

AN EXPLORATION OF THE PARAMETERS OF LIVEABLE URBANISM  
THROUGH INCLUSIVE INCREMENTAL DEVELOPMENT

**David Duke**

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**Student ID: DKXDAV003**

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**Supervisor: A/Prof Nancy Odendaal**

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Name: David Duke

Signature: Signed by candidate

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## ABSTRACT

“Despite a significant reduction in the percentage of population living in informal settlements from 2000 to 2014, the absolute number of people living in deplorable conditions has increased from 689 to 880 million people over the same period. Current policy and planning practice in developing countries has not been able to cope with such pervasive rapid urbanisation. By 2050 the United Nations predicts two-thirds of the global population will live in cities. Of which as many as one-third of this population could be living in informal settlements (slums). To address these unsustainable and undesirable trends in support of the disadvantaged and maintaining environmental sustainability, this minor dissertation conducts comprehensive research of contemporary policy and planning work to seek alternatives. The purpose of the literature review is to identify commonalities, differences, gaps of knowledge and constraints of current policies and planning practice currently used to plan and manage growth of cities. Analysis and findings then inform and add value in exploring parameters for a ‘liveable’ or improved urbanism from that currently experienced in informal settlements. Historic global policies focusing on government led top down approaches to provide large scale low cost housing have not kept up with demand, although they remain popular politically. From these policy and planning failures, it is evident that a more inclusive and incremental approach better utilizing available human capital should be considered. Critical analysis of literature with an alternative urbanism and planning paradigm in mind emerges in the findings and conclusion in the form of recommended parameters for a new inclusive and incremental urbanism. Such urbanism is entirely possible provided the critical issues identified such as lack of political will and good governance can be mitigated. To dramatically improve the lives of millions will require a compelling vision and collaborative effort seldom seen in current policy and planning of developing countries. Despite the daunting task, this paper seeks to define a conceptual framework drawn from findings to mitigate issues and guide an alternative vision of the future. The alternative urbanism that emerges from the conceptual framework may fall somewhere between that of current informal settlements and current discourse such as smart cities”

# CONTENTS

CHAPTER 1. INTRODUCTION .....	9
1.1. BACKGROUND .....	9
1.2. RESEARCH MOTIVATION .....	10
1.3. LITERATURE REVIEW AND RECOMMENDATIONS .....	11
1.4. OUTLINE OF CHAPTERS .....	12
CHAPTER 2. LITERATURE REVIEW .....	13
2.1. INTRODUCTION .....	13
2.1.1 LIMITATION OF POLICY AND PLANNING FOR PREVAILING URBANANISATION TRENDS 14	
2.1.2 GROWTH AND INCLUSION .....	19
2.2. CHALLENGES OF INFORMALITY, EXPERIMENTATION AND INCREMENTAL URBANISM FOR TRANSFORAMTION .....	21
2.2.1. NEW URBAN AGENDA AND THE START OF CHANGING PRACTICE .....	21
2.2.2. URBANISATION AND DEMOCRATISATION CHALLENGES IN AFRICA.....	22
2.2.3. DATA COLLECTION, PLANNING AND PUBLIC POLICY .....	22
2.2.4. URBANISATION AND DEVELOPMENT .....	23
2.2.5. URBAN LAND-INFRASTRUCTURE COORDINATION.....	25
2.2.6. ECONOMIC DEVELOPMENT .....	27
2.2.7. INFORMAL ECONOMY.....	27
2.2.8. URBAN FINANCING .....	29
2.2.9. CLIMATE CHANGE AND DEVELOPMENT CO-BENEFIT PRECEDENTS .....	31
2.2.10. FOOD INSECURITY .....	32

2.2.11.	TECHNOLOGY IN THE CITY .....	33
2.2.12.	RESIDENCE IN AUTO CONSTRUCTED CITIES.....	34
2.3.	LEARNING AND EXPERIMENTATION .....	36
2.3.1.	LEARNING.....	36
2.3.2.	EXPERIMENTATION .....	39
2.4.	INFORMAL SETTLEMENTS, PARTICIPATION, INCREMENTALISM AND PLACE MAKING .....	44
2.4.1.	SUPPORT FOR UPGRADING INFORMAL SETTLEMENTS .....	44
2.4.2.	PARTICIPATION IN INFORMAL SETTLEMENT UPGRADING .....	45
2.4.3.	INCREMENTALISM.....	46
2.4.4.	PLANNING APPROACH TO UPGRADING INFORMAL SETTLEMENTS .....	46
2.4.5.	PRECEDENTS FOR PUBLIC STRUCTURE APPROACH .....	48
2.4.6.	MANAGED LAND SETTLEMENT .....	49
2.4.7.	INFORMAL ARMITURES (AN ALTERNATIVE APPROACH) .....	51
2.4.8.	INFRASTRUCURE APPROACH .....	54
2.5.	CONCLUSION.....	57
CHAPTER 3. FINDINGS, ANALYSIS AND RECOMMENDATIONS FOR PARAMETERS FOR LIVEABLE URBANSIM THROUGH INCLUSIVE INCREMENTAL DEVELOPMENT.....		58
3.1.	THE NEED FOR A NEW URBANISM APPROACH IN THE FACE OF PREVAILING TRENDS IN DEVELOPING CONTEXT .....	58
3.2.	SPATIAL PLANNING AS TOOL TO SUPPORT SUSTAINABLE URBANISM.....	61
3.2.1.	UNDERSTANDING THE NEED TO SHIFT TO INCLUSIVE AND EQUITABLE PLANNING ....	62
3.2.2.	THE USE OF DATA AND TECHNOLOGY IN EQUITABLE PLANNING .....	63
3.2.3.	EXPERIMENTATION OF ALTERNATIVE PLANNING PARAMETERS.....	63
3.2.4.	POLICY, GROWTH AND URBAN LAND-INFRASTRUCTURE COORDINATION.....	66
3.2.5.	INFORMAL SECTOR AND INCLUSIVE PLANNING .....	67

3.2.6.	FINANCE CONSIDERATIONS IN PLANNING.....	68
3.2.7.	CLIMATE CHANGE IN PLANNING.....	69
3.2.8.	AUTO CONSTRUCTED CITIES AND LEARNING .....	69
3.2.9.	UPGRADING INFORMAL SETTLEMENTS AND CHALLENGES.....	70
3.2.10.	EXPLORING PARAMETERS FOR A LIVEABLE URBANISM .....	71
3.2.11.	ALTERNATIVE PLANNING APPROACH .....	73
3.2.12.	INFRASTRUCTURE .....	75
3.2.13.	HOUSING.....	78
3.3.	CONCLUDING REMARKS AND PROPOSED PARAMETERS FOR LIVEABLE URBANISM .....	79
3.4.	RECOMMENDED PARAMETERS .....	79
3.5.	CONCLUSION.....	81
CHAPTER 4.	CONCLUSION.....	82
REFERENCES		85

## LIST OF ABBREVIATION/ACRONYM

<b>Abbreviation/ Acronym</b>	<b>Description</b>
CO2	Carbon dioxide
GDP	Gross Domestic Product
GIS	Geographic Information System
ICT	Information and Communications Technology
IDT	Independent Development Trust
ILS	Incremental Land Settlement
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resource Panel
IA	Informal Armatures
IS	Incremental Settlement
ISU	In-situ Upgrade
ISU	informal settlement upgrading
ITR	Intent to Reside
MDG	Millennium Development Goals
MLS	Managed Land Settlement
NGO	Non-governmental Organization
NUA	New Urban Agenda
NYU	New York University
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnerships
SALGA	South African Local Government Association
SDG	Sustainable Development Goals
SDI	Shack/Slum Dwellers International
SUDS	Sustainable Urban Drainage Systems
SUPs	Sustainable Urban Projects
TOD	Transit Orientated Developments
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFPA	United Nations Population Fund
WEF	World Economic Forum

# CHAPTER 1. INTRODUCTION

## 1.1. BACKGROUND

According to the UN-Habitat, by 2015 the population of the world living in urban areas reached 54% (4 billion) (UN-Habitat, 2016a). From 1995 to 2015 the highest urbanisation rates were recorded in the least developed parts of the world. Africa experienced the highest global urbanisation rate of 3.44%. The African urban growth rate was approximately 11 times higher than that of Europe (UN-Habitat, 2016a). This rapid urbanisation in Africa is driven by various factors such as natural population increase, rural-urban migration, natural disasters (droughts, floods), famine and conflicts (ethnic, civil/strife and war) (UNFPA, 2007:12; UN-Habitat, 2009; UN-Habitat, 2016a:7). Considering these cities are some of the poorest in the world, they lack the financial capability to build infrastructure and provide services for their rapidly increasing populations (UN-Habitat, 2016a:7). These countries typically have high levels of poverty and unemployment. The result has been a rapid increase of slums or otherwise known as squatter or informal settlements, often characterised by “deplorable living and environmental conditions” (UN-Habitat, 2009:8).

The term ‘slum’ refers to a type of house. This can also include houses required to be upgraded. The term ‘slum’ is often used interchangeably with ‘squatter settlement’, ‘shanty town’ and ‘informal settlement’ amongst other descriptions (UNFPA, 2007:16). For purposes of this paper the term ‘informal settlement’ which arguably has less negative connotations than ‘slum’ will mostly be used in analysis and discussion. This term will define make-shift housing that does not comply with formal planning and building regulations. However, in literature reviews and particularly those from South American and Indian context where the term ‘slum’ is commonplace, these references in some cases will remain unchanged.

Responses to find solutions and formulate strategies to solve this typical urbanisation crisis (rapid increase in informal settlements) have varied over time. Globally a key response has been to build large scale low cost public housing. However, most schemes have not been able to keep up with demand and subsequently seen a decline of this policy adoption (UN-Habitat, 2016a:13). This response also requires supporting infrastructure that is often seen as a secondary consideration following the housing demand. Globally infrastructure shortfalls and requirement costs are estimated at \$35 to \$40 trillion US dollars for the next 20 years. In a best-case scenario, Boston Consulting Group (BCG) has estimated that governments will be able to fund approximately half of this requirement. Others have argued that government should not focus on providing houses but rather focus on provision of infrastructure that would enable people to improve living conditions and improve their homes incrementally (Gouverneur, 2015).

With increased urbanisation in developing cities, informal settlements and associated poverty is rapidly increasing. According to UNFPA (2007) statistics hide deep inequalities and overlook harsh poverty experienced within cities. Similarly, the UNEP (2012) recognise the core challenge facing cities is to bridge the vast and increasing socio-economic inequality or 'urban divide' between the inhabitants of informal settlements and the wealthy. The urban poor are often unable to access basic services compared to the wealthy receiving the highest level of services.

## 1.2. RESEARCH MOTIVATION

According to UN-Habitat (2016a) data, Informal settlement (slum) populations in developing countries declined from 39 to 30% between 2000 and 2014. However, the absolute number of informal settlement residents in these developing countries increased from 689 million to 880 million people in the same time. With ever increasing urbanisation (54 % in 2015 and predicted to increase to 66% by 2050) the absolute number of informal settlement residents will further increase. From these trends, it is evident that current planning practice of developing countries often referred to the 'global south' is inadequate to deal with increasing urbanisation. This alarming trend therefore highlights the need for academics, professionals, government, business, civil society to increase efforts to work together to help improve living conditions of those deprived living in informal settlements. My research will focus on literature reviews of global planning policy and deep experiences of planning in developing countries. The literature review will explore the underlying challenges and possible varying approaches to deal with the rapid urbanisation crisis. Precedents of varying approaches adopted in the developing world will be evaluated on their merits and lessons learnt. These precedents will then be considered for adaptation to developing context to form new planning theory and practice.

My research dissertation is titled "an exploration of the parameters of liveable urbanism through inclusive incremental development". Global policy is shifting away from government large scale low cost housing delivery due to inability to meet demand of rapid urbanisation. This dissertation focus will therefore shift away from top down governmental solutions. And rather focus on solutions that foster inclusive developments that are planned and co-produced by local government and communities. This type of solution would envisage settlements that can be improved and formalised incrementally over time as residents may improve their means. In addition, local governments would generate revenue in cities to support planning and management of rapid urbanisation trends.

The type of urbanism expected from incremental bottom up 'grass roots' development is also unlikely to mirror architectural rendered images typically associated with 'smart cities' or 'new developments'. The purpose of the research is therefore to explore and find parameters for a different urbanism that may fall somewhere between 'informal settlements' and 'smart cities'. The thinking is to create an alternative urbanism that is vastly superior to that of unplanned informal settlements, albeit not at the 'elitist' level evident in typical smart city type offerings.

This urbanism should afford residents with access to basic services, public amenities, job opportunities and allow for some form of tenure (potentially incremental) that will permit and encourage them to improve their dwellings as they improve their livelihoods over time. In summary, 'liveable urbanism' would need to ensure residents lives are vastly improved from that typical of informal settlements. This urbanism would seek to afford residents decent and safe living conditions within a functioning city. Under such conditions residents may prosper and achieve a measure of happiness where they live within their means and environmental constraints where sustainability is protected.

Early thoughts of exploring parameters of liveable urbanism relate to pre-establishment of settlements by allocating suitable land with demarcated sites. Whilst these sites may not be initially serviced, a planned layout would ease incremental development and avoid unnecessary re-location normally required to upgrade existing informal settlements. Servicing of sites could be done through community self-help or labour based programs that provide employment and foster ownership of a development. A transformative framework will need to include sustainable development principles, innovative and dynamic planning. The framework may also employ the use of technology in ways that support and uplift the community and reduce resource consumption.

The challenges of managing rapid urbanisation in developing context are global and often quite similar in nature but typically differ in context. The literature review draws on various policy and planning experiences listed under the global south which include South American, Indian, African and South Africa case studies and experiences. The intention of the dissertation is not to provide place specific solutions but rather to draw from various places and formulate a conceptual framework that can be applied globally. However, in the application of the framework, the contextual nature and obstacles of each place will need to be carefully considered and final planning adapted. Final solutions implemented should then align with the local conditions. It is suggested at this early stage, that an inclusive participatory planning practice should be considered to mitigate the risks of applying inappropriate solution for people who will live in the planned settlement.

### 1.3. LITERATURE REVIEW AND RECOMMENDATIONS

In pursuit of environmental sustainability, a plethora of literature and public discourse has manifested itself in present day planning practice. It can be argued that some themes of this literature relate to overarching sustainable goals set by multinationals and the discourse of 'smart cities' with focus on technology, energy efficiency and reduction of carbon emissions. However, there is also much literature on Informal settlements (slums), but perhaps with more focus on short-term solutions to alleviate poverty and health issues that are often driven by political agendas. My research will seek to uncover what value and constraints lie in these global policies, and more importantly other planning practice experience from developing countries that will be useful to support management of rapid urbanisation. Planning practice literature to be researched, will also cover self-help and community participation that supports incremental development.

Although not limited to self-help schemes, research on new thinking or experimentation will be sought for dealing with informal settlement (slum) urbanism and proposing new interventions. The main objective of the literature review will be to seek insight on thinking of a different urbanism that could be considered more sustainable, inclusive and pragmatic than current paradigms of formal town planning, provision of major infrastructure, and large-scale housing. Supporting evidence of such thinking and results of experimentation if available will be sought. A review of appropriate infrastructure solutions and configurations for possible alternative urbanism will be required. Lastly overarching critical success factors for sustainable urbanism i.e. what works, what does not and what we can learn, will be critical questions to be answered through the process.

The scope of the literature review in Chapter 2 will be mainly limited to published Books, Journals, Papers and Planning Guidelines, that will be sourced through academic libraries and published sources. In Chapter 3, the summary detail of the literature review findings will then be further analysed to check the logic, credibility and effectiveness of the research arguments in supporting an alternative urbanism. From further argument, adopted or amended recommendations to support an alternative urbanism will be formed. This process will also identify key issues, success factors and how to mitigate risks in adopting recommendations.

#### 1.4. OUTLINE OF CHAPTERS

The minor dissertation will include four chapters in total which includes the introduction. The second chapter will engage in extensive literature review. The purpose of this review is to build a richer picture of the constraints of planning from global experiences attempting to deal with rapid urbanisation challenges. The research will also look at learning and experimentation relating to planning and practice of dealing with informality through inclusive incremental urbanism. This will include a review of place making and city building modes that may be applicable. The third chapter will detail key findings of the literature review that will be analysed and argued to determine recommendations for setting parameters for liveable urbanism. The final chapter four will then seek to draw conclusions of the review and recommendation process and highlight what the success factors are, what will work, what will not work and what we can learn.

## CHAPTER 2. LITERATURE REVIEW

### 2.1. INTRODUCTION

The purpose of the review is to research current literature on the contemporary challenges of rapid urbanisation within a developmental context. The review will further explore how this rapid growth is being planned (accommodated and managed) and how limitations of current policy and planning practice are inadequate to deal with the pace of urbanisation challenges. The literature considered, recognises the global debate relating to political, social, economic and cultural aspects in developing world contexts. Much of this debate is driven by the widening gap of unequal living conditions in developed and developing worlds.

The literature review further explores the pervasive growth of self or auto constructed cities or more commonly known as informal settlements. Because of this growth, huge pressure is placed on planners to use planning as a tool to deliver sustainable and climate resilient developments. What is becoming clear in review, is that planning needs to be re-imagined or re-framed to respond to the prevailing challenges. The pre-occupation of this literature review is focused on what the re-framing may look like and how can we develop a new framework? Literature suggests that cities are at the forefront of the transition required. Cities simply must innovate and look for new paths to function in the face of pressing issues. It is for these reasons that 'living labs' and 'experimental cities' are appearing and shifting to a new epistemology, placing great expectations on cities as spaces to create social change. These responses do however appear to be unique to the context in which they developed. It is therefore not a simple process to apply a principle of 'best practice' or 'upscaling' to a new context or larger scale. Bhan, Srinivas & Watson (2018:4) have 'repeatedly' found through teaching and engagements with professionals that theories are assumed to be universal and do not consider the art and science of how theories emerge from a distinct history and location.

To overcome misuse of universal planning assumptions, learning is advocated as an important practice of urban planning debate that promises more socially just forms of planning suitable for locations. Learning is viewed as more than just reproduction of specialist knowledge, but requires tactile learning about the city and more collaborative forms of planning and co-production. Incremental learning is also part of informal settlements or makeshift urbanism in daily life. These learnings involve evaluating urban knowledges located in space and time in a specific context. They also democratise planning learning by including community and lastly proposing urban knowledges that are socially just. This learning can be incremental or radical but this is where Bhan *et al* (2018) advocate urban change will occur. The review seeks to confirm the need for action to correct the apparent divergent trajectories of informal settlement growth compared to the rate of delivery of formal housing.

To reverse unsustainable informal settlement growth, new strategies and parameters must be researched and developed to help guide and anticipate growth of informal settlements for purposes of improving living conditions. Research will seek how to support incremental development that is co-produced with communities to form a new or liveable urbanism as described in Chapter 1, and address climate change and future de-carbonisation.

### 2.1.1 LIMITATION OF POLICY AND PLANNING FOR PREVAILING URBANISATION TRENDS

Urbanisation notably took place in Europe and North America in what is known as the first industrialisation and first wave of urbanisation between 1750 and 1950. The urban population increased from 10% to 52% representing an increase of 15 to 423 million urban population. This wave produced urban industrial societies that would subsequently dominate the world (UNFPA, 2007:7). At a world level, urban population increased from 29% in 1950 to 43% (2,3 billion) in 1990. This figure then increased to 54% (4 billion) by 2015 (UN-Habitat, 2016a:6).

On more detailed review of the same period of 1995 to 2015, the average annual rate of change of urban population was 2,16% globally, 3.44% for Africa, and as high as 3.68% for some low-income countries (UN-Habitat, 2016a:7). Africa as a continent is therefore experiencing the fastest urbanisation rate. In addition, "Given that African cities are among the poorest in the world, their growth rates signal a major challenge to their resource base, to build and to sustain adequate infrastructure and public services for their growing populations" (UN-Habitat, 2016a:7).

With further reflection on the population growth rate of 3.68% for low-income countries, an urban population of 10 million will double in 20 years and increase to 60 million (six times increase) after only 50 years due to compound growth. With the population of cities doubling in only 20 years, studies show that a substantial increase of a cities spatial extent is likely. In this regard Angel, Sheppard, & Civco (2005) in *The Dynamics of Global Urban Expansion* paper, studied various cities to measure the relationship of population growth and spatial extent. In a global sample of 120 cities, each with a population of more than 100,000 people, the data was analysed to compare the population growth and spatial extent. In the analysis from 1990 to 2000 this study revealed that the population growth was 17% and the spatial extent increase was 28% (Lamson-Hall, Angel, Blei, Madrid & Galarza, 2016).

From the evidence presented in these global expansion studies, the projection for developing countries by 2030 is that the population will increase two-fold while spatial extent will increase by three-fold (Angel, Parent, Civco, & Blei, 2012). This also means that the average densities of these cities over the study period was decreasing. An example studied over a long period of time for Paris from 1800 to 2000 indicated a population increase of 20 times while the spatial extents increased by 200 times (see <http://atlasofurbanexpansion.org>). Later work by Angel *et al* (2012) used higher quality imagery from the *Atlas of Urban Expansion* and used a global sample of 200 cities of which 18 were in Sub-Saharan Africa. The results further support spatial extent increasing faster than population growth rate and therefore a net decrease in cities overall densities. Of the Sub-Saharan Cities, 16 of these show an average decrease in densities of 2,48% per year. With declining densities and expanding populations, Sub-Saharan African cities can expect to see further significant increases in spatial extent (Lamson-Hall *et al*, 2016). This increase in spatial extent is typically referred to as 'sprawl' and according to Angel *et al*, little to no attention has been paid to this phenomena in these areas where most urbanisation has and will continue to occur (Angel *et al*, 2005:3).

The concern over this phenomenon is the increased requirement for land and energy requirements, and resultant increase in greenhouse gas (UN-Habitat, 2016a:7). In addition, “uncontrolled sprawl generates inefficiencies, injustices, and degradations that undermine economic and human development” (Turok, 2018:101).

Returning to population growth projections, further evidence of rapidly urbanising cities globally recorded major changes in the population size of cities from 1995 to 2015. The changes were in the total number of; mega cities (> 10 million population) from 14 to 29; large cities (>5 million) from 22 to 44; and significant increases in the number of small to medium cities (1-5 million) (UN-Habitat, 2016a:7-8). The massive growth of cities (particularly in developing countries) through rural-urban migration (voluntary and involuntary) has hugely increased the demand and challenge of building large-scale low-cost affordable housing (UN-Habitat, 2016a:13). Large scale public schemes have not been able to keep up with housing demand (UN-Habitat, 2016a:13). The market has also been unable to supply low cost housing that is affordable for low-income households (UN-Habitat, 2016a:52). The results have manifested in widespread large scale informal settlements in Latin America, Asia and Africa.

These informal settlements are characterised by lack of tenure, illegal occupation and resultant precarity with little to non-existent services such as potable water and waste removal (UN-Habitat, 2016a:13-14). Data from UN-Habitat (2016), Global Urban Observatory Urban Indicators Database (2015) indicates a decline in urban population in developing countries living in informal settlements from 39% in 2000 to 30% in 2014. However, the absolute numbers of informal settlements in developing countries has increased from 689 million to 880 million in the same period. Sub-Saharan Africa accounts for 56% of this increase (UN-Habitat, 2016a:14). World population is expected to reach 9.7 billion by 2050 of which 66 % will be urban.

On review of these urbanisation trends, particularly over the past two decades it is apparent that cities face unprecedented challenges to adequately plan and manage rapid urbanisation. These challenges have raised global debate on policy and planning by multilateral forums to address sustainability challenges. UN-Habitat has over the last few years moved towards an urban city-centric approach to guide response whereby dedicated ‘Urban SDG’ Sustainable Development Goals (SDG’s) were adopted in 2015. And subsequently a ‘New Urban Agenda’ (NUA) of global policy was adopted at the UN-Habitat’s conference, Habitat III in Quito Ecuador in 2016. Such is the dynamic nature of the challenges that revisiting and repositioning of urban policy is required on a continual basis. These policies are therefore considered to be “just a start” of implementing and monitoring a new development agenda. The policies have the potential to reconfigure the understanding and role of local government in spatial planning (Barnett & Parnell, 2018:25). The Sustainable Development Goals (SDG) and New Urban Agenda (NUA) provide overarching guidance on achieving social equality, sustainability, and enhance urban economies with focus on planning as a central tool to achieving these goals and agenda (Bhan *et al*, 2018:2).

The goals and agendas are mostly urban in character and therefore solutions are also expected to be urban focused. Cities have therefore emerged as the places to solve these challenges (Evans, Karvonen & Raven, 2016:1).

With cities identified as the location to solve problems, the question is then raised by (Bhan *et al*, 2018), how do we conceive and re-imagine 'planning' as a tool to deal with these challenges in cities and how will this 're-framing' look? Further to this question, there is a growing realisation that 'business as usual' planning will not address the challenges faced and alternative ways to plan, build and manage cities will be required (Evans *et al*, 2016:1). Contemporary literature suggests a change of urbanism will be required. This brings in a question our understanding of urbanism. Bhan *et al* identifies a moment now, where urban planning theory and practice is in need for a "opening, correction, crisis, rebellion or transversal engagement", quoting "a good crisis, as it is often said, is a terrible thing to waste" (Bhan *et al*, 2018:4). Where it is further argued "for the need to re-imagine modes of practice that emerge from new theories of knowledge" (Bhan *et al*, 2018:4). These theories advocate 'writing from' opposed to 'writing about' when considering place. Bhan *et al* advocates to write from his own (Bhan) locations: university and planning theory, authorities and planning institutions of planning practice as well as from himself. He calls this 'theorising from the 'South' or 'Southern urban theory'. To understand southern locations Bhan *et al* seeks to dislocate his (Bhan) own understandings of planning and learn from auto-constructed cities that can be dislocated or in other words 'picked apart'. He then seeks to re-assemble and re-shape them slowly in a manner to find meaning that challenges current planning to create new politics (policies) and new knowledge (Bhan *et al*, 2018:7).

To understand how this new knowledge, described by Bhan *et al* can be created, it is suggested that the process of 'learning' may shed light on our understanding and approach to urbanism (McFarlane, 2011:6). Here the concept of learning relates to understanding the changing nature of urbanism through individual and group 'lived' experiences of a city. The sites and sources of learning a city are located not just in spaces but in multiple places such as conversations, a car ride, walking the city, web sites, policies, databases, books etc. Learning is the gaining of knowledge and skill or ability to analyse a problem and see it in a different way. It is a way of acquiring 'assemblages' consisting of knowledge, sources and people's experiences to effect a change. This learning will emerge through 'translation' of knowledge from various spaces for context specific situations, co-ordination and construction of functional systems. These systems are needed to apply the translations of adapted knowledge and how learning is lived through inhabiting the city.

McFarlane further argues that this learning process is central to informing urban planning in that learning does not just come from the office and reviewing data, but from encounters and informal relationships within the city environment. (McFarlane, 2018:325-326). In other words, urban planning or 'planning' itself in the broad sense is understood as practices concerned with "the linking of knowledge to action" (Friedmann, 2011:208).

Forester defines planners as “all those that need to understand environments whether public, private, social or natural - to change them” (Forester, 2006:124). Barnett & Parnell (2018:25) recognize how this helps us understand how global policy planning is reconfiguring these definitions. Previously this was defined as a narrow planning field of professionally registered planners and now reconfigured to a broad range of actors that is more inclusive and equitable. In this new paradigm, varied actors of public and private sector are now involved in knowledge production, application and distribution. Traditional practitioners of urban planning are now just one set of actors in a complex environment trying to understand and intervene in complex systems of urban settlements.

Under this new planning paradigm, these are indeed interesting times and paradoxical in that planning is receiving high attention to address challenges and yet at the same time, the definition of planning and whom needs to be educated and who is responsible is becoming unclear. In addition, a second paradox has been created where a global commitment has been made. However, the narrow range of planning professionals may not be able to deliver these expectations. Other challenges reside in the fact that the formulation of the global policies is inherently political in nature. This provides both potential and constraints for meaningful engagement of professionals, civil society, local state and social movements (Barnett & Parnell, 2018:26).

Regardless of the inherent politics and outcome of the engagements to define global policies, these have culminated in the current Sustainable Development Goals (SDG's) and New Urban Agenda (NUA). These SDG's then act as a starting point for local planners. Barnett & Parnell highlight the importance of locating the ‘the city’ within the SDG's. The SDG's were approved by the UN in 2015. Included in the 17 SDG's, specifically relating to the urban agenda was Goal 11 that commits to “Make cities and human settlements inclusive, safe, resilient and sustainable”. To support Goal 11, the SDG's were followed up shortly after by the NUA led by UN-Habitat. Barnett & Parnell highlight the important issue of how these multi-lateral agreements (and others) will frame the way in which actors (national, regional, city, agencies, international donors, and civil society) will identify and deal with urban issues for the future. Throughout the UN policy documents they discuss a dedicated urban agenda where “cities emerge as a critical site of action” where planners are concerned with improvement of human settlements (Barnett & Parnell, 2018:26).

To support the dedicated urban SDG's agenda, the policy focuses on four claims. These being recognition of empirical evidence that poverty is increasingly located in urban areas; dynamic cities support economic agglomeration and growth; cities can provide pathways for global environmental change; and that cities provide the best platforms at a political scale to co-ordinate and make decisions. A key difference of previous Millennium Development Goals (MDG's) to SDG's is the shift from a poverty alleviation focus to global goals for all nations, which seek interdependence of environmental, social and economic values. SDG's focus is also for; development within ecological limits and the need to mitigate climate change; reduced poverty and inequality; and monitoring and evaluation using data (including geospatial) to benchmark against local and global indicators. Lastly the agenda is now being debated in terms of critical institutional capacity and finance availability.

Recognition of these limits will require reconfiguration of scales of infrastructures and institutions according to a city and its urban issues.

Paradoxically the manner or lack thereof in which cities are planned and managed has contributed to the many contemporary urban issues. However they also seen to provide opportunities to plan and manage as a response to issues arising in cities (Barnett & Parnell, 2018:27-28). Swilling (2011) highlights this paradox in much greater significance where urban processes have contributed to major causal significance of global challenges, such as environmental pollution and degradation, peak oil, carbon emissions, climate change, inequality, poverty and food insecurity. Similarly, the reconfiguration of urban processes to better manage our resources and reduce pollution will elevate the responsibility of cities and planners (Swilling, 2011). Importantly urban management is no longer limited to spatial planning to manage externalities, but provides the opportunity for urban scale infrastructure, institutions and community to address global challenges.

Barnett & Parnell sees this conceptual shift of urban agenda behind Goal 11 of SDG's and included in the NUA as associated in turn that cities are sites for experiments to develop new practice and solutions that be translated to other locations (Barnett & Parnell, 2018:28-29). On policy setting it is articulated by Barnett & Parnell that the process of setting urban agendas is highly complex in making proposals, setting agendas and taking final decisions. The reasons that add to this complexity relate to processes that involve multiple actors such as transnational bodies, international NGO's, multinational companies representing various sectors such as ICT, Real Estate, Transport and other utilities, and all of whom may have differing agenda's (Gilbert, 2011).

Marx, Halcli, & Barnett (2012) describes this process to produce coherent policy a choreography of consultation, summarising, reporting, drafting and ratification. All this while, cities across the world will be looking to align their planning with regional and national agenda's that refer to global agenda's. Considering this complex policy making process and potential promotion and influencing of agenda's by participating self-serving actors, it is likely to result in contradictions and tensions at local government levels. These tensions may well become the challenges of the urban planner and city budget control officers to resolve how to plan and finance these global outcomes (if indeed appropriate or adaptable for context) (Barnett & Parnell, 2018:29-30).

Barnett & Parnell (2018:31) suggest that in addressing global agendas and possible tensions, we must understand the role of cities, locations and the urban agenda that occurs in public debate, in spatial rationality. The rationalities relate to the causal power of spatial arrangements, built form and design elements where people interact. The common assumption is that ordering of spaces, environments and design can order (or disorder) individuals and populations to conduct themselves in a set way. Traditionally this thinking has been used to reconfigure and redesign to help bring about change (e.g. reduce crime and improve health conditions). Contemporary thinking or decision making considers how spatial rational and urban policy can improve urban resilience to withstand and cope better with environmental change and shocks.

These changes can be severe or catastrophic natural disasters, political and civil unrest, terrorism, financial (can be global), climatic change or transitions to post carbon cities.

To solve such contemporary challenges, Barnett & Parnell further see cities as “unimagined future pathways of innovation and experimentation” (Barnett & Parnell, 2018:32). The role of knowledge, learning and planning considers the core concept of ‘wicked problems’ to frame problems. Here key planning challenges involve causal complexity, uncertainty and political opposition. These systems are inherently complex where interventions are not a simple ‘one-shot’ fix but involve a range of interventions such a combination of social, technological and policy changes. In tracking a 40-year history of wicked problems, cities were previously thought of as locations of urban problems compared to contemporary thinking where cities are viewed as sites to trial and develop solutions that can be translated to other cities. The city itself could even be viewed as the variable in an experiment (Barnett & Parnell, 2018:32-33).

### 2.1.2 GROWTH AND INCLUSION

Most developing large or mega cities struggle to reconcile growth and inclusion where ‘hyper-commodification of land’ has marginalised the poor. It is also becoming recognised in emerging literature that the state is playing an active role in promoting growth through land-use planning, providing supporting infrastructure and services. This practice essentially reduces city resources available for the poor which further marginalised and condemns the poor (often large populations in developing cities) to informality (Heller, 2018:37). A typical result of this practice is the poor are forced to live on peripheral land, typically characterised as unsuitable for development, lacking tenure, lacking infrastructure and located far from work opportunities. A counter argument or criticism of this view is that the practice of promoting growth, should in theory attract investment, create jobs, increase rates, taxes and service revenue. If so, it could also be argued that such practice could also generates excess revenue that could be used to the benefit of the poor.

The reality is perhaps global competitiveness does not allow for the luxury of such neo-liberal models to generate extra capital to support the poor. This is because investment of private sector may then be lost to a competing city offering greater incentives and returns for developers (at the expense of the poor). In support of this hypothesis, Heller further highlights the case of large cities in India and South Africa where ‘land development has become a dominant source of rent’ of private sector. In South Africa state policy, growing information and communications technology (ICT), service provision and related construction and jobs has supported the growth of the middle class. The result is a ‘powerful pro-growth coalition’ that has only exacerbated previous spatial inequalities. The poor remain spatially excluded although they receive basic services. However they also form part of a rent seeking process even in informal conditions. This growth mode is said to be the ‘default mode’ in developing cities where global competitiveness subjects the urban form to ‘intense market forces’ (Heller, 2018).

Global literature often assumes that urban governance and planning is connected to the growth mode. This growth mode increases commodification and exclusion (Brenner & Theodore, 2002). In the case of Indian cities, politics is dominated by a small group of bureaucrats, politicians and developers which has facilitated enormous land rents. Under such conditions, a growth machine cannot exist due to lack of co-ordination and capacity to support productive growth. In South Africa, a strong capacity and relative sovereign state is available to support a growth engine. However, with declining profits in strong sectors such as mining and industrial, land development supported through policy has facilitated new capital investment supporting the growth of the black middle class. This process then continues to marginalise the poor. Under such a regime there is a clear growing unrest as witnessed in the rise in service protests. The protest incidents have increased from approximately 6000 per year in 1997 to more than 12 000 in 2013. This is according to South Africa Local Government Association (SALGA) report Community Protest: Local Government Perception (SALGA, 2015).

In South Africa, genuine participatory planning and avenue for grievances is lacking. Combined with growing inequality, it is unsurprising that service protests are becoming an increasingly popular and contentious format to engage with local government. By contrast, South American countries like Brazil (now changed) were long seen as typical examples of inequality and exclusion which manifested themselves in the form of 'favelas' often in stark contrast or 'splintered urbanism' located adjacent to formal developments. To support this change, Brazilian cities have in the last three decades undergone major political and institutional transformations. These transformations have built citizenship through participatory structures and transformed the nature of state and civil society engagements. Under these conditions it is interesting to see how the Brazilian Cities are becoming the 'locus of transformations' characterised by an 'increasingly sovereign and embedded city'. On further review of these cities in different locations, (all developing in character) there are major differences in the transformation trajectories. This according to Heller highlights the major influence of politics in institutional structures and support. This influence can severely hinder or promote effective planning and management of cities (Heller, 2018:45). Heller concludes that in general where democratisation of state-society relations has occurred, greater autonomy of local decision making and power to intervene and assist with urban transformations has occurred. This has also increased the states embeddedness and improved its social functioning.

## 2.2. CHALLENGES OF INFORMALITY, EXPERIMENTATION AND INCREMENTAL URBANISM FOR TRANSFORMATION

### 2.2.1. NEW URBAN AGENDA AND THE START OF CHANGING PRACTICE

To effect change and learn in the process, various actors (policy makers, planners, designers, private companies and other organisations) are looking to test 'alternative future visions'. These visions include social and economic improvement, environmental sustainability, policy improvement, service delivery and infrastructure provision and research (Karvonen, Evans & van Heur, 2014). This concept of 'experimentation' seeks out innovative and creative modes to achieve 'sustainability' targets and align with government policies to define actions that can be translated to specific places (Karvonen & van Heur, 2014). Such urban experimentation is typically radical and ambitious while the scope of the experiment is limited. This raises debate regarding the translation of these experiments and "their ability to prompt genuine change" or generate new alternatives that will effect profound transformations (Evans *et al*, 2016:1). To evaluate contemporary urban thinking includes the notion of using cities as 'test-beds' for bounded experiment case studies in comparative learning where ideas or proof of concepts can be proved. These ideas may then be applied or translated for other locations or purposes (to effect urban transformations) (Barnett & Parnell, 2018:32).

In thinking about what experiments to conduct and their scale, the question is raised of what 'test bed' do we consider? Satterthwaite noted that since the 1970's the most effective urban agendas effecting urban scale transformations have been those conducted at a small enough 'do-able' scale. In addition, the effective agendas have also been relatively 'low-cost' that rely on power of local government, professionals, and other experts and their ability to network and create partnerships (Satterthwaite, 2016).

Returning to the SDG's and NUA as a starting point for planning, these have proved instrumental in mobilising a variety of actors and supported development of a global urban governance. Here cities are assigned the central role of managing technical and professional systems. On a negative aspect, the SDG's imply that cities have the greatest fiscal capabilities to deal with urban challenges which is not always the case. The financial resources available under local government control will therefore determine what 'do-able' actions can be implemented. Barnett & Parnell, conclude that there are two key interpretations of the SDG's and the NUA. The first view advocates that cities need to be "much better run" to ensure sustainability. The second view sees entire populations lifestyles, all services, cities and city regions changed and run in a completely different way to secure sustainability as opposed to excluding it. The key difference is making cities work better and that of radical transformation to address global challenges. This view is not new and characteristic of divisions between planning theory and practice. In this division, planning can be viewed as to "ameliorate practice" or as "transformative practice".

### 2.2.2. URBANISATION AND DEMOCRATISATION CHALLENGES IN AFRICA

According to Olowu (2018), policy declarations in Africa are ambitious in that they look to address multiple issues. Although noble in their approach 'are more theoretical than realistic' such as the policy guidance set out in (African Development Bank, 2012). The policy urges African leaders to focus on creating inclusive and integrated settlements, mobilise local and foreign investment, strengthen local government, improve human capital (education, skills) and diversify economies particularly where commodity based. If these policies had been implemented, fewer African states would find themselves in their current situation and thus highlights the 'disconnect' between good policy and implementation in relation to African urbanisation. Olowu, concludes that there are two key reforms that are already popular in the African continent and would improve the disconnect between policy and implementation. These two reforms are 'democratisation' and 'decentralisation'. This focuses on democratic and participatory inclusive planning and devolution of powers from the state down to local government to allow them to make local decisions in implementing policy of urban planning and infrastructure financing with focus on reducing high inequalities (Olowu, 2018: 60-61,68).

### 2.2.3. DATA COLLECTION, PLANNING AND PUBLIC POLICY

In the formulation of good policy, Marques (2018) advocates 'data collection itself has profound consequences for policy' reasoning that any intervention or programme will need to understand the underlying characteristics, location and distribution of the problems to be solved. The information or lack thereof could then bias or completely exclude social groups or locations from the proposed solutions.

To avoid exclusion of social groups or locations, reliable and comprehensive planning data must be collected prior to detailed planning. Planning data can be in the form of geographic information defining physical information (topographic, environmental, infrastructure and buildings) and then social information obtained from documents and studies that may include demographic social studies of settlements. Information would need to come from 'on-the-ground surveys and fieldwork' where detail of an informal settlement may include for example, streets, alley ways, public spaces, types of buildings, construction materials, quality and maintenance. In the cases of informal settlements this information can be important as this may define the level of 'precarity' of the residents in terms of their legal status. For example, if dwellings conflict with formal building codes (i.e. what makes them illegal) and or conditions of legal tenure as housing precarity is highly heterogenous. If assumed that such informality will not be upgraded and will be cleared and replaced with formal housing at some stage, it is then not necessary to understand the level of precarity. However, if housing policy acknowledges some form of tenure or wishes to reduce precarity (i.e. avoid evictions of residents) by more formal tenure and in-situ development upgrades, then accurate data is essential to formulate appropriate policy. Form of tenure or ability to formalise tenure is very important as people living under precarious conditions are unlikely to invest in upgrading of their dwellings without security of tenure.

In addition to obtaining accurate data, heterogeneity of information is also essential for planners and decision makers to formulate policy and interventions based on analysis of data. Marques further highlights the importance of standardised information at a national level and regional level. Sufficiently uniform and standard information is required to ensure consistent application of planning. Without this approach, it is likely that entire social groups and the poor who are less visible at higher levels of information are then underrepresented (e.g. from GIS high level data) and risk being further excluded. Paradoxically these social groups are in 'deeper need of social and urban policies' (Marques, 2018:70-77).

#### 2.2.4. URBANISATION AND DEVELOPMENT

Global organisations and think tanks commonly view cities as per the cliché as 'engines of growth' and believe "that cities function as powerful generators of national economic prosperity" (OECD, 2014; UN-Habitat, 2012; World Bank, 2009). Turok (2018) challenges these statements by exploring the causal relationship of urbanisation and development, and if indeed positively re-enforcing in causal relationships. Many of the global organisations boldly follow the corollary that urbanisation drives economic progress by concentrating people in cities. For example, the UN-Habitats NUA and central theme under Habitat III boldly states "The transformative power of urbanisation" (UN-Habitat, 2016b).

Turok raises the important debate, and questions if reliable data indeed supports this causal relationship view about urbanisation and development, the time frames of which it unfolds and the national context. This question is asked considering the critical context of developing countries that face enormous pressures to "raise household income levels and well-being" (Turok, 2018:93). Are pre-conditions required to ensure a positive causal relationship? The contemporary corollary suggests that urbanisation will lead to prosperity.

However, the evidence of developing countries (particularly with lower levels of GDP) undergoing rapid urbanisation, manifests itself in negative consequences of chronic traffic congestion, squalor, poverty and social issues. These issues are so pronounced that according to UNDP three-quarters of governments have policies in place to restrict rural-urban migration (UNDP, 2012). This evidence conflicts with the concept of transformative powers of urbanisation, yet in 2009 the World Bank argued that much of Sub-Saharan Africa is under-urbanised, and could benefit from faster urbanisation and bigger cities (World Bank, 2009). Rwanda and Ethiopia are however following China's remarkable economic growth by combining urbanisation and industrialisation which saw 500 million people lifted out of poverty over the last three decades (OECD 2013; World Bank, 2015). Based on the Chinese precedent, Turok argues that to ensure urbanisation will further prosper, government policy for cities would need to take priority. Planning for city growth would also need to lay the foundation to build economic growth that will allow for revenue returns. These returns could be retained and re-invested in infrastructure to support further growth and human well-being. The question then asked, is under what "suitable mediating conditions" the NUA would support self-sustaining development (Turok, 2018:93-94).

To answer this questions of under what “suitable mediating conditions’, Turok further examines the causal relationship of urbanisation and growth by unpicking the concepts and definitions. Urbanisation is an increase in urban dwellers in relation to the total population. Growth is an increase in economic output, activity and income. Development is a broader term in that it considers economic development that increases production, equity and improves sustainability. Turok then challenges the notion and ubiquitous statements that urbanisation alone has a direct causal effect on economic growth and implies that it is a pre-requisite for success (Turok, 2018:94). While rural-urban migration will provide labour, it is typically not skilled labour and rarely a constraint on growth of business. With low skills, migrant income opportunities are low and therefore will not dramatically increase consumer demand for goods. If anything, this will encourage informal sector growth of entrepreneurs (albeit with limited business skills and capital) to grow businesses and make a significant contribution to economic growth.

Other views such as Jacobs (1984) see value in relative density and social diversity that permits ‘intense interaction’ and fosters fierce competitiveness and the need for ingenuity and innovation as well as harnessing of diverse skills. These interactions then foster, negotiation, co-operation and learning. Such densities allow for economies of scale in higher production of goods facilitating lower costs. Higher densities also allow specialisation of skills that would further increase production efficiencies and cost competitiveness. These interdependencies support the urbanisation and economic growth causal link. Turok argues against the underlying problem statements that population growth can come first and then spur economic development (Turok, 2018:95). This statement ignores the underlying economic founding conditions typically associated with the origin of cities where migration occurs in response to opportunities. Potts (2016) notes where urban economics are growing strongly, that migration increases and vice versa. Turok further analysed empirical evidence from various studies using ‘cross-country correlations’ of urbanisation and growth. Statistical results indicated that “highly urbanised countries are more likely to be prosperous” (Turok, 2018:96).

However, these studies represent only a snapshot of data. Therefore, the statistical evidence alone is not enough to provide evidence of the causal relationship. Studies of changes in urbanisation and growth over time for numerous countries will provide a richer picture of the correlation. Turok reviewed evidence from Henderson (2003) who studied 70 countries from 1960 to 1990. This study found little evidence to support urbanisation drives growth. However, the Brulhart & Sbergami (2009) study, analysed 105 countries from 1960 to 2000 and found ‘some evidence of a positive association’ and surprisingly in low-income countries. The results however varied for locations and underlying economic structures and where “far from homogeneous or ubiquitous” and described in their own words as ‘suggestive at best’ (Turok, 2018: 97). However, this does infer that ‘urbanisation is intrinsically linked to growth in developing countries’ although the methodology did not allow for isolation of specific causal effects. In another study by Storper & Scott (2009) they also concluded that urbanisation and growth are ‘closely intertwined’ but may be statistically impossible to identify specific causal effects (in either direction).

Turok then concludes that further undisputable evidence exists of many sub-Saharan African cities where rapid urbanisation over a long period of time has not resulted in economic growth. This may be because of 'push' factors rather than 'pull' factors where urbanisation has occurred because of changing rural conditions. These can relate to climate change, conflict or disasters which clearly indicates that urbanisation is not always related to growth. Turok concludes that there are other mediating factors restricting positive growth in developing countries and are poorly understood (Turok, 2018:97).

To better understand these 'other mediating factors', Turok views urbanisation and economic development as a two-way process with extensive feedback. Urbanisation is not a cause or symptom of growth, but an increase of density and human interaction that can both enable growth and be an outcome of growth. However, much depends on the 'form of urbanisation' and 'composition of the economy'. The result is that widely differing variables make it difficult to measure the effects of the causal relationship. Although a mutually re-enforcing recursive relationship would arguably require economically functional urban conditions. These conditions also do not occur naturally or because of market forces, but require collective effort in the form of planning, regulation, co-ordination and infrastructure investment. In Turok's view, industrialised economies that produce goods help to increase productivity, employment and income. In commodity based economies, goods are typically exported without local beneficiation and tend to promote inequality in urban areas (Turok, 2018:97-98).

#### 2.2.5. URBAN LAND-INFRASTRUCTURE COORDINATION

Unstructured or un-coordinated growth carries the risk of permitting gridlock, exhausted infrastructure and adverse impacts on natural environments with higher living and business costs imposed (Turok, 2018:99). Scott & Storper (2015) advise that "these dysfunctionalities would unquestionably undermine the viability of a city, for market forces alone is congenitally incapable of regulating the urban commons in the interest of economic efficiency and social well-being" (Scott & Storper, 2015:8). Turok sees four interrelated ways in which a cities physical structure can become disorderly and chaotic. The first is the incorrect allocation of land at inappropriate densities and land uses. Second is fragmented land ownership that may remain undeveloped due to land banking (speculation) or other reasons. In such cases authorities may not have the legal powers or capital to expropriate for benefit of the city. Thirdly urban growth can be constrained by underinvestment of infrastructure. The critical point made is "Urban infrastructure provides the spatial skeleton that supports the location of housing, industry, retailing and public services" (Turok, 2018:99).

Another critical aspect and the most difficult challenge in city planning is the high cost of infrastructure and low affordability of the population to purchase land, build dwellings and pay for services. In Turok's words these are 'serious obstacles' and can severely disrupt informal settlements if required to be retrofitted after settlement patters have formed (Turok, 2018:99-100). This observation highlights the need for an urgent change which is the critical preoccupation of this paper.

This is supported by Angel (2016) who argues “There is a sequencing problem in that it is best to prepare ahead of urban growth by investing in serviced land in advance of settlement, but the tax base only grows after development”. This is a problem of financing where municipalities may lack authority and capability to prepare in advance of settlements. Alternatively, infrastructure could be financed through value capture where revenue may be generated from taxes, development levies or through sale of ‘air rights’ for higher densities where supported by public transport networks. It is also difficult to control decisions of individuals, firms and state entities, however where cities are “well-configured, compact and connected” they can generate positive benefit of access to affordable services, income and employment (Turok, 2018:100).

To better understand external investment decisions, Collier & Venables (2015) make an interesting conclusion in that housing provision is dependent on investment of private sector firms nearby, and public-sector investment in infrastructure to ensure the housing is effectively linked to the city. Accordingly, cities that manage their ‘urban land-infrastructure-coordination nexus’ are more likely to have better functioning cities and property. The concluding critical theme of Turok is to ‘plan ahead’ to develop ‘coherent land parcels’ that will streamline redevelopment of ‘well-located’ sites that will permit ‘structured layouts’ and greater building density. Infrastructure investment will also improve mobility and liveability (Turok, 2018:100). Turok is clear in his assertion that to realise the urbanisation potential, the underlying condition is that of having a foundation and composition of economic growth. He also confirms that ‘broad-based industrialisation’ is more likely to foster positive urbanisation and economic development than commodity based exports. To support his argument Turok notes there is greater employment in manufacturing and in local supplier opportunities than in commodity exports (Turok, 2018:100). Turok suggests urban policy needs to support industrial policy to help cities produce more (and hopefully re-use and recycle) of what they consume to ensure income from commodity exports is reinvested in urban infrastructure and productive activity.

Turok concludes his study by stating that “Enhancing the character or ‘quality’ of urbanisation would seem to be much more valuable than trying to accelerate or resist it” (Turok, 2018:101). In support of this proposal, governments should be trying to assist individuals and firms gaining access to well-located and serviced land rather than trying to exclude them. Most cities could do more to improve opportunities for new firms and to make available well-located land for these purposes and especially for those currently living in squalor. In addition, government could do much to improve existing informal settlements. They could provide land, basic services, assist with upgrading shelters, support livelihood creation and lastly “relax petty rules and regulations that frustrate people trying to gain a foothold in the city” (Turok, 2018:101). The key factors summarised are land allocation, land assembly, infrastructure and co-ordination of land use that will directly influence and support investment decisions. This work cannot be left up to market forces alone and requires strong government support.

In Turok's closing comments, it is interesting to observe his statement on 'relaxing the rules' as town planning and building codes are historically in place to protect property interests. However, in the case of the poor they are exclusionary and deter them from any voluntary upgrades unless they can comply with these rules. Otherwise if they do not comply with the rules and do not have any form of tenure or permission to occupy as security, their efforts may be wasted. This points to the need to evaluate the rules and how they benefit or deprive all. Turok alludes to this point, but infers that it is important that we consider re-writing the rules (Turok, 2018).

#### 2.2.6. ECONOMIC DEVELOPMENT

Srinivas (2018) argues that economic development requires a framework within the public planning process. Further to this Srinivas concedes that it is far easier to criticize plans than formulate them in defence of the disadvantaged (Srinivas, 2018:127). It is suggested that planners need to increase their skills in this area and develop a new 'lexicon' to maximise benefits to the disadvantaged in the planning process. Economic development typically involves productive structural change and institutional reform of plans. This includes a visioning process that also articulates goals and targets which requires supporting policy and public administrative capacity suitable for the location (Srinivas, 2018:127-128).

Within the visioning process described by Srinivas, he also makes the point that single factors such as climate change for example require us to plan for new economic sectors, create jobs and innovate to make our cities more resilient and reduce our environmental impact. Critique is not sufficient to deal with our developmental challenges and requires 'professional planners' which includes policy makers and public administrators "with imagination and tenacity" to respond. This also requires the inclusion of economic planners in teams with understanding of dynamic change and how local planning can be imbedded in regional, national and international changing environments. Lastly Srinivas notes that these planners will need to consider "substantial experimentation in economic plans" (Srinivas, 2018:137).

#### 2.2.7. INFORMAL ECONOMY

In most developing cities, most of the populations income is derived from the informal sector (Skinner & Watson, 2018:140). According to Vanek *et al* (2014:7) the percentage income of non-agricultural employments is the highest in South Asia at 82%, followed by Sub-Saharan Africa to 66%. Skinner & Watson (2018) highlight the issue of this 'dominance and persistence' of this activity, yet policy continues to follow ambitions of 'world class' or even 'best practice' which completely contrast the status quo. They argue strongly that acknowledgement of the informal economy is required when finding an approach to urban planning that maintains this relationships to the city. To achieve this goal Skinner & Watson consider the reasons for locating business and how they make use of space. These considerations are critical to how urban planning can better inform 'spatial and infrastructure inventions' to improve productivity and earning potential (Skinner & Watson, 2018:140). In planning, it is important to understand the size and composition of informal sector as this can vary widely from country to country.

South Africa for example has a 33% non-agricultural share of informal employment compared to 76% in Tanzania (Skinner & Watson, 2018:141). This major difference is likely to be attributed to larger mining, industrial and manufacturing sectors in South Africa. The term 'informal sector' was phrased by Keith Hart (1973), at a time when most believed it would transition into a formal economy through industrialisation. Various literature defines different schools of thought on why some 'choose to operate informally'. All of which as noted by Skinner & Watson makes no reference to spatial or 'urban imagination'. Contemporary planning and policy discourse appears to acknowledge the fact that the informal economy state is persistent and more effort is being made to support and formalise this economy.

This recognition of persistent informal economy co-insides with a change of perspective of informal traders previously seen as tax evaders. They are now being recognized as a group requiring protection in terms of income and policy to support their upliftment 'within a right-based approach to formalisation'. This transition would require maintaining existing livelihoods and improving them. (Skinner & Watson, 2018:143). This would signify as some theorists such as Porter (2011: 116) maintain that: informality is not "outside" of formal systems but instead is "produced by formal structures and always intimately related to them". This sentiment is also echoed by Yiftachel who sees the "state, and planning as deeply implicated in the production and maintenance of informality" (Yiftachel, 2009:89). Skinner & Watson note the importance of recognising these issues and bringing them back into policy discussion. This is particularly important in that urban planning institutions, regulations and planning practice can vary around the world. However,, all factors implicitly through land use and business regulations look to constrain the informal economy (Skinner & Watson, 2018:144). The degree to which these regulations are enforced or ignored may depend on political choices (Skinner & Watson, 2018:145). Skinner & Watson raise a very important question. Does the informal sector have the right to trade in public places? Courts have recognized this as a constitutional right for people to work in the street to earn an income in Columbia, Mexico and India (Skinner & Watson, 2018:146).

As an observation on the rights of informal traders, it is an interesting debate as to how authorities would differentiate between those genuinely looking to earn an income and those looking to avoid costs of conducting formal business. This raises various interesting questions. Does this add character to the city or detract from the quality of the public realm? Does this attract or deter private sector formal investments if informal trading is permitted in the adjacent public realm?

Regardless of the debate on rights of informal traders, if a public place is secured, there is ideally a requirement for basic infrastructure such as electricity, water, toilets, tables, basic shelter, storage and refuse removal (these according to interviews with street traders in five cities in South Africa). Looking at the informal sector in more detail, food production is a common mode of vendors. Food production in the informal context (particularly where lacking infrastructure) is assumed to be a health risk. However, Skinner & Watson believe if this assumption can be removed, it can provide positive benefits if "correctly supported and managed" (Skinner & Watson, 2018:146-147).

Such visions of including informal trading in public spaces are not envisaged in the rhetoric of a 'global city' (or even smart city) which are typically supported by local politicians and business (Skinner & Watson, 2018:145).

As a commentary on rhetoric highlighted by Skinner and Watson, it is interesting to note that the direct linkage as to how these global cities will benefit the poor and help transition does not appear to be articulated and at best implied it will occur naturally. The contribution of the informal sector (particularly in developing countries) to the economy is seldom recognised or promoted (even if supported). There is also a gap between the needs of the informal workers and the municipal officials usually charged with 'planning and management of informal work places and spaces'. Skinner & Watson have made a compelling argument for greater support of informal sector which is dominant (and not in decline) in many urban economies over the world. Most policies of cities seek to contain rather than promote this sector. Planners (urban spatial) therefore have an important role to better understand the informal sector activities and engage in dialogical debate to further support and integrate this sector in the city (Skinner and Watson, 2018:140-150).

#### 2.2.8. URBAN FINANCING

In any urban development planning, finance is required to create robust plans, implement and manage them (includes infrastructure provision). According to Smoke (2018) this element is neglected and essential for urban governments to realise their potential. Some of the reasons for the neglect of the finance element is the diverse institutional structure which makes operating developmentally complex, as well as it is not clearly defined in law and practice. Smoke advocates the need for governments to better understand the finance-planning linkages and how to improve their fiscal power for further development (Smoke, 2018:153). This misalignment perhaps starts from a historical position as Smoke explain that physical (land use and physical infrastructure) and development planning (socio-economic) were seen as distinct functions. In addition, early planning was deemed more of a technical nature handled by experts. In contemporary planning, there has been greater acknowledgement of the finance element as part of a political process which involves multiple actors at urban level. Smoke sees that the planning-finance nexus needs to consist of various technical, intergovernmental and other elected bodies. All of whom will have key interactions and relationships which also need to include citizens in the planning and budgeting process (Smoke, 2018:154). Smoke further highlights that differences in governmental structures can "have great implications on urban planning and finance". These differences can relate to sources of revenue or funding/borrowing and by whom they are collected and distributed (e.g. national, provincial and local government). These structures can influence decisions and ability to implement plans if restrictions or tensions in priorities exist as they introduce difficulty in accountability (e.g. where funding is withheld due to conflicting priorities) (Smoke, 2018:154).

On other issues, Romeo & Smoke (2016) highlight the fact that in developing context urban planning focuses on creating a vision with less attention on how it will be implemented and resourced (financed). Smoke advocates institutional finance management reforms will be required to improve the finance-planning nexus. This critical role of finance in urban planning is subject to 'many attitudes, systems and behaviours' but can be better understood by simple planning and implementation process in a basic six step process.

This 6-step process consists of: 1) Policy Review and Performance; 2) Set Policy and plan (including finance); 3) Allocate funds/budget; 4) Implement plan (capital investment); 5) Monitor activities and expenses; 6) Evaluate/audit results (Smoke, 2018:156). Urban finance is critically dependant on sources of revenue which has traditionally been a weakness in developing cities. With high levels of informality in developing countries, it is unsurprising that property taxes are typically only about 0,5% of GDP when compared to 2% of OECD countries (Smoke, 2018:157).

Other sources of own urban revenue can include property tax (as mentioned above), fees, licences, charges, and business tax (Bahl & Bird, 2008; Martinez-Vazquez, 2013). Revenue for some countries may be obtained through national government as VAT and resource taxes. These taxes can be redistributed to local government in the form of grants or fiscal transfers (Smoke, 2018:158). Beyond own revenue, local authorities may borrow money provided they are permitted to do so and can provide requisite creditors guarantees (Smoke, 2018:159). Other options to generate revenue include land value capture which is generated through increased land value through incremental infrastructure improvements (e.g. roads, transit, water, sewerage etc). Options of special levies (can be applied to developers to fund infrastructure that will raise property values), tax incremental financing (borrowing on future increased property taxes) and land readjustment (can be pooling of land to sell for financing or sale of air rights). Smoke confirms that whilst there is much debate on how to measure land value and recovering of infrastructure, land value capture is a reasonable way to increase urban revenue. This does however require strong institutional capacity. Another option is that of Public Private Partnerships (PPP) where a private party can implement and manage projects to user specification for revenue or defined payments. Successful implementation of PPP projects requires good supporting legislation and institutional capacity which is not typically found in developing contexts (Smoke, 2018:160). Smoke concludes that various financial reforms can be 'blended' to improve urban planning-finance linkages, but cautions that 'not everything can be done at once' and various actors involved will need to 'learn' how to reinforce partnerships, collaboration and devise improved implementation strategies in 'pragmatic ways' that will improve urban governments to play a stronger role in sustainable development (Smoke, 2018:164)

### 2.2.9. CLIMATE CHANGE AND DEVELOPMENT CO-BENEFIT PRECEDENTS

With global awareness of climate change, developing cities have recently and are increasingly responding by seeking mitigation and adaptation through implementing environmental sustainability action plans (Chu *et al*, 2018:169). Developing cities face increased pressure to develop adaptation as they face disproportionate exposure to impact and lower capacity to respond (Bicknell, Dodman, & Satterthwaite, 2009). Nevertheless, most cities are moving to protect infrastructure assets and buildings from impacts. Chu *et al* highlight the urban development issues facing municipalities in developing context such as poverty reduction and the need to improve economic growth. Tensions result where 'conflicting priorities and practices' make it difficult to understand how to balance climate adaptation and urban development needs.

Chu *et al* explore how this urban adaptation planning can be balanced to support more equitable development. They suggest that this can possibly be more easily achieved through learning from adaptation examples in other cities. The selected cities for adaptation examples include Medellin (Columbia), Durban (South Africa) and Indore (India) (Chu *et al*, 2018:169). With development defined as a process of economic growth, livelihood improvement and poverty reduction (or even eradication) climate change is in fact linked to development through four linked concepts. The first link is the fundamental principle that from unsustainable development (e.g. increased carbon emissions) we are experiencing climate change. Second is the reverse concept that sustainable development will reduce or reverse climate impact through reduced carbon emissions (Bizikova, Robinson & Cohen, 2007). Third according to (Ayers & Dodman, 2010; Carmin *et al*, 2015) climate change reduces previous gains made in terms of poverty reduction. Lastly, climate change where conceived to fundamentally change future paradigms can in fact support transformation of unsustainable pathways. This according to Shi *et al* (2016) is where the problems experienced bring the challenges into focus and demands change to avoid a clearly untenable outcome. Chu *et al* and others see broad consensus in that greater adoption and implementation will be achieved when climate adaptation issues are associated or aligned with development agendas rather than seen as provision to reduce risks (Chu *et al*, 2018:170). The three examples listed and to be discussed further include mainstream strategies of climate adaptation using development planning tools.

In Medellin, there were many examples of households placed at greater risk of mudslides from increased frequencies of storm events. The adaptation involved re-creation and connection of a greenbelt as well as improvement of public space. This adaptation was not in the absence of tension where certain households at risk, where required to be relocated in the creation of the greenbelts. However, through participatory designs the advantages of reducing risks and developments stress was implemented. Although not without its impacts such as concerns of economic loss and 'green' gentrification some success has been achieved in mitigating risks.

The Durban example focused on a similar theme of increasing 'carbon sinks' for pollutants where three areas were re-forested by local communities. This was done to offset the carbon footprint associated with the construction of the 2010 World Cup soccer stadium in Durban.

Lastly the Indore case involved the building of a reverse osmosis plant to provide fresh water to a 5000 population village previously without piped water. In addition a rain water harvesting and filtration system for greater re-use and water conservation was constructed. The project was mainly implemented and maintained by a women group with some support in the form of reduced electricity provided by the municipality. This represents a good example of where development needs are closely aligned 'co-benefits'. Development benefits included improved livelihoods from health benefits and easier access to water, which thereby saved time collecting water and provided income to reduce poverty thus creating co-benefits.

To support these co-benefits, Chu *et al* identify two sources of tension that may require resolution. The first is conflicting strategies, priorities and capacity constraints. To solve these conflicts will require champions or leaders as well as the forming and building of partnerships across sectors. It is suggested from the case studies of Indore and Durban, where experimental approaches were adopted that these are more likely to be 'more effective, legitimate and inclusive' for climate adaption. The second tension relates to municipal interventions and grass roots initiatives by communities. Whilst communities may benefit from poverty reduction through participation, the difficulty lies in scaling up these projects. This is due to lack of skills and resources with the results that more powerful actors may then find ways to take up the adaptation benefits and once again marginalise the community. The challenge is for cities to find 'more transformative adaption strategies' that support just and sustainable development. Chu *et al* advocate that cities will need to further experiment with new cross-sectoral partnerships and civil society 'to support inclusive, sustainable and pro-poor adaptation' (Chu *et al*, 2018).

#### 2.2.10.FOOD INSECURITY

With rapid urbanisation, poverty and food insecurity historically associated with rural conditions is now shifting to urban areas (Crush, Frayne & Pendleton, 2012). Battersby (2018) has identified the need to improve food security and nutrition in African Cities. Battersby (2018) further argues that urban planning in the form of spatial planning and land use planning can effectively support this need in the African context. To ensure food security requires four key pillars which includes 'availability, accessibility, utilisation and stability'. Battersby (2018) contends that through planning, these four pillars can be supported. Availability relates to the types and balance of foods available to meet healthy nutritional needs. Accessibility relates to the financial and spatial accessibility of these nutritional range of foods. Utilisation is contingent on access, storage, clean water, refrigeration and health conditions. Lastly, stability is the reliability of meeting these abovementioned requirements.

Battersby (2018), then highlights the historical view of planning (related to food security) which 'has been virtually ignored by planners', although contemporary policy of North America and Europe is placing more emphasis on planning. In Africa, Maxwell (1999:1940) suggests priority is given to "more urgently visible problems" such as housing and sanitation. Battersby (2018) contends the problem relates to lack of clear mandate within sub-national or urban government. As well as due to persistent views that food security is a rural and production related condition.

Other reasons suggested by Battersby (2018) relate to the current discourse of a 'modern African city' which largely follows previous colonial or neo-liberal planning and land-use. Narratives of 'Africa Rising' and 'future cities' depicted in master plans (as heavily criticized by Watson (2014) and labelled 'new urban fantasy plans') do not reflect the current realities of African cities. Nevertheless, Battersby (2018) has noted a marked shift in planning focus on municipalities in African context to support urban agriculture. Support has also been received from various development agencies and NGO's working in urban areas to support urban agriculture. In support of urban agriculture, Habitat III NUA Un-Habitat (2016) see place for 'more purposive food system planning' in African cities.

Considering increased global interest and awareness of the pressing need to improve food security in cities, Battersby (2018) sees the opportunity for planners to understand how urban households access and utilize food and 'develop planning responses that acknowledge these realities'. These planning opportunities relate to how urban planning can improve access and affordability of healthy nutritional food for the urban poor. The opportunities range from food production through to food preparation which is a significant activity within the informal sector. With consideration of the full food system, Battersby (2018) highlights an opportunity normally missed. This is to plan for space and better infrastructure for food vendors at transport interchanges. This could support both informal sector by ensuring zoning is not exclusionary and improving health issues related to food preparation. Battersby (2018) concludes her argument that planning of food system components fall within the role of municipal planning which can offer further opportunities to meet 'economic, social, environmental, health and other objectives' (Battersby, 2018:204-211).

#### 2.2.11. TECHNOLOGY IN THE CITY

Contemporary discourse of the 'smart city' according to Odendaal (2018) is used to describe an all-encompassing manner of the relationship of technology and cities. This relationship assumes technology will ensure efficiency and progress within the city. Odendaal (2018), however notes that such a relationship has changed and no longer evenly applied across cities. This is due to various reasons such a neo-liberal practice and corporatisation of infrastructure where it is no longer deemed a 'common good' and only those that can afford it are provided a service. The result is 'fragmented delivery of infrastructure' and unplanned or unmanaged spaces without infrastructure which has often manifested itself in stark contrast of formal and informal spaces. These spaces can be adjacent or divided by a road or fence in what is described as 'splintered urbanism' (Graham & Marvin, 2001).

To combat these fragmented infrastructure spaces, Odendaal (2018) explores ways in how the relationship of technology and spatial governance could help empower people (developing context) in an inclusive way. The exploration avoids following the smart city vision narrative, but rather focuses on 'technology appropriation' and the relationship with urbanism at different scales through technology adoption. Odendaal (2018) highlights the need to revisit our understanding of technology and space in terms of three dimensions. This firstly involves currently available on-line digital mapping and information for grass roots planning. This alludes to supporting the marginalised but are often almost invisible without such information.

The second relates to how this information can empower communities to engage with more powerful stakeholders and lastly how such information can be used for spatial governance. Odendaal (2018) does not deem technology as a 'panacea' to remedy uneven development, but certainly provides opportunities for innovation to intervene in the relationship of technology and space. The question raised by Odendaal (2018) is how can ICT support human and material agency interactions and overcome spatial inequalities? In some contexts, the opposite is true, where spatial constraints (or vast extents) limit access and spaces remain underserved. Access to technology may also be influenced by income and available bandwidth. This is in stark contrast to the planned 'smart cities' or 'well-off neighbourhoods' that have highly networked environments driven typically by corporates that provide superior access. This is where the largest revenues for hardware, software and data can be obtained. Put in other words, the poor receive an uneven service commensurate with what they can afford to pay.

However, returning to the point that technology can support addressing uneven development, Odendaal (2018) highlights the efforts made by Shack/Informal settlement residents International (SDI). SDI enlisted technology to understand the 'science of slums (informal settlements)' by studying from the bottom up development patterns or spatial logic. This study was done from mapping and GIS information of informal settlements with a view to establishing how 'spatial interventions can assist in improved access' (for ICT and other infrastructure). This information could then be used for self-enumeration and participation and engagement with state in planning or re-planning (e.g. re-blocking to facilitate infrastructure provision (or upgrading). Through these acts the community is empowered to partake in a more inclusive practice. Odendaal (2018) rejects the notion that 'smart city' technology alone can successfully intervene in such complex urban systems. However, it can play a vital role to support interventions and strategies to support planning for the marginalised (Odendaal, 2018:215-222).

#### 2.2.12. RESIDENCE IN AUTO CONSTRUCTED CITIES

Bhan, Goswami & Revi (2018:255) consider the notion that the definition of planning through application of laws, policy and plans is meant to shape the city in a certain way. Therefore, many cities of the 'global south' (or developing context) with consideration of empirical evidence have been built in tension of this notion, and not in accordance with planning intent. Cities built under these conditions (or lack thereof in terms of notion of defined planning) do not look like plans originally indicated, and neither do they conform to applicable laws. This is especially so in terms of legality of ownership and property. According to Caldeira (2014), "significant parts of cities of the South are built by residents themselves" and done so in an incremental manner, with "transversal engagements with official logics of legal property, formal labour, colonial dominance, state regulation and market capitalism" (Caldeira, 2014). Simply put these cities are not built in alignment with formal logic and rules but rather in conflict of them. Caldeira (2016) further terms this 'auto-construction' which forms the basis of mode for space production as 'peripheral urbanisation' (Caldeira, 2016).

Bhan *et al* (2018) notes that although Caldeira (2016) acknowledges there is significant variation in how this urbanisation occurs in different cities, there is consistency despite histories, location and politics. The consistency is that they are 'remarkably pervasive' in their manifestations in cities of the South. This consistency persists even though the modes of development (characteristics) can "vary and constantly transform" (Caldeira, 2016: 2-3).

With reference to this consistency, Bhan *et al* (2018) then seeks to understand what this mode of 'auto-construction' means for developing cities around the world. To this end, urban theorists have sought to better understand (in different ways), how auto-construction conflicts with formal planning and therefore its consequences such as informality and illegality. This understanding could then be used to determine how to intervene and improve this situation. The critical issue as evident from the context of a contemporary Indian city as argued by Bhan *et al* (2018) is that of spatial illegality because of auto-construction. This has been used by authorities to "block access to rights and resources" for auto-construct residents (Bhan *et al*, 2018:256). The lack of secure tenure then prevents residents from obtaining access to services as secure tenure is a pre-requisite to acquiring services. Bhan *et al* (2018) advocate that we need to re-think planning, policy and state action to better respond to auto-construction. To do so, a new framework that re-frames how we see residences through what they call "Intent to Reside Framework" is required (Bhan *et al*, 2018: 256).

When considering a new framework, the two broadest extremes of development where auto-construct may be 'futile' and strictly enforced planning viewed as 'hegemonic', Bhan *et al* does not believe we need to find a position necessarily 'slotted between' these planning views. Policy may not fully determine an urban outcome but will "certainly shape and influence them" (Bhan *et al*, 2018: 256). This observation in the context of a modernist planning approach versus auto-construct is significant as it highlights the differences in outcome influenced by the level of planning. Most often residences that are auto-constructed will not receive tenure "precisely because of the way they were built and settled" (Bhan *et al*, 2018: 256).

The simple definition of tenure according to Payne (2004: 167) is where the rights of individuals and groups will be protected by the state against forced evictions. Whilst those living in auto-constructed areas (mostly without tenure or different degrees of tenure) do not have security and will continually conflict with law and planning. This situation will also extend to incremental development that may relate to improving dwellings or accessing basic services. These increments will likely require negotiations and outcomes that are uncertain. This 'spatial illegality' presents clear obstructions and exclusion for residents wishing to improve their livelihoods. In addition, Bhan *et al* (2018) describe how the circumstances may also determine state action. A scenario is given where the state may wish to provide basic services to residents for health and ethical reasons. However, they may not be able to do so without 'violating regulations' that requires conditional forms of legality to provide services.

Bhan *et al* (2018) then seek to respond to this problem of violating regulations by building legitimate residency through the Intent to Reside (ITR) framework. The approach is applied in an Indian context where the basis to prove ITR is based off a 'legal and bureaucratic precedent'. Here basic criteria such as residence for the past 6 months and intention to further reside along with various forms of supporting evidence of identification is used. The ITR is then valid if intent is proven. Bhan *et al* (2018) conclude their provocation by addressing the need to recognise residents of auto-constructed cities as indeed workers and citizens who are entitled to some basic services. This requires basic criteria of residence described to offer more inclusionary practice. Lastly, Bhan *et al* explains that planning is a means of shaping the environment through "assemblage of attempts" (which alludes to experimentation) to deliver "services or entitlements" to developing cities (Bhan *et al*, 2018:255-261).

## 2.3. LEARNING AND EXPERIMENTATION

### 2.3.1. LEARNING

In contemporary urbanism, the distinct terms of 'informal' and 'formal' have endured in urban and planning theory as ways of describing a 'broad arrangement of urban space' (McFarlane, 2011). McFarlane (2011) however advocates that the terms are more than a simple descriptor and in practice is a "powerful distinction that has an active effect on urban imagination and practice", and therefore playing a fundamental role in the production of urbanism (McFarlane, 2011). McFarlane (2011) sees formality and informality as practices rather than separate geographies which 'both enable and restrict life' and both 'are involved in the production of space' (McFarlane, 2011). In earlier work, McFarlane (2011) set out to assert that the 'conceptualisation of learning' plays a valuable role in understanding the politics and practice through which our cities are 'assembled, lived and contested'. Through learning we can better understand urbanism, and present a "critical opportunity" to think about how to develop "progressive urbanism" or perhaps alternative urbanism (McFarlane, 2011:1). Learning emerges from "processes, practices, and interactions through which knowledge is created" (McFarlane, 2011: 3).

This learning plays a significant role in processes of urban change and politics where certain cities may learn from others policy discourses such as "knowledge cities" or "creative cities" resulting in travelling urbanism (McFarlane, 2011: 5). His main claim is that learning is "central to the emergence, consolidation and contestation of potential urban worlds" that is supported by three key arguments or learning processes. These relate to translation, coordination and dwelling. Translation relates to distribution of information across space and time and various actors or intermediaries that are critical to how this learning is constituted. Co-ordination is the setup of functional systems for management that may include a variety of tools such as plans, maps, policy, data, rules etc. Lastly dwelling relates to how learning is lived where people draw on memories, experiences and encounters through day-night, time, cycles and rhythms of how to attune and inhabit the city. McFarlane then introduces the concept of urban learning assemblage which is not simply a collection of elements as the description may suggest.

The learning assemblages are constituted by events in history, continually thinking of the actual and the possible, product of interactions, as a process of doing, and performing. Assemblage focuses on how the three processes of translation, coordination and dwelling “are spatially composed and aligned”. This is not a simple concept to grasp but simply put, assemblages help explain how learning can influence achieving a different urbanism (McFarlane, 2011: 15-31).

McFarlane further explains how in the process of dwelling, urbanites learn from spatial and social practice in the city as a sort of “experimental immersion in urban space-time”. McFarlane then considers in more detail forms of learning which relates to informal settlements: *incremental urbanism* and *tactile learning* (McFarlane, 2011:32). McFarlane explores how these forms of learning can be useful for planners looking to upgrade and improve life in informal settlements. He argues that incrementalism is key to how people learn the city. To support his argument, he draws on work by Simone (2008: 28) who also argues that no matter what state or fragmentation of cities, trajectories of incrementalism are persistent where houses and infrastructure through individual and sometimes group efforts (pooling resources) are continually “added onto bit by bit”. This view is supported by Edgar Pieterse (2008: 113) recognising the value of learning from “below-the-radar” small actions to extend housing and infrastructure. McFarlane further argues that such incremental urbanism and tactile learning is crucial to “how different groups address urban marginality” and can open new possibilities of urban dwelling (or urbanism) (McFarlane, 2011: 33).

In tactile learning, McFarlane describes a tactic as a “fragment that manipulates events and turns them into opportunities” or a “calculated action determined by the absence of a proper locus”. To explain these statements, McFarlane notes these tactics are the “kind of actions that are possible once people have been marginalised” by external factors or strategies (McFarlane, 2010: 54). An example of this and a contemporary feature in South Africa at present is that of service protests. It is probable that as a lack of participation, formal engagement, failure by state to deliver and effectively engage with the marginalised may be the only “actions” possible to create “opportunities” (McFarlane, 2010: 54). This type of action is intuitively captured and described in what Scott (1985) calls “weapons of the weak” learnt by doing and becomes a tactic to be heard and seek action (McFarlane, 2011: 60).

Other tactics of the marginalised are less controversial and can be supported by groups or social movements. These can relate to learning through groups that operate as learning movements such as Slum (informal settlements)/Shack Dwellers International (SDI). In what SDI terms ‘horizontal exchange’ the urban poor learn from each other. The kinds of tactic learnt relate to examples such as self-enumeration by the community which allows for interactions and creates a platform for engagement of unequal powers. This can foster a participatory approach to incrementalism.

Other examples include community saving schemes that may be used for extension or improvements of housing and in some cases completion or provision of infrastructure and management which can provide income. Such programmes or grass roots efforts can also include training as a component and tactic (McFarlane, 2018).

McFarlane further argues that the way in which people learn the city opens possibilities “for a critical urban planning” (McFarlane, 2018: 328). To explain further he draws on the work of Peter Marcuse (2009) who outlines three key steps of critical urban planning. These are; *evaluating* urban planning theory of dominant ideologies known to planning elites; *democratising* by assessing for whom the “planning learning process” includes. And lastly *proposing* alternative urban knowledge that will produce more socially just urban planning (or urbanism). An example given by McFarlane of a more socially just form of urban planning and urbanism production is that of the participatory budgeting process in Porto Alegre, Brazil. Here ordinary citizens including the marginalised could have a say in the decisions made on allocation of budgets in the city. Their input might provide greater benefit to their community in a more socially just and democratic process where ordinary citizens could learn and participate in planning. McFarlane however cautions that any such collaborative learning opportunity, will require political will as a pre-requisite on the part of the state to proactively engage. He sees great value in exploring learning for collaborative urban planning where focal groups could learn and identify and agree planning priorities through consensus. More radical forms of learning such as the Porto Alegre budgetary participation then lends itself more towards *co-production*. According to Beebeejaun *et al* (2015) they argue this is more than just inclusion to gather different groups perspectives, but rather a ‘genuine collaboration’ that challenges relations of power and where genuine learning can emerge.

In support of collaboration and co-production Diana Mitlin (2008) demonstrates how SDI used this strategy to strengthen relationships and partnerships with the state. Here the knowledge and input from the poor is used to form strategies to improve infrastructure and housing for urban development in a way that may even challenge planning and policy and leads to improvement in state competencies. Lastly, Satterwaite & Mitlin (2014: 215) argue further that co-production challenges urban visions (from both sides) and may inform the setting of new priorities whilst remaining accountable to the communities of operation (McFarlane, 2018: 330). McFarlane makes his argument about whose learning is important when he considers discourse of ‘smart’ cities which are technically and commercially driven by large corporate and developers that are also politically supported. In these typical “positivist rendering” McFarlane notes how residents of informal settlements do not appear. This McFarlane outlines is the challenge for urban researches to establish whose learning is to be used or how can alternate visions of the future be created in a more socially just way through urban learning (McFarlane, 2018: 331). McFarlane imagines an image of a “reassembled just city” as a progressive urbanism that continually “invokes an alternative, more inclusive urban commons” achieved through urban learning (McFarlane, 2011: 165-166).

### 2.3.2. EXPERIMENTATION

In thinking about different futures and new ways to plan and manage the cities we live in, experimentation is gaining popularity as “a mode of governance to stimulate alternatives and steer change” (Bulkeley & Castán Broto, 2012). To this end a variety of actors ranging from policy makers, private companies and other organisations are engaging in innovation activities to ‘trial alternative future visions’ of various economic and social development, infrastructural services and academic research (Karvonen, Evans, & van Heur, 2014). This experimental notion concept ‘feeds on attractive notions of innovation and creativity’ where the concept of sustainability can become a reality rather than distant goals and policies (Karvonen & van Heur, 2014).

Evans *et al* (2016) then sets out to understand and determine if this experimentation often with “radical ambition” but limited in scope has the “ability to prompt genuine change”. Previous research on international experiments addressing this question “suggests that there is no simple answer” (Evans *et al*, 2018: 1). Parameters of experiments can vary from extremes, such as ‘smart cities’ lead by corporates to grass roots social cohesion projects lead by civic groups at neighbourhood scale. They nevertheless share commonalities as ‘emerging fields of practice and theory’ and bring these different approaches into possible dialogue of each other. Urban experimentation is a framework to ‘arrange instruments, materials, people’ under controlled conditions to learn from these lived experiences (Karvonen & van Heur, 2014). Experimentation receives considerable ‘rhetorical power’ where the ‘promise of learning, and by extension innovation’ to ‘scale up’ the experiment is offered. Evans *et al* then brings into question the politics of experimentation in terms of who can take part and what types of experiments should be conducted as these may empower some and disempower others. For example, the choice of smart city vs informal settlement upgrading experiments where different groups may or may not benefit.

The choice of experimentation may also not necessarily be positive (for disadvantaged) and may even be part of the development strategy (Evans *et al*, 2018: 3). Watson (2014) and Hollands (2008) consider the use of ‘smart city’ discourse as a means of reducing or avoiding contestation of a development. In this case, to smooth the development process, a city is presented as technologically advanced (and perhaps if being rezoned from agricultural) and is considered “incontestable”. The process of measuring and definition of a successful urban experiment then becomes more important as the outcome is what could potentially be scaled up to city scale. With further reflection on the enormity of contemporary key challenges such as rapid urbanisation, resource depletion and climate change we seek “path-breaking innovations” based on explicit attempts of real life experimentation (Evans *et al*, 2018: 5).

A key factor in the success of including experimentation as part of urban practice will be the political mode of governance that itself is also experiencing dynamic change because of interventions to support this transition in seeking alternate futures (Evans *et al*, 2018: 9).

The key focus of the further literature review on experimentation by Evans *et al* looks at how to 'embed' experimentation into cities for long term that will prompt real and broad urban change (Evans *et al*, 2018: 10). Sengers, Berkhout, Wieczorek & Raven considers that experimentation can be grouped into two domains. The first relates to green technologies following technical regimes that will support new markets. The second relates to new terms described as bounded socio-technical experiments. Sengers *et al* based on general literature consensus, argue that a framework is required to evaluate experiments and proposes that evaluation should determine the extent to which they are " (1) inclusive, (2) systemic, (3) practice-based, (4) challenge-led, (5) sites of social learning and (6) adaptive in the face of uncertainty and ambiguity in fostering socio-technical change" (Sengers *et al*, 2018: 15). With this framework as reference the second domain of experiments at neighbourhood or city scale socio-technical experiments align better with this proposed framework that will likely include more diverse interests rather than the first domain of niche experiments that appear transverse at best (Sengers *et al*, 2018: 20). These according to Lezaum (2011) "will require sustained and high levels of financial, social and political support" (Sengers *et al*, 2016: 24-25). May & Perry (2016) make an interesting observation in considering extremes of urbanism (e.g. smart cities versus informal settlements) where 'symbolism' and 'global posturing' of competitive and smart cities appear to 'triumph' over the harsh realities of urban life such as that of informal settlements.

May & Perry also argue that affirming experiments of neoliberal practise will not provide overall benefit to the city but instead will further exacerbate massive inequalities. To reverse this trend, they advocate strongly for grass roots experiments to be taken seriously to prove that alternative ways may exist to better utilise our resources. This contrasts sharply with focusing mostly on commercialisation of sustainability research based on capital accumulation (May & Perry, 2016: 37-42). Marvin & Silver (2016) in empirical research and analysis of the existing kinds of urban laboratories found that most discourses related to technology relating to 'smart cities'. In these discourses, specific focus is on reducing carbon emissions and conserving natural resources through creation of more circular flows. Where many of these discourses fail, is in their ability to address poverty, inequality and can result in 'splintered urbanism' (Graham & Marvin, 2001). This further supports the argument for political support and intervention in what kinds of experiments (competing for funding) are conducted to debate and contest our urban future (Marvin & Silver, 2016: 57-58). For example, in evaluating ability of experiments to bring about change questions such as "what is the potential to produce socio-material change in urban infrastructures that challenges splintered urbanisms" (Graham & Marvin, 2001). Beyond political will to bring about change, another critical factor is that of *agency*. This relates to the interest or rather desire and purpose combined with the capability of the city needed to effect transformation (Ryan, Gaziulusoy, McCormick, & Trudgeon, 2016:63).

Notwithstanding supporting political will and required agency within a city to undertake experimentation, these experiments involve intervening in systems within the city. These systems are easily understood as being complex or indeed 'complex systems' and due to 'embedded interconnections' of the city and living patterns that it is unlikely that one component can be re-imagined and re-designed without affecting a larger connected system.

This challenge as Ryan (2013) determines will require a 'whole-system re-conceptualisation' and re-imagining of the city. Ryan *et al* (2016) further suggest that in modelling such an alternative future, it will not be possible to conclusively determine futures other than determine 'new possibilities' that could work. However, the final answer to transformation lies in "widespread experimentation in the real, messy, living world" that involves "wide-ranging dialogue with local citizens" that supports a participatory and co-production approach (Ryan *et al*, 2016: 64). In engaging with participatory processes Ryan *et al* examines the tactic of using virtual experimentation in the form of images to help participants imagine the future possibilities. It is suggested that these images are produced by design professionals to act as a 'provocation to conversation' that contains sufficient information to avoid confusion but can give comfort and allow for interpretation and dialogue. It is suggested that different audiences may require different presentations and may also need representation of time-scale. The use of a 'story-boarding' and sketches of everyday life can make a valued contribution and potentially assist in changing preconceived ideas or perceptions. When considering incremental urbanism, this type of tool has clear potential to embed a tangible outline of possible future pathway of development over time (Ryan *et al* (2016: 72-73).

On returning to review of the type experiments conducted, Rapoport (2016) in a study of sustainable urban projects (SUPs) pertaining to developments at scale established that these are largely driven by private developers who typically have a short-term view to develop and sell as quickly as possible to maximise returns. In this process, it is possible that long term costs (financial and environmental) can be externalised to end users and genuine full life cycle costs are not evaluated. In this case sustainability comes down to economic value where ultimately developers may only include sustainability features in a limited capacity where this fits into a development strategy where commercial value is added. Rapoport cautions that the current approach remains "only tinkering around the edges of conventional urban development" and we cannot rely solely on this approach to determine our urban futures (Rapoport, 2016:86).

Other literature of sustainability transitions argues for radical change in the way that people sustain their needs (Markard, Raven, & Truffer, 2012). This relates to consumption of resources and our planned and lived environments which forms systems also called 'socio-technical regimes'. These regimes comprise of multiple dimensions such as industries, technology, infrastructures, policies, politics and knowledge, all with different structures and influence of actors.

Navigating these regimes may therefore need varying strategies to deal with them (Gosh, Sengers, Wieczorek, Ghosh, Roy & Raven, 2016:123). Grass roots community initiative experiments may not be considered to constitute radical change, but co-exist in the city and have potential for innovation and valued contribution towards sustainability transitions.

An example of a grass roots community project is the 6000 square metre central community garden called Prinzessinnengarten within the city of Berlin in Germany, started in 2009. The project is an urban agricultural project inspired by a previous experiment in Cuba called *agricultural urbana*. The project purpose is to address lack of fresh produce, raise awareness of food production and increase biodiversity in the city. In the Berlin case, the extent of cultivated spaces and participation as well as the addition of activities has steadily increased from inception. At present there are 20-30 workers, 1000 volunteers and many visitors. The garden produces a variety of fresh vegetables, herbs, medicinal plants and accommodates other uses such a café, bee keeping and other small-scale activities such as a cycle repair workshop. The key theme of the Prinzessinnengarten is a sustainable approach where emphasis is on re-use and re-cycling (or refashioning) of materials to make simple infrastructure such as a drip irrigation system (using old hose pipes, flour tanks etc). The local community can come and immerse themselves in gardening and tactile learning activities which are in the format of a DIY approach with instruction through postcards, websites and books. The experiment is an 'intriguing space of grass roots experimentation' in an immersive learning environment. It presents opportunities for locals to grow their own food and sustain small business and in addition 'acts as an open space for ideas and projects' to support innovation (Wendler, 2016). According to Ingold this type of experiment will foster social engagement and communication that is unique and can create a 'taskscape' (Ingold, 1993: 158). This kind of project or small-scale experiment can speak strongly to food production and food security. As well as the possibility to build stronger communities that empower themselves. This is of particular value in a developing context where cost and availability of fresh nutritional foods, employment and poverty reduction are key challenges.

Over the last decade institutions who are conducting experiments are frequently calling themselves a 'living lab'. The term is not new and was described by Abowd, Atkeson, Bobick, Essa, MacIntyre, Mynatt, & Starner (2000) as a 'experimental platform' for new home technologies where partnerships to develop and test the products can be done in a 'ecologically valid' manner. This definition according to Schliwa & McCormick has not been defined further and can vary dependant on the institution as well as adapted to contemporary themes (Schliwa & McCormick, 2016). Other emerging terms for characteristics within living labs relating to human interface is that of 'user', 'citizen', or 'people' – 'centric' or 'driven'. The definition of these according to research by Schliwa & McCormick is blurry and terms are often used interchangeably. Juujärvi & Pessa (2013) see the key element of the urban living lab as being the residents of communities as users or in other words as ordinary people who want to solve real-life problems.

In the research conducted by Schliwa & McCormick, the common mode identified in review of various global case studies is that of the 'introduction of users as key stakeholders' in experiments. Other key dimensions and characteristics of the living lab is that of bounded geographic space and time, institutions (stakeholders), intentional experiment (e.g. ICT), knowledge (focus on learning in lived environment) and networks. In this study, a scale rating of case studies analysed is suggested to rate the probability of the lab having a 'transformative impact' at various scales (e.g. building, neighbourhood, city, region, international). Beyond this rating Schliwa & McCormick emphasise that measurement and reporting is an important aspect in the learning process to measure the impact.

These impacts of experiments are further sub-categorised into *direct*, *indirect* and *diffuse* according to Loorbach (2013). *Direct Impacts* relates to tangible results such as job creation. *Indirect Impacts* is follow up action such as further research and resultant policy change as a later result. *Diffuse Impacts* would represent the greatest impact where a "change of cultural and normative values within a society" occurs (Schliwa & McCormick, 2016: 172-173). This is paradoxical as Schliwa & McCormick note the most important impact would be the least tangible. A critical characteristic identified in this review is that of the intentional experiments which favour contemporary discourse such as 'smart cities' which according to (de Jong *et al.* 2015) has surpassed 'sustainable city'. This intentional experimentation characteristic of a living lab leads focus on a product or leading theme. Schliwa & McCormick see this as major finding in their work where two distinct streams emerge. The first is that of *product-service system* which can be more readily categorised as *user-centric*. The second is that of a *citizen-centric approach* in an urban area with focus to inspire citizens to participate in actual transformation to achieve sustainable development.

The critical conclusion of the research conducted by Schliwa & McCormick is that living labs must have a defined *physical arena* and have a *collaborative approach* with *different stakeholders* to "experiment, *co-create* and test innovation in real-life environments" (Schliwa & McCormick, 2016: 174). In analysis of this conclusion, the emphasis of *co-create* with *different stakeholders* is interesting in the question it would raise of where is this strategy most likely to have the greatest impact (e.g. in which type of city)?

## 2.4. INFORMAL SETTLEMENTS, PARTICIPATION, INCREMENTALISM AND PLACE MAKING

### 2.4.1. SUPPORT FOR UPGRADING INFORMAL SETTLEMENTS

By the mid-20<sup>th</sup> century (after the first wave urbanisation and now entering second increasing wave of urbanisation 1950-1990) it was clear that informal settlements were becoming inevitable, but were considered only as a temporary situation and a by-product of the process (Turner 1969, 1976; Turner & Fichter, 1972). The phenomenon was simplistically understood whereby rural-urban migration would occur and people without means to buy, rent or build, would locate on any land possible in proximity to work opportunities. They would then build temporary shelter until they find employment or gain an income and then upgrade to more adequate housing or secure formal housing through various options (Cirolia, Görgens, van Donk, Smit, & Drimie, 2016). However, Cirolia *et al* (2016) identify various flaws located in this view.

These flaws relate to assumptions that migrants will find employment whilst living cheaply in the temporary condition and that these settlements will disappear once further economic development gets underway (Cirolia *et al*, 2016). Evidence of population growth or urbanisation linked to economic growth to support assumption on employment is described as 'tenuous' by Fox for Sub-Saharan countries in Africa. In addition, high evidence exists of "low degrees of intergeneration socio economic mobility for households living in slum (informal settlement) conditions" (Fox, 2014; 192-193). In other words, the evidence does not support the assumption that migrant livelihoods are automatically improved over time. Secondly the assumption of cheap living is disproved in evidence that costs can be higher for services (than formal areas) in examples by (Gulyani & Talukdar, 2008; Lee, 2007). This can relate to lack of infrastructure, distance and extortion by land lords acting as service providers. Lastly no clear empirical evidence exists to support the relationship of an increase or decrease in informal settlements in relation to economic growth. Because of this evidence, new views have formed where urban population growth is faster than the economic and institutional growth and this manifests in what is termed 'disjointed modernisation' (Fox, 2014: 193).

Much of these new views as explained by Cirolia *et al* (2016), are through pressures of urbanisation that is not supported by economic growth and formal planning systems that cannot cope with the rapid urbanisation. An alternative view relating to this 'disjointed modernisation view' is that these exclusionary and sometimes exploitive (rent seekers) are in fact a product of decision makers. The state can decide what is considered formal and informal and can choose to continue such exclusionary practice or not. While it can be easily argued that the state does not have capacity (financial and institutional) to deal with these challenges, Cirolia *et al* reminds us of the clear 'agency' in the urban poor who have managed through their own means to create spaces and connect themselves to the city. (Cirolia *et al*, 2016).

Historical responses to informal settlements (late 19<sup>th</sup> century) was that of 'clearance' where informal settlements were demolished and replaced by public housing to primarily reduce health risks (UN-Habitat, 2003). Post-Second World War in developing countries, Smit (2016) notes that similar principles were applied to rapidly urbanising cities in developing countries. According to Huchzermeyer (2002), the informal settlement patterns presented security, health and a threat to the middle class and therefore by interpretation required 'eviction' or re-location. This resulted in relocation typically to 'peripheral areas' manifesting in segregated (excluded) communities which were viewed as a "pool of cheap labour" (Huchzermeyer, 2002:99). The assumption had been that these informal settlements would ultimately cease (Pugh, 1995). However, because of continued growth, new criticism of clearance policy emerged in the late 1960s and early 1970s. Turner amongst others began research and consideration to in-situ upgrading to formalise settlements (Smit, 2016). Turner argued that it is preferable to upgrade in-situ by improving infrastructure, and then dwellings could also be upgraded (incrementally) over time. In relation to self-improvement of dwellings this is far more likely when security of tenure is received (Turner, 1976; Turner & Fichter, 1972).

This in-situ approach was not without criticism as some like Burgess (1982) argued that upgrading would support commodification and result in forms of gentrification that would be exclusionary practice. At this same time the World Bank began to experience increased pressure from developing countries to fund infrastructure and housing. Combined with criticism of affordability of low cost housing and lack of available land for re-location, World Bank shifted support from large scale housing and infrastructure projects to a self-help in-situ upgrading approach (Smit, 2016). The overarching aim was to convert from illegal to legal settlements and the key approach was to provide 'physical infrastructure and hard service delivery' (Abbott, 2002). Other organisations have subsequently followed similar strategies although with varying approaches. An example of such varying approach is that of Huchzermeyer (2004) which advocated for the upgrading in a 'support-based' approach where the community plays the lead with support from a NGO. Whilst acknowledgement is given to informal settlements who auto-construct their own settlements in 'bit by bit' incremental fashion, the conditions for the most part are "not tolerable or sustainable" (Cirolia *et al*, 2016:17). This reality characterises much of African cities and for these reasons the UN-Habitat (2011) supports informal settlement upgrading as a preferred intervention as opposed to re-location. The focus is on the improvement of the physical, economic and social environment in a process which avoids displacing residents (UN-Habitat, 2011). Cirolia *et al* advocate for a "more holistic, transformative and sustainable approach" supported by two pillars of 'participation' (state and civil society) and 'incrementalism' (Cirolia *et al*. 2016:17-18).

#### 2.4.2. PARTICIPATION IN INFORMAL SETTLEMENT UPGRADING

Currently informal settlements can be attributed to a lack of governance and by implication would require new governance measures to resolve (Cirolia *et al*, 2016). It is argued by Cirolia *et al* that sustainable solutions cannot be achieved without input from affected stakeholders. Here decisions of what must be done, where, by whom and how thereby strengthen the voices of participants (Cirolia *et al*, 2016). Participation can be in two forms which may be a 'top-down' or 'bottom up' approach.

An example of a 'top-down' state lead participation is that of a state lead infrastructure delivery focused imperative in South Africa. Here stakeholder consultation is 'side-lined' as a compliance participation (Oldfield, 2008). With service delivery protest (as previously discussed) on the increase in South Africa, there is evidence that this phenomenon is linked to community dissatisfaction of governments processes (van Donk, 2012).

This reflects evidence of communities wanting to have a voice in decision making (for them). Cirolia *et al* therefore argue that 'radical bottom up participation' in planning and decision-making holds promise to address 'structural inequalities' and current dissatisfaction. This should be done in an inclusive and collaborative approach where the key feature of the participation is that of building *trust* between stakeholders. The process is unlikely to be without 'contestation' but through participation offers 'new options or alternatives'. These options may require negotiations and 'trade offs' achieved through participation of various actors. This process is reflective of an 'experimentation' process which fosters 'learning and adaption' to generate new solutions that would reflect technical and social knowledges from diverse stakeholders (Cirolia *et al*, 2016).

#### 2.4.3. INCREMENTALISM

It is recognised that urban environments are not static, but dynamic and constantly changing (Daniels, Kruger-Fountain, Garetto, Irrgang & Steyn, 2016). The dynamic city will maintain its public structure but individual elements will be subject to change over time (Crane, 1960). This view aligns with an incremental upgrading approach that is more flexible to respond and adapt to small changes over time. Incremental upgrading or incrementalism is inherently less disruptive and will have greater ability to maintain social networks and spatial layouts. Other benefits are that it allows for testing (experimentation) and adaption. In this ongoing incremental process, it would allow for participation of stakeholders and possible new ideas through contestation and negotiations (Cirolia *et al*, 2016). In other words, it allows the stakeholders to 'pause, reflect and learn' from the experience (Eglin and Kenyon, 2016; 402). Cirolia *et al*, however warn that there are substantial risks to incremental upgrading if a coherent vision and co-ordinated upgrade strategy and implementation plan are not in place. This can result in uncoordinated investment that does not add mutual value to the settlement. Lastly with weak partnerships, projects labelled 'incremental' tend to be left for the community to take responsibility. For incrementalism to succeed it will require supporting commitment to transformation through multiple spheres of policy, programme, plans, projects and practices (Cirolia *et al*, 2016).

#### 2.4.4. PLANNING APPROACH TO UPGRADING INFORMAL SETTLEMENTS

The term informal settlement is defined by the United Nations (1997:43) as a specific type of slum in which the key characteristics are defined as "where groups of housing units have been constructed on land that the occupants have no legal claim to, or occupy illegally" and/or "where housing is not in compliance with current planning and building regulation". This definition also implies that no formal planning and reservation of land use and parcels has been defined.

In addition, elements such as public space, road and infrastructure servitudes or reservation of land for other uses to support urban growth was not formally planned.

The role of 'formal' planning according to Dewar & Uytendogaardt (1991) is to show people (ultimately the client of planning) 'new horizons of opportunities' where they are 'offered rich choices' and can participate in making these choices. Under such conditions "planning can genuinely enrich society" (Dewar & Uytendogaardt, 1991:13). Physical plans have long been a tool of urban management to "structure" and "order" urban growth of cities. Dewar & Uytendogaardt believe that plans should allow freedom and at the same time exercise constraint to contribute to positive urban environments. To explain this further, the purpose of plans is to provide an overarching framework that is not only protective, but allows for individual creativity within the enabling framework. Within this freedom, more organic and complex "order" deemed more "liveable" is produced (Dewar & Uytendogaardt, 1991:24). In the informal settlement context, evidence of informal settlements reviewed in Cape Town show where houses can be grouped closer to create social spaces and living places of "great secrecy". However being developed without planning, they severely lack formal structuring elements. (Dewar & Uytendogaardt, 1991:65). This philosophy promoted by Dewar & Uytendogaardt amongst others from the 1970s to mid-2000s is now described as the 'public structure approach'.

This public structure approach has influenced the practice of many planning and design firms in Cape Town and related municipal departments of the City of Cape Town. This approach is a 'spatial tool' and 'starting point' for state intervention in informal settlements. Foremost, the approach seeks to provide 'public components' for community needs within a spatial structure that allows for "dynamic and transformative urban development" (Daniels *et al.* 2016:131). Analysis of historical urban precedents reveal that primary structuring elements such as 'public institutions, public space and movement patterns (corridors)' are key features of positive urban environments (Dewar & Uytendogaardt, 1991:55). These are areas where communities can share public space and is deemed a community need in addition to having their own private domain. Individuals quality of life is then not only determined by the quality of the services they receive and that of their individual dwelling, but also by the quality of public spaces and the rights they receive. This is achieved primarily through a structural function of how space is allocated (and designed) (Daniels *et al.*, 2016).

Social interaction of residents is 'enabled' through well-structured public space that is well connected with public circulation networks (Fiori *et al.*, 2009). For these reasons, the public space is valued above other elements and is proposed "from the outset to create human settlements where a level of dignity and citizenship is possible" (Daniels *et al.*, 2016:132). The public structure approach advocates governments focus (in South African context in this case) should shift away from focus of provision of housing and services to that of 'elements of public structure' as 'a critical element to service delivery'. Of significance is the strong argument that the public structure cannot be provided by individuals alone. At this point, the elements themselves (that individuals are deemed unable to provide or maintain) become important for collective needs. According to Lynch these elements include 'connections, public space, public facilities and public utilities' (Lynch, 1981).

To add to this argument an important aspect of public space which is not implicit in name is that these spaces can be used 'for different uses at different times and in different contexts'. The time frame could relate to day/night, weeks, seasons or years.

The functions of these public spaces could serve a multitude of uses beyond being primarily 'aesthetic and for recreation'. These multi-uses could include natural systems (urban rivers and wetlands or green corridors), or accommodate infrastructure such as roads or supply of utilities. In addition, these spaces could host events, accommodate trading locations (vendors, tourism activities) and small-scale manufacturing. The summary is that the public space system "is enriched to the greatest degree possible and resources are optimally utilised" (Dewar & Uytendogaardt, 1991:34). Lastly through diverse activities Dewar & Uytendogaardt (1991) believe these conflicting and competing activities will stimulate competitiveness and spur creativity to create rich environments. Although the public structure approach would need to be planned at the outset, it cannot be built upfront, or retrofitted quickly in the case of informal settlement upgrading. However, in both cases the public structure is linked to a dynamic process over time of urban, social and economic development and therefore incremental in character (Daniels *et al*, 2016).

#### 2.4.5. PRECEDENTS FOR PUBLIC STRUCTURE APPROACH

The public structure approach has been adopted and implemented in various projects executed by the City of Cape Town, South Africa. Of these, three noteworthy projects that can provide learning experience include; Monwabisi Park (5500 informal dwellings), Joe Slovo (part of greater Langa area) and the Dignified Places Programme (creation of 68 public spaces across the City of Cape town). Feedback of the three projects highlighted, show that partnerships were critical and greater demands on 'consultation' was required to build trusted partnerships. Secondly, by observation of how the existing settlements of Monwabisi Park and Joe Slovo were formed, it was found to be a direct result of the respective sites social, spatial and environmental conditions. These conditions determined how the residents used and navigated their space during every-day living. The public structure approach applied to the sites was therefore informed by in-situ conditions. The in-situ information was gathered from aerial photography, detailed enumeration processes combined with georeferenced data and from community engagement.

With in-situ information in place and where practical through planning, disruptions to daily activities were minimised and dwellings re-located only when necessary. The process was not simple and required significant resources and time. Political and fiscal pressures were also not conducive to allowing time to perform sufficient analysis (and engagements). Other issues identified is that of maintenance and management responsibilities (including budgets) after project completion. Lastly to adapt designs to accommodate existing conditions and introduce innovation can and did result in non-conformance of accepted engineering norms and standards. These deviations have implications for design professionals and authorities taking over designs and services. These are implications from a legal perspective relating to professional liability and accountability.

A suggestion to overcome this significant issue is proposed as that of establishment of a register of 'tried and tested' (experimented) solutions that deviate from norms and standards but provide an acceptable level of service to end users and can be maintained at appropriate costs by authorities and or communities. (Daniels *et al*, 2016).

#### 2.4.6. MANAGED LAND SETTLEMENT

In South Africa, the government have provided 3.7million houses from 1994 to 2014. However the backlog in absolute number of 2.1 million in 1994 has still increased to 2.3 million in 2014 (Sisulu, 2014). The result is that poor South Africans without housing then have a choice to wait for a government house (formally planned development). This can take years and the period of waiting is uncertain. Alternatively, they can choose to occupy land illegally (land invasion). With poor choices, Eglin & Kenyon (2016) recommend more options should be made available for accessing land and housing between these extremes. A proposed option is that of *incremental settlement* (IS). This involves a *step by step* process where a development is incremented in small increments over time. This approach can be adapted for two situations.

The first situation is that of informal settlements that have already formed by a process of 'auto-construction' where residents occupy the land and have constructed their own informal dwellings. In this case the settlement could be incrementally *in-situ* upgraded (ISU) over time. The second option is more pro-active in its approach where in advance of settlement, suitable land is secured to facilitate settlement. However, the site is not fully serviced in advance, as typical of formal planning, but undergoes some basic preparation and residents move in initially and further upgrading and settlements occur incrementally over time. This is called managed land settlement (MLS) (Eglin and Kenyon, 2016).

In South Africa, policy has supported the ISU approach to IS, but Eglin & Kenyon advocate that insufficient attention has been paid to the MLS approach. The key difference in the MLS and ISU approach is the sequencing of planning and provision of basic services. ISU does have advantages in that people have chosen their location and is often well-located to 'perceived employment'. However, without prior planning, these settlements lack structure and ability to generate opportunities. According to Dewar & Uytenbogaardt, the ability of a city to provide opportunities is not purely related to size, but "profoundly affected by the way in which the city is structured" (Dewar & Uytenbogaardt, 1991:16). The MLS approach has the advantage that through planning, an enabling basic structure is provided. Basic services are then added and a basic level of tenure security is achieved upfront. Settlers can then take the opportunity to build their own dwellings with their own resources and whatever state (government) help they may receive in an aided self-development process. Further incremental upgrades then increase the level of service of infrastructure, improve housing and tenure security is enhanced. Maintenance and improvements continue over time.

The ILS approach follows the same incremental steps to MLS but requires identification and negotiation with state to agree upfront which settlements are suitable for ISU. The key difference in the process then relates to the requirements and challenges of in-situ upgrades to retro-fit structural elements and infrastructure within existing spatial patterns. This invariably has higher costs to install infrastructure with constraints (e.g. more expensive and restrictive hand excavation required to install services adjacent to dwellings). ISU also requires greater data collection (mapping and enumeration), stakeholder engagement, participation and accommodation of existing constraints and re-locations (houses) where unavoidable. Further argument raised by Eglin & Kenyon to favour MLS over ISU is that of the initial settlement actions. For example, the ISU approach favours those who have invaded land illegally and then receive support to upgrade, whilst those who have not illegally occupied, and followed the law do not receive any benefit. This is clearly unfair practice. Other key advantages of the MLS approach, is that it can accommodate re-locations where unavoidable in ISU processes or from overcrowding.

MLS can also accommodate rural-urban migrations and immigrants or others who do not qualify for state assistance but are accommodated in a basic way (e.g. basic occupation of site and access to communal infrastructure e.g. standpipes) but may not receive title and other subsidies (Eglin & Kenyon, 2016).

Another similar approach used in South Africa by the Independent Development Trust (IDT) was that of site-and-service approach where a stand and full services are provided. This process requires greater capital outlay upfront, and was also seen as a start and end of process. The MLS approach however requires less capital outlay as only basic services are provided upfront and can limit and smooth cash flow and affordability for the state. Further upgrading aligned with government fiscal capacity can then continue over time. Another advantage of MLS over site and service is that of aided self-build support. The MLS process also can reduce or avoid land invasions and resultant informal settlement growth (where ISU is more difficult to manage). The biggest advantage of MLS is that beneficiaries can receive a piece land that has been 'formally allocated and publicly agreed'. This is the first major step in secure tenure whereby they can 'call it their own' and they can invest without the risk of eviction (Eglin & Kenyon, 2016: 400).

A valid criticism of the site-and-service process can be that of perpetuating urban sprawl by providing a single plot per dwelling. Eglin & Kenyon suggest this issue could be ameliorated through smaller plots with provision of a shared fire walls as a basic service to build against. This would require zero building lines i.e. houses are built right up the boundary of the plot. The MLS approach takes proactive steps to accommodate the poor. If supported by political will, could over time negate or reduce the need for reactive ISU upgrading (Eglin & Kenyon, 2016).

#### 2.4.7. INFORMAL ARMITURES (AN ALTERNATIVE APPROACH)

The MLS approach was developed and tested in a South African context to provide greater choice for people to access land and housing through a supported self-help process. Despite South Africa's unique history and profoundly unequal development, the situation is not unique. In most developing countries of the world, the population of informal settlement may equal or surpass that of formal settlements and may likely become the dominant urbanisation (Gouverneur, 2015). As a former National Director of Urban Planning in Venezuela in the early 1990's, David Gouverneur experienced challenges in efforts to house the poor in Venezuela. These challenges related to using typical quality oriented plans and ordinances, typically generic and not too dissimilar to those of older industrialised countries and resulted in further exclusion. The results were planned areas remained vacant, while other areas (for various reasons) were occupied illegally. Gouverneur then posed the question of how can rampant urbanisation be 'intelligently guided' that will include those currently excluded from formal planning approaches?

Through research and practice his suggested approach sought to provide the following:

"Pre-emptive planning and design should provide for informal occupation, minimize the difference between formal and informal settlement, foster sustainable living conditions, and promote a balanced relationship between the urban and the rural, particularly at the threshold between them" (Gouverneur, 2015:10).

This stark differential or splintered urbanism is a major characteristic of Caracas in Venezuela. An example is where the informal settlement of Petare and the formal city La Urbina are separated distinctly by a highway. Reflecting on global housing programmes to address housing demand, Gouverneur observed these have focused on quantity and not always quality where minimum standards are provided and do not offer much possibility to improve housing units. The capacity to deliver housing also seldom exceeds the demand. Gouverneur also observed that most informal settlers in early stages struggle to meet their basic needs of food, water and access to land to build a shelter. For these reasons, he advocates that social housing should not be the focus of solving informal urbanism as it is not affordable to them. His view recommends 'creating urban and managerial frameworks' that will permit residents to 'self-construct' using human capital available.

Much like the MLS approach, Gouverneur also confirms the challenge with informal settlements is the lack of 'overall urban framework' to 'structure public space' and provision of services and amenities. Hence focus should be directed towards providing 'adequate land' and 'urban frameworks' rather than housing. This framework should assist in facilitating access and opportunities of employment and income, basic infrastructure and amenities.

With this framework in mind Gouverneur introduces a viable alternative notion called 'Informal Armatures' (IA) experiment which is a hybrid approach that incorporates 'vibrant social' qualities of informality with 'sustained planned visions and design interventions' (Gouverneur, 2015:30).

This new paradigm includes clear theoretical, practical and pedagogical set of tools. It intends to merge 'formal design techniques' with the 'dynamics of informality' that will provide performative and morphological conditions within a transformative process. Critical contributors of the paradigm are: a) consistent management and community engagement; b) multi-purpose design of public space with areas reserved for infill of settlements and other uses; c) connections (multiple) are design and performance components to facilitate quick growth and transformation; d) introduction of same principles in informal settlements (Gouverneur, 2015:123). A fundamental difference in this approach from conventional planning is the focus of the public realm. These public space areas start with small interventions and is expected to transform over time to suit dynamic needs. As needs can change over time, some land is then reserved and kept free of occupations. This can be for interim purposes until dynamic demands dictate what transformation and land use is ultimately needed.

For example, a public space could be used as a communal garden for food production or recreational space until a greater demand arises and the original use is no longer required. The approach requires the creation of supporting conditions for sustainable development through engaging and educating communities to shift values where sustainability and survival are aligned and not in conflict. To achieve this kind of sustainable urbanisation will require low-cost, simple to implement, use and must be innovative solutions. Infrastructure solutions tested in industrialised context would likely require adaptation for developing context. The incremental approach does however allow for some testing and experimentation to suit context of the site.

Food production as mentioned in public spaces is a key priority to reduce the cost and availability of nutritional foods. Agricultural land use is seldom included in formal planning schemes and is proposed to aid food security and provide a visual break of continuous development. It is suggested that land with agricultural potential within or adjacent to the settlement is a key selection criteria when finding well located land. For schools within the development it is proposed that agricultural education is included in the curriculum.

For new open spaces, it is proposed that early planting of trees commences to support reducing ambient temperatures, provide shade and delineate spaces. The support of a diverse actors (e.g. NGOs, government officials, experts, schools, and public) with knowledgeable team members who are committed and transparent, are regarded as critical factors for successful implementation. Facilitators of this process would be required to deal with continually changing conditions. Upfront planning will need to be sensitive to natural features such as rivers and wetlands and other natural features that can enhance the site and provide additional amenity and biodiversity value. In terms of components the planning system is divided into three categories of Corridors, Patches and Stewards. The corridors provide the enabling structural framework that includes roads, walkways, infrastructure, natural features, and green corridors.

The corridors determine upfront the system of open spaces and framework for urban infill. The corridors therefore vary in width and include public spaces that are defined either as attractors or protectors. Attractors may then provide land for public space, public utilities & services, and protect areas for future higher density urban infill as may be determined over time. Protectors are then provided to conserve sensitive areas, agricultural uses and reserve areas with less intense activities and lower density for future urban infill. These would typically be located on the urban fringes to act as a buffer to rural areas and contain urban expansion.

The infill areas protected are the Patches. Within the patches are two further categories of Receptors and Transformers. The Receptors are areas made available for informal occupation where settlers wish to self-build their houses. The Transformers are the mixed-use land that will contain services, retail, commerce, manufacturing and other land use. These areas are expected to undergo rapid and dynamic change in land use as the city transforms. The Receptor patches should typically be accessible on foot and permit access to public amenities and facilities. Dependant on the means of the settlers, the Receptor Patches are suggested to accommodate settlers in three possible approaches of: Self-construct with basic services; site and services; or formal schemes. Essentially the approach is not a top-down or completely bottom up but a middle ground of previous attempts that is flexible for varying needs.

Lastly Stewards are provided to protect and enhance the performance of the public realm and will define land use, spatial and performance conditions. These stewards could either be institutions or community organisations but would need to be trusted by the community. In summary, the IA approach is seen a practical initiative that provides initial spatial performance framework and public realm.

The IA components will then support various configurations and evolution of public realm and guide where and what urban infill occurs. This will require varying infrastructure and design to suit the means of settlers. A critical success factor and possibly the most valuable element of IA for the poor is access to cheap (or free) land (that is also well located) to allow them to construct their own homes (Gouverneur, 2015:145). This approach is indeed an interesting hybrid that provides a pre-emptive framework that would also allow for spontaneity of informality and is flexible and adaptive to changing needs. This approach has been developed through academic research and practice experienced in a developing context. However, it has not been tested in the field. Gouverneur suggests that a pilot project (experiment) with adaptation to local conditions (including understanding of historic, cultural, physical, social and economic conditions) is required. This experiment will provide feedback and learning to support the theory and the approach for further development and application.

#### 2.4.8. INFRASTRUCTURE APPROACH

Firstly, what is Infrastructure and Services? According to UN-Habitat (2012), Infrastructure is defined as “an interconnected network of physical artefacts and organizational structures that supply basic services to humans living in a built environment”. Services are defined as “a beneficial service provided to humans by infrastructure, for example hydration and cleansing (from piped water), warmth and light (from the electricity grid), and hygiene (from sewage and solid waste management systems)” (UN-Habitat, 2012: ix). Cities are critically dependant on their infrastructure systems and services that flow through them (UN-Millennium Project, 2005:52).

Cities only occupy 3% of the worlds land area, but consume the bulk of natural resources at approximately 75% of all human consumption. Cities produce approximately 70% of all CO2 emissions (United Nations, 2011:15). With rapid urbanisation and resultant growth of cities, global resource consumption is increasing faster than population growth. In a study from 1900 to 2005 the resource consumption increased by a factor of 8. This was almost double the population growth factor (UNEP, 2011). According to the World Resources Forum Publications - Facts and Figures (<https://www.wrforum.org/publications-2/publications/> accessed 19 Jan 2018), by 2005 the global resource consumption was approximately 58 billion tons per annum. The 2005 resource consumption translated into 8 tons of primary resources usage and 4.5 tons of CO2 emissions per capita (Swilling, 2011). Using a ‘freeze and catch up’ scenario, if the world population continues to grow, developed nations will need to ‘de-couple’ economic growth and resource consumption rates. To do so they would need to maintain consumption rates like those in the year 2005 (irrespective of population growth). If developing countries then raise their consumption level to equal that of developed nations, then by 2050 the global resource extraction will be 140 billion tons per annum from a population of 9.5 billion people. Carbon emissions would triple from current and could represent a fourfold increase to 28.8 gigatons of carbon per year. These figures are according to the Intergovernmental Panel on Climate Change (IPCC) (UNEP, 2011:28-29). This scenario ignores the finite nature of many of the resources consumed and ultimately the carrying capacity of the planet. The carrying capacity relates to the earths bio-capacity to replenish resources such as food, wood and fish as well as the capacity to absorb pollutants and waste (UN-Habitat 2012:7).

The above scenario follows how cities where traditionally planned. In this planning, resources, land and air space to dump waste was unlimited. The result is carbon emissions manifesting in climate change (global warming), resource depletion and degradation of bio-diversity systems. With all life dependant on these factors, planning without consideration of environmental limits clearly represents unsustainable practice. Because of these unsustainable paths, Swilling, Musango, & Wakeford, (2016) defines sustainable cities as those that can reconfigure metabolic flows. This reconfiguration calls for reduction of resource consumption to 6-8 tons of primary resources per capita per annum, and similarly reduce carbon emissions to 2 tons of CO2 per capita per annum (Swilling *et al*, 2016:4). These figures are proposed by the International Resource Panel (IRP) (established by UNEP). The figures suggested by IRP are intended to limit material usage, acceptable for ‘living in ways’ that will result in carbon emissions of no more than 2 tons of CO2 per capita per annum.

This usage of material would translate to roughly 60 billion tons total resource consumption or roughly 6 tons per capita per annum for a 9.5 billion population by 2050.

It is for these reasons that Swilling (2011) highlighted the failure of urban researchers to recognise the significance of networked infrastructure and the specific configurations that connect people to natural resources and information. These infrastructure networks can be connected and configured in various ways. These configurations depend on various factors such as investment, technology, institutional capacity, and user demand. Networked infrastructure provides conduits for socio-metabolic flows such as vehicles, water, power, data, etc which can be either linear flows (i.e. not re-used and converted to waste or emissions) or circular flows (i.e. if re-used or re-cycled). Urbanism experienced by end users or inhabitants of cities is therefore strongly linked to the configuration and type of infrastructure, material flows and quality of built form which life depends (Swilling, 2011). Because of these configurations, Swilling (2011) broadly categorizes the results of different configurations in four categories that manifest in cities as vastly differing forms of urbanism. These are; inclusive, splintered, slum (informal settlement) and green urbanisms.

These four urbanism principles are defined as follows:

*Inclusive urbanism* resulted from a highly democratic vision following WWII. In this vision, every city dweller had a right to access highly networked cheap and good quality infrastructure. The results of this vision were highly equitable, but also proved highly unsustainable practice for governments.

*Splintered urbanism* occurred because of the commodification of services from unbundling of public sector utilities to private sector which brought about the 'user pays principle'. This result excluded the poor that were unable to pay for services. Other results manifested in profoundly unequal service and resultant stark difference in urbanism.

*Slum urbanism* is often a result of relocation to make way for new networked infrastructure developments, or where displaced residents or migrants new to a city and with limited means seek to auto-construct homes and connect to infrastructure via whatever means possible (sometimes illegal).

*Green urbanism* is networked infrastructure that seeks to restructure socio-metabolic flows, reducing resource demands by 'doing more with less' where livelihoods will continue to improve while reversing resource demands. The problem with green urbanism is that it focuses on a 'techno-fix' for elite residential and commercial developments, which does not address the needs of the poor (Swilling, 2011).

In response to finding a more socially just and ecologically sustainable resource efficient urbanism, Swilling (2011) is inspired by many positive examples around the world. Through examples of development in India (Auroville) and Columbia (Gaviotas), proposals have resulted in 'restoration of nature' to create a liveable urbanism. This search for a resource efficient urbanism is also inspired by a billion odd inhabitants who live roughly within the planets carrying capacity. These inhabitants also have a livelihood that makes it possible for them to pay for networked infrastructure, live modestly and have sufficient (resources and amenities) to meet their needs (Swilling, 2011:90).

As per these examples, there is a need for a new understanding of the role of infrastructure and how we break the negative link of city growth and unsustainability. To do this, we must serve the needs of people without further environmental damage. For many urban dwellers these needs are not being met and have little or no access to basic services. The challenge of sustainable infrastructure is then to “reconcile environmental interests with human interest, particularly those of underprivileged groups” (Un-Habitat, 2012:11). Further literature review examines what infrastructure types and configuration may support this proposition. For poor communities in the context of informal settlement, “Physical interventions of providing water, sanitation, roads (for mobility) and street lighting can have a significant impact on the quality of life for residents” (Smit, 2016:33). Current infrastructure configuration of cities, typically follows that of industrialised models of development. These are characterised by ‘unhindered’ use of non-renewable and renewable resources.

To curb ‘unhindered’ use of resources, new technology may certainly help to reduce consumption and facilitate more circular than linear material flows. However, the problem currently, is that many cities possess good knowledge (that ignores new technology) on how to design, construct and operate resource intensive systems. These precedents unfortunately make it easier to translate and replicate sustainable practice (UN-Habitat, 2012:27). A further issue globally is the inability of current infrastructure to meet growing demand. The Boston Consulting Group (BCG) estimates \$35-\$40 trillion US Dollars are needed to fund infrastructure globally over the next 20 years. BCG group also notes that existing infrastructure globally is deficient in capacity and quality. This deficiency is often for current and for future demands. In addition, BCG estimates that only in a best-case scenario government will be able to fund at least half of the required infrastructure (BCG, 2010).

In the face of such financial, social and environmental challenges, a new vision of sustainable infrastructure where all citizen benefit from investments is arguably required. This approach will need to focus on long term visions rather than short term decisions (UN-Habitat, 2012). To vision this long-term scenario, the following questions arise. What kind of urban infrastructure will need to be built? How will it produce sustainable socio-ecological metabolisms that do not deplete natural resources and degrade ecosystems? Lastly how can these infrastructure systems provide greater social equity and assist in reducing (and eliminating) poverty to build stronger communities? (UNEP, 2013:48). These answers will require socio-technological solutions that address existing and new developments in either integrated/systemic or highly networked approach (UNEP, 2013).

However, before selection of infrastructure systems (and technologies) to respond to a new vision and answer questions raised, it is important to acknowledge the dominant planning mode and status of cities. Much of this urban world is characterised by poor management and unstructured growth. This is driven by ‘conventional motorisation’ where the planning mode is ‘business as usual’ catering for an expected increase of private vehicles. The current figure of 1 billion private vehicles is expected to double to 2 billion by 2030. In addition, urban areas are expanding at alarming rates. These areas are expected to triple from 2000 to 2030. This equates to an area equivalent of Manhattan, New York every day (Seto *et al*, 2012).

The challenge with the rapid expansion of urban areas particularly in developing context is the increase of informal settlements, where provision of infrastructure and services cannot keep pace with population growth. The combined effect of this urban sprawl and motorisation (at low densities) is often evident in informal settlements and gated estates that occur immediately adjacent to each other. Both developments seek to occupy what is perceived to be 'well located' or the nearest available land (or affordable) to the city. The result is a stark contrasting splintered urbanism where residents living adjacent to each other experience vastly different levels of service and quality of life (UN-Habitat, 2011). The critical issue with sprawl is the increased costs of providing and maintaining infrastructure networks, as well as increased travel costs and carbon emissions associated with longer travel time to city centres. In the United States, an analysis for the country on the cost of urban sprawl was estimated to be \$400 billion per annum for providing public services under sprawl conditions. Had the United States adopted a compact growth pattern, the saving could cover the countries entire funding (infrastructure) gap (Litman, 2014).

## 2.5. CONCLUSION

The literature review in this chapter has covered extensive research and identification of wide-ranging issues associated with rapid urbanization. This research has specifically focused on a developing context and recent planning work. The issues identified, focused heavily on the limitation of urban planning amongst other issues in dealing with informality and incrementalism, that is prevalent in developing cities. The review also covered approaches to place making, constraints, and consideration of precedents and experimental alternative frameworks to deal with rapid urbanization. From these findings Chapter 3 will look to summarize the detail of findings, evaluate the logic and credibility of the research, argue and draw recommendations (parameters) for liveable urbanism that is inclusive and incremental.

## CHAPTER 3. FINDINGS, ANALYSIS AND RECOMMENDATIONS FOR PARAMETERS FOR LIVEABLE URBANISM THROUGH INCLUSIVE INCREMENTAL DEVELOPMENT

The research in Chapter 2 has specifically focused on a developing context and recent planning work. Although much of the data presented relates to Africa, the findings and recommendations that will be proposed in this Chapter 3 are envisaged for a developing context, and not intended to be specific to any country or continent. The key issues and gaps raised in the literature review in Chapter 2 will be summarized and analyzed in separate sections (using a similar format to that of Chapter 2) in this Chapter 3. The purpose of this similar format is to firstly provide succinct summary detail of the literature reviews main and supporting arguments. Secondly the summary details of the key issues will then be further analyzed to make sufficient argument or counter argument to make proposals for an alternative urbanism. These proposals will need to draw on the strength (and weaknesses) of the research to ensure that they will be effective in supporting an alternative urbanism to better deal with and manage rapid urbanisation. These proposals will then be succinctly grouped into recommendations to provide parameters (framework) for planning an alternative livable urbanism that can be co-developed in an inclusive process that is incremental over time and space.

### 3.1. THE NEED FOR A NEW URBANISM APPROACH IN THE FACE OF PREVAILING TRENDS IN DEVELOPING CONTEXT

The data from UN-Habitat on global prevailing urbanization trends (1995 to 2015), presented in Chapter 2 provides recent and critical evidence of the scale of the problem. The data further identified the highest urban population growth rates are occurring in developing parts (Latin America, Asia and Africa). Africa is experiencing the most rapid urbanization of 3.68% compared to the global average of 2,6%. The lowest was that of 0,31% in Europe. The African urban growth rate as pointed out by UN-Habitat, is therefore more than 11 times greater than Europe. With focus on African cities and applying the average urbanization rate of 3,68%, these cities will therefore further double in population (from 2015) by 2035. Due to economic and political influence, the larger mega-cities are likely to receive the highest attention to address urbanization issues. However, the handful of mega-cities do not accommodate most of the African population. It is the numerous small to medium size cities of 1 million or less that serve most of the rapidly expanding population. Regardless of city size focus, the UN-Habitat acknowledge and highlight the enormity of the challenge facing African cities. These cities are amongst the poorest in the world, and will experience major demand on their resources (natural, human and fiscal). They will need to build infrastructure and provide adequate services to meet the rapidly growing demands (UN-Habitat, 2016a:7). With reference to data on rapidly urbanizing small to medium size cities, the responses of this dissertation will therefore focus on smaller developing cities and urbanizing peripheral areas of medium to larger cities. This approach could however include infill areas previously underdeveloped in larger cities.

On further evaluation of data presented on African cities, by simple reasoning, if the population doubles then the footprint of these cities is also expected to at least double in size (assuming the development density remains constant). However, according to research by Angel *et al* (2012) in developing parts of the world, while populations double, the spatial extent can even triple. Where the spatial expansion rate out-paces the population growth, this will place further demands and impact negatively on land and resources. The impacts of the rapid population growth and spatial expansion are well documented and manifest in environmental degradation, pollution, unsustainable resource consumption, carbon emissions, global warming, inequality and poverty.

In addition, global rapid urbanisation has created huge demand for housing. However, responding large-scale housing schemes have not been able to match the demand, nor has the private sector been able to supply low cost housing that is affordable (UN-Habitat, 2016a:52). The results are evident in the pervasive large scale informal settlements in Latin America, Asia and Africa. While acknowledgment is made of the decline in the total percentage of informal settlement residents from 2000 to 2015 (39% down to 30%), the absolute number of 880 million people living in informal settlements (2015) cannot be ignored. More staggering is the prediction of 6,3 billion (66%) global urban population out of 9,5 billion total population by 2050 (UNDP, 2009). If the percentage of informal settlement residents remain constant at 30% this would represent 1,89 billion people living in informal settlements out of 6,3 billion urbanites by 2050. A reversal in trend back to previous 39% urban population would see this number soar to almost 2,5 billion informal settlement residents.

These scenarios provided are predictions based on recent and accelerating trends. They raise the question, how accurate and credible are these predictions? What if the 'low road' scenario of 2,5 billion (39%) urban informal settlement population occurs? If so, is sufficient urgency by multilateral organisations, state and local governments being applied to mitigate these 'low road' undesirable and unsustainable scenarios? Returning to the first question of data prediction accuracy and credibility of publishing agency, the prevailing population trends and impacts reviewed are determined by multilateral organisations such the United Nations. From research on publications issued and authors, the evidence indicates that the UN utilises global and highly skilled persons. These include input from academics, NGO's and experienced practitioners to ensure well-defined methodologies are adopted in the data collection, verification and predictions. From review of data in numerous recent reports, evidence indicates that the UN strive to provide the best available data at regular intervals of publication. These studies are typically recent and widely accepted as an accurate reflection of 'best information' available. Projections using historical data and other growth factors is then used by the UN to predict population trends over the next 20-35 odd years. There is little evidence or commentary in research or reflection on literature to raise doubt as to the validity or unlikely occurrence of the data presented. On the strength of this information (population trends), it can be argued that current planning has not been effective to curb these negative trends.

The response to planning challenges to curb negative trends, has however brought about global debate and action from multilateral forums. The results are reflected in the UN-Habitats SDG's and subsequent NUA to address the dynamic nature of these challenges. These policies focus on four key areas of concern and solutions covering; increasing evidence of poverty in cities, cities can support economic growth, cities are acknowledged as the sites to combat change, and lastly the correct political arena to action changes. By the UN-Habitats own acknowledgment, these overarching plans are only the start of providing guidance to achieve sustainability and equity, where planning is a central tool to achieve goals.

These overarching plans whilst noble in approach are arguably highly idealistic and political in nature. They are determined through what is described as a choreography of inputs from diverse actors that potentially align with differing agendas. The agreement of these agendas is notably also finalised at international conference centres located around the globe. These international conference and hotel venues are arguably the most utopian environments to be found globally. These venues are in complete contrast to that of the dystopian environments of informal settlements. This raises an important question of how applicable and effective are global overarching goals (applied in generic context), in dealing with day to day challenges facing informal settlement residents? These global policies are not context specific to a developed or developing context and geography, and therefore arguably not a 'one size fits all'. With broad decision taken so far removed from context, it is likely to result in contradictions, tensions and challenges (financial and social) at local levels when applied. The global goals (SDG's and NUA) should therefore be thought of as a framework or 'starting point' as suggested earlier.

Beyond setting of global agendas, academics like Gautam Bhan, understand that our current overarching planning approach is not sufficient to address contemporary challenges. We therefore should find new ways to plan and manage our cities. This re-imagining according to Bhan, will emerge from new theories of knowledge. Bhan argues that to find these new ways may require a conscious dislocation of our own understanding of planning. This revised understanding or new learning can consider including both theoretical and person lived experienced from 'auto-constructed cities'. His thinking of 'dislocation' and 'immersion' down to lived experience or 'learning', intuitively feels pragmatic and more likely to be effective to inform planning at local scale.

McFarlane supports Bhan's argument, whereby the changing nature of urbanism is understood through persons daily lived experience in the city. This process is understood as gaining knowledge and developing skill to analyse and solve problems. It is therefore argued that urban learning cannot only emerge from an office with review of data, but requires perspective of lived encounters and challenges of daily life within the city. With this more inclusive approach, learning and agency from citizens creates new knowledge that can be linked to action to bring about change. This approach moves away from thinking about planners as professionally registered town planners.

It embraces a concept of planners being made up as a diverse group of people that will allow more equitable and inclusive planning. To arrive at this juncture, McFarlane spent periods of time visiting various cities in developing context (South American and Indian).

During these learning visits, McFarlane observed within each city, changing rhythms during different times of the day or week, and how ordinary citizens navigated the city to serve their needs. A critical observation was that of the power of knowledge. This is the knowledge that residents need to access resources (by whatever means) to meet their basic needs. This research finding is useful in establishing a planning theory that is augmented by lived or personal experience to place the citizen at the heart of the planning. The effects of city planning and infrastructure provision therefore need to be considered with learned knowledge from various end users.

The summary of these findings and analysis is that a new planning approach could benefit from thinking of end users on a personal level (from immersed learning experiences), going about their day to day business in the planned city in our minds, rather than imaginary persons viewed from an office.

### 3.2. SPATIAL PLANNING AS TOOL TO SUPPORT SUSTAINABLE URBANISM

Returning to global agenda's that are considered as the start of planning, Barnett & Parnell (2018:31) suggest the issue of application of global agenda's (that are not context specific) can be overcome by understanding them in spatial rationality. It is commonly argued and accepted that causal power of such arrangements of urban form, design elements and interaction of people can order (or disorder) people to act in a specific way. This assumption is also supported in dealing with climate change to arrange cities and infrastructure such that they are more resistant to environmental change and shocks (e.g. floods or drought). Interventions may involve causal complexity where planners may encounter political opposition or unexpected and undesirable consequences, otherwise known as 'wicked problems'. These spatial, physical and institutional arrangements of urban systems are therefore inherently complex and hence known as complex systems.

Because of causal complexity, urban planning is not a simple process with simple fixes but understood as range of interventions which may involve policy, physical planning, socioeconomic and technological considerations. Cities were historically seen as the place where urban problems manifest. In contemporary discourse, this negative view of cities has shifted. Cities are now seen as experimental sites where solutions can be trialled and then translated accordingly to other locations. The benefit is that results of experiments provide feedback in the system to amend and adapt to solve issues. (Barnett & Parnell, 2018:32-33).

The logic presented by Barnett & Parnell to test and provide feedback resulting from causal complexities to improve planning by use of experimentation follows well researched 'system thinking' theory and is accepted. However, as a critique of the logic, when allocating capital expenditure within cities, high demand is placed on officials and professionals to deliver upfront, effective and efficient plans with enabling infrastructure. There is little room for 'trial and error' as associated with testing and experimentation.

When it comes to spending public money, and placing citizens as ‘subjects’ of experimentation, this testing or experimental logic narrative is rarely if ever discussed or shared publicly. This may well be the key reason why planning and implementation commonly revert to traditional ‘tried and tested business as usual’ planning, albeit not sustainable in the long term.

To avoid ‘business as usual’ planning, a reframing of this experimentation approach is required to help stakeholders understand the essential nature of the process is to ensure that continuous feedback will allow for improvements and a better long-term sustainable solution. For these reasons, the incremental approach to developing infrastructure will support and aid in the prevention of abortive expenditure on experimentation, where early feedback will allow for adjustment of planning before further commitment.

### 3.2.1. UNDERSTANDING THE NEED TO SHIFT TO INCLUSIVE AND EQUITABLE PLANNING

As per literature review by Heller, strong evidence of ‘hyper commodification’ of land has occurred where the state promotes land use planning, provides state resources and infrastructure services. The land is then only accessible to those who can afford to purchase the land and pay services. This action by the state has indirectly rationed state resources and marginalised the poor to peripheral unsuitable and underserved locations effectively forcing them into informality (Heller, 2018:37). State land use planning and infrastructure provision is provided on the premise of promoting growth that will attract investment and support job creation. Evidence from South Africa, India and Brazil demonstrate how these practices further spatially exclude the poor. Service protests recently experienced in South Africa are symptoms of a lack of participatory processes and being heard. In the absence of more inclusive practises, such engagements have emerged as a contentious means of the marginalised to engage with the state.

It is therefore interesting to see how Brazil who were long known for exclusionary practice, have undergone political and institutional reform in the last three decades to move to more inclusive planning. Such major transformations have helped build greater citizenship through participatory processes like public input to government budgeting. Heller, therefore argued that political and institutional structures are critical to support good planning and management of cities. Where democratisation of state and civil society relations has occurred, this had led to greater autonomy of local government to make local decisions, intervene and support urban transitions and improve social functioning (Heller, 2018).

On review of planning approaches in dealing with informality in South Africa and Brazil, both countries have relatively strong institutional structures and experimented with alternative planning approaches. The evidence suggests that Brazil have been more successful in dealing with informality because of political and institutional reforms over recent decades. As mentioned previously, in South Africa, political will to support participation and inclusive planning has been lacking as evident from increasing service protests as a means of engagement with leaders.

A renewed political will to deal with informality and improve service provision through a participatory process (like Brazil) is most likely required to reverse current trends. Political will is therefore considered a critical success factor in supporting inclusive and more equitable planning.

### 3.2.2. THE USE OF DATA AND TECHNOLOGY IN EQUITABLE PLANNING

From the literature reviews, an interesting aspect arises relating to the importance of having heterogeneous data to support inclusive planning. In the case of informal settlements, their distinct characteristics such as lack of tenure and socio-demographic data make them less visible and further increases risk of being excluded (Marques, 2018:70-77). To assist with acquiring heterogeneous data, technology can indeed play an important role. Odendaal (2018) explored how technology can support overcoming spatial inequality. In this context technology may not be the 'fix-all' but can certainly intervene and support sustainable transitions. The example of online mapping reflects how this data could make informal settlements visible and empower residents. Detailed information is an important part of planning to 'make clear' all constraints and ensure solutions are adapted accordingly. High-resolution photography, combined with topographical survey, collection of ground data, socio-economic data and learning through engagement with the community are essential tools of planning and design interventions. All of which can be collected and facilitated through technology.

The examples and benefits raised by Odendaal clearly provide means to support participatory planning, self-enumeration, sharing and distribution of information. This is easily possible where basic ICT access is enabled. Connectivity and technology can improve levels of participation and residents' connectedness to the city. The use of ICT can establish access points to include residents in the planning process. Historically a person would for example desire a car to be able to fully 'access the city' to seek employment and take advantage of other opportunities. With ICT and hand-held devices now commonplace, the advantages are numerous in terms of accessing information, training, employment and market opportunities to mention a few. These hand-held devices as raised by Odendaal, can provide a common platform for sharing and collecting information. This access can make the planning process more transparent and inclusive, where residents can play greater roles than before the advent of such technology.

### 3.2.3. EXPERIMENTATION OF ALTERNATIVE PLANNING PARAMETERS

The literature review discusses alternative futures where experimentation is becoming commonly accepted by a variety of actors (policy makers, public and private sector) to stimulate innovation and trial alternative future visions (Karvonen & van Heur 2014). As a commentary, the research claims experimentation is 'commonly accepted'. As discussed previously, I would challenge the authors on the validity of this statement. Whilst the type of planning and projects are becoming common place, they almost never referred to as 'experimental' in the day to day planning and implementation process. Such labelling of 'experimentation' is more common place in academic literature and not discussed in the public realm (for fear of criticism). Nevertheless, actual 'experimentation' as viewed by academic and critics, is often radical in ambition but limited in scope. It is also commonly biased towards a technology that a private actor may be pursuing for commercial gain and commodification.

Therefore, the ability of experiments to “prompt genuine change” or “stimulate profound transformation” is questioned by (Evans *et al*, 2016:1).

Although the emergence of the NUA has been beneficial in enhancing the role of the planner, results of profound transformations from experimentation are not immediately apparent in public discourse and case studies. What is however accepted is that in review of experiments conducted from 1970, Satterthwaite observed that the most effective transformations come from small ‘do-able’ actions that are relatively ‘low-cost’. These effective transformations also relied on local government, professionals, and experts who have been able to network and form good partnerships (Satterthwaite, 2016:4).

Considering constraints of institutional and financial capacity of local government, these observations by Karvonen & van Heur, and Satterthwaite are particularly helpful in re-framing how we look at critical challenges with respect to what experiments should be conducted and at what scale? The key purchase taken from these findings is to propose ‘do-able’ and ‘low-cost’ actions. On further review of the questions raised, what type of experiments should be conducted? Key themes of contemporary experiments are grouped into two categories of smart cities and grass roots neighbourhood projects. The problem raised by writers in the literature review, is who decides which experiments get done and how effective are they? There appears to be no easy answer. For these reasons Sengers *et al* (2016) suggests common evaluation criteria is used. The evaluation criteria then looks at overarching issues and the experiments ability to contribute to improvements using general literature consensus. The evaluation criteria framework (using general literature consensus) could then determine how effective experiments are in terms of being; inclusive, systemic, practice based, challenging, learning based and adaptive to changing condition and bringing about socio-economic change (Sengers *et al*, 2016:15). The logic proposed by Sengers *et al* appears valid, however the challenge here (as discussed previously) is that of identification of ‘experimentation’ and financial support. Experimentation could easily be construed as potentially abortive costs borne by tax payers that may or may not work. Similarly, the incremental approach aligned with Satterthwaite observation of the most effective transformations arising from ‘do-able’ and ‘low cost’ actions is recommended. This strategy will allow for feedback loops to adjust and correct planning to limit expenditure and improve results.

Returning to the literature review of smart city type experiments, these are typically driven and funded by private developers. Therefore, the question of how to intervene in funding or analyse the effectiveness of experiments as suggested by Sengers *et al* is difficult to apply. In the public realm, as mentioned repeatedly, the term ‘experiment’ is not commonly used. The public may arguably not like to think of themselves as being ‘subjects’ within an ‘experiment’. A solution to this challenge could be increased discussion and understanding of the concept and benefits articulated through multinationals such as the United Nations through the NUA. Intervention received from a credible body could help to garner support at high-levels of government. This strategy could also unlock grant funding at national government level to provide a suitable mechanism to fund experimentation.

This grant funding option could help mitigate public scrutiny of spending at local government level where experimentation may not be fully understood by local tax payers. The suggested framework evaluation could then be applied at national government level for funding applications received from public and private entities, NGO's and civil society representing the interests of communities.

From the literature review, low cost actions are strongly supported and proposed for experimentation. However the literature also acknowledges that such experimentation (often termed grass roots) will require sustained levels of political, financial and social support (Lezaum, 2011). If efforts can be sustained, these experiments hold promise to improve harsh realities of residents living in informal settlements. If one then considers the benefit of experiments at the opposite end of the spectrum such as smart cities, due to affordability they are unlikely to improve lives of residents of informal settlements living in proximity to planned smart cities. According to May & Perry (2016), smart cities may be nothing more than 'global posturing' that affirms neo-liberal practice and further exacerbates inequality. This is an interesting thought if one considers the images of informal settlements side by side with the perfect images of modernity typically used to promote smart cities and new developments. In thinking of these stark contrasting visions, one is hard pressed to understand how informal settlement residents will assimilate into these new visions of cities. Without radical economic and social transformation driven by local government in strong partnership with private developers over sustained periods, this is highly unlikely to happen. Benefit to informal settlement residents living adjacent to gated or smart cities may only be marginal i.e. low income from domestic employment opportunities at best.

The above discussion relating to grass roots experimentation, represents compelling argument to bring about political support and agency to reverse trends of spatial inequality. Such political support and action will better inform our urban future through experimentation of inclusive and equitable urbanism. However, the challenge is to present a compelling argument to gain political support for new proposals. To overcome this challenge, we need to identify issues facing politicians where this experimentation may offer solutions (quickly) and require less funding than conventional planning. For example, the service protests discussed in South African context may in fact represent an opportunity to enlist such political support. For politicians with limited funding available, but anxious to restore faith of support base, these lower cost actions with results visible in a shorter time, could be a strong selling point to garner political support for experimentation.

Provided political support for experimentation is established, the literature review further details how experiments can be re-imagined according to research conducted by Schliwa & McCormick. They recommend that these 'living labs' must have a defined area and embrace a collaborative approach with varying stakeholders to co-create and test real-life environments. Schliwa & McCormick ask the question, in which context would a given approach have the greatest impact?

With consideration of the absolute number of people living in informal settlements (880million in 2015 and could grow to between 1,89 – 2,5 billion by 2050), it is paramount that we seriously consider the fate of these people and look for real world solutions. Again small do-able actions with low cost solutions that can be done incrementally will allow for dynamic change and observe financial constraints.

Based on the evidence presented in the literature relating to pervasive informal settlement growth, there is a strong case to propose experimentation of pre-emptive planning. The main goal of this pre-emptive planning will be to vastly improve harsh conditions experienced by residents of unplanned informal settlements. This experimental planning would also envisage guided and supported auto-construction of cities through incremental development that could ultimately provide good living conditions comparable to formally planned developments.

#### 3.2.4. POLICY, GROWTH AND URBAN LAND-INFRASTRUCTURE COORDINATION

In the literature review of planning policy within the African context, it is noted by Olowu that the global policies are 'noble' in their objectives but few states have achieved this position due to a disconnect of good policy and implementation. He does however advocate that democratisation and devolution of powers, would aid improvement in participatory planning and ability of local government to make autonomous decisions (Olowu, 2018:60-61&68).

From analysis by Turok on urban growth, there is little evidence to support the notion that urbanisation necessarily drives growth, but can enable growth or can be an outcome of growth. However, for growth mediating factors, much depends on the form of urbanisation and composition of the economy. These factors require collective effort to plan, regulate, and invest in infrastructure that preferably supports manufacture of goods. Such infrastructure (for manufacturing) would increase productivity, employment and income rather than economies supported by export of commodities without local beneficiation (Turok, 2018:97-98). Turok, further warns of the risk of unstructured growth in cities, which can lead to chaotic conditions such as chronic congestion which market forces alone cannot fix and will therefore limit investment opportunities Turok (2018).

From analysis of the summary of findings of Turok, key fixes to these problems should relate to correct land use, appropriate density and ownership. These factors (if inappropriate), can be a major barrier to achieving planning goals. Appropriate land use must be supported and integrated with a comprehensive transportation network and enabling infrastructure system. The biggest challenge in city planning is the high cost of infrastructure and low affordability of the population to purchase land and build dwellings. In Turok's (2018) words these are 'serious obstacles' and can severely disrupt informal settlements if required to be retrofitted after settlement patters have formed (Turok, 2018:99-100). These 'serious obstacles' where highlighted in the literature review and supported by Angel (2016) who identified this as a common sequencing problem in cities. These obstacles could therefore be avoided by planning in advance of informal settlements.

The challenges with this approach relate to capacity, finance constraints and political will. A key financial restriction to infrastructure investment in advance of development, is that the tax base will only come afterwards. In developing context, the recovery of taxes is expected to be low and will not cover investment.

Turok also outlines and acknowledges that it is difficult to control the actions of private sector. However, where cities are well planned (well-configured, compact and connected), and have the correct urban land-infrastructure co-ordination, they are more likely to attract investment and function better. With this understanding and where funding for infrastructure is a major constraint, the first 'do-able' actions are proposed by Turok (2018) to plan and create coherent land parcels with the correct composition for urban growth. Turok (2018) also believes cities could do more to improve informal settlements by assisting people to access well located land and basic services. In addition, support to provide and upgrade shelters is better than excluding them through regulations which deter upgrading due to risk of non-compliance and illegality. To further manage rapid urbanisation (both formal and informal), findings by Turok suggest well planned and structured growth is essential. Comprehensive planning with compelling visions will also aid financing of infrastructure. In addition for developing context where tax recovery is expected to be low, this further supports the argument to commence with smaller low cost (grass roots) solutions. Lastly on reflection of Turok's work, it is inferred that to achieve more inclusive development, consideration of re-writing rules may be needed to encourage and guide, rather than discourage auto-construction.

### 3.2.5. INFORMAL SECTOR AND INCLUSIVE PLANNING

From the literature review, evidence is presented for most developing cities that most of the population derive income through the informal sector. The percentage of non-agricultural employment is 82% in South Asia and 66% in Sub-Saharan Africa (Vanek *et al*, 2014:7). It is expressly argued by Skinner & Watson that despite this reality, planning practice continues to follow models of developed nations or 'world class' or 'best practice' (Skinner & Watson, 2018:140). Such practice is designed to exclude the informal sector in their current form of operation. The informal sector functions despite these formal regulations associated with best practice. Suggestions to acknowledge the informal sector and planning for them requires understanding of their operations, needs and reasons for establishing business locations. Through such learning and understanding, planners would be better informed to provide spatial and infrastructure solutions. These interventions could improve income and support growth opportunities to transform business operations. At present informal sector typically operate wherever they can. This can depend on how strictly regulations and laws are enforced.

Where strict laws are not applied, there is strong debate between formal and informal sector, and question raised, should the informal sector be allowed to operate in public spaces? Some view informal sector operations as a way to avoid the costs of running formal businesses. Considering the high proportion of income derived from informal activities, it would appear they have no other choice but to operate under informal conditions.

It should be considered reasonable to follow an approach that will support and improve their livelihoods, rather than providing rules to favour minorities of formal traders. One of the key activities in the informal sector is that of food production, which is considered unhealthy in these environments. It is identified and argued by Battersby (2018) that there is a strong need to improve food security and nutrition in African Cities.

To provide this security requires 'availability, accessibility, utilisation and stability' of fresh and nutritional foods. She argues that urban spatial planning and provision of infrastructure can support and improve food insecurity. This support for food vendors and all other types of informal vendors can be provided in the form of spatial inclusion and provision of basic infrastructure such as power, water and sanitation. This offers transformative potential for informal traders and opportunities to transition to more favourable operations. Battersby makes compelling argument to plan for and include food vendors as part of city planning to improve livelihoods, nutrition, health and support food security in developing context. As Turok alluded to in the rules of informal settlement, such consideration may require a re-thinking of the rule book that will assist people to transform rather than prevent them from integrating with the city.

### 3.2.6. FINANCE CONSIDERATIONS IN PLANNING

As per literature review, with massive informality in developing countries, it follows that government income through property taxes is very low compared to developed countries (0,5% vs 2% for OECD) (Smoke, 2018:157). Faced with severe financial constraints, efforts often focus on a compelling vision of the future with less emphasis on the financial resources to fund the implementation. Smoke advocates that this planning cannot be in a vacuum and that financial reforms are needed. These reforms should follow simple steps of good principles to improve the planning-finance connections. One of the critical elements in the financial reforms is policy review. This is where a re-thinking is required, and Srinivas advocates that cities will require economic planners with "with imagination and tenacity" to respond. These planners will need to consider "substantial experimentation in economic plans" (Srinivas, 2018:137).

As an alternative narrative or re-thinking of economic planning as described by Srinivas, the logic of perpetuating informal settlement with low tax recovery is not sustainable. On the other hand, in developing countries, formally planned and typically high value developments are not likely to sufficiently raise revenues to deal with overall urbanisation challenges. It follows that a pre-emptive incremental development approach where regularisation can occur incrementally over time, provides a better option to then incrementally increase revenues over time as well (as people improve their means). It is paradoxical in that by not recognising settlements, government cannot hope to improve their financial situation. It is precisely for these reasons of current paradigm extremes that an alternative pre-emptive incremental model should be tested to find an alternative urbanism.

### 3.2.7. CLIMATE CHANGE IN PLANNING

In the literature review, Chu *et al* identified challenges that may result in adaptation to climate change where tension and conflicting priorities may result. For example, the need to house the poor versus the need to reduce environmental impacts. Another example is continuation of low density development in peripheral locations. This perpetuates urban sprawl and increases resources requirements, compared to what could be achieved in well located denser developments. The result is increased carbon footprint in tension with mitigating climate change. The challenge here is to find strategies that are mutually beneficial to resolve these tensions. It is proposed by Chu *et al*, that this will require champions and leaders that can build cross-cultural partnerships between public sectors and civil society actors. This proposal will be more likely to achieve inclusive and effective transformation adaptation strategies that are sustainable and pro-poor (Chu *et al*, 2018). On reflection of the literature, proposals for projects with co-benefits are many and could involve labour based construction of varying forms of infrastructures (i.e. water, sewer, solar) that may reduce environmental impacts, reduce resource consumption and improve re-use and/or re-cycling options.

### 3.2.8. AUTO CONSTRUCTED CITIES AND LEARNING

According to Bhan *et al* (2018) and Caldeira (2014), many cities in developing context are built in tension with formal logic and rules, and termed 'auto-constructed cities'. These cities occur despite formal regulations. Because of the way these cities were constructed, settlers do not have tenure and this often makes them ineligible to receive basic services. For these reasons, they can be denied a basic right to receive service (even if local government wishes to do so) as they may be in contravention of regulations. Bhan *et al* (2018) seek to re-think planning and policy that will better respond to the process of auto-construction. Such a process may not necessarily be to locate a neat space somewhere between the informal and formal modes of development. However, this may certainly help shape and influence a new outcome that is preferable to current informal mode. This again raises the question by Bhan *et al* of who do we plan for? This question in simple terms could be understood as, who benefits the most from the planning process? The elite or the poor? The assumption by government is likely that the informal scenario is temporary, or populist political visions do not accept informality as an acceptable future. As evident by rising dissatisfaction in South Africa in the form of service protests, the populist politics (i.e. promise of housing where demands cannot be met) may not ultimately provide for all citizens. It is therefore further argued that the pervasive and continued nature of informality requires a change of politics, policy and new ways to transition to more acceptable liveable urbanism.

In addition to political will, McFarlane (2011) argues that new policy experimentation and learning offers alternatives. In his argument, he advocates learning from practices, processes and interaction of city life. He then uses the example of incremental or auto-constructed city to highlight how knowledge is created through such learning processes.

This knowledge can be used to formulate new policy and interventions to support auto-construction that could help develop a new or progressive urbanism. This learning he believes plays a significant role in politics and urban change where cities may also learn from one other and translate and adapt ideas to local context.

On further review of the findings and analysis of the text in this section (and previous), a clear and consistent message emerges, outlining the need to learn from auto-construction and adapt our planning to help guide and improve rather than hinder this process. The evidence and argument for this process is thoroughly convincing, yet from research it is seldom adopted. The key issue preventing this type of planning reform returns again and again to that of political will and support for embracing new ways of planning and managing the growth of cities. The solution to this problem is not a simple one, but research findings and analysis indicate that presentation of low cost schemes that will produce tangible 'quick wins' is favoured to gain political support. However, when developing and communicating such schemes to garner support for funding and implementation from politicians, end users must always be placed foremost and firmly in mind to ensure these schemes succeed (i.e. remember for whom we plan).

### 3.2.9. UPGRADING INFORMAL SETTLEMENTS AND CHALLENGES

Research on the debate of in-situ upgrading versus demolition, rebuilding and/or relocation indicates the UN-Habitat support the in-situ upgrading option. The reasons for their support is to avoid relocations which are considered more traumatic than in-situ upgrading. Relocations typically further deprive residents as they are often displaced far from work opportunities, and become disconnected with the city. Advocates for in-situ upgrading propose a holistic transformative approach, supported by participation and incrementalism. This incrementalism is proposed to support the dynamic nature of a city (Daniels *et al*, 2016). A city will maintain its core structure, but to adapt to changing needs it should allow for changes of land use over time. Incremental upgrading can therefore adapt to suit these changes and will be less disruptive to social networks. This type of experimental approach supports learning and adaptation to generate new solutions (Cirolia *et al*, 2016). From evidence presented, this approach is logical and considered pragmatic to improving the life of existing urban settlement residents. However, we need to take a step back from this canvas before adopting this as a 'business as usual' approach to dealing with rapid urbanisation. As per evidence by Angel, when considering further urbanisation, Africa has virtually doubled urban population from about 240 million to 480 million people between 1995 and 2015. Doubling of the urban population without a change in densities may also force land area to double or even triple. Based on current trajectories, where auto-construction is outpacing capacity to deliver formal housing, vast new areas of development could be mainly composed of informal settlements.

On reflection of this possible future scenario, the question for city planners in developing context (assuming it is better to upgrade in-situ developments), is do we wait for these settlements to form before we plan? Or do we plan now for the future to accommodate these constantly changing informal settlements in a more pre-emptive, inclusive and supported auto-construction method, using an incremental approach? The incremental approach will accommodate dynamics of informal settlements patterns (within a planned structure) whereby the city could be co-produced to form a new urbanism more liveable than current realities.

### 3.2.10. EXPLORING PARAMETERS FOR A LIVEABLE URBANISM

Let us imagine for a moment that a Mayor is elected to govern a small to medium size city in Africa. He or she then fully considers the impact of long-term growth trends and challenges on their city. The Mayor then identifies the need to plan appropriately to accommodate this growth in a sustainable manner for future years (well beyond his or her expected term of office). Based on prevailing trends researched in the literature review, it is understood that further rural migration and massive growth of informal settlements is expected. The Mayor tasks his council to review and update long term plans, much like any city typically undertakes. However, a key difference in the brief is to 'plan in advance' of further land occupations. Therefore, most if not all occupations because of rural-urban migration should take place with agreement and a form of provision by government.

This provision would need to be low cost as financial constraints are not likely to allow for provision of full services or full housing subsidy. The planning philosophy would need to embrace informal settlement auto-construction. However, this would need to be a guided and assisted approach such that settlements can be regularised over time. In this incremental approach, the city would have opportunities to transform without constraints of unstructured or unplanned informal settlements. How would we then prepare and plan to solve this brief? For purposes of brevity in response to this brief, we assume the first challenging task of finding and securing sufficient well-located and suitable land for development has been completed in advance of occupations. This land may either be infill land within the city footprint or land located and planned in a compact and connected way as a logical extension to the city. How would we then choose to structure and sequence (or re-sequence) the development?

To answer the question of structuring and re-sequencing development it is useful to reflect on the *Manifesto for Urban Change*, by Dewar & Uytendogaardt (1991). They describe the role of planning as that of providing new opportunities and choices where citizens can also participate in making these choices. Dewar & Uytendogaardt (1991) advocate that under these conditions we can genuinely enrich society. This philosophy on physical planning allows key structuring features to order and guide growth while allowing for individual creativity. It is within this freedom and organic nature that they advocate more 'liveable' urbanism is achieved.

These characteristics provide broad structure to order growth and performance with freedom within. Such structures are missing in informal settlements. It is considered inherently difficult to retrofit structure to existing informal settlements. Re-structuring of informal settlements requires re-locations of residents which are typically contested and costly to install infrastructure under in-situ conditions. It is not to say in-situ upgrades should not be done in existing informal settlements, but recommended to explore parameters to aid reducing and preferably avoiding further informal settlements (unstructured) developing.

As per literature review, in-situ upgrading has long been adopted in Cape Town and known as the public structure approach. Primary structuring elements are retro-fitted as components for community needs such as services, public space and amenities that are connected to public circulation. As per Daniel *et al* (2016), this approach should be proposed from the outset and not just viewed as spatial tools to re-order existing settlements. These public space systems include natural features such as wetlands, rivers, or other naturally occurring features than can help create and order structural elements. These could also be multi-use areas at different times of the day and week. Development of these spaces could also be incremental over time as needed by the community. Importantly they can also provide space for businesses to operate such as goods and food vendors as well as light manufacturing of furniture, doors and other building materials for example.

Testing of the public structure approach in existing formal settlements in Cape Town, revealed many challenges. To overcome these challenges, required understanding and learning of how the settlements occurred and therefore a participatory and consultative approach to solve challenges of re-locations and adaptation where resistance was too great. Other challenges experienced was that of providing infrastructure solutions where existing constraints required pragmatic solutions. These deviated from the norms and standards and introduced new risk and liability to project owners and professionals. While it is accepted that in-situ upgrading is preferable to relocations, it produces new challenges that require additional time, cost, innovation and experimentation to solve issues. This will be an ongoing challenge to improve all informal settlements. The case precedents in the literature review of informal upgrading support the notion to change our approach to limit the extent of the problem and guide future informal settlements. This will need to be done in ways that will reduce the need for timely, costly and abortive work. Limited natural resources and financial capital can then be better utilised in a more pre-emptive and incremental approach.

In other work by Eglin & Kenyon, another approach is the that of managed land settlement described in detail in the literature review. In South Africa, despite massive efforts by government providing public houses, the absolute number of housing backlog is growing, and therefore other approaches have been explored. Other reasons for this alternative approach involve provision for immigrants or others who do not qualify for subsidies provided in South Africa to qualifying citizens.

The managed land settlement approach, advocated by Eglin & Kenyon (2018) provides an alternative option other than; wait for formal housing, or choose to invade land illegally. This process also follows a step by step approach applied to either; existing informal settlement upgrading (ISU) where auto-construction has occurred (reactive manner), or in a proactive manner to 'plan in advance'. The key principle of managed land settlement (MLS) is to secure suitable well-located land that is prepared in advance of settlement with basic services. In this proposal of MLS, the sequencing problem can be solved. However, for political reasons it is not fully supported in South Africa, as full free housing provision is promised to eligible citizens and therefore favoured over MLS. The unique history in South Africa and resultant political agenda, is a major obstacle in adopting political reform or alternative planning approaches that move away from the promise of free (unsustainable) housing policy.

In other contexts, policy approach for planning and housing provision, is that of low cost with provision of upfront tenure to allow incremental upgrading over time. This approach is however limited in that it focuses on residential land use at low density, that will ultimately perpetuate urban sprawl. It also does not include the benefits of a fully integrated development and is typically planned in peripheral locations where the land is cheap. The alternative site and settlement approach is also an option that provides services upfront. However, when projects are completed, this option does not allow for further upgrading support. These types of projects have a clear 'start and stop' and typically planned on available cheap land with the same residential single land use at low densities. The MLS approach is also not without its criticism relating to low densities that are achieved. To mitigate this criticism and increase densities, planning proposal can include zero building lines and shared firewalls to limit the building footprint and maximise densities. Consideration could extend to planning and assistance to residents to build foundations to support 2<sup>nd</sup>, 3<sup>rd</sup> or even 4 storey walk-up buildings.

### 3.2.11. ALTERNATIVE PLANNING APPROACH

In the literature review relating to alternative planning for informal settlements, the work of Gouverneur (2015) provides an interesting alternative view called Informal Armatures (IA). This work is considered in a developing context in Latin America, and is arguably influenced by policy changes in South American cities. The focus of this work is more on participatory planning and incremental upgrading. The work is influenced by precedents such as the city of Medellin in Columbia. Urban interventions in Medellin have arguably shown good levels of success in recent decades, and promise of a new or alternative approach. Gouverneur (2015) sets out to find pragmatic ways to guide growth and support auto-construction, thereby improving living for those who are currently excluded from formal planning. Gouverneur, broadly seeks to pre-empt settlement and accommodate settlers in a way that would reduce inequality and pervasive splintered urbanism. This approach is pragmatic in that it does not expect dramatic transitions. To explain further, the approach does not envisage a situation where people are 'kind of beamed up' if it can be imagined from the images of informal settlements to that of smart cities.

The IA approach acknowledges that informal settlers have serious affordability challenges just to meet their basic needs (food and shelter). As such, residents are un-likely to transition and assimilate quickly into such urban imaginaries of smart cities. The approach however recognises that informal settlers can offer human capital to co-create and construct cities with support.

The IA approach is intriguing, and is distinctly a hybrid approach that merges the dynamic nature of auto-construction achieved through human agency with guiding formal principles to structure space. The key argument conveyed by Gouverneur is that well-structured space cannot be achieved on its own i.e. under auto-construction. The approach is like that of Dewar & Uytendogaardt (1991) or public structure approach. However, IA goes further in providing and including a range of approaches to suit people with varying means. For example, the integrated nature of the planned land parcels is not pre-determined and can be planned in different options or parameters. The summary of the IA approach range includes; informal areas to develop within a structure with basic communal servicing, sites and services for those with increased affordability, and lastly formally planned areas with formal housing. Essentially the range of options are contingent on peoples means and are located within integrated land parcels. As a commentary, IA offers significant opportunities to integrate various income levels and reduce stark spatial inequalities.

Critical to IA, is to provide access and connectedness to the city, to offer employment, provide income, social and recreational opportunities. Another key feature of IA, is the dynamic nature of public space which can change over time to suit the needs of the public. The formation of the approach can be thought of as a well-planned structure that focuses on the quality and performance of public space. Public space that has flexibility and allows for the dynamic nature of cities. It is noted that supporting infrastructure will profoundly affects the performance of the city and resultant urbanism, and critically the level of sustainability achieved. According to Gouverneur, IA will need to do more than limit current ecological degradation and pollution, but instead will need to reverse prevailing trends.

On further review and analysis of Gouverneur's work, by his own admission the theory has not been tested in real world situation. Throughout his book on IA, the theory and potential gains are continually repeated and a strong argument is continually augmented. The fact that Gouverneur must continually repeat his theories and benefits, is viewed as process of continuous positive re-enforcement of the guiding principles. Following on with this message of continuity, strong leadership and sustained efforts over a long duration will therefore be needed to implement IA. On analysis of this message, it becomes apparent that projects with a distinct 'start and end' will not aid the successful implementation of IA. Gouverneur, is clear in his guidance, that dedicated and committed champions who are passionate about their work will be needed to guide the community and IA process. It is therefore suggested that the principles of IA for planning and the provision of infrastructure (incremental), can only be done under a long term programme. The programme would need to feature an inclusive stakeholder engagement plan. Under this long term programme, various individual projects would need to be identified and phased over time to suit the incremental approach.

Under the programme management system, feedback loops (Monitoring & Evaluation) for projects could help to adjust and inform the overall programme and individual projects for future.

### 3.2.12. INFRASTRUCTURE

In building on the preceding planning recommendations, supporting infrastructure systems form an integral part of the planning. Although not included in the literature review, the framework of Cartwright (2017) is useful to provide a supporting infrastructure approach for incremental development. It proposes broad guidance of various sustainable infrastructure transitions for African cities (or could apply to similar developing context adapted to suit local conditions). These transitions move from the 'business as usual' approach of unconstrained resource consumption and expansion (typical of urban sprawl) to a potential 'hybrid' of adapted 'engineered, ecological and institutional' infrastructure. With use of the transition framework, as per Cartwright (2017) and drawing on my own experience (>25 years) as a civil engineering professional, broad concepts for Infrastructure services aligned with the IA approach could be re-imagined as follows:

- Built Environment – Urban sprawl with poorly managed land-use is inequitable, segregated, and expensive to build and manage infrastructure/transport systems. New planning will need to transition to integrated land use with higher densities to make servicing and transport cheaper. This could also encourage investment, intensity, competition, innovation, vibrancy and social interaction. The design of the urban form and public space is also important to support passive design to reduce cooling by greening for example. Selected use of local materials for construction of public spaces, public amenities and private urban form (reducing carbon emissions associated with transport over long distances or importing of materials via ship). Public spaces would need to be multi-functional in providing amenity for recreation and for biodiversity systems. These public spaces can also act as buffers for heat, pollutants and controls of drainage systems. The public structure system can also be linked and provide accessibility to housing and act as further natural buffers. For example, protect areas prone to flooding or sea-level rise resulting from climate change.
- Transport – Associated with urban sprawl, is the rapid increase in private vehicles and smaller forms of public transport, along with increased resource consumption, transport costs, accidents, congestion and pollution. A shift to a more compact and integrated form of development is proposed such as Transit Orientated Developments (TOD) where developments are compact, include mixed land use, higher densities, and are walkable and safe. This will mitigate many of the costs and effects of urban sprawl, while increased densities can increase ridership to make transit systems more viable and less dependent on subsidies. These strategies could include Bus Rapid Transit (BRT), electric vehicles, bicycles and walking friendly precincts to support viable and sustainable transport.

- Energy – It is important to rethink the ‘business as usual’ approach in networked supply as these are commonly supplied from a distant power station possibly using non-renewable resources that is inefficient and expensive to distribute. To do so, bottom up solutions from houses and business should first be explored. For example, power generation through photo voltaic installation on roof dwellings or community mini-grids, solar thermal geysers and energy efficient household lighting and products should first be considered. These interventions may either serve energy demands in the interim condition or long term at least reduce the need for external resources supplied through a networked connection. Other local interventions to reverse the traditional paradigms of networked energy supply could include local sources of energy from biomass (biodiesel, solid waste, sludge and wood chips). A key challenge with these options is typically to secure sufficient feedstock. However, the key intervention of energy options is to create diversity of supply and reduce demand from networked supply. Other interventions may relate to institutional arrangements such as carbon taxing and increased tariffs for use of non-renewable energy.
- Water – Similarly to energy supply approach, bottom up solutions need to first be considered to support sustainable transitions. For example, we should not consider upfront water supply from remote catchments (dams) and disposal of sewage through networked connections to sewer treatment works. Bottom up solutions for water supply should first consider communal boreholes or local ponds, combined with rain water harvesting and re-use of grey water to reduce reliance on communal source. Other water demand management strategies relate to interventions such as changing user behaviour through water conservation awareness campaigns combined with increased tariffs or punitive charges for excessive usage from communal sources.
- Sanitation - In early stages of development, bio digesters, composting toilets and communal toilets may be more viable solutions at household and neighbourhood scale. Other grass roots options may include cost effective small diameter low-tech grey water filtration disposal systems. These could be installed by respective communities to irrigate trees to provide shade, passive cooling, CO2 absorption and greening aesthetics in public space. This low cost and low-tech grey water solution can reduce overland grey water pollution in the absence of formal water borne sewer systems. As development occurs, intermediate solutions may need to transition to larger neighbourhood scale networks. For example, in early development, shallow depth gravity sewer systems that reticulate to biological treatment works (reed beds) or settling ponds, act as smaller de-centralised systems. These systems can function for lower densities as alternatives to costlier conventional mechanical and chemical treatment works. If in the longer term, more conventional treatments works are unavoidable, the treatment works should at least benefit from reduced generation through water demand management and preferably be powered by renewable energy. Further treatment of this water towards potable standards may then be possible by using renewable energy. Re-use of this water for irrigation of crops or to recharge ground water aquifer storage is then possible.

- Drainage - Uncontrolled drainage from increased hardened surfaces in urban areas can present major threats to life, property, infrastructure, and spread of infectious diseases when contaminated with pollutants. To aid mitigation of these risks and effects, good principles of Sustainable Urban Drainage Systems (SUDS) is recommended. The principles of SUDS start at house source control level, where collection via rainwater (harvesting) and re-use prior to discharging, preferably equivalent to pre-development natural flows to public neighbourhood areas occurs. Within roadways, the use of vegetated central or side swales for example are preferable to piped options. Run-off can be minimised through limitation of hard surfaces and controlled where practical in open swales and detention areas. The principles of such systems are to; control both quantity and quality of water through filtration, aid biodiversity within wetlands, and provide public amenity using more natural systems within green space as multi-use scenarios.

In planning of Infrastructure systems, a critical consideration is the reservation and protection of space to install infrastructure. With consideration to an alternative incremental urbanism approach, the ultimate infrastructure is not expected to be installed upfront. However, the area needs to be protected from obstructions to allow installation of infrastructure at a later stage. This relates to protection of road reserves and servitudes. For example, within a city, to cater for long term growth a road reserve of say 24m width may be needed to provide for; 4 lanes of traffic, a central median, parking and sidewalks. However, in the early stages of development only minimal infrastructure may be needed. This initial infrastructure could consist of overhead electrical power, nominal diameter water pipeline for communal stands, and a 2-way gravel access road of 6m nominal width (built in the position of one of the future carriageways). The road could also be a block paved to provide all weather conditions and cleaner environment, built by community labour.

The question is then how would the remainder of the road reserve be protected from infill development? Undoubtedly this would require engagement and support from the community to assist in protecting their own future. To solve this problem, these reserved areas could be used to help support the community. The reserved area of remaining road reserve could for example support informal trading with some basic service provision. Alternatively, to reduce surface run-off and increase food security these areas could be used for food production or public open space for recreation in the interim phases.

### 3.2.13.HOUSING

Housing typologies have not been extensively researched in the literature review. However, in auto-constructed settlements housing is typically low quality 'bit by bit' structures that are often incrementally upgraded over time to more permanent structures. They are often built in heuristic fashion that does not normally support further upgrading or vertical expansion. For vertical expansion, they lack engineering foundations and other structural considerations. These engineering considerations relate to investigation of geotechnical founding conditions, soil allowable bearing pressures, expected building and live loads, wind loads, and seismic activity. In summary, design and construction of foundations and/or piling as appropriate to site conditions and type of building has not been performed by professional persons. There are some exceptions to this norm where in South America for example some informal settlements have been built up to 7 or 8 stories informally. This happens when self-builders have worked in the construction field and follow the application of similar specifications without formal engineering investigation and design. Although the principle of increased density is supported for compact cities, this construction approach is by no means supported and fraught with risks of poor structural integrity that could result in a disastrous situation. For safety reasons, engineering standards and norms cannot be relaxed and require formal engineering investigation, design and construction in accordance with given specifications. This a typical example of exactly why buildings may not comply with formal regulations and therefore may never become formalised over time.

To overcome such engineering challenges, to support guided auto-construction at higher densities, an approach could be to consider structural requirements in advance. For example, when planning of a new city, the main or high streets and city centres, that require higher densities could be supported by state interventions. These interventions could involve provision of engineered foundations for these areas that can support say 3-4 storey (or even higher) buildings. Under these circumstances, mixed land use could be permitted. For example, commercial use on ground floor with office and residential above. In other residential areas, the previously suggested common fire walls built upfront can support denser settlement patterns and provide a literal basis for auto-construction. These solutions would require state funding to build upfront and then support over the long term (design and building considerations) as developments occurs. These are simple suggestions to support improved regularisation and reduce some of the persistent challenges condemning areas to informality. The challenge with these ideas is to provide funding firstly, and then secondly to whom and how is this support provided? The problem here is who benefits and who does not? These proposals could provide unique opportunities for owners and/or tenants to generate long term income. So, how does government decide who should receive this benefit? A solution may be to provide a housing policy that provides subsidises to fund incremental development of infrastructure and housing or building foundations. The amount of subsidy will need to be linked to that of local governments fiscus ability. The policy drawn up to support this proposal would need to be equitable with eligibility criteria well defined. This option could also allow for later additions if the policy and subsidy is increased.

### 3.3. CONCLUDING REMARKS AND PROPOSED PARAMETERS FOR LIVEABLE URBANISM

The literature reviewed in Chapter 2, and findings and analysis in Chapter 3 is intended to focus on the challenges, constraints and to think about new ways of exploring alternative urbanism. Then in addition to analysis, propose suggestions or recommendations as to how this urban assemblage might form. The suggestions or recommendations raised throughout this Chapter 3, would then need further detailed investigations of the specific challenges, and mitigation strategies determined. In confirming the strategies, these would need to be planned in a context specific real world planning process. This planning would then need to be critically tested with experimentation in a real-world situation. Feedback loops, to allow for changes, improvements and adaptation of planning would be essential as part of a learning process. With further reflection on the literature review and recommendations, there are wide ranging considerations and is arguably a daunting task to cover all the elements and consequences of planning. For these reasons, testing is critical. Even if tested at the largest replicable scale possible, the answers may at best only provide further recommendations for others to learn from and adapt to their own context, re-test and implement. Nevertheless, as a conclusion of this Chapter 3, recommendations will be captured as succinctly as possible to provide parameters of a liveable urbanism through inclusive incremental development.

### 3.4. RECOMMENDED PARAMETERS

1. Use of planning as central tool and starting point to achieving goals.
2. Use of 'dislocation' and 'immersion' learning tactics to understand 'for whom we plan' to keep end users firmly in mind when planning. Planning theory will need to be augmented by lived or personal experience to place the citizen at the heart of the planning. Learning is critical to the process (planning and auto construction) to adapt and adjust to changing needs.
3. The composition of the planning team will need to be made up of a diverse group of people (e.g. academics, planners, architects, engineers, environmental and social scientists, economists, NGO's, local community and business) that will allow more equitable and inclusive planning.
4. Interventions may involve causal complexity where planners may encounter political opposition or unexpected and undesirable consequences. A reframing of experimentation approach is required to help stakeholders understand the benefits. Through experimentation, continuous feedback in the system can be used to amend and adapt planning to solve problems for a better long-term sustainable solution. The use of 'system thinking' and leverage points (i.e. from making small changes in planning right through to policy and paradigm shifts) applied to experiments of real world situations. Experiments using incremental approach to developing urban form and infrastructure, with early feedback loops will support and aid in the prevention of abortive expenditure.

5. Use of evaluation criteria framework (using general literature consensus) to determine what experiments are conducted. Criteria frameworks will need to determine how effective experiments are in terms of being; inclusive, systemic, practice based, challenging, learning based and adaptive to changing condition and bringing about socio-economic change. Focus on experiments using small 'do-able' and 'low-cost' actions.
6. Pre-emptive planning for rapid urbanisation where well located land is critically determined (and secured) by use of multi-criteria analysis. Criteria would need to include; environmental, technical (topography, slopes, geotechnical, ability to service), underlying economic conditions and connectivity (distance and accessibility) for a city to function (and most importantly exist).
7. Incremental approach to accommodate dynamics of informal settlements patterns (within a planned structure) whereby the city is co-produced to form a new urbanism more liveable than current realities
8. Guided and supported auto-construction programmes of housing and buildings by local government to ensure regularisation over time and secure tenure.
9. Greater use of technology (i.e. ICT and hand-held devices) to improve visibility, transparency and participation of communities for whom we plan. Includes support of data collection, sharing of information, auto- construction guidance and participation of planning (physical and budgetary).
10. Public structure planning to restructure and re-sequence development. Provide well planned public structure that focuses on quality and performance of public space. Structure must order growth and performance with freedom within a defined framework. The broad structure or framework can be defined by making use (where appropriate) of the sites natural features to create and define well planned and connected public space. The public structure will need to provide the greatest ability (within a framework) to transform over time to adapt to the dynamic nature of cities. Provide maximum opportunities for social interaction and support of livelihoods by provision of multi-use environments (e.g. agriculture, trading spaces, commercial, amenities, recreation). Allow public space land use to change over time as communities needs change.
11. Well planned city using the public structure approach that is well-configured, compact and connected, with the correct urban land-infrastructure co-ordination, more likely to attract investment and function better.
12. Appropriate mixed land use and density (to avoid urban sprawl) must be supported and integrated with a transportation network and enabling infrastructure system.
13. Plan and develop Infrastructure incrementally in support of housing and for economic growth (i.e. infrastructure to support local manufacturing activities and food production). Systems starting at house and neighbourhood scale. Appropriate systems at house scale could include; use of boreholes, solar thermal and voltaic. At community scale; mini-grid, on-site sanitation or communal systems and proceed onto larger systems such as central biological treatment works and then conventional systems only as development occurs and is required. All systems designed and built with full emphasis on 'circular economy' of resources.

14. Minimal preparation of land. Provision on public space systems which include roads and infrastructure servitudes. Roads, public areas and some development areas may require some enabling earthworks to avoid resettlement at later stages. Preservation of public space and road reserve or infrastructure servitudes with interim land uses (i.e. for food production, recreation or public amenities).
15. Protection of natural systems with minimal intrusion of infrastructure and conservation of resources.
16. Use of IA (Informal Armatures) to provide a range of options of servicing options with integrated land parcels. These options are contingent on peoples means and will create more integrated and inclusive settlements.
17. Increase densities on main and high streets. Use of zero building lines and shared firewalls to limit the building footprint and maximise densities. Planning and assistance to residents to build foundations to support taller buildings and increase bulk densities.
18. Climate change adaptation. Identification of projects with co-benefits for community and local government to build climate resilient infrastructure that will generate income and employment. e.g. Renewable energy and water supply projects.
19. Establishment of long term programme to compliment incremental development approach. Setup of programme management unit to plan and manage stakeholder engagements, partnerships and individual projects within long term process.
20. Participation and Partnerships are crucial to successful implementation. Requires champions to facilitate these partnerships located within programme management unit.
21. Financial reforms and innovative financing considerations required i.e. establishment of grant funding at national level. This will require economists with imagination and tenacity.
22. Political and institutional reforms (democratisation and devolution of powers to local government) to allow for more inclusive and participatory planning.
23. Amended development policy to support incremental development and better respond to infrastructure requirements and auto-construction of houses and other buildings. Policy that employs the greatest use of human capital available. A re-writing of the rules is required to include the poor rather than exclude them.
24. Sustained political will and strong leadership (and preferably continuity) is critical for success of alternative more liveable urbanism.

### 3.5. CONCLUSION

From these recommended parameters, the final Chapter 4 will seek to draw conclusions on the effectiveness of the process used to review, analyse, argue and determine recommendations. This following chapter will need to highlight what the success factors are, what will work, what will not work and what we can learn.

## CHAPTER 4. CONCLUSION

Based on critical evidence, global patterns of rapid urbanization and resource consumption have reached critical proportions where resource consumption is outpacing the carrying capacity of the planet. Africa is experiencing the most rapid urbanization whereby populations of cities will double in the next 20 years and spatial extents could potentially triple. These trends will place further demand on land and resources where African cities are amongst the poorest in the world and are the least prepared to manage this urban growth. Current impacts of urbanisation in developing cities is characterised by chronic congestion, pollution, environmental degradation, inequality and poverty. The response to urbanisation and the need for housing has seen many large-scale housing schemes implemented but have been unable to supply affordable housing to meet the demand. The impact of this policy failure has manifested in a proliferation of auto constructed informal settlements in Asia, Latin America, Africa and other developing contexts.

From global debate on policy and literature, it is understood that contemporary planning approaches are inadequate to deal with these challenges. As a result of this global debate, the United Nations set global SDG's and the NUA to address these challenges. By their own omission these policies are just the starting point to achieving sustainability and equity. These policies are however generic and not context specific.

To change our planning approach to deal with urbanisation challenges, academics like Bhan and McFarlane argue convincingly that this will require new theories of knowledge achieved through the process of new learning, that combines theory and lived experience of residents from auto constructed cities. This represents a more inclusive approach where knowledge of daily struggles can be linked to action to intervene and bring about change. This represents a shift in thinking of the definition of planners from the traditional sense to include a diverse group of people as 'planners' in the planning process to promote equality. The challenge of this approach is that it requires institutional and financial capacity as well as strong political will to move to a more inclusive and participatory practice. The paradox here is that for these same reasons or lack thereof we are unable to plan and manage our cities in a sustainable way. However, through global agenda's, a critical shift in thinking about planning and the role of cities has occurred. Previously cities were viewed as the places that contribute to urbanisation issues. The shift in thinking and planning approach now views cities as the places where sustainability transitions can be achieved. This also represents a transition from ameliorative practice of 'limiting the damage' to a more transformative approach of 'reversing unsustainable patterns of consumption and impacts'.

Application and promotion of contemporary planning practice and regulations has directly excluded the poor as they cannot afford to comply with formal regulations and rules. Auto constructed cities are built in direct conflict with these rules. For these reasons, they typically cannot receive tenure and thus ineligible to receive services legally. The formal rules do not support the poor and serious consideration should be made of how to re-write this rule book or adopt alternative policies and strategies that actively seek to support and promote livelihood of the urban poor.

Whilst the efforts and merits of auto construction to produce settlements and connect to the city in self-supported ways is commendable, the qualities and performance of formally planned cities cannot be achieved in auto constructed cities. These settlements while organic and dynamic, lack structure and guidance to permit growth and promote opportunities to improve livelihoods. For these reasons, the central occupation of this dissertation has been focused on how the agency within auto-constructed cities can be harnessed and guided to co-produce functional cities through incremental inclusive development that achieves performance qualities comparable to those of formally planned cities.

From extensive research in the form of literature review, the epistemological and critical issues relating to developing an alternative urbanism have been raised. The main argument and supporting arguments have been evaluated and challenged for logic, credibility and effectiveness. From concluding arguments, the key strategies supporting an alternative urbanism have been defined as succinct recommendations (parameters) in Chapter 3. The key feature of this liveable urbanism is to plan in advance of informal settlements and co-produce with residents, a new liveable urbanism that is vastly superior to that of current informal settlements. This process then allows for upgrading over time to further improve livelihoods. To achieve this goal, detailed recommendations have been provided and ordered as far as practical in the most logical planning sequence. They also represent a wide range of success factors that are needed to plan and ensure successful implementation of an alternative urbanism. Some of the key success factors such a political will are listed last in these recommendations. However, they could also be regarded as one of the most critical success factor to introducing alternative paradigms and required upfront. The reasons for listing these high-level success factors last is to ensure that sufficient planning incorporating all recommendations is first done to clearly promote the benefits and explain how challenges will be overcome. By doing so, this will mitigate risks of failure in making pre-mature underdeveloped proposals.

On analysis of the recommendations, the key emerging success factors relate to political will, strong leadership, amended policy (re-writing of rules), institutional and financial reforms to address capability and capacity, participation and partnerships, establishment of programme management unit, climate adaptation and environmental sustainability, incremental development, well-structured planning and sequencing of public space and infrastructure, guided and supported auto-construction, learning, and lastly planning as a central tool to achieve goals.

With so many key success factors listed, the task of successfully planning and implementing such an alternative urbanism is substantial. For this to work, a central theme of the process is that of 'buy-in'. This will require full support of a wide range of actors involved in the process that can provide sustained support and input to co-produce a new urbanism. To make this work we require a compelling vision that is well articulated and clearly highlights key benefits and risk mitigation strategies. Then during implementation, we require 'quick wins' to build on successes in a recursive self-reinforcing pattern to advance the programme.

Conversely early failures, place the process at serious risk where such derailment can lead to a complete undoing of the process and allow planning to revert to an unsustainable default mode of business as usual. For these reasons experimentation at scale with real life situations to trial and gain feedback to adapt and amend the planning approach and inform policy is critical. This experimentation is probably the most important learning opportunity to realize the potential of a path breaking alternative liveable urbanism achieved through inclusive and incremental development.

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#### Notes

1. A version of this paper was previously published as Bhan *et al.* (2014).