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Smarting the City or Development: The Dilemma of the Post-Oil Countries in sub-Saharan Africa

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1 ABSTRACT

Although sub-Saharan Africa (SSA) is the home of over 900 million people, it is estimated that this is likely to treble at the end of the 21st Century. More than 50% of this population would be living in Cities with its infrastructure woefully inadequate to support these lives. SSA is a region with 54 countries, 28 of which are listed among the world's 30 least developed countries. More than two-thirds of the people in the region live on less than 2 dollars per day. However, despite the fact that mobile phone penetration in Africa is about 80%, it is estimated that not more than 20% has direct access to electricity.

Most of the SSA countries on the advent of oil or gas discovery have embarked on many audacious infrastructure projects with the goal to develop the cities and the country as a whole. With the influx of the hype of 'Smarting everything', that is from mobile phones, computers, and cars to communities and cities, most of these countries are faced with the generational question- whether to 'smart' the development or the cities? This paper takes a look at what 'smart development' and 'smart cities' are in the context of the SSA socio-cultural milieu. It also explains what would be the dynamics for the urban fabric of Smart fractal communities within the cities in the light of quality of life, sustainability and resilience. It goes further to expatiate what strategies needs to be adapted if smart cities or development is what SSA currently needs to tackle its urbanisation crises. Finally, recommendations for the way forward shall be posited.

2 URBANISATION AND DEVELOPMENT IN SUB-SAHARAN AFRICA (SSA)

Only one century ago, two out of 10 people in the world were living in urban areas. In the least developed countries, according to the UN-Habitat (2012, p.25) this proportion was as low as five per cent, as the overwhelming majority was living in rural areas. Interestingly, only 60 years ago (1950), the number of people living in urban centres was slightly higher in the developed nations (54 per cent, or 442 million) compared with developing countries. Today, of every 10 urban residents in the world more than seven are found in developing countries, which are also hosts to an overwhelming proportion of humankind (82 per cent of the world's population) (UN-Habitat, 2012, p.25). Moreover, it is estimated that, between 2010 and 2015, some 200,000 people on average will be added to the world's urban population each day. Worth noting is that 91 per cent of this daily increase (or 183,000) is expected to take place in developing countries (UN-Habitat, 2012, p.25). In the last decade, the urban population in the developing world grew an average 1.2 million people per week, or slightly less than one full year's demographic growth in Europe's urban areas. Asia dominated the picture, adding 0.88 million new urban dwellers every week. Africa was the second largest contributor with an additional 0.23 million per week (UN-Habitat, 2012, p. 28). Large urban configurations come with a number of well identified, specific risks: poor urban/regional planning, lack of coordination and deficient coping strategies in the face of social and fiscal disparities (UN-Habitat, 2012, p.33). Although sub-Saharan Africa (SSA) is the home of over 900 million people, it is estimated that this is likely to treble at the end of the 21st Century. More than 50% of this population would be living in Cities with its infrastructure woefully inadequate to support these lives. In a region with 54 countries, 28 of these were listed among the world's 30 least developed countries having more than two-thirds of its people in SSA living on less than 2 dollars per day (Kieh Jnr, 2008). With this dire need prevailing in the sub-region, it becomes obvious that any attempt to boost the development is long overdue. More so, although mobile phone penetration in Africa is about 80%, it is estimated that not more than 20% have direct access to electricity. Despite the fact that official statistics reveal that 89 per cent of the urban population in Africa now have access to improved water supply, a large majority of Sub-Saharan African cities experience regular water shortages. The UN-Habitat survey shows that 11 of the 14 African cities (79 per cent) under review are faced with such serious problems (UN-Habitat, 2012, p.50). Though urbanisation in SSA seems to have an exponential growth, the corresponding development to support it is either stagnant or seems to have taken a nose dive downwards to exacerbate the problem of degradation of the urban fabric. Policies of spatial decentralisation of many African Countries which favour smaller cities investment and planning decisions have contributed immensely to the growth of medium-sized cities and they have been growing faster than the

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largest cities (Kieh Jnr, 2008). African city development is an expression of rapid population concentration characterised by urbanisation running ahead of industralisation;slow or declining economic growth and imbalance between industrial, social, administrative infrastructures and the demand cum expation of the in-migrants (Kieh Jnr, 2008). More so in developing countries, especially SSA, urbanisation and city development are characterised by 'international demenstration effect' whereby national surpluses (if any) are wasted by elite purchases of fashionable consumer goods rather than being used to stimulate the local economy (Herman, 1999). This trend is not only far from smart development but could be as well described as unintelligent.

3 DEFINITION OF 'SMART DEVELOPMENT' AND 'SMART CITY'

3.1 What is development?

Development implies changes in the economic, social and environmental situation of individuals, households, groups, institution, firms and countries (Zeller, 2011). These changes overtime could be referred to as process of development whereas the situation at a certain point in time as the state of development. Though changes over time are certain to make individual or groups worse off while others better, development is understood intrissically as something positive(Zeller, 2011). Development as a term is usually used with different connotations and sometimes behaves as suffix, it's therefore ambigous and depends on the value concepts. Due to the multiplicity of objectives and viewpoints regarding 'good' development in any society, the term development defies precise definition (Zeller, 2011). The SSA lags both in the process and the product. The process of development is stagnated and the state of development appalling. It is only when the process of the development is 'smarted' that would be relevant if the state of development is usually affected by the objectives pursued by development strategies and policies and thus determines which policy instruments, programmes and projects should be considered for promoting development. Hence the stem of development being referred to in this paper may be group into Ecological, Historical, Political, Social, Human, Economic and Technological. The foundational or root process that lead to the desired changes include hard and soft infrastructure development whilst the geo-spatial environment consisting of the rural or urban communities may be considered as the product or fruit.What one sees as a geo-spatial environment could be referred to as a city, town, community or village and has its foundation from the hard and soft infrastructures that have been created over a period. The city is thus a product of developments and hence the big question is - do we 'smart' the Product or the Process?

3.2 Smart development as a function of smart infrastructure

Smarting a system is enabling behaviourial change via community engagement using contemporary information communications technology to generate a resilient and sustainable output (ARUP, 2011). This entails the design and implementation of sensor instrument networks and associated technologies that report in the activity and performance of the infrastructural system. In 'Smart Development' provision of real-time data allows the out-sourcing and procurement, operational frameworks and management, organisational structure and data policies. Whereas, with 'Smart Infrastructures', the process of engagement and management is affected possitively as better information is released to users for behavioural change, emissions reduction and increment of quality of life.

The term infrastructure connotes the underlying structural ’base’ of a society or economy that helps it to function and without which economic growth and overall development is severely hampered (Caves, 2005; Chambers, 2007). Caves (2005) defined infrastructure as ’the physical structures, facilities, and networks which provide essential services within a community such as transportation, utility companies, water and communication systems as well as public facilities such as schools, hospitals, and government buildings’. In an attempt to distinguish between different groups of infrastructure, Caves (2005) described comprehensively as: capital assets that traditionally have included public and privately owned facilities and systems such as utilities (gas and electricity, water supply and sewerage, waste collection and disposal, storm water management); public works (roads and bridges, dams and canals, ports and airports, railways, transit and other transportation services); community facilities (schools, parks, recreation, hospitals, libraries, prisons, civic buildings); telecommunications (telephone, fax, internet, radio, television, satellites, cable, broadband, multimedia); and knowledge networks (universities, research institutes, corporate research and development, government, philanthropic foundations, libraries, museums, archives) (2005, p.261).

Consequently, due to the broad nature of what infrastructure means, it could be classified as soft and hard/physical. Smart urban infrastructure can keep track of city operations, predicting faults before they occur, while optimising delivery of resource or services to match demand. For the development to be smart, one has to reckon that instrumenting resource systems and infrastructures is vital and crucial. For example, sensors located on existing infrastructure, can monitor water quality or air quality or mobile phone data, revealing patterns of movement and energy use in the city. Hence soft and hard/physical classification of Smart urban infrastructure could be expatiated as follow:

(a) Physical/Hard infrastructure refers to the large physical/technical/fixed networks and capital assets, as ecological capital and digital capital, serving to convey or channel or transmit people, vehicles, materials, fluids, energy, information, or electro-magnetic waves. It is the base for the functioning of a smart nation, as:

- Green Infrastructure, Land, Environment and Landscape
- Sustainable Transportation infrastructure
- Green Energy infrastructure
- Water management infrastructure
- Smart Communications infrastructure
- Solid waste management infrastructure
- Environment/Earth monitoring and measurement networks
- Basic energy or communications facilities, such as oil refineries, gold mines, coal mines, oil wells and natural gas wells, radio and television broadcasting facilities, are classified as part of national infrastructure.

(b) Soft infrastructure refers to all the institutions which are required to maintain the economic, health, cultural and social sustainability and quality of being of a country/region/area/city. Smart soft infrastructure systems include the fixed assets, the control systems and intelligent software to operate, manage and monitor the systems, as well as constructions, facilities and vehicles. For the scope of this discussion, smart soft infrastructure comprises;

- Smart Financial System,
- Smart Education System,
- Smart Health Care System,
- Smart System Of Government,
- Smart Law Enforcement System,
- Smart Emergency Services
- Smart Defence System.

The infrastructural integrity of the cities in SSA is critically important as it can either create a technological lock-in or facilitate 'positive' change or development towards smartness. Deficient Power infrastructure constrains social and economic development in SSA. Most SSA countries, especially those with post-oil economies are in the midst of power crises which is characterised by inadequate, unreliable and costly electricity infrastructure. Infrastructure is also an important input into human development. Better provision of electricity improves healthcare because vaccines and medication can safely be stored in hospitals and food can be preserved (Jimenez and Olson, 1998; Ebehard & Shkaratan, 2012). Electricity also improves literacy and primary school completion rates because pupils can read and study in the absence of daylight (Ebehard & Shkaratan, 2012). Similarly better access to electricity lower cost for business and increases investment, driving economic growth positively (Reinikka and Svensson,1999; Ebehard & Shkaratan, 2012).This correlation could also be extended to the supply of transport, food and water related infrastructures.

3.3 The city as a cncept and place

Although the terms urban and city according to Herbert & Thomas (1990) have often been used interchangeably by urban geographers, Caves (2005) defines a city as a permanent and densely settled place with boundaries that are administratively identified. The classification of a city may vary and overlap as this

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may depend on the geographical location, settlement pattern, time/age, the city's economic base, its function, population size and density (Herbert & Thomas, 1990; Caves, 2005). The type, growth and function of a city may be specific or diversified and may change over time (Kotler, Haider, & Rein, 2002; Caves, 2005). The city is the embodiment of an urban lifestyle characterized by individuality and impersonal relations (Herbert & Thomas, 1990). The city is also distinguished from a village by its sheer numbers, retail outlets such as shopping centres, medical centres, offices, banks; public utilities, bright street lights, extensive transportation network, cars; and entertainment or leisure avenues such as golf courses, parks, pubs and restaurants (Herbert & Thomas, 1990; Potter & Lloyd-Evans, 1998; Caves, 2005; Williams, 2005).

Conceptually, a city's importance is not just limited to itself but also functional to the surrounding towns and cities within a nation or region (Herbert & Thomas, 1990; Caves, 2005). A city may function as an industrial centre, administrative centre, transport node or commercial centre inter-alia. Most cities and towns however, as O'connor (1983) posits, in developing countries, are the result and dynamics of colonial and post-colonial processes or policies. As indicated in Box 1, there are about seven different types of cities by O'Connor's analysis of the progressional formation of SSA cities. These historic conceptualisations of most SSA cities have direct reflection of the current city structure governance and urban fabric.

More so, the city as a basis for economic activities essentially, 'every place performs a particular economic function' (Kotler et al., 2002, p.230). Cities have a primarily non agricultural economic base often distinguished by a more industrial and service oriented economic base (Jacobs, 1984; Herbert & Thomas, 1990; Caves, 2005). They are economically efficient in that they are a location for dense economic activity (Jacobs, 1984). They serve as a place for mobilizing the production and consumption of goods and services. The city as a place has a meaning and value for its dwellers or simply having a 'unique spirit of place' (Holloway & Hubbard, 2001 p 68). It is this sense of meaning and value that holds a point of significance for place marketing. Besides, a positive economic growth enables the city itself to expand in size and develop basic infrastructure which combined with better incomes leads to a higher standard of living, acting as an urban pull which attracts jobseekers and migrants (Jacobs, 1984; Potter & Lloyd-Evans, 1998).

Box 1: Conceptual Typology of African Cities

In a more comprehensive analysis O'Connor (1983) identified seven types of African city:

(1) The Indigenous City. Indigenous cities were constructed in the period prior to European colonization in accordance with local values and traditions.

(2) The Islamic city. Though influenced by an urban tradition brought across the Sahara, most Islamic cities were built by Africans, with local initiatives dominant in their early growth. Found across much of the Sahara, this type includes Tombouctou, Katsina and Sokoto.

(3) The Colonial City. Established by Europeans, mainly in the late nineteenth and early twentieth century's, colonial cities comprise the majority of urban centres in tropical Africa and include most of today's capital cities.

(4) The European City. Founded primarily in southern and eastern Africa, for example Nairobi, Lusaka and Johannesburg, these settlements were established by and principally for Europeans. African in-migration and permanent residence were constrained, subject to the labour requirements of the Europeans.

(5) The Dual City. In a dual city, two or more of the above types are combined, as in Kano, where a walled Islamic city is surrounded by a modern colonial-type city, or Khartoum–Omdurman, where the Islamic and colonial city elements are separated by the river Nile.

(6) The Hybrid City. A hybrid city is one that comprises indigenous and alien elements in roughly equal proportions (as in the dual city) but in which the parts are integrated. This urban type has increased since decolonisation as cities expand and become more integrated. Examples include Accra, Kumasi and Lagos.

(7) The Apartheid City. South Africa's apartheid city represented a unique form of urban social segregation that dominated the national urban system for most of the second half of the twentieth century. The roots of the apartheid city lay in the concept of 'separate development' and in early British colonial policy, which favoured 'native' reserves

Source: (O'Connor, 1983; Pacione, 2009, p. 468-470)

Cities are centres of innovation and not surprisingly, there is a strong association between industrial agglomeration and urban growth (Glaeser, 2000, p. 138; Porter, 2000). Across space and time, cities have been pivotal in civilizations and reputedly, most cities in developed countries are characterized by industrial growth (Herbert & Thomas, 1990; Potter & Lloyd-Evans, 1998). The city structure refers to the pattern or arrangement of the development blocks, streets, buildings, open space and landscape which makes up the urban areas (Marful, 2012). It is the inter-relationship between all these elements and the landscape, settlement and movement that creates the framework for the structure of the city to be appreciated. The structure which provides the basis for detailed designed of the constituent elements also provides a coherent framework for individual designs to be implemented (Marful, 2012). As a place, the city structure provides integration through connection and overlapping of contingent areas. They also demonstrate functional efficiency which is reflected in the working together of individual elements (building, streets) (Marful, 2012).

3.4 Smart city – a cfunction of smart development

Just as the definition of development, Smart City is another term that has generated a lot of debate in recent times. While images of the digital city, intelligent city, high-tech district and neighbourhoods of smart communities abound, they fail to convey what it means to be smart and why it is important for cities to be defined in such terms (Deakin & Al Waer, 2012, p. 9). Whereas Deakin & Al Waer, (2012) suggest that progressively smart cities must be seriously start with people and the human capital side of the equation, rather than blindly believing that IT itself can automatically transform and improve cities, Holland (2008) infers that, the recent developments have more to do with cities meeting the corporate branding needs of marketing campaigns than the social intelligence required for them to be smart. Hollands (2008), futher posited that cities too often claim to be smart whithout defining what this means or offering the evidence to support such claims. A smart city as posited by ARUP (2011) is one that uses technology to transform its infrastructure and make better use of energy and resources. Information and communications technologies (ICT) can be deployed to create new, intelligent ways of making our urban centres more resources efficient and reduce their carbon footprint. It goes further to suggest that what makes a 'Smart City' smart is the combined used of leadership, urban informatics and systems architecture (or smart systems) to enable residents to make better and more informed choices. The Smart city is further being developed as a concept which many communities and states are deploying as part of their developmental (positive change) strategy.Though a Smart city also uses technology to transform its basic infrastructure and optimise energy and resource usage, it’s also all about giving people better information so that they can behave differently in itheir energy and resource usage.

However, according to Climate Consortium Denmark (2011) 6 dimensions to a ‘smart’ city and these dimensions interact progressively through integrated systems to function effectively. The Consortium opines that, whether developing new cities from scratch or rebuilding existing cities, the challenge is to ensure that the city becomes more liveable, economically successful, and environmentally responsible. A research project carried out by European Smart Cities defines a ‘Smart City’ as a city that performs well in these 6 dimensions:

- Smart economy: High productivity, entrepreneurship and ability to transform
- Smart mobility: Strong ICT infrastructure and sustainable transport systems
- Smart environment: Sustainable resource management, pollution prevention, environmental protection
- Smart people: Diversity, creativity and participation in public life
- Smart living: Cultural facilities, housing quality, health and safety issues
- Smart governance: Political strategies and perspectives, transparency and community participation in decision making

It could be seen that all the above six dimensions are aspects of the the process of development hence a smart city can only exit if the development is tackled in a smart way.

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4 POST-OIL CITY TREND EVOLVEMENT IN SSA

4.1 What is a post-oil city?

A Post-Oil City is a relatively large and permanent urban settlement which generally have advanced or complex infrastructural systems which has evolved or been developed after the discovery of oil in the country of location (Marful, 2010). These cities manifest itself by the type of investment and infrastructure that follow the city's development. Due to the hysteria that follows oil find and economy, a lot of basic fundamental process that are considered the building blocks of sustainability are overlooked or side-tracked (Marful, 2012). A vision for the city that considers the entire country as well as the welfare of the current and future populace is critical. This is usually accompanied by a pragmatic action plan that is built on consensus building but not necessarily democratic principles (illiteracy level is critical for a successful democracy). This is really important because after the oil economy becomes a focal issue in national discourse, the people must take ownership of this vision and implement it for the upliftment of the living standard of the entire country (Marful, 2010). Oil and gas which is termed as black gold has also been described as a blessing in many Arabian countries whilst turning out to be a source of a 'curse' in many African countries (Marful, 2012). The difference is the approach of utilization and distribution of wealth and infrastructure that accompany the Post-Oil Cities (Griffiths, 2012).

4.2 Examples of post-oil cities in SSA

The effect of post-oil economy in SSA does not depict the type of scenarios evident in the Middle Eastern countries with respect to city development and fabric. Most cities in the Middle East have transformed their developmental agenda and strategy into a smart one and are now pursuing what they term as smart cities. In countries like Nigeria and Angola which possess about 75% of SSA oil capacity, their cities shows evidence of some level of massive transformations but shy away from being called smart. (Ebehard & Shkaratan, 2012). From table 1 below, although Sudan and South Sudan have mature production of oil, the effects of income accrued from the oil-economy is yet to be felt across the countries. What is going on in Nigeria and Angola cannot be compared to the effect of the oil -economy on the Middle Eastern Countries like Kuwait, United Arab Emirates, Qatar and Saudi Arabia. Although Abuja and other satellite towns are undergoing massive urban transformations, oil cities like Port Harcourt is nothing to be proud of. New SSA Post-Oil countries like Ghana, Uganda and Niger are also experiencing some levels of uncoordinated massive urban transformations which looks like a wholesale copying of the styles from the Middle East without any recourse to the effect from and on climate. Almost all the capital and industrial cities of the top five oil producers in SSA are potential post-oil cities but are all experiencing uncoordinated developments without any grand developmental vision for the urban fringes and the rural peripheries.

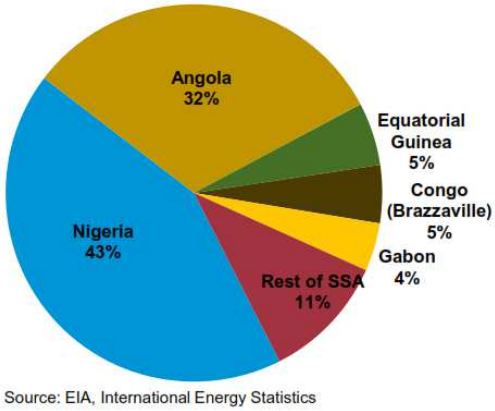
Mature Production	**Production Management**	**Production Growth**	**New Producers**
Production is forecast to decrease because of natural decline in mature fields. New production may come on-stream, but volumes are not large enough to offset the declines	Forecast production is flat or steadily increasing. New production coming on-stream equals or exceeds the natural decline in mature fields	Production is forecast to grow in countries that are relatively new producers as additional fields come on-stream	Oil Production is expected to start sometime within the next five years
Sudan and South Sudan	Nigeria	Ghana	Uganda
Equatorial Guinea	Angola	Niger	Magadascar
Gabon	Congo (Brazzaville)		
Cameroon	South Africa		
Chad	Ivory Coast		
Congo (Kingshasa)			

Table 1: An Overview of SSA Countries with potential Post-Oil Economies. Source: (Adapted from Griffiths 2012)

Top SSA Liquid Fuels Producers in 2012

Country	Production (million bbl/d)
Nigeria	2.52
Angola	1.87
Equatorial Guinea	0.32
Congo (Brazzaville)	0.29
Gabon	0.24
Other SSA	0.64
Total SSA	**5.88**

Source: EIA, International Energy Statistics



Source: EIA, International Energy Statistics

Figure 1: Liquid Fuel Production Overview for SSA

5 MORPHOLOGICAL DYNAMICS OF SMARTNESS IN SSA COUNTRIES

If people can work and operate businesses from anywhere, the organic development of cities would not need to be restructured. However, due to lack of creative solutions for the so called chaotic communities, Grid plan structured formation is predominantly used. The rate of wiping out the fractal communities which coincidentally happens to be the marginilised sections of the old cities in SSA shall be reduced due to the intelligent systems and community consultations that comes with smart community development.

5.1 How Fractals Manifest in SSA Communities

The morphology of the communal spaces in Tropical SSA is a direct reflection of some aspects of the morphological details inherent within its traditional housing units. Roberts (1996, p.87), makes it clear that the basic settlement unit is a house and thus it is also evident from the most superficial observations that settlement forms have close and complex relationships with human culture, reflecting lifestyles and aspirations. At the first glance of it appears chaotic and more of a labyrinth than a functional plan of a unit within small settlement (Griaule, ibid p. 97; Oliver,1976, p.13).

Based on the recognition that urban patterns are highly complex, heterogeneous and hierarchically ordered revealing self-similarity across scales, numerous models of fractal analysis have been applied at the study of the urbanization processes. Fractals are by definition complex, hierarchically ordered structures revealing self-similarity across scales presenting remarkable similarities to urban built-up patterns, urban boundaries, land use distribution etc. Fractals have been widely used in order to distinguish between different urban typologies (Frankhauser 1998), to measure the degree of urban sprawl and examine the way cities expand in space and time (Batty & Longley 1994).Prior to the formalisation of Fractal Geometry by Benoit Mandelbrot in the late 1970s, Doxiadis' Ekistics (Doxiadis 1968; Batty and Longley 1994, p.33) which represent one of the most complete statement of organic approach to city planning was used to identify most of the cities in Africa.

More so, based on the speed at which cities change or the scale of the development, one can classify a city as naturally (organically) or planned. In terms of visual and statistical order, organic towns when viewed in plan form resembles cell growth, weaving in and out of the landscape, closely following the terrain and other natural features embodying the technology of movement through the main transport routes like spider webs or tree-like forms focussed on centres which usually contains the origin of growth. Hence these organic city structure and layout usually depict some levels of fractal geometry it its structural formation. Fractals are self-similar , at least in general sense. It also can be described as hierachy of self similar objects and modules and are ordered hierachically accross many scales. (Batty & Paul, 1994). These manifestations is eveident in almost all the post-oil countries whoes cities are under massive transformation.

5.2 Implications of Smartness on Fractal and Marginalised Communities (FMC) In SSA

Whereas living the Smart Development Concept will make communities in SSA resilient, following a leapfrog approach to smart city ideology will just create more fragile and marginalised communities within the urban centres. As resiliency involves self-sufficiency, smart development with the vision of smart

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communities (not cities), will help create more sustainable supplies of goods and services including food, fuel and power, water as well as the ability to source basic materials and manufacture everyday goods and services. In SSA self-sufficiency is long overdue and ought to be considered as efficient integration of the rural and urban regions to wean off total dependency on imports, grants and foreign aid. The smarting of the communities would invariably create cities and neighbourhoods that would embrace density, diversity and mix of uses, users, building types, and public spaces. Since most of the fractal communities happened to be the areas marginalised in the cities in SSA, the idea of making all old city centres and downtown to be slum would be checked.

Through the use of mobility management as a result of the smart concept for the fractal communities, could prioritize walking as the preferred mode of travel, and as a defining component of a healthy quality of life. As a destination of most in-migrants and brisk commerce, the smart fractal communities could also develop in a way that is transit supportive. Instead re-planning these marginalised areas to be grid structure, the neighbourhoods could focus energy and resources on conserving, enhancing, and creating strong, vibrant places, which are a significant component of the neighbourhood's structure and of the community's identity. This shall promote tourism and increase the local economy through the growing and production of the resources they need, in close proximity (200 kilometre radius). More so, apart from developing building types and urban forms with reduced servicing costs, and reduced environmental footprints these emerging smart communities would enhance active participation of community members, at all scales mobile phone apps. These new qualities that could be accrued to the fractal communities could make them more resilient and bring some meaning into the perceived chaotic urban structure.

6 THE WAY FORWARD TO SMARTNESS IN DEVELOPING COUNTRIES

6.1 Recommendations

With the current unprecedented population growth, increase rate of urbanism and the advent of the post-oil economy SSA are experiencing growth pains in its cities. Critical growing pains of SSA cities include such things as air and water pollution, congestion, noise, urban sprawl, overburdened infrastructure, inadequate public services, and the social consequences of unaffordable housing, under-employment, crime, and under-privilege. Rising concerns about global climate change over the past decade have also elevated energy consumption and CO_2 emissions to the top of the list of urbanisation challenges (Hodgkinson, 2011). One could legitimately ask, why would influx of oil-economy create growth pains? The lack or absence of well prepared development plans and agenda to utilise these finacial influx aggravate the already existing problems without providing any meaningful solution. Hence it is recommended that the Policies, Development Planning, Technology, Human Capacity and Accessibility of basic infrastructures needs to be 'smarted' to spearhead smart development which could culminate to smart communities of which smart cities are part.

- Smart policies: Simplifying requirements for rural electrification schemes, defining common ground rules for integrating technologies and business practices, balancing cost recovery mechanisms for utilities, identifying better ways to support effective demandside management, and developing new policies to support the integration of distributed generation. All such policies would need to be underpinned by welldefined performance goals and transparent metrics to ensure effective monitoring of anticipated benefits. In SSA, leveraging international Smart city frameworks for smart communities, legislation, regulation and standards, and adjusting them to the subSaharan African contextwill are essential. New policies may need to diverge from international precedent, in order to prioritize access to affordable utilityservices for the poor, respond to rapid demand growth and urbanisation, and reduce theft of electricity and utility assets. Such policies should enable access through flexible, no-regret electrification strategies that accommodate expansions of stand alone systems, mini and national grids, and that support their integration.
- Smart Planning: Adjusting the planning system and education to local circumstances and developing design principles that ensure an effective interoperability of existing and new grids, leading to even smarter communities over time. In SSA a balanced approach between regional planning integration, national development strategy and deepened decentralisation is required.

- Smart Technologies: Deploying proven smart technologies, optimising interoperability with emerging technologies, and developing future solutions to best address electrification needs. For SSA, The technology deployment path will vary widely at regional and country levels due to diverse needs and goals of different societies and markets. Defining these technology pathways and markets and verifying them through pilot projects will be important first steps.
- Smart People: Building stakeholder capacityto facilitate the transition to Smart Communities, to manage and administer thesecommunities and to attract and actively engage the private sector and consumers so that as many people a possible profit from the transition. For example in SSA, educating consumers in sub-Saharan Africa about efficient electricity use whilst moving towards Smart Grids will be essential, especially for those who previously had no access. Training tools and materials about state-of-the-art power systems will also need to be widely disseminated. Specific attention needs to be paid to the training of off-grid communities so they can manage and maintain mini grid systems in a sustainable fashion.
- Smart Accessbility: Ensuring universal access to basic utilities like electricity and water. This could be done by encouraging that utilities are tapped off from larger grid extension projects to local customers' enroute. Connections for large consumers are often the primary driver for grid extensions. Such extensions may offer a great opportunity to connect the underserved at the same time; Using grid technologies that can cope with fluctuating supply and demand in rural areas and thus increase supply quality of supply, for example by building on strategic load control and management instead of conventional load shedding; Also introducing hybrid and off-grid electrification for communities that is difficult for the grid extension.

7 CONCLUSION

Smarting Cities in SSA should not be the goal and vision but Smarting the Development and Communities. The rural fringes and territories represent a vital segment of the SSA region. Hence when the cities get 'Smarted' and the entire development and its process remain in the status quo, it will serve as a pull factor for the rural-urban migration. This would in the long-run off-set any gains that might have been made on the smarting of the cities as in-migrants usually tend to develop slums within the cities.The inter-dependency of the villages and the cities in SSA is so crucial that any attempt to smart one prtion without the other will not solve the problem of the rapid urbanisation with its negative effects.

- E-Urban Planning and Development: Online publication of city policy and planning information, online processing of development submissions, online forums to promote citizen participation in the urban planning discussions.
- E- Governance: All appropraite public services are available online, over the phone or both to boost productivity and reduce unnecessary travel. Open access to public data encourages more eyes and transparency as well as good governance which is the missing puzzle for the the anti-corruption drive for the oil funds.

Apart from the above two basic strategies, the developmentprocessshould also encompass preparation, implementation and adhearance to a vision for ICT industry and leadership. This in the long run shall feed into promoting a digital economy as well as a digital inclusion and ICT Capacity building for all. In addition to these, promotion of centres of innovation and technology clusters as well as research and development need to be done religiously. Policies and regulation to monitor infrastructure development, management and maintenance needs to be pursued. Effort ought to be made my governments to showcase best examples through the media and the public sector. Subsequently, awards and incentives could be used to promote start-up enterprises that develop supporting Apps and softwares to enhance the quality of life for rural and urban poor. Smarting the cities in SSA will make the communities eficient but not necessarily effective. Being effective is doing getting things done in the right way but these things may be the wrong ones as it may not have any direct impact on the quality of ife of the entire country. Nevertheless, when the development is 'smarted' it would make the communities effective. As effective communities do the right things in effecient way.

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Suffice it to say, SSA Post-Oil Countries needs to focus on ‘smarting’ their development process and their communities as per their national development framework and plan and not follow the hype of smarting only cities from the developed world.

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