The Role of Geographic Information Science in Property Rating Administration in Nigeria

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Abstract: Nigeria government has woken up to the fact that depending solely on revenue from oil is a thing of the past and therefore other means of revenue must be exploited. There are many sources of revenue that are operative in the country but property rating promises to generate more probably because of its vast tax base. Property rating is one source of income government has used to acquire revenue for public works but poor administration has marred it by yielding far below expectation. It becomes imperative for a reform especially in the aspect of assessment to generate more revenue and present a more transparent valuation list. An important step in doing this is to make use of Geographic Information System (GIS) which can utilize spatial features of properties to produce digital maps and attribute data as tool for preparatory work and for the property rate assessment, Availability of digital maps and spatial data cures the inhibition created by analogue maps promotes, easily accessible information on property transactions and improved and customized working procedures. The main aim of this paper is to describe how GIS can be used by a valuer in all the aspects of his rating exercise to increase the efficiency of some of the basic processes in the Nigerian property rating assessment system. Hopefully, this paper will encourage the State and Local governments to look inward and see how they can utilize GIS as an instrument for a more refined Property tax system and more importantly a boost for increased revenue.

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Introduction

Nigeria's dependence on crude oil as a source of revenue is becoming a thing of the past because of the volatility in the world's oil market and consequent dwindling of income there from. However, the responsibility of states and local governments have continually increased without a corresponding increase in revenue. This has awakened these two tiers of government to the reality of increasing their tax base so as to increase their revenue. Taxation can be expressed as a method of apportioning the cost of government works among those who in some measure are enjoying its benefits and must, therefore, bear its burdens. Taxes are the significant tools used to redistribute wealth and income and also used for the better allocation of the resources. These functions results in removing the resources from the private to the public sector (Dadkhah et al, 2012). It is an important factor in economic planning and an agent of social change (Ogbuefi, 2004). Taxes on property are the single most important source of locally raised revenue in most parts of the world and seen as reliable revenue for local

governments (Dillinger, 1992). The most popular land –based taxation in most states in Nigeria is Property rating. It is a reliable way of raising internal revenue for the administration of local government areas.

Property Rating and Taxation

Property Rating and Taxation System is defined as the whole activities that are carried out from the approval of the enabling law to the collection of assessed taxes. The process is seen as completed when the rates are collected and paid into the treasury of the concerned local government. Property rates are local taxes imposed upon owners (Nigerian system) or on occupiers (British system) of landed properties in respect of the landed properties they own or occupy (Anumnu, 1988). The starting point of the Rating and Taxation chain is the legislature that provides the enabling Law. It is from the law that we derive the rating system. The word 'RATE' is understood to mean "**a tax for local** ***purpose imposed by the local authorities the basis of which is the annual value of lands and buildings arrived at by adopting different recognized models of making the levy*****".**

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Nigerian System

Nigeria and some Common-Wealth countries inherited the British traditional rating system. The practice is a derivation from the British Poor Relief Act 1601 that provided for the levying of taxation on "every occupier of Land, houses…… towards the relief of the poor". The property law of most states stipulates taxation of improvements or properties. This is probably because properties possess qualities that make it suitable for revenue generation. The British Colonial Masters that introduced property rating in Nigeria modified the practice by rating the property owners due to obvious reasons of not having established tenanted properties during the colonial era (Ezeudu, 2009).

Legislation

Due to a nationwide local government reform in 1976, various state governments were directed to enact a local government law in their states, for which they incorporated some sections of property rating. The law was operated with the Tenement Rating (Method of Assessment), Order 1979. The content of the law for most states and their amendments are basically the

same. Tenement rate law provided for the collection of property (tenement) rates by local governments but vested the valuation and assessment of rates on the Valuation Office (a government agency). The rental values of properties are taken as the basis for imposition of property taxation. The Annual Value (AV) or the Annual Rateable Value (ARV) forms the basis of taxation and is arrived at by making statutory deduction of 25 percent from the Gross Annual Rent which the land or building might at the time of assessment be reasonably be expected to let from year to year.

Property Rate Administration

Property rate administration follows a given process or methodology where the rating authority establishes ratable occupation or ownership, determines the assessed value using an appropriate valuation method (assessment) and then apply a rate nairage to the Assessed value to arrive at the Rate burden.

The tenement rate laws of the states prescribe the persons that handle the assessment (appraisers, assessors) and who should appoint them. The rules and provisions of Estate Surveyors and Valuers (Registration, Etc) Decree No 24 (Now Act), 1975, Cap 111 LFN 1990, under 2 (d) on the functions of Estate Surveyors and Valuers Registration Board of Nigerian (ESVARBON) and the powers conferred on the Minister by Section 18 to make Rules and Regulation had at Section 2 said that "Nobody shall determine or estimate the value of any or all interests in real property unless he is an Estate Surveyor and Valuer". This is in line with the definition of appraisal and valuation handled by the professional Valuer/Appraiser as "The art and science of determining, at some specific date, for a specific purpose or purposes, and by one authorised, the monetary value of the property rights encompassed in an ownership and the value so determined", (Ifediora, 1993).

Property rate administration can be separated into eight (8) phases according to the task or function performed at each phase:

(i) Tax base identification- To determine what will be taxed, whether land or improvement and then the area to be covered (especially when given out to different consultants);

(ii) Tax Base- The tax burden (who bears what) and how it will be distributed among the tax payers is determined. The tax base is weighted by characteristics such as zone, value etc;

(iii) Tax Assessment- This entails determining how much tax will be levied, especially the rate as approved by Local government council;

(iv) Tax Billing/ Distribution of bills- Tax Bills served as legal notice of tax liability of the owner and tax officials ensures that the tax is equitably administered. Rating officials or Consultants delivers bills to property owners. The numbers of bills served are recorded in valuation list

(v) Tax Collection- Rating officials or Consultants collect tax and so generate revenue while committing taxpayers to fulfill their social responsibility.

(vi) Tax enforcement- Valuation courts are set up by Local Government to help in enforcing law by defaulters. This determines how much revenue will be collected through enforcement.

(vii) Tax Objections / Valuation Appeals and Resolution: At this stage, disputes concerning objections to Assessed values or rate payable is resolved through Valuation Appeal court set up by the state government. This ensures that equity and fairness is maintained

(viii) Monitoring and Evaluation- Valuation offices are established by states to monitor compliance as well as equity and accountability.

Poor administration has been shown to be the major culprit to poor revenue realized from property rate. In assessing the maladministration of property rating policies, much of the revenue losses can be traced to problems in the system of identifying, assessing, collecting taxes on properties. In order to identify, assess, and collect the tax on a property, a record identifying the location of the property, its characteristics to be used for valuation is required.

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Geographic Information System

In simplest term, GIS is interaction of digital map with database. It is both a database system with specific capabilities for spatially referenced data as well as a set of operations for working (analysis) with the data (Wheatley and Gillings 2002). According to Fellmann, Bjelland,Getis and Getis (2008) a GIS database can be seen as a set of discrete informational overlays lined by reference to a basic locational grid of latitude and longitude. Its most salient feature is that the user can move between the two systems with ease and also transparent. This makes it possible for the user to click on a parcel with a map and get information on the database and likewise click on the data base and have the parcels and their characteristics displayed so that the parcel and its geographic location can be analysed.

In addition to the digital map and database, the software and human beings are also incorporated in the GIS system. Thus four important parts of the GIS interaction are (1) digital map, (2) Database, (3) Software and (4) Human Interaction

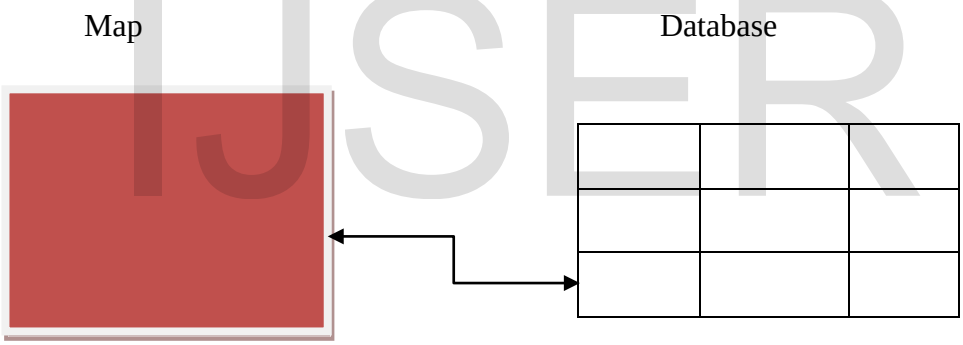

Figure 1: Relationship between Map and Database

Property Rate Assessment

Property rate administration in Nigeria is engulfed in analogue system. For example the maps that are used to delineate zones or units for effective taxation are analogue maps. Of the eight stages of property administration enumerated above the Estate Surveyor is involved in determining tax base but most importantly in tax assessment. His work is based on spatial characteristics of the property (the size and location) and the relevance of GIS is best described

under the four stages of Methodology rating: Zoning, Enumeration, Referencing, office work after inspects by (Akujuru, 2000) according to his field experience.

Zoning: Rating areas are usually delineated into subunits often known as zones or areas for easy collection of data. The zoning may correspond to some physical boundaries or such other boundaries as the surveying firm might choose. GIS has become a veritable tool for creating these sub-units or zones in developed countries. The analogue maps are geo-referenced with the help of GIS software to generate geo-referenced digital maps on a computer screen. This helps in creating boundaries and intended boundaries such as roads and property boundaries. In times of revaluation, the surveyor may only go back to the field to update his information and not to start the task all over. For example the spatial data of a state in form of a digitized street map will contain all the streets in the local Government areas of the state.

Enumeration. This is the actual listing of rateable properties in the zone. The aim of the enumeration is to ascertain the total number of properties within each zone. Estate Surveyors and their assistants usually take the streets according to zones, in alphabetical order etc depending on what they deem fit to list the tenements in them. Any approach they choose must ensure that no property is omitted. Surveyors have believed that this stage of going round and listing the tenements is a waste of time and resources, instead they prefer to inspect the tenement at once and as a result some render inaccurate, valuation lists. Those who relied so much on secondary information from their field assistants, encountered problems in completing the-assignment on schedule . Consequences were the direct results of obviating the Primary on-the-spot information which enumeration affords the team leader and the uncoordinated approach to nerd inspection which non-enumeration necessitates. This necessitates the fact that the enumeration stage is a crucial stage for the success or failure of a rating exercise. GIS is a tool the Estate Surveyor will need if he must enumerate without omission, increase efficiency, maintain accuracy and save cost. Where GIS maps exist, they can serve as a guide to the number of properties in each zone thus eliminating going to the field for property listing. In instances where valuation firms are assigned to different zones, it should be possible to estimate approximately the total number of tenements within the area assigned to the firm without visiting the field. During physical inspection, the documentation of spatial attributes of individual properties for taxation can be

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enhanced for the present and subsequent rating exercise. At end of the enumeration stage, the Valuer now has a complete picture of the zone he is to rate.

Referencing: The aim of referencing is to acquire as much information about the tenements as to enable the Valuer determine their value for rating purposes. Once the wrong details have been recorded, a wrong valuation will result and this may lead to objections on rateable values , which could discredit the whole exercise.

At this stage, relevant details as will enable the valuer form a mental picture of the tenement to be valued, is taken.

Among the general data that would be collected, are: - a) Legal description of the hereditament b) Neighborhood characteristics c) Property Data – (i) Personal details; Name of owner, address of tenement, name of occupier (ii) Site details (area, details of construction , accommodation (bedrooms, living area etc) (iii) Structural and Decorative State of hereditament (iv) History of the tenement - purpose, age, major renovation/additions. These data will be collected for each tenement along every street. This systematic approach will ensure conformity with the approach laid down for the enumeration. The role of GIS at this stage cannot be over emphasized especially for subsequent rating assessments. The time and resources the valuer or his assistants waste to pick the details from the field or from analogue data base is saved as all the data (spatial and attribute) are all encoded in the GIS system

Office Work: This stage spans:

(a) Daily cross - checking of surveyed tenements with the enumeration data.

(b) Daily inspection of Survey Sheets.

(c) Actual valuations of the tenements once the survey sheets have been adjudged complete and accurate.

(d) Compilation of valuation lists and bills to be distributed to property owners

In the present day property rating zonal team leaders will ensure that the daily survey sheets are accurate and proper valuation will be executed to determine the rateable value of the various hereditaments. The surveyor needs accurate data which he must have professionally collected to effectively execute a good valuation to make them useful for property rate administration. GIS promises to be a great and indispensable tool for property rating at this stage. Numeric data;

demographic data like population census, vector data; data with spatial component e.g houses, streets and raster data; data in a. JPG, .TIF and images of a digital camera are integrated into one map and used for many purposes.

The ways it can prove useful are:

Creation of Attribute Data: Analogue data collected on tenement rate administration from the field can be encoded on the computer using the relational database model of Microsoft Excel. This will be used to perform further functions like (a) Browsing, (b) Query and Display, (c) Map Analysis (d) Spatial Modelling

Browsing: in the course of valuation and revaluation for taxation, there may be need for identification of items of interest and subsequent retrieval and manipulation of data. By browsing particular features and patterns such as property type, addresses, ownership, etc. can be easily identified.

Figure 2: shows the owner of property 1/9 (in yellow), the state of repair and type of use
(Source: Igwe, Obodoh, Oladejo 2017)

This GIS function helps the generation of maps, diagrams and attribute data by a computer. Figure 2 displays the identification of a property, the owner, state of repair (good) and type of use (residential).

Query and Display: In order to put the system to test, some useful queries on typical user needs as they relate to

- Purpose of use
- Condition (developed/ undeveloped) -
- Location
- Accommodation type
- State of repair of the accommodations.

Fig 3 shows an attribute table, a query environment and the GIS map. A click on the query builder wills bring out the query environment from which the use to which properties are put will be answered. Once the 'use' field and value are clicked the result shows in the attribute table and the ArcView map. The yellow colored polygons on the ArcView map show the properties that are for residential use.

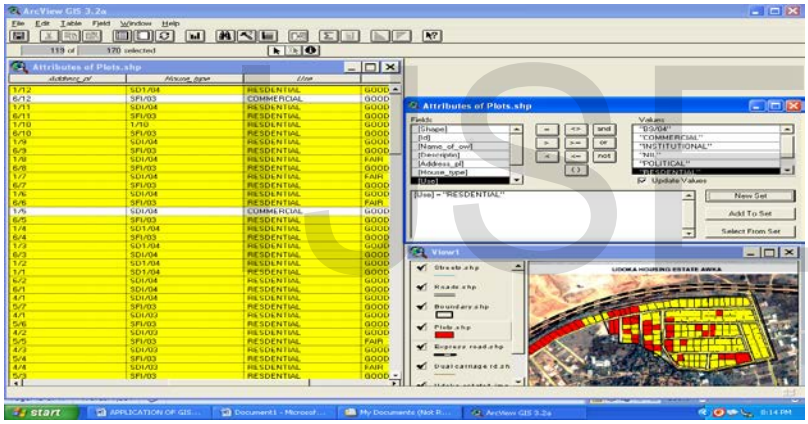

Figure 3: A typical Query showing properties used for residential purpose
(Source: Igwe, Obodoh, Oladejo 2017)

Map Analysis: This involves using the analytical capabilities of GIS to define the relationship between layers of spatial data. Map analysis involves the super-imposition of one map upon another to determine the characteristics of a particular site. The output is called a schematic map; the map is in a way that layers of spatial data can be placed on top of another.

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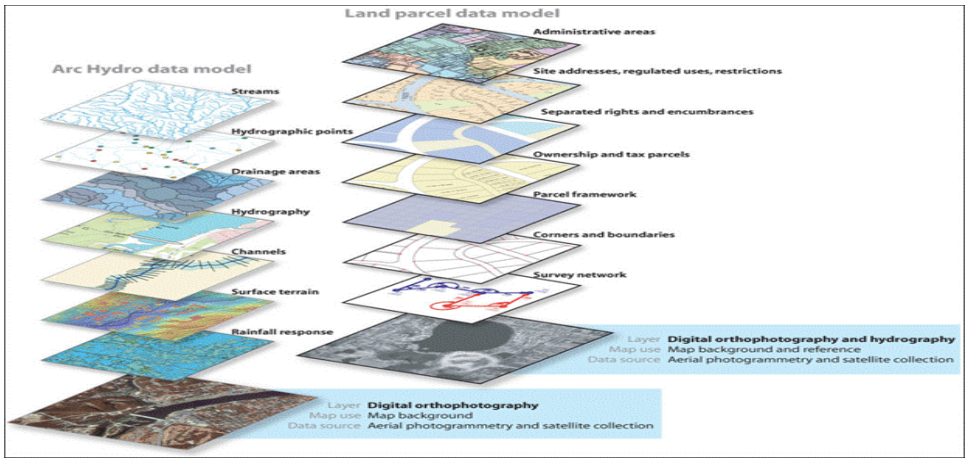

Figure 2: A typical GIS schematic map

(Source:http://researchguides.library.syr.edu/GIS)

One factor which is very important for the accuracy of the assessment is the correct evaluation of location. Every property has its own unique location, which can be defined by x and y co-ordinates and sometimes z co-ordinate. This characteristic is used to generate property value maps for delimiting group of properties with same location value for assessment. For example, a residential property has a unique bundle of attributes such as accessibility to work, transport, amenities, physical characteristics, neighborhood, and environmental quality (Muth, 1960; Ridker and Henning, 1967; Stegman, 1969; Kain and Quigley, 1970; Evans, 1973; Lerman, 1979; So , Tse and Ganesan, , 1997). Many of these attributes are spatially unique in which location is an intrinsic attribute that directly determines the quality and market value of the property.

While it is possible to judge whether a property has a better location than another at a glance, it is not easy to state the extent to which it is better without first checking against these factors of location and quantifying them. The different values assigned to location can be the basis for grouping properties that have similar location values in value zones for accurate taxation.

The rest of the paper work in the rating office like maintaining comprehensive up-to-date accurate property records, monitoring changes in property ownership, addresses, changes in street names or property usage, or changes in property can be effectively done with the aid of GIS

Conclusion

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Poor property rate assessment is a very big impediment to property rate administration in Nigeria. GIS is a tool that can be used to correct most of the anomalies that are seen throughout the stages of assessment and in the administration in general. The valuation of properties to determine rate payable can be greatly enhanced with the use of GIS for it utilizes the foremost characteristic of properties- location and turn them to spatial data for determining the value of properties. GIS further helps display all the spatial attributes for property owners especially when they are in doubt of the differences in rate assigned to properties which though they are in same location commands different property rates. My hope is that the usefulness of GIS as buttressed by this paper will encourage the government to use the application to enhance property rating.

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