

# Urban Space Administration in Nigeria: Looking into Tomorrow from Yesterday

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**Abstract** Urban space administration is a branch of public administration designated for ordering, re-ordering, regulating and controlling urban systems and urban land uses for the purpose of human comfort, convenience, urban aesthetic or city's branding and economic and environmental sustainability. Urban space administration is not new in Nigeria; it dated back to precolonial periods when city management was vested in kings and a team of advisers including the local priests. The advent of colonial government introduced paper-assisted urban administration which continued after independence. The 1976 local government reforms and the subsequent fragmentations of states to many local government resulted in multiplicity of administrations and agencies governing urban areas in Nigeria. The results are manifested in blighted condition and pockets of slums in all Nigeria cities. The paper examined trends in urban administration in Nigeria and advanced two approaches to solving multifarious urban problems in Nigeria. The approaches include devolution of urban administration powers to local authorities and deployment of geospatial technology tools for urban system administrators (Knaap et al 1998). The paper further suggested recommendations for bridging the digital shortfall in the applications of modern technologies to city administration in Nigeria.

**Keywords** Urban space · City administration · Urban planning · Electronic cadastre

## Introduction

Nigeria urban space is becoming increasingly more complex and difficult to govern due to rapid urbanisation and uncontrolled growth. There are over a hundred cities with population of above 100,000 in Nigeria. Out of these, more than 20 have above 500,000 population, while 12 are mega cities passing the mark of a million population.

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The result of the surge in urban population, increasing urbanizing economy and inconsistency in urban administration policies in Nigeria is the poor urban governance and development of slums and blighted areas in all cities in Nigeria. Urban land use projections and trajectories are difficult in Nigeria due to the changing nature of urban economy and government policies.

Urban administration is a programme of government to administer the urban bodies like the municipality, municipal corporations and the Notified Area Council of the state (Kelly H: <http://references-definitions.blurtit.com/3343465/what-is-urban-administration-means>).

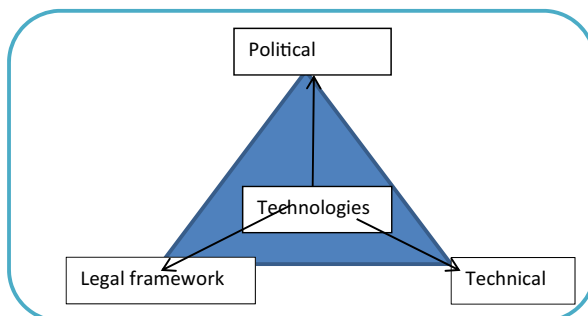
Urban space administration is a branch of public administration designated for ordering, re-ordering, regulating and controlling urban systems and urban land uses for the purpose of human comfort, convenience, urban aesthetic or city's branding and economic and environmental suitability. Public administration is that area of government which provides the planning and management functions that are essential to the supply of urban services (Bateman 1984). Though public administrations in Nigeria are constantly being refined, redefined and reformed from the national levels, urban administration is virtually neglected to the whims and caprices of the sitting governors in the state. Bamidele (2008) identified the inefficiency of the state government to properly manage urban settlements and called for federal government presence in the cities in terms of infrastructural developments. Most local government areas have no financial capacities to manage urban settlements. Though the local government area is the third tier of governance in Nigeria, the funds allocated are often hijacked by the state government and local government area administrations are left with paltry funds only for the payment of civil servants' salaries and emoluments. The state governors often assume the roles of urban administrators, but most of the time efforts are concentrated on the state capital city which further fuelled emigration from the other settlements to the capital city (Adeyinka et al. 2006, Oyesiku 1999). The mechanism put in place to administer urban areas in Nigeria has gone through historical metamorphoses with resultant footprints on the patterns and functioning of urban spaces in Nigeria. During the precolonial era, the Obas, Obis, Emirs and village heads were responsible for managing urban areas under their jurisdictions through various instruments, local laws and tokens such as mental maps, deeds prepared on clothing materials, annals, animal skins and other materials (Mabogunje 1968, 1991; Olomojeye 1999; Omole 1999; Fabiyi 2006, 2014). Urban administration policies were simple but adequate for urban administration.

Today, though there are common political and public administration systems among Nigeria states, but different states adopt different systems of city administration. Despite the diversity in culture and ethnicity among states in Nigeria, city administration is obviously disjointed, epileptic and confused in many states. The lack of focus in many city administration and the heavy concentration of investment only in the capital cities have resulted in migrations from smaller cities to the main city and the attendant urban population surge, development of slums and blighted conditions and general insecurity of cities in Nigeria. Previous studies have confirmed that poor housing and housing environment are found in any part of Nigerian cities including the new areas; most sprawl developments are virtual slum. Recently, there is a general drive by state governments to improve urban administrations in the capital cities through installations of modern procedures and computerised systems to assist in urban land allocation,

infrastructural facility management, traffic control and administration, urban security and administrations but holistic urban administration is alien to Nigeria. Urban administration power and resources are located far from many cities in Nigeria, and this calls for a paradigm shift in order to transform Nigerian cities to generative status from the current parasitic conditions that most of these cities are.

The use of paper plan or paper titles of land allocation and sequential and organized urban administration emerged with the advent of colonial government. During the 1970s, shortly after independence different master plans, structure plans and schemes were produced for some cities such as Lagos mainland and Ikeja in Lagos State, Bida, Kontagora, Suleija and Minna in Niger State, Ilorin in Kwara State, Enugu in Enugu State, Port Harcourt in Rivers State and Ibadan in Oyo State to guide urban administration and to control developments (Mabogunje 1981). The master plans were poorly implemented in most cities, thanks to poor urban administration system deployed at that time. Since then, series of urban development projects have been carried out by many states and private initiatives with the intention of managing limited but highly resourceful urban land. The survey plans, land use schemes, master plans, urban plans, structure plans, subdivision layout and other urban administration instruments developed and deployed in the 1970s and early 1980s were purpose-based emergency maps and plans without due regards to high cartographic integrity and quality. There were no follow-up strategies for upgrading and updating the systems.

Consequently, urban administrations in Nigeria are largely uncoordinated, fragmented and lacked focus mostly due to inadequate urban administration tools such as spatial data and map products and poor legal framework (see Fabiyi 2014). Urban administration functions have been classified into three broad categories that serve as the pivots for efficient city administration. These functions are political function, technical functions and legal function. The three functions must be properly implemented for a city to be administered effectively and the society would derive the full benefits therefrom (see Fig. 1). The paper examined the implementation of these functions in Nigeria and advanced the need to adopt geospatial technologies to effectively implement urban administration while political restructuring is advocated for the political functions of urban administration functions. The paper further examined the challenges of urban administration in major cities in Nigeria and posited that the techniques, tools and institutional mechanisms for urban administration need to be refined, frequently updated and appropriately deployed for effective and efficient urban systems.



**Fig. 1** Urban administration functions

The paper is organized into five sections. The next section described the methodology adopted in data collection and analysis. ‘Urban Administration in Nigeria’ section discussed the progress in political functions of urban administration in Nigeria and recommendations for improved technical and legal functions of urban administration, ‘Recommendations for Effective Urban Administration in Nigeria’ section highlighted the challenges of urban administration and presented two main approaches to upscaling urban administration in Nigeria. The last section, ‘Conclusion and Recommendations’ presented recommendations for integrative platforms of geospatial technologies in urban administration in Nigeria.

## Methodology

The data used for this study were obtained from the following sources:

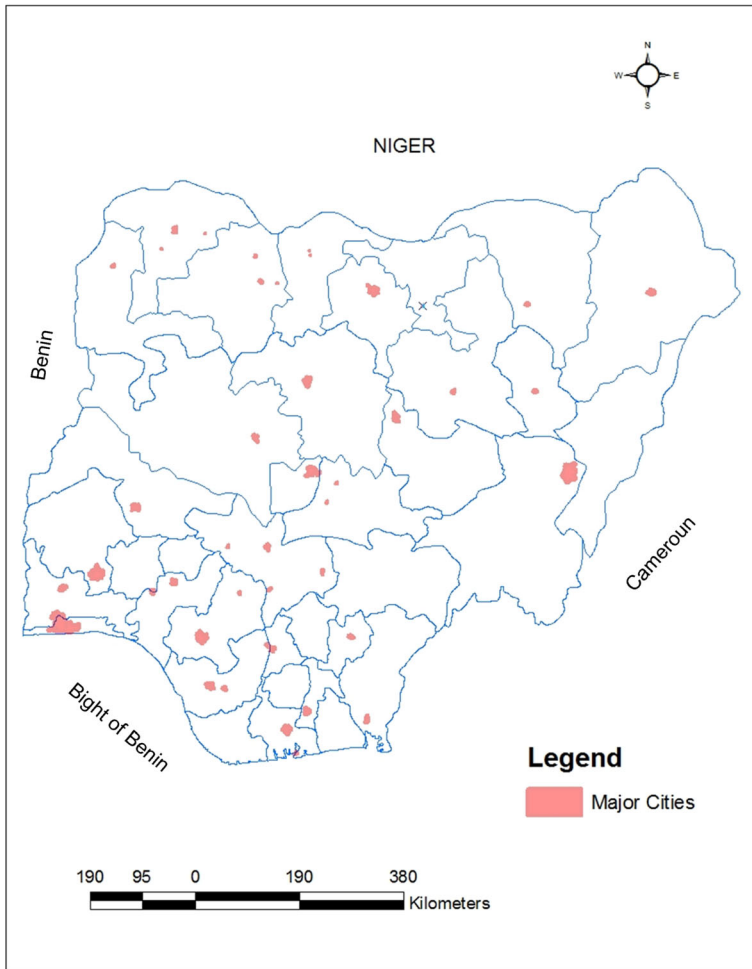
1. Key Informant Interview: Selected staff members of federal and some state urban planning agencies and private urban planning companies were contacted and interviewed on the positions of urban administrations in the cities, the challenges against urban administrations and the suggestions for improvements. Middle level town planning officers were randomly selected in nine state ministries responsible for urban administration and town planning.
2. Context Analysis: Relevant websites of federal and state mapping organizations were accessed to examine the status of data availability and web-enabled data dissemination capacities. Anecdotal reports of urban land administration projects were evaluated, and procedures for data access were examined. Other data that were context analysed includes newspaper reports and opinion of stakeholders on urban administrations. The selected agencies evaluated are presented in Appendix 1.
3. Desktop Review: Relevant literature, policy documents, newspaper reports and workshop presentations were also used for the analysis of the study.

## Urban Administration in Nigeria

Urban administration comprises of three major interrelated functions and should be under the control of an umbrella authority that possesses broad and comprehensive view of the city in order to archive effective and sustainable cities as shown in Fig. 1.

At the heart of these functions are the appropriate tools and technologies. These tools include urban legal regulatory authority (police power), urban maps (or cadastre) and urban plans. These tools are important to achieve effective management of urban land uses and component systems that make up urban area. The next sections discussed these functions in Nigerian context.

Urban administration style adopted in different parts of Nigeria informed the sizes and the growth patterns of the cities. Figure 2 shows that southwestern parts of the country have more large cities than other parts of the country. The results of the interviews showed that the procedures for land acquisition and approval of development plans are somewhat relaxed and easy for informal private developers and most tedious in the southeastern parts of the country. Slum housing in the urban fringes



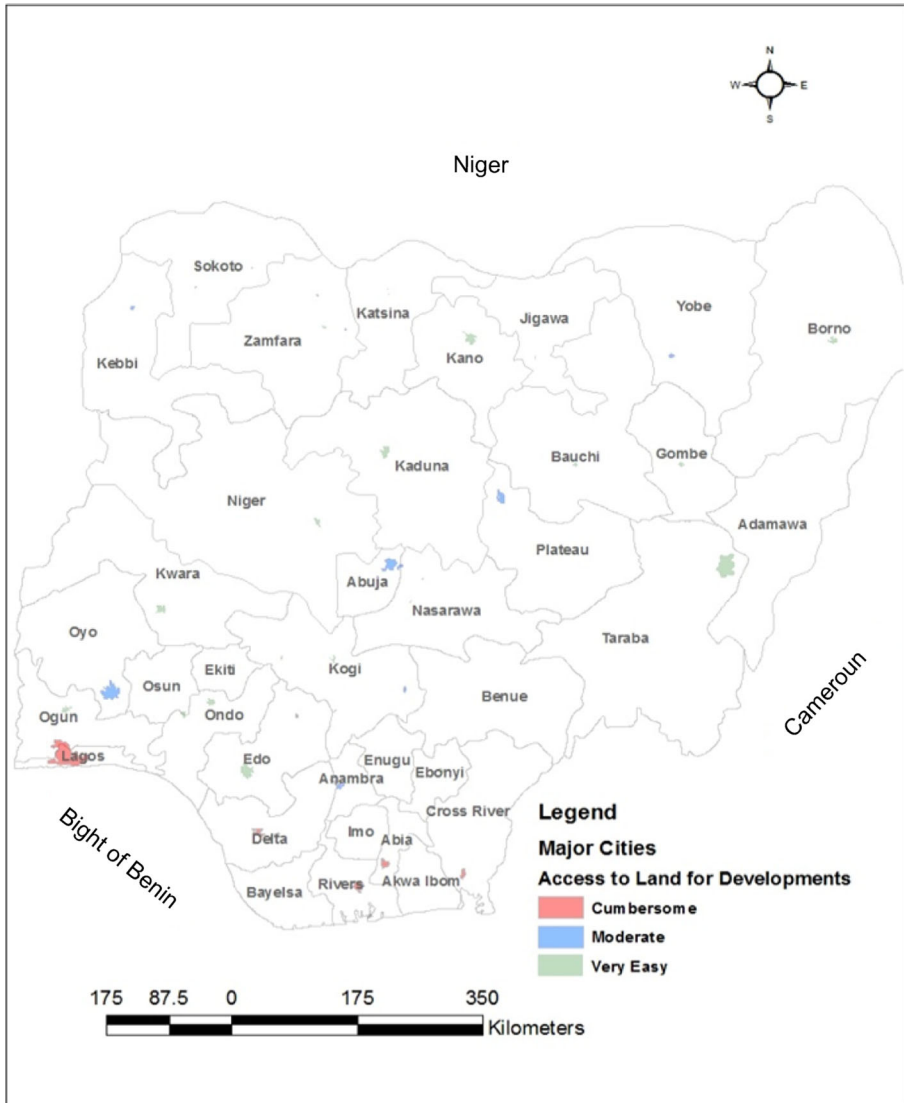
**Fig. 2** Selected major urban centres and sizes in Nigeria

is more rampant in the southwestern part of the country due to active involvements of the informal low-income earners in the residential developments. The slum in the northern parts of Nigeria is limited to older areas and degraded communities. Enforcement of strict control was noticed in the northeastern part of the country. Abuja is the only city in Nigeria where urban fringes are dominated by better residential housing. It was noticed that corporate private developers are more active in Abuja than the informal private developers.

Urban administration style adopted by the state governments and the level of accessibility to land are a major determinant of the development of poor housing and slum formation. When urban residents do not have access to cheap lands, they develop makeshift shanties to house them pending the time the owner will evacuate them. In some area, the informal private developers secure loan to purchase land and use the

remaining to construct dwellings thus introducing slum to new areas. Figure 3 shows the level of accessibility to land in the selected cities.

There is also high political interference in the urban planning decision in the southwest than any other parts of the country. It is the part of the country where access to land for public activities is very difficult. There are cases of individual families taking state or federal government to court over land and landed matters. Lands still belong to families and they dispose off land to individual or cut them into private plots for residential or commercial building purposes. The level of control by government on



**Fig. 3** Levels of accessibility to land in the selected major cities in Nigeria (source: authors' interviews of urban stakeholders)

lands is unequal among the states though the same land use act operates in all states and implementations varied.

In three states in the Southern Nigeria, urban administrators noted that governor's perceived urban land as their 'crude oil' so they change policies from time to time with the main focus of generating more revenue from urban land and not necessarily for urban governance (Oyesiku 1999; Adeyinka et al. 2006). Some states keep restructuring the agencies and ministries in charge of urban administrations under the pretence of improving urban administration, but the main intention is to generate higher revenue and to pay back political loyalist with *juicy* appointments. Urban administrators were thus appointed not on the basis of competence but mere political patronage.

Lawanson (2016) particularly noted when reviewing the activities of Lagos State Waste Management Agencies (LAWMA) that the rigid mechanism put in place is discouraging to the informal settlements since a state-wide policy is adopted for all parts of the state. She opined that more effective and flexible mechanisms would encourage the communities to cooperate better with LAWMA and promote sustainable waste management.

Lagos State is the most urbanised state in Nigeria; therefore, it is easy for the governor to effectively control the cities from the centre (Lawanson 2015). However, many states have the seat of government in one of the cities in the state and the control of state government on the cities outside the seat of government is very difficult and such cities suffer from neglect which is expected, except a political gladiator is from such city and can wile some influence for government attention.

## Urban Administration and Political Functions in Nigeria

Urban administration in Nigeria dated before the advent of colonial governments as early visitors to Nigeria met a handful of large settlements. The Obas, Obis and Emirs and district chiefs were in direct control of urban systems and urban lands in the precolonial era.

During the colonial era, the Lord Lugard's Land Promulgation of 1900 ushered in a new approach to urban administration in Nigeria. The indigenous settlements were administered indirectly by the native rulers, kings, chiefs and family heads while the European Reservation Areas (ERA) that were later renamed Government Reservation Area (GRA) were administered by the colonial government. The colonial government enacted Township Ordinance 29 in 1917, which aimed at introducing spatial orderliness to the Nigerian cities. The guidelines for physical layout of towns and schemes were produced. The ordinance also set out administrative council for urban administrations. For first class town such as Lagos, there was a town council with the full-fledged capacity to carry out urban administrative functions. The second class towns were administered by local authorities with limited urban administration functions. They were headed by town planning committees which were later substituted by the Health Board to combine health functions with urban administrative functions.

In 1928, Lagos Executive Development Board (LEDB) was set up with full urban administrative functions under the Lagos Town Planning Ordinance of 1928. LEDB had the responsibilities to plan, implement and control all aspects of urban physical development within Lagos territory. In 1946, the colonial government enacted the

Town and Country Planning Ordinance (No. 4 of 1946) which was the first comprehensive legal instrument for full urban administration in Nigeria. Though poorly implemented in major cities in Nigeria, it is the first comprehensive approach to efficient urban administration in Nigeria.

At independence, the 1946 Town and Country Planning Ordinance was retained and designated as Town and Country Planning Law Chapter 123 of the Law of Western Nigeria, Chapter 130 of the Law of Northern Nigeria and Chapter 155 of the Law of Eastern Nigeria. The laws were differently applied in different parts of Nigeria until 1976 Local Government reforms law of Nigeria (Olomojeye 1999; Nigerian Institute of Town Planners (NITP) 1991; Onibokun 1985; Ola 1984). The states were partitioned into different local government councils, and urban administration and town planning functions were placed in the local government councils. The succeeding Military Era saw the creation of more states, from 19 states in 1976 to the current 36 states. The local government was further fragmented to the current 774 local government areas in the 923,000-km<sup>2</sup> land of Nigeria. The consequence of these series of fragmentation is the partitioning of existing cities to different political administration of local government areas (LGA). Some states however retained the urban administrative functions in a metropolitan authority or urban development board that cut across different local government areas usually controlled by the state governors. The land use act enacted in 1978 further constrained urban administration as the roles of traditional rulers, and the local government authorities in urban land administration were removed and put on governors who have the whole state and many cities to administer. The Land Use Act conferred the custodianship of urban lands on the state governors, while major administrative functions of the city were still under the local government administration. Consequently, the local planning authorities in urban areas were stripped of all the powers to effectively control urban area under their jurisdiction as they lack control on allocation and sales of urban lands which can generate funds for their activities and can use the same to provide services in the cities. Their functions were reduced to approval of plan proposals from private individuals.

The clamour for more state and local governments led to further fragmentations of large cities into different administrative authorities (local government areas), for instance Ibadan City was divided into five local government areas while Kano City was divided into at least ten local government areas. Many cities in Nigeria were fragmented to between four and six local government areas which make coordination and urban administration very cumbersome. Some urban administrative functions were retained by the state governments such as waste and water management, flood and erosion control and land taxation among others which limited the capacities of local government area councils to manage urban areas. The fussy boundaries in the administrative functions of local government council and state government authority constitute confusion and overlap in the urban administration in Nigeria. There is no state government in Nigeria that has comprehensively considered urban administration as a holistic management of urban complex and interrelated system of systems. Rather different departments, agencies and ministries are saddled with fragmented urban functions and sometimes duplications of functions. There is no agency playing the overall coordinating roles of ensuring city sustainability, functionality and suitability of the different interrelated components of urban systems. Just as agencies do not communicate, professionals and the datasets are not connected for a holistic decision



making. The result of the uncoordinated fragmented urban administration strategies is an unending disconnect among different components of the city.

The responsibilities of urban administration are straddled with the ministry of land and urban developments in most states in the country and are carried out in the three departments of town planning, land/surveys and valuation/estate. These three departments jointly coordinate the arrangement and orderliness of urban systems. The physical planning departments prepare planning schemes, layout scheme and land use plan and approve private building plans. The land and survey department provides title/right documents for all landed properties, and the valuation/estate departments intervene in land and landed property transactions, including valuation and determination of rent value of properties for taxation and ground rent.

### **Legal Functions for Urban Administration in Nigeria**

Legal framework relates to the legal backing for urban administration. It includes the police power given to urban managers to enforce spatial decision and punish offenders in the city. It also sets rules and regulation to manage urban elements and achieve the purpose of urban administration. The main legal framework available to local government authorities for urban administration in Nigeria is the Development Control Act. This act empowers urban planners/administrators to regulate the use of land in the city subject to the political authority of the chairman of the local government or the governor as the case may require.

#### *Development Control*

Development control has been variously defined by several authors, but the definition provided by Onokerhoraye and Omuta (1985) will be adopted, ‘...the control of the use of land, the character, appearance and arrangement of buildings and facilities, to ensure economy, convenience, sightless results and aesthetics’. While the town planning office uses legal authority provided under the development control to control the use of land and arrangement/organisation of property in the city, they rely heavily on urban land use map, land use scheme, topographic maps and other available maps in their archives to arrange, rearrange and realign land and building characters in urban areas for efficiency, aesthetics and economy. Development control can only be effective if used as proactive mechanisms, but when it is used as after the event apparatus, it becomes cumbersome and costly both to private developers and government agencies. Development control in Nigeria is subject to the manipulation of politician and the political powers who have little understanding on the comprehensive city administrations (Kadiri 1995). Most land use decisions are taken not on the basis of professional advice but on political patronage and the parochial agenda of politicians.

### **Technical Functions for Urban Administration in Nigeria**

The technical functions relate to the techniques and apparatus used to manage urban areas. These techniques include the preparation of urban master plans or urban land use plans to guide the development in cities. Some of these tools are discussed in the following sections.

## *Urban Maps*

A typical urban map is a two-dimensional scale model of the city or part of it usually prepared for city administration. Urban map model systematically describes or represents urban elements including man-made and natural entities using symbols, texts and line features to represent certain objects and phenomena. Maps are effective ways of presenting a great deal of information about objects and the spatial relationship of objects. Urban maps can depict existing urban condition or model the future perception of experts and administrators. When urban maps are a model of urban future, they are referred to as urban plans. There are two popular types of urban maps which are particularly useful in urban administration; these are urban land use map and urban cadastre. Urban land use maps and urban cadastre are a collection of selected elements on the surface of urban area chosen based on the focus of the map and the importance that mapmakers give to the set of urban information they want to represent. These two types of maps have been employed by city administrators over the years in Nigeria. Most maps used by planners in the mid-1990s were analogue and two-dimensional representations. In 1994 however, UN-Habitat piloted sustainable city projects in Karu (Nasarawa State), Ibadan (Oyo State) and Enugu (Enugu State). During these projects, the first digital city maps were produced and deployed for urban administration. The digital maps produced for these cities provided opportunities to comprehensively understand the city components in the computer environment. In 1994, Lagos commenced a novel Land Information Systems when Oracle database was used to capture the land records and ArcInfo GIS software was used to capture the property boundaries. There were hotlinks of several important places in the database. The project was implemented by a foreign company with limited local inputs. The project was delivered but could not contribute substantially to urban land administrations as local practitioners lack access to the data while those that have access lack the necessary motivation and capacity to add value to the database. Lagos State further made two major attempts in updating and upgrading comprehensive GIS database under the Lagos GIS programme; however, the utility of the database was limited to land administration rather than comprehensive urban management. Data are not available for other users in urban administration. Ogun State also embarked on Ogun GIS which aimed at digitalisation of all land records and titles for effective land administrations and control of land transactions. The programme is still in progress, and it is difficult to evaluate the success of the programme. Other cities/states where urban GIS have been partly or wholly implemented with varying degrees of success are Kano, Nassarawa, Kaduna, Kwara, Rivers and Enugu.

Abuja GIS was implemented in 2005 and was aimed at efficient management of urban land in the Federal Capital City. It was meant to curb the excesses of land speculators and to prevent multiple allocation of land in the nation's capital. Abuja GIS is one of the success stories in electronic land administration in Nigeria; however, Abuja GIS is still limited in terms of comprehensive urban administration systems.

Currently, many state governments in Nigeria have commenced complete or partial digitalisation of their cities and setting urban geographic information systems (UGIS) in relevant ministries, departments and agencies (MDAs). The integration of urban GIS in urban administration has significantly improved the compilation, production, updating and utilization of urban maps for better and informed urban administration. Some urban

maps that can be produced from successfully implemented urban GIS include urban land use maps and urban cadastre.

### *Urban Land Use Maps*

Urban land use maps categorise urban area into different subclasses of land utilization. The utilization of a piece of land in an urban area is based on the physical structures on the land and the activities taking place on, above and below the ground surface. Anderson et al. (1976) presented a scheme for classifying urban land uses and could be used for producing different levels of urban land use maps.

The main purpose of urban mapping is to allow competent and comprehensive urban land administration. An up-to-date and detailed urban map requires huge financial outlay and relatively low return on investment particularly in the short term. This explains why many private investors have not been interested in urban mapping. Urban maps also require regular updating as map quickly becomes obsolete due to influx of people to urban area and resulting in sprawl developments. Most Nigerian cities make no provision for rise in urbanisation and thus find land administration very confusing and tedious. An average urban centre has an annual population growth of 3.5 % which has implication on the development of slum and sprawl in many Nigerian cities. The influx of people from other smaller cities and rural areas to big cities in Nigeria creates the need to find spaces for the urban new entrants for accommodation and business, work, worship, education and other urban uses.

Urban map making in Nigeria has come a long way from the elementary manual systems to the current automated digital cartography making use of disparate, more accurate data sources for productions of multi-purpose urban maps. The electronic revolution in cartography has become one of the greatest forces in changing the role and functions of urban maps and cadastre. Professionals involved in urban administration are using digital maps for day to day administrations of urban systems including transportation, security, banking, communication, investments, safety, marketing, sales, building operations, urban land use planning, development control, property taxation and property transactions among others. Digital urban maps are not merely physiographic representations of the city elements but major tools for public and private sectors for managing complex and interrelated urban spaces.

### *Urban Cadastre*

Urban cadaster on the other hand is a parcel-based and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). Urban cadastre is an inventory of the real properties with juridical purposes. It comprises of four fundamental components which include physical (i.e. the position, dimension, form and general physiographic characteristics of the piece of land), juridical (i.e. the legal situation of land and landed property), fiscal (the monetary components including taxation, ground rent and the economic value of land) and social–economical (the characteristics of owners and occupant of lands).

Urban cadastre is useful in private and public decision making and ultimately improves the efficiency of city management. The main focus of urban cadastre is urban

land administration. Urban planning administration and urban systems are the process of determining, recording and disseminating information about ownership, value and use of land when implementing land management policy.

### *Urban Plans*

Plans are prepared to guide the future direction and growth of cities. There are different types of plans usually developed for urban administration. These are master plans, structure plans and development plans among others.

The technical functions of urban administrations depend on the introduction of appropriate technologies that enable easy access to urban plans and to monitor new development before they degenerate to slum condition. Geospatial technologies have been introduced to urban administrations in different economies, and the results have been tremendous.

### **Geospatial Technologies in Urban Administration**

GIS has been variously defined by different authors and researchers as computerised systems that make use of geographically referenced data for the analysis of spatial problems and displaying the results in decision-making context (Faust 1995; Demers 1999). Fabiyi (2001) defined GIS as ‘ a unique integration of computer hardware, software, peripherals, procedural techniques, organizational structure and people for capturing, manipulating, storing, analysing, modulating, modelling and displaying of geographically referenced data for solving complex earth related problems’. Therefore, GIS is basically a decision-making tool in the earth-related systems. Today, the term geospatial technologies (GTs) have been adopted due to the amalgamation of several systems combined to make spatial decision in the computerised platforms. Geospatial technologies refer to the unique integration of several spatial information and analytical systems for making comprehensive and implementable geospatial decisions. GT combine the benefits of generic GIS systems, remote sensing systems (RSS), global navigation satellite systems (GNSS), information communication systems, geostatistical systems (GS) and a host of others for spatial decision making. GT has the capabilities to contribute to the technical functions of urban administration especially the three tools often employed.

GTs have been applied in various aspects of urban administration, such as the preparation of land use plans, cadastral plans, master plans and structural plans for routine administration of urban areas. Specifically, different flavours of GTs have been used in urban land zoning, land use inventories, site suitability assessments and socio-demographic analysis for urban and rural development, urban design, scheme developments, housing supply and demand modelling, urban land use change, urban building modification, change actor analysis in urban developments and urban accessibility assessments among others (Budic 1994; Warnecke et al. 1998; Fabiyi 2006, 2007, 2011).

Urban administration in Nigeria has been disjointed and uncoordinated, therefore could not meaningfully utilize the power of geospatial technologies for urban administrations. The United Nations Human Settlements Programme reports (UNHABITAT) indicated that virtually all the cities in Nigeria fell below average in good urban governance index (GUGI).

## **Recommendations for Effective Urban Administration in Nigeria**

The future of effective urban administration in Nigeria depends on the following actions which are (a) devolution of urban administrative power to local authorities and (b) deployment of geospatial technologies for urban decision making.

### **Devolution of Power to Local Authorities for Urban Land Administration**

The authority for urban administration in Nigeria should be closest to the people such as local government chairmen. The local government chairmen should control the entire city and its environs in order to forestall the conflicts that characterised the present arrangement. For instance, urban wastes are collected in Ibadan north local government but the waste depot is located in Oluyole Local Government. Urban waste collection programme for the city cannot be fully implemented because other autonomous local government are involved. There are fussy boundaries between local government in cities where road networks are often used as administrative boundaries such boundary roads are usually neglected as it does not fall in the juridical boundary of any local government. Urban administrators should be appointed to manage all aspects of the city as holistic entity. While it is necessary to bring all professional on board for urban administrations, it is especially necessary that the head of the team should be someone who has training on the urban management and urban system analysis.

Traditional rulers in Nigeria have major roles to play in urban administration though they lack the legal authority. The Land Use Act of 1978 had removed ownership and control of land from the traditional authority. Though the focus of the policy was to free land for development purposes and remove the bottlenecks in land accessibility by state and federal government, the withdrawal of land allocation authority from the traditional rulers who are more permanent and have traditions which will assist them in urban management had further constrained urban management policies. Though only the state governments have authority to allocate and dispose off lands, according to the Land Use Act of 1978, Nigerian courts are inundated with several land-related cases on a daily basis. Many land cases are filed in Nigerian court on a daily basis.

### **Deployment of Geospatial Technologies Under an Urban Administrator in Nigeria**

Urban administration in developed economies has substantially benefitted from the emerging technologies and science over the years. Physical planning departments have been on the forefront of the use of urban maps for urban administration among local government agencies (French and Wiggins 1989, 1990; Juhl 1993; Bishop 1998; Warnecke et al. 1998; Mandelbaum 1996). The design and concepts adopted by planners over the ages depend largely on current developments in science and technologies. Planners have developed and used computerised models, planning information systems and decision support systems and other flavours of GIS to improve performance (Brail 1987; Bateman 1998; Klosterman 1995; Fabiyi 2014).

Urbanisation in Nigeria is steadily increasing; while there are currently more than 40 large cities, new ones are coming up due to rural–urban migration. Planners and other urban managers are rising up to the new challenge through the integration of technologies and tools for solving multifaceted urban problems. One of such technologies is

geospatial technology. Urban systems in Nigeria require more pragmatic and coordinated administrations in order to perform wealth generative roles in national development.

Nigeria has large data resources for urban administration, which were collected and archived by different agencies, but most of this data are not made available for use in urban management. There are now land information systems (LIS) or electronic cadastres developed by some state governments: Lagos, Kwara, FCT, Kano, Ogun and a few others. The data are, however, of little use for day-to-day urban administration purposes, as the emphasis has been more on land allocation and revenue generation.

Similarly, while huge resources are committed each year for the generation of data and reports, the infrastructure and skills required to translate the data to planning information and useful data for urban administration are not shared among the stakeholders.

Despite the vast opportunities of GT in efficient urban administration, Nigeria is yet to benefit significantly due to the following challenges:

- Low awareness of the benefits and possibilities of geospatial technologies
- Lack of national data infrastructure (NDI) for data sharing among government agencies and the private sector
- Internal imbroglio among agencies in charge of producing urban maps and those involved in using urban maps for urban administration. When digital cadastre is made available by the government, professionals do not share such data for better city administration
- Low Internet density in the country
- Protectionism of professionals on boundaries of applications of GT
- Lack of local add-on to project executed by foreign experts
- Fear of losing control of accuracy and integrity of information
- Electricity challenge
- Lack of harmonization in the activities of urban gatekeepers
- Duplication efforts by agencies of government and inconsistency and poorly structured databases
- Lack of basic data for building GIS databases

### **Potentials of GT in Urban Administration**

The geospatial technology tools earlier developed were of little relevance to urban administration because they have limited tools and programmes that address urban management issues. They were, therefore, underutilized and considered unsuitable for urban management (Harris 1989; Harris and Batty 1993; Holmberg 1994). However, there is a rapid growth in the development of GT and the incorporation of new and more relevant functions in software and hardware. The growth in GT also resulted in increased interest in the use of geospatial technology tools by planners and urban administrators.

The integration of geospatial technologies to urban mapping and urban administrations evolved rapidly from loosely coupled urban spatial decision support systems,

urban management information system and urban spatial models to more sophisticated urban administration systems.

According to Klosterman (1995), geospatial technologies changed in the 1960s with respect to developments in applied sciences, to political–economic changes in the 1970s and information and communication technologies (ICT) in the 1980s. These epochs were characterised by rapidly changing terrains in information science, knowledge dissemination to an increasing number of the citizen, huge reduction in the cost of the hardware and software and more participation in the use of computerised systems. Urban administration has also developed along the same pattern but at a reduced speed.

The progressive technical integration of geospatial technologies to urban mapping and administration includes the following:

- **Loosely Coupled Packages:** In these packages, cartographic map compilation was done outside GIS package and the GIS database was coupled with the cartographic software output through some programming procedures with prediction. Urban modelling packages such as Location Allocation Decision Support Systems (LADSS) were coupled with ArcInfo and ArcView through avenue scripts.
- **Embedding Generic Urban Models Within GIS in Experimental Procedures to Understand Urban Areas:** Urban model-specific submodules were built in some generic GIS package for urban mapping and urban land use management.
- **Customised Urban Land Use Change Modeller in GT:** Change detection models were integrated in GT packages for specific urban applications.
- **Physical Planning Support System (PPSS):** This emerged as a customised package based on multiple technologies and common interface. PSS provides ‘views and tools for sketch planning, model building, scenario building, evaluation, lineage tracking, and plan-based action’.
- **Enterprise GIS and Web GIS:** EGIS and WGIS have been used to spatially enable some urban administration functions in an Intranet and web platform. In an enterprise GIS, data are harvested from the platforms to conduct routine planning exercises and prepares medium-term and long-term plans. The results could also be published via the network to disseminate spatial decisions to stakeholders and users.
- **Expert Systems and Spatial Artificial Intelligence Systems:** These are custom-based spatial database systems that enable users to provide required information and get an expert solution on spatial planning processes and procedures (Han and Kim 1989).
- **Three-Dimensional Purpose-Based Geospatial Systems:** These systems dominated the spatial planning systems in the last two decades, and development is ongoing on how three-dimensional panoramic view of the city can be used in routine planning decisions (Counsell and Phillips 1997; Rimscha 1997). This approach has been used to identify future foreseeable problems in the urban scape. The three-dimensional view of the city can be used to evaluate the cityscape and propose future development in a computerised virtual urban laboratory.
- **Crowdsourcing, Cloud Computing and Open Source Era:** This era represents the climax of successful integration of GT to urban administration at different levels and in different sectors. Data that were previously expensive to acquire are now available at reduced cost or free download, while software previously acquired through tedious vending procedures and at prohibitive cost are now available as

open source packages. Another major breakthrough in this regards is that data can be crowdsourced through network of data producers and available large volume of volunteered data. The web platform is now being used to disseminate data to large audience in urban systems, and many nodes could be opened accessing the data at the same time without undermining the integrity of the datasets. Feedbacks on spatial decisions or fresh data can be obtained to refine urban spatial decision through videos, photographs and other datasets from anonymous population.

## Conclusion and Recommendations

Urban administration is an intelligent and multidisciplinary activity and requires the use of concepts, techniques and tools developed from various disciplines and urban sectors. This calls for a system that integrates all sectors of urban administration in a joint spatial decision support platform. A system of this nature has been variously referred to as urban cooperative work systems or *Urban Groupware System* (Coleman and Khanna 1995; Shiffer 1992, 1995, 1996; Jones 1998; Laurini 1998). Urban groupware is a set of computer- and network-based technologies that allow several users, urban planners, land surveyors, estate valuers and other allied professionals and end users located at different offices and sites using different work practices and performing different urban functions to work together and interact towards the same goal (adapted from Laurini 1998).

Urban groupware (UG) has been implemented in experimental version by many authors and researchers (Coleman and Khanna 1995, DeSanctis and Gallupe 1987). Spatial Planning Groupware (SPG) has also been used to carry out management and decision sciences in the last two decades. SPG holds the key for modern urban management as it serves as one-stop geospatial technology solution platform for efficient and effective comprehensive urban management. It can efficiently facilitate understanding of geographical problem and decision making for different groups and locations including varying ideological standpoints. These include groups embroiled in locational and professional conflicts. SPG also provides platforms to experiment and test disparate ideas, policies, schemes, action plans and strategic plans in a *virtual laboratory* for urban administration. A similitude of urban groupware has been implemented in different countries especially in Europe and the West (Ahris et al. 2005). These have recoded varying level of success in implementation, but the results in all cases were improvements in urban administration and efficiency of cities. Nigeria will benefit tremendously if SPG can be deployed for a body or agency that has holistic mandate for urban administration.

## Appendix 1

### State institutions where interviews or data were collected

1. Federal Capital Development Authority (FCDA) Abuja
2. Osun State Ministry of Housing and Urban Development
3. Kwara State Ministry of Land Housing and Urban Development
4. Kaduna State Ministries of Housing and Physical Planning



5. Kano State Urban Planning and Development Authority
6. Lagos State Physical Planning and Urban Development
7. River State Ministry of Urban Development
8. Enugu State Ministry of Lands and Urban Development
9. Adamawa State Ministry of Lands and Physical Planning
10. Delta State Ministry of Lands and Physical planning
11. Kogi State Ministry of Housing and Urban Development

## Appendix 2

### Questionnaire on City Administration and Slum Developments in Nigeria

This questionnaire is intended to solicit information of the challenges of slum and urban administration in Nigeria. It is an ongoing academic research by *Centre for Human Settlements and Sustainable Development (CHUSSDEV)*. You have been selected for this interview on the basis of your experience, competence and knowledge of the issues of the research. The information provided will be treated with utmost confidence and under no condition will it be released to third party. Thank you.

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