, rise.

INFRASTRUCTURE

Infrastructure is a significant positive determinant of economic performance. The infrastructure consists of underlying core amenities within a particular community that supports the basic processes of the social-economic system within the community (Ercan and Hendricks, 2013). The water system, roads and public buildings correspond with the meaning of infrastructure in this chapter. The relationship between infrastructure and economic development is well-established in local regions. The shortfalls in infrastructure investment results in the decline of productivity. The physical infrastructure promotes economic development in a community. It is an amenity that serves as a magnet

in the location decisions of firms. This will also determine the growth pole within the region. Infrastructure enables the development of sufficient decent houses.

PRINCIPLES OF LOCAL ECONOMIC DEVELOPMENT

Each community and region have unique challenges and opportunities, hence there are common principles that guide the development by all sectors to promoting economic vitality within their communities and in partnership with their neighbours in the larger region. Integrated Approach is one of the principles of indigenous commercial expansion that includes a participatory approach. Government, business, education NGOs and the community come together to create a lively local economy (Rowe, 2016). This is through a long-standing investment strategy that can encourage local creativity. The strategy serves the needs of residents, workers and businesses. A long-term strategy should promote stable employment and revenues by building on local competitive advantages. This means any development that takes place within the communities should bring long-term employment.

Local economic development promotes equitable and sustainable economic growth. If there happens to be even-handedness in societies, when the development takes place, it should increase (Soja, 2009). Equitable means opportunities to wealth creations are open to both men and women. Both rich and poor, urban and rural dwellers and all ethnic and religious groups should access the opportunities. It is also principled to sustain economic growth. Local resources may be transformed into marketable goods for the current population but they must be continuously regenerated such that it does not deprive future generations of the same resources.

Poverty reduction is one of the principles of local development. Both local and regional economic development efforts should be targeted at reducing poverty (Rowe, 2016). This is done by promoting jobs that match the skills of existing residents. Low-income individuals with certain skills should be improved. This will then address the needs of families being struck off government welfare. LED ensures the availability of affordable quality childcare, transportation and housing in all the domiciles.

LED also aims at the local focus. The community's most valuable assets are the ones they have. The existing businesses are contributing to their home communities (Nassif & Araujo, 2013). Economic development efforts should give priority to supporting existing creativities as the best source of business expansion and local job growth. Decoying businesses away from neighbouring communities is a zero-sum game that does not create new wealth in the regional economy. Community economic development should focus, instead, on promoting local entrepreneurship to build locally-based industries and businesses that will succeed against national and international competitors. LED must not create unfair competition for existing businesses. This could by way subsidising some companies to the detriment of others. In doing so, it is creating an uneven environment in society. This can be existing businesses, start-ups or external companies coming into the location. When development occurs in a certain community, it should promote and support spin-offs and subcontracting, attract investors that fit nicely into the local economic structure and consider franchises as a source of new local businesses.

Human Investment is another principle of local economic development (Pettinger, 2019). Because human resources are so valuable in the information age, communities should provide life-long skills and learning opportunities by investing in excellent schools, post-secondary institutions and opportunities for continuous education and training available to all. Investment in better educational facilities will provide better skills to the inhabitants, who, in turn, improve themselves.

LED also aims at vision and inclusion (Rodgerson and Rodgerson, 2010). Communities and regions need a vision and strategy for economic development as observed by these principles. Visioning, planning and implementation efforts should continually involve all sectors. This includes the voluntary civic sector and those traditionally left out of the public planning process. The proposed development should be implemented, with all the stakeholders participating.

Environmental Responsibility is another principle for LED. Communities should support and pursue economic development that maintains or improves, not harms, environmental and public health (Kingsley, 2014), and protects the natural environment. Development that takes place without degrading the environment is encouraged. Activities taking place within the area should not leave voids in the

environment or should not pose detrimental effects to the community. The environment must be enjoyed by both the present and future generations.

LED encourages compact development. This is to minimise economic, social and environmental costs and efficiently use resources and infrastructure. New development should take place in existing urban, suburban and rural areas than using more agricultural land or open space (Meyer-Stamer, 2018). Local and regional plans and policies should contain these physical and economic development planning principles to focus on development activities in desired existing areas. This means that all the infrastructure developed should consider building vertically than horizontal. More compact cities are encouraged to discourage the sprawl of areas. Considering human health and cost, most of the services needed within certain areas should be developed within the existing area. This is to reduce fuel consumption and air pollution, that has a detrimental effect on the people. To protect the natural environment and increase the quality of life, neighbourhoods, communities and regions should have compact, multi-dimensional land-use patterns that ensure a mix of uses. The development should minimise the impact of cars and promote walking, bicycling and transit access to employment, education, recreation, entertainment, shopping and services. Economic development and transportation investments should reinforce these land-use patterns and the ability to move people and goods by non-automobile alternatives, wherever possible.

THEORIES OF UNDERSTANDING LED

Theories of LED play state-of-the-art theoretical positions on such important issues, like inner-city development, rural development, technological innovation and rebuilding economic infrastructure (Bingham 1993). Different economic growth models stress alternative economic development.

Mercantilism is where the wealth of a nation is determined by the accumulation of gold and running trade surplus. LED aims at making better use of locally available resources (Pettinger, 2019). The use of locally available resources is encouraged. This will encourage increasing returns from the developments since the surplus is exported. Extracting resources available within the community is less costly and more profitable from exporting the products.

The classical theory emphasises the role of increasing returns to the scales or specialisation. The productivity of labour. Smith argued that income per capital was determined by the state of the skill, dexterity and judgment with that labour is applied in any nations (Birkan 2015). LED aims at creating favourable locational factors that are qualities that make a place a good place to do business. This includes noticeable elements like improving the infrastructure and training workers, but also less obvious elements such as the business-mindedness and efficiency of local administration. In the communities where development is taking place, it means the local people who are participating are trained and become well-skilled. This then creates more jobs within the community. The theory also states the role of trade in enabling greater specialisation.

Neoclassical theory growth based on supply-side as labour productivity, size of the workforce, factor inputs. As capital increases, the economy maintains its steady-state rate of economic growth. The need for technological progress, that then increases the productivity of capital or labour (Birkan 2015). The theory focuses on the supply-side model of investment. This is how to supply targeting those outside the region. It creates high chances of having interregional convergence. Draws heavily on the literature of national economic growth developed by Roy F. Harrod (1939) and Evsey D. Domar (1946). Interregional convergence is more likely than international convergence because factors of production are more highly mobile across regions. There are three key elements in the model labour supply, capital stock and technical progress. Improved investment in education and technical knowledge from other region lead to technical progress. The development of the health facilities will control the death rate hence population growth. As a result, increased labour supply. Placing regional wage to become relative to other wages in other regions, migration of workers from other regions will result in the increased labour force. The participation of the residents will enable them to invest and causes regional growth in the capital stock. This will then result in the growth of a region where development takes place.

The *Endogenous growth theory* states that the rate of economic growth in the community is strongly influenced by human capital and the rate of technological innovation. Paul Romer and Robert Lucas placed great emphasis on human capital (Bingham, 1993). Workers with greater knowledge, education and training can increase rates of

technological advancement. It is imperative for government to encourage technological innovation. The increase in human capital productivity can have increasing returns. The type of capital investment determines. The theory emphasises the importance of spill over benefits from a knowledge-based economy (Pettinger, 2019). LED aims at making local markets work better. It aims at creating places and opportunities to match supply and demand and to discover, propagate and promote new business opportunities.

The central idea Of *Growth Pole Theory* is that economic development or growth is not uniform over an entire region but, instead, takes place around a specific pole or cluster. This pole is characterised by core or key industries around that linked industries develop, mainly through direct and indirect effects. These key industries involve a wide variety of sectors, including automotive, agribusiness, petrochemical, etc. Direct effects imply the core industry is purchasing goods and services from its suppliers or providing goods and services to its customers. Indirect effects involve demands of goods and services by the people employed by the core and linked industries supporting the development and expansion of economic activities such as retail (Gavrila-Paven and Bele, 2017). Perroux (1950) views space as a force that defines space as a type of network that is held together by centripetal forces. A growth pole refers to linkages between firms and industries. The expansion of the key industries implies the expansion of output, employment, related investments and new technologies and new industrial sectors. Development at the centre produces trickle-down effects within a lagging region as the lagging region's goods are purchased and labour.

Product Life Cycle theory is broken into four stages, which are introduction, growth, maturity and decline (Kopp, 2020). It is the length of time a product is introduced to consumers into the market until it is removed from the shelves. The product cycle is also the expected life cycle of a typical product from design to obsolesce. The maximum product value at each stage is the goal. The location of the product in the first stage is most preferably in the urban areas for immature firms. Once the product is standardised undeveloped regions are more preferable due to cheap labour and low-cost location in the final stage. The central focus of the model is a technological change in the context of multinational corporations and multinational capital and the progressive maturing, standardisation and obsolescence of products.

At the core of the model are technological change and the contention that after the initial development of a product within an undefined business enterprise context. Locational suitability, change systematically as the new technology ages.

Ageing is reckoned to increase the need for more capital-intensive production, more specialised equipment, longer production runs and stable production techniques, cheaper, unskilled labour and lesser inputs of managerial and technical skills (Rowe, 2016). Simultaneously, the market shifts from a seller's market to a buyer's market, price elasticity increases and competition become fiercer. These changing conditions have spatial consequences. A locational element was central to the early formulations of the product-cycle model as it was applied in metropolitan areas, an aspect of the model that has been elaborated with great clarity. Technological maturity in this context was reckoned to reorient production and exports away from bases in developed countries towards new bases in developing countries (that ambiguously, could be operated either by entirely new firms or by branch plants of developed-country transnational corporations).

GLOBAL EXPERIENCES IN LED

LED is a widespread facet of international development planning, particularly in the context of pervasive trends towards decentralisation. Europe is regarded as the cradle of local economic approaches. Pressure to stimulate has come from the uneven distribution of economic resources. International experience has demonstrated that local authorities can play a pivotal role in LED initiatives for poverty alleviation (United Nations, 2015). Municipalities have been placed strategically to undertake local long-term planning in the arena of poverty alleviation particularly as it relates to NGOs, CBOs and the private sector. The task is to address the crucial issue of how territorial development and the potential of the local economy can be both means and resources for the concrete application of the new SDGs. This is to face challenges of food and the environment, a more socially equitable development, development based on social innovation and the enhancement of cultural identities.

South Asia experienced LED as local stakeholders, often led by local or regional authorities working together to mobilise local skills and resources. This is to develop economic opportunities within the local

area. LED tools and techniques support public and private sector interventions to ensure equitable distribution of benefits to the citizens. Asia experienced LED as a process of development that occurs at the subnational level (Research Continental-Fonkom (RCF) and FinMark Trust [FMT], 2012). The national, regional, local government, business, community groups and international development partners work together to counteract and reverse some of the negative development trends. These include the growing incidence of absolute and relative poverty, inequalities and disadvantage linked to marginalised social groups, poor access to infrastructure and services, growth in formalisation and the disappearance of industries.

The Pacific region contains more than half of the world's population, of which 900 million are classified poor. Inclusive economic growth became essential for the countries of the region to reduce poverty and vulnerability. The shortfall for urban infrastructure investment is undermining the competitiveness and the social cohesion and environmental sustainability of Asian cities. The civil people in these countries have a lack of capacity in the decision-making process, especially in India and the Philippines.

In Kurunegala District, Sri Lanka, the local authority, in partnership with a multi-stakeholder, promoted small local producers to develop the dairy sector which then created more jobs for the unemployed youth. In Indonesia, the local economic growth promoted a people-oriented approach in rearranging traditional markets and street vendors towards a liveable city (Zhihua-Zeng, 2021). This was done through the construction of the vending or market infrastructure within the cities. At the same time, this development promoted greening in the environment. For instance, Monjari, the area which was formally occupied by vendors, was transformed into open green spaces for the public and became liveable. LED also resulted in the construction of better market infrastructure for the city.

In the region of Rhone-Alpes in France, local authorities, in partnership with the urban planning department, the peoples' committee and NGOs worked together in identifying the key needs of the marginalised communities. This resulted in the improvement of these communities. Offices were established to develop the links between small to medium enterprises (SMEs) and in other regions. In America, LED was thrust on the centre stage of domestic policy, often focusing on emerging

tensions between central and local government (Boyle & Meyer, 2007). The urban economic growth witnessed a decline, hence local authorities collaborated with the private sector. This led to economic growth and the high rate and unemployment and poverty declined. Yigitcanlar and Velibeyoglu (2008) state that knowledge-based development strategies play an important role in supporting LED cities in the knowledge area. LED contributed to the creation of a better environment in Brisbane, Australia. This was through the help of communities and use of the locally available resources. The use of local resources promoted more jobs for the community and better infrastructure from the generated revenue.

REGIONAL EXPERIENCES

LED in Africa aimed at building African unity from within and driving development through the grassroots. In South Africa, it is notable that LED is understood in a very different way from elsewhere in the world. For the past 15 years, South Africa has become a laboratory for LED. It is often confused with territorial planning in particular as Integrated Development Plans claimed to address, among other things, LED (Meyer-Stamer, 2018). It is often entangled in community development, which leads to a situation where, due to conflicting rationales and goals, neither social nor economic objectives are achieved. LED often focuses primarily on black empowerment and the promotion of emerging entrepreneurs. LED is not supposed to be "smokestack chasing" (Khumalo and Mthuli, 2019). This is adequate to the extent that luring external investors merely by offering subsidies is not a smart LED concept.

However, it encourages a mindset that neglects the opportunities created through the attraction of external investors, thus forfeiting the option to attract the type of investor that have created millions of low-skilled jobs in Asia and Latin America. In other words, LED in South Africa tends to be muddled and highly selective. Community development in South Africa is about solving social problems such as health, housing, education, and it involves principles such as solidarity and support for the weak and marginalised.

Instead of encouraging the creation of oversized, ineffective LED opportunities, local stakeholders must be persuaded to look for specific project ideas that are quickly implementable and will make a difference for local businesses and encourage local stakeholders to establish a

governance structure only when there is something to be governed, i.e., when some practical projects are underway. The Department of Provincial and Local Government, South Africa, argues for LED, claiming that through it, local people work together with the support and facilitation of the local state and other external stakeholders to achieve sustainable economic growth and development that brings an improved quality of life for all. For several years the government gave preference to projects focused largely on poverty alleviation. The Eastern Cape happened to be the pioneer in modern LED activities, followed by Durban and Pretoria, leading the way in initiating activities (Department of Provincial and Local Government South Africa, 2008). The activities include building local competitiveness by encouraging place entrepreneurship and strengthening city assets and capabilities, as centres of production or consumption or knowledge-based information-processing activities, within a changing global economy.

Donor interventions and support have been crucial for launching an agency approach and broader LED activities in Mozambique and Malawi. Malawi's experience is of particular interest as it is the first African country to fully implement Japanese-conceptualised LED in the form of the 'one village one product' (OVOP) movement (Yoshida, 2009). It is an approach that represents a self-reliant and community-based variation of applied LED. It focuses on developing unique products linked to human resource development and capacity building. Non-governmental organisations have also shown to assume a role in promoting alternative rural development in parts of Africa.

LED in Switzerland, Zambia and Kenya focus on upgrading small enterprise clusters. Strengthening local economies by developing the popular or informal economy and integrating towns and their hinterland, represents the axis of the West African ECOLOC (managing the economy locally) programme (Abraham, 2005). In urban area, the concern was to improve the business environment, for both informal and formal sector enterprises.

LED strategies have surged in Brazil over the past decades. Brazil has an uneven spatial distribution that explains why economic activities centres on Sao Paulo (Nassif and Araujo, 2013). The development aims at reducing the technological gap in the cities. This will then boost productivity within the country. The government noted the impact of social and geographic disparities within the country, leading to the LED

to aim at creating equitable opportunities for society. This means a fair distribution of social and economic growth facilities. The government aimed at reducing poverty through the provision of jobs to the poor in the rural and urban areas (Dalto, 2007). The housing and transport facilities were developed in communities of both the low-income earners and the high-income earners. It is observed that African countries often lag badly on the indicators of the quality of the business environment.

LOCAL EXPERIENCES

Ndlovu (2020) argue that through LED, agriculture and mining production aim at creating employment for the people, especially in rural areas. LED is an example of a national development policy targeted at empowering marginalised communities. The Government of Zimbabwe aims at poverty reduction. The government's commitment to developmental local government through LED is particularly relevant for understanding the current LED-poverty connection in Zimbabwe. The definition of LED in Zimbabwe encompasses the spatial area, the concept of collaboration among local stakeholders for the promotion of economic growth and development towards the end of achieving improved quality of life for all. Stakeholders in LED include the state actors, the private business sector and civic society. The state creates an enabling environment that removes unnecessary transaction costs, bureaucratic barriers and promoting knowledge asymmetries.

The private sector brings in capital and expertise, creating employment opportunities (United Nations Country Team, 2014). Civic society is responsible for the checks and balances that ensure the improvement of the quality of life for the local communities - for participation and involvement that enhances partnerships of the LED trajectory acceptance. LED experience has been a well-appreciated concept in Zimbabwe at the central level of government and slowly appreciated at the local level government.

The Government of Zimbabwe introduced policies such as the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET) from 2013 to 2018, to promote LED. This was after a noticeable unequal distribution of facilities. The Constitution of Zimbabwe created a framework for free interaction of local governance stakeholders in planning processes and execution of policies for LED

(Law Development Commission, Law Society of Zimbabwe, 2016). The Ministry of Small and Medium Enterprises and Cooperative Development is mandated to stimulate economic growth, create wealth and employment opportunities and promote sustainable environmental conservation practices to reduce poverty. The Ministry created a revolving fund, the Micro Enterprise Development that Fund. It was set up to benefit innovative enterprising individuals in Tafara and Mabvuku (high-density locations in Harare) and other areas. LED allowed the provision of training centres through the Ministry that created a Micro Enterprise Development that Fund that is a revolving fund. It was set up to benefit innovative enterprising individuals in the Areas of Tafara and Mabvuku (High-density locations in Harare).

DISCUSSION

Local economic development has increasingly become crucial. Hence there is need to understand and implement it well. Knowledge about the concept of LED is very important to create better living standards. The urban and rural have been suffering from inadequate decent shelter, unreliable and overloading public transport, poor infrastructure, unemployment and poverty. Many countries have struggled to find solutions to these problems through financial and food donations. Despite these efforts, it is imperative to consider the sustainability of the solutions provided that are encompassed in LED. Development should involve community participation, NGOs and the private sector. Community engagement enables sustainability in the development.

LED will enable poverty reduction in cities, through employment creation for both the rich and poor, the skilled and unskilled . Compact cities will reduce the use of and costs of fuel and the creation of mixed uses. The use of local resources will generate more revenue for the communities. Resource mobilisation will enable the current generation to enjoy the benefits while not forgetting the future. LED ensures resource extraction without degrading the environment. The government should engage in public participation within the economic growth of the country. This will enable long-lasting developments. Training should be given to the community inhabitants to enable them to find employment and participate in the development. Planners are encouraged to participate so that they can design sustainable infrastructure and encourage the bottom-up approach.

CONCLUSION AND POLICY OPTIONS

It is concluded that in a bid to achieve liveable communities for both young and old, rural and urban areas, rich and poor, it is imperative to understand the local economic growth of the areas so that the development is well executed. It is noted that LED is an approach that has been used in different countries. It is of greater importance to understand that LED is an approach for different stakeholders to work together in a bid to achieve a better quality of living. Better quality of living comprises the provision of jobs, adequate housing, poverty alleviation, adequate public transport provision, education and food security. However, it is noted that these measures do not last because of different factors within the countries. These factors include political instability, corruption and lack of funding. This chapter will help the government on how the development should take place within the communities. Understanding LED enables transformation within the communities and creation of liveable cities. The development should encourage job-creation, educational facilities, decent housing and provision of adequate and efficient transport. It should also allow compactness and become environmentally friendly and encourage community participation. Not only the government should participate in the development, but also the NGOs, private sector and civic sector. This is so because more funding is needed to successfully implement the development. Different innovations are also encouraged.

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ABOUT THE BOOK

Human settlements are dynamic systems that have stocks and flows that one needs to understand. This present text is meant to bring an understanding to the reader of how human settlements are designed and managed to functionality. The book serves as an introductory text to the issues in human settlement planning, design and management. Although its ultimate focus maybe skewed towards Africa and Zimbabwe, its application is for an even broader context.

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