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THE RELEVANCE OF GEOGRAPHIC INFORMATION SYSTEM TECHNOLOGY IN NATION BUILDING

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ABSTRACT

A good nation building strategy is an attempt to solve generic problems in terms of health, transportation, education, security ecological crisis, agriculture, poverty, land, resource managements for the government and its people in order to improve on the economic structure of a nation. A reasonable government must have a manifesto for nation building planning processes and other programmes in order to solve some pending problems. Many of these problems, if not all, are geographic problems. The essence is therefore to improve on existing sectors and policies and to establish new ones in order for an enhanced livelihood for the citizenry and also to boost the economic structure of the nation. The relevance of Geographic Information System (GIS) Technology in nation building can be connected to the advancement in technology. In today's technological environment, the emphasis is on Information Technology (IT) that is observed to have gained currency in the scientific world in the past few years. This revolution has added new capabilities to human intelligence arid consequently

Introduction

Nation building is an attempt or process of developing a nation, especially in peoples, social and economic structures. (Ade A. etall, 2006). One of the greatest problems a man could have is the lack of information. Some of these problems may include an attempt to answer any of the questions of where is what? And what is where? (Morenikeji, 1997)

The world is clamouring for solution to the numerous geographic problems in each geographic location within a reasonable time. Today, most developed countries like the United States of America, tackles these geographic problems through the use of Geographic Information Technology (GIT) in its national development policies for a formidable nation building. (Strahler and Strahler, 2017).

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changed the way we work (mode of operations) and the way we live together (interaction of people). However, Geographic Information System (GIS) being a new technology is helping tremendously in the area of environmental researches and as a decision support tool to complex human problems, thereby enhancing good national policies in nation building plans.

KEYWORDS: GIS, Nation Building, Technology, Planning, Economic Structure, Development, Government.

In the early broadcasts of President Bola Tinubu, he as well also highlighted some critical problems facing Nigerians and in his attempt to solve these problems, he tagged his nation building programme as "Renewed Hope". One of the fastest ways of accomplishing this is through the use, of the latest technology available. The advancement in Information Technology is a means of getting information across within a reasonable time. Geographic Information System, is therefore one of the best tools that can be used to analysis and solve these geographic problems through some specific decision-making. Many arid more of these geographic problems can only be solved through the adoption of GIS Technology.

There are many definition of Geographic lnformation System (GIS) but Sada, (2018) simply defined it as a computerized tool for data capturing, checking, integrating, manipulating, analyzing and displaying data/information which are spatially referenced to the earth specially used in decision making.

AIM OF THE RESEARCH

The aim of this paper is to examine the relevance of GIS technology application and use with a view to determining how it affects nation building and/or development.

RESEARCH METHODOLOGY APPROACH

The study centered on collection of data from relevant bodies such as Kwara State Geographic Information System (KWAGIS), professionals from built environment such as Land Surveyors, Estate Surveyors, Architects, etc and some GIS experts within and outside Kwara State.

Personal interview were also conducted from stakeholders and some experts. Members of academia were also consulted to gather information on the issue. Nevertheless, secondary data was also collected from textbooks, past thesis, past journal papers and other academic work.

ELEMENTS OF GEOGRAPHIC INFORMATION SYSTEM

The principles of GIS were first conceived in the 1960s and the first system (the Canadian Geographic Information Systems) was implemented in 1964. It was not until the 1980s that rapid progress was made because of increasing reduction in the cost of hardware and the development of very versatile software. (Keller, 1986). Firstly, there was the proliferation of data in computer readable format because of increases in activities of government. Secondly, the advances in geographical sciences, theories and techniques led to the development of integrated systems, while the need to appreciate the multi-dimensional nature of geographic data became an important factor. Detwyller and Marcus (1972), reveals that the practical nature of GIS in the commercial world became a major factor as the business community spearheaded strongly in application-oriented research.

Geographic Information Systems being "a Computer-based Information System" which attempts to capture, store, manipulate, and display spatially referenced data (in different points in time), for solving complex research, planning and management problem". Its components consist of data input, data processing, data storage, retrieval and database management; data manipulation and analysis; display and product generation, and user interface.

Also, since GIS collates and manages geo-spatial data in a standardized manner, its use is likely to result in more efficient data collection and analysis, since common geo-spatial datasets need be captured only once, but can be used for many different functions, by many interested organizations. The common use of geo-spatial datasets minimizes duplication of effort; and engenders team approach required to tackle multidisciplinary geo-spatial problems.

According to Rodney, (2008) GIS provides a measure of flexibility and timeliness when responding to environmental questions. Consequently upon its being reality updated, and in light of the new information or changes in environmental condition, GIS maintains a far greater currency than a paper map which may be several years old and represent only a snapshot of environmental conditions at a point in time. When geo-spatial information in GIS technology is updated, the

result of the query is also updated. So also the results of the environmental models will be regenerated from the new data, responsive to dealing with environmental contingency, planning, monitoring, or disaster management.

WHY DOES GIS MATTER?

Charles Abraham, (2016) states that almost everything that happens occurs somewhere. We humans are largely confined in our activities to the surface and near surface of the earth. We travel over it and in the lower levels of the atmosphere, and through tunnels dug just below the surface. We dig ditches and bury pipelines and cables, building construction and other infrastructure developments, extract mineral deposits, and drill wells to access oil and gas, etc. Keeping track of all these activities are important and knowing where it occurs can be the most convenient basis for tracking knowing where something happens is critically important if we want to go there ourselves or send someone there, to find other information about the same place, or to inform people who live nearby. Geographic Information Systems is a special class of information system that keeps track not only of events, activities, and things but also of where these events, activities and things happen or exist.

Knowing where something happens is critically important. Because location is important, it is an issue in many of the problems society must solve. Some of these are so routine that we almost fail to notice them - the daily question of which route to take to and from work. Problems that involve an aspect of location, either in the information used to solve them, or in the solutions themselves is termed geographic problems. Adeyemi, (2002) highlighted some more examples of problems that GIS can be used to solve.

• Health care managers want to solve geographic problems when they decide where to locate new clinics and hospitals.

• Delivery companies want to solve geographic problems when they decide the routes and schedules of their vehicles, often on a daily basis.

• Transportation authorities want to solve geographic problems when they select routes for new highways.

• Forestry companies solve geographic problems when they determine how best to manage forest, where to cut, where to locate roads and where to plant new trees.

• Governments equally want to solve geographic problems when they decide on how to allocate funds and resources in its yearly budgets.

• Travelers also want to solve geographic problems when they find their way through airports, give and receiving driving directions, and select hotels in unfamiliar cities.
• Farmers want to solve geographic problems when they employ new information technology to make better decisions about the amounts of fertilizer and pesticide to apply to their fields. etc.

A good nation building strategy is its ability to solve geographic problems in terms of health, transportation, education, security, ecological crisis, agriculture, poverty, land and other resources management, etc. Nation building is a paramount issue in the planning processes of any reasonable government. The essence is to improve on existing sectors and to establishing new ones in order to enhance better livelihood for the citizen and boost the economic structure of the nation.

GIS APPLICATION OVERVIEW

According to Adlai E. Stephenson, (2012) GIS application involves the use of Geographic Information Technology in satisfying a given need. The applications of GIS depend on how it is being used. In some cases, GIS is used as an organizing framework for systematic collection, collation, storage and analysis of data, while in others, it is used as a means for taking appropriate decisions (i.e. a case where GIS becomes part of Decision Support System (DSS). (Adisa, 2021)

When the two are combined, GIS possesses a wide range of applications. GIS and closely related technologies are now applied, to dozens of different disciplines and fields of work. Among the most important in number of users are Land Planning, Forestry, Automated Mapping/Facilities Management (AM/FM), Environmental Management, Natural Resources Extraction, Land Management, Urban Planning, Government Planning and Management of many kinds, Education, Geology, Hydrology, Agriculture, Military Affairs, National Mapping, Coastal Planning and Management, Real Estate Management, etc. There are, quite simply a huge range of applications of GIS, and indeed several pages of this paper could be filled with a list of application areas.

Until recent time, GIS has moved the world of applications onto a bigger agenda specifically the deeper conceptual grounding of successful applications. Government users were among the first to discover the value of GIS. Indeed the first recognized GIS, the Canadian Geographic Information Systems (CGIS), were developed for natural resources inventory and management by the Canadian

government. Today government users still comprise the biggest single group of GIS professionals. Of the tasks undertaken by governments, 70-80% is geographically related, which involves GIS in so many ways. (Adlai E. Stephenson, 2012)

Today government and private organizations are acutely aware of the need to improve the quality of their products, processes and services through ever increasing efficiency of resource usage.

Governments also use GIS in unique ways because of its responsibilities for the long-term health, safety, and welfare of citizens. Other issues needed for consideration by the government may include delivery of services in a fair and equitable manner, and representing the views of citizens by working with selected officials, including in-corporation of public values in decision-making. Thus GIS is used in inventory resources and infrastructure, plan transportation routing, improve service response time, manage land deve1opment and generate revenue by increasing economic activity. Other typical GIS applications thus include monitoring public health risk, managing public housing stock, allocating welfare assistance funds, and tracking crime, etc.

FINDINGS.

RELEVANCE/APPLICATION OF GIS TECHNOLOGY IN NATION BUILDING.

As earlier mentioned, Nation Building is a task and responsibility of the government. It involves mapping out strategies, programmes, policies and plans that are geared toward National Developments. Most of the key areas or sectors that constitute National Development programmes are in the areas of Economic Planning and Developments in terms of improving economic activities. Relevance of GIS technology therefore covers many areas like in the area of monitoring public health risk, managing public housing stock, allocating welfare assistance funds, and tracking crime through national security policy. Others include providing adequate education, improving agricultural developmental programmes, infrastructure facilities and transportation, exploration and exploitation of mineral resources, environmental impact assessment, coastal monitoring and sea navigation, land management, real estate management, population census and studies, tourism and sports, political administration and development, etc.

In attempt to highlight the relevance of GIS technology in nation building, some of it applicable areas relevant to nation building must be briefly discussed. Some

of these developmental programmes that can aid nation building are briefly highlighted.

Agriculture development

Before the discovery of oil in commercial quantity, agriculture was the backbone of Nigerian economic life and also the largest employer of labour. Groundnuts and cotton from the North, cocoa from the West, the palm-produce throughout the South was of main economic values. - Cash crops-millet, yarn cassava and other food crops ensured that Nigeria had enough to eat and flourish.

Geo-informaticians' contributions towards the development of agriculture were mainly in the acquisition and demarcation of agricultural lands, water resources development for dams and river channeling for irrigation purpose, crops area demarcation and enumeration. Also, most importantly is the evaluation for the purpose of compensation of acquiring lands.

Infrastructural planning

Planning for the provision of new road networks, power generation, provision of drinkable water, telecommunication systems and other infrastructural facilities become easier for the government if they have information about the infrastructures needed.

Education

Education is knowledge and knowledge is power. A nation needs to know the number of literates and illiterates and where they reside in order to be able to map out a good education policy in an attempt to eradicate illiteracy. GIS technology also helps the government in citing schools at appropriate location from the available geographic information informs of charts, maps, e.t.c.

Public Health Services

GIS has capabilities that are ideally suitable for use in infectious disease surveillance and control, particularly for many sector-borne diseases that are often found in low and highly populated areas. They are also highly relevant to meet the demands of outbreak investigation and response, where prompt location of cases, rapid communication of information and quick mapping of the epidemic's dynamics and vital areas. It also helps to locate and site specific types of specialist hospitals.

Land Administration and National Security

A nation must know its boundaries and properly demarcate them by producing good digital map. Failure to know the extent of its boundary will cause problems with adjourning countries which in some cases may lead to wars between nations when such boundaries become subject of disputes. (Nigeria and Cameroon over Bakasi land is a good example).

Environmental Impact Assessment

The depletion of the ozone layer owing to pollution caused by human activities has occasioned a lot of concern throughout the world and today Environmental Impact Assessment and subsequent monitoring have become a must. Even though this is a multi-professional affair, the Geographic Information Technologist (Geo-informaticians) who produce an up-dated digital map is significant and his maps are bases for assessment.

National Population Census

Knowing the number of people and where they reside is a tool for national planning and budgeting. The last population census carried out some few years back extended its contents of information beyond just name, age, sex but also required number of people living in a particular type of building, available electrical & electronic gadgets and other information. This is to enable the government plan its budgets an allocate resources to different sectors of the economy e.g. power supply, water supply, housing scheme, transportation & road networks, education, job security, health care services, etc. Without all this information, national budget estimates will definitely not be a successful exercise for the government.

Real Estate Management

A good Cadastral or Land Information System (LIS) is a supportive tool for Real Estate Management Information like: location of property, type, owner's name, etc, serves as tools for an Estate Surveyors and Valuers to estimate the value of a property, know location of properties, the name of the owner, type of right on the property, available facilities within the property, etc. in managing the property without necessarily going through any stress of constant physical contact with the property provided he or she is up-dating the information from time to time.

Tourism and Sports

To enhance the economy of any nation, tourism could be a major foreign exchange earner for the country. This however would require mapping out all major tourist attractions throughout the nation and a road map showing road networks, hotels and other facilities and where tourists would need.

Environmental Management -

GIS functionality provides the environmental manager with a powerful set of tools for modeling problems where several layers of graphical and tabular data may be involved. GIS can resolve spatial problems accurately and rapidly, particularly as a result of its modeling capabilities. GIS can provide useful support to environmental management decision-making.

SUMMARY AND CONCLUSION

All these applications and other relevant areas where GIS technology is embarrassed are clear indication of the relevance of GIS technology in our day-to-day activities either by an individual or by the government. In view of this, if a developing country like Nigeria wants to grow in order to meet up with the standard of the developed countries, GIS technology should be embarrassed and encouraged by all organizations as a computerized tool for decision making and in solving geographic problems. By conception, the term "nation building" includes improving the physical environment, social environment and economic environment within a nation in question. GIS has been found to be quite an ideal technology in nation building, planning, monitoring and management. It fundamentally requires a spatial analysis to describe, model and interpret it.

The range of applications of Geographic Information System (GIS) and its relevancies reviewed in this paper is a clear testament to the significant value of the relevance of GIS technology in nation building. GIS being a computer-ended database management and mapping technology has the capabilities to organize and store large amounts of multi-purpose information. GIS adds the dimension of geographic analysis to information technology by providing an interface between the data and map.

Finally, the relevance of GIS technology in nation building has being established throughout the world, especially in the developed countries. The need to use GIS technology in solving geographic problems is now a paramount measure that must be adopted in order to enhance an efficient, effective and quick decision-

making. The relevance of GIS technology in nation building can therefore not be overemphasized.

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