

Changes in Surveying Practices in Nigeria: Opportunities, Responsibilities and Challenges

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SUMMARY

The surveying practice in Nigeria is facing enormous challenges as technology and legislation create a new paradigm for employment and career opportunities. The surveying profession is currently facing the biggest challenge in its modern history. Developments in technology have had a significant influence on the structure of the surveying and mapping industry. The demand for traditional surveying services has seen a shift in demand as the breadth of the information society widens.

The rapid technological change, micro-economic reform, procurement reform, privatization, regulation of the professions, and the Internet are placing pressures on traditional professional operations and structures of surveying practice in Nigeria. The situations which have never previously experienced, although the situations are beginning to present opportunities and challenges to surveying profession.

For example, issues central to our profession such as cadastral reform, updating of maps and spatial data infrastructures are grabbing the attention of policy makers as they are beginning to realize the importance of surveying and mapping services in economic development, environmental management and social stability. The surveying practice has been undergoing significant change and the extent, pace, unpredictability and impact of change is projected to increase.

The surveying practice in Nigeria is rapidly changing as the skills required in the past give way to new technology; and new opportunities for the provision of added value services is beginning to mount pressure in survey rules and regulations. One of the major challenges for the surveying profession in Nigeria is the ability to capitalize upon the change created by GIS, Digital Mapping, Location based services using GPS. This paper will describe a number of changing trends in the provision of surveying services in Nigeria including changes within the profession. Finally the paper will assess the potential impact of these changes in the current and immediate future.

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1. INTRODUCTION

The surveying practice in Nigeria is facing enormous challenges as technology and legislation create new paradigm for employment and career opportunities. The surveying profession in Nigeria is currently facing the biggest challenge in its modern history. Developments in technology have had a significant influence on the structure of the surveying and mapping industry. The need for traditional surveying services has seen a shift in demand as the breadth of the information society widens.

The rapid technological change, micro-economic reform, procurement reform, privatization, regulation of the professions, and the Internet are placing pressures on traditional professional operations and structures of surveying practice in Nigeria. The situations which have never previously experienced, although the situations are beginning to present opportunities and challenges to surveying profession. For example, issues central to our profession such as cadastral reform, updating of maps and spatial data infrastructures are grabbing the attention of policy makers as they are beginning to realize the importance of surveying and mapping services in economic development, environmental management and social stability.

The surveying practice has been undergoing significant change and the extent, pace, unpredictability and impact of change is projected to increase. The surveying practice in Nigeria is rapidly changing as the skills required in the past give way to new technology; and new opportunities for the provision of added value services is beginning to mount pressure in survey rules and regulations. One of the major challenges for the surveying profession in Nigeria is the ability to capitalize upon the change created by GIS, Digital Mapping, Location based services using GPS.

This paper will describe a number of changing trends in the provision of surveying services in Nigeria including changes within the profession. Finally the paper will assess the potential impact of these changes in the current and immediate future.

2. REASONS FOR CHANGES IN SURVEYING PRACTICES IN NIGERIA

The world has been continuously changing. The speed of changes have been accelerated in recent decades not in the technical field only, but in the economy and the world society as well as creating new challenges to be solved, implemented world wide. Therefore, the reasons can be summarized as follows:

2.1 Global Challenges

The main global drivers for change in the spatial information world can be identified as technology development, micro-economic reform, globalisation, and sustainable development. These global drivers therefore also affect the profile of the surveying profession and they challenge the whole educational basis of the profession.

2.2 Technology development

The technological development in the surveying and mapping industry is the major driving force in changing the face of the spatial information world. The GPS technologies for measuring have revolutionized the traditional surveying discipline and the high-resolution satellite imagery tends to revolutionize the mapping discipline. The database technologies for storage of large data sets and the GIS technologies for data management, analysis and manipulation arguably have had the greatest impact on the spatial information environment. In recent times, the communication technologies such as the WWW and the Internet have become the focus of attention for viewing and using spatial data.

2.3 Micro-economic reform

The micro-economic reform initiatives by the Federal Government of Nigeria represent the institutional and governmental side of the changes observed during the latest one decade. These changes includes initiatives such as privatization, decentralization, monetisation, downsizing, cost recovery, performance contracts, quality assurance, value for money, public/private partnership, and other policies to ensure service delivery and cost effectiveness. These initiatives have changed the focus from the pure technological issues to include also the more managerial components of building and maintaining national spatial data infrastructures.

2.4 Globalisation

A globalised world is one in which political, economic, cultural, and social events become more interconnected. The process includes that events in one part of the world increasingly have potential to impact on people and societies in other parts of the world. Globalisation widens the perspectives from the local to the global level. This should lead to a world movement towards improving the quality of lives of people by thinking, working together on common concerns. Globalisation has a social, economic, political, as well as an educational dimension. The www is the most graphic example of this trend, even if the full potential of the web as an educational resource is still to be seen.

2.5 GIS and Surveying Reforms

The last decade has seen moves towards incorporation of GIS as part of Surveying services as it is done in the surveying community throughout the world. GIS and Surveying are beginning to evolve as components of more global land administration systems. GIS Business in Nigeria is gradually becoming big time business. More people are getting interested each day and

more ideas are being unveiled as GIS practitioners search for enduring legacies for sustainable wealth creation for Surveying through GIS.

2.6 Capacity Building

The Capacity Building Challenge is about establishing

- Sustainable Survey Departments
- Sustainable Survey and Mapping infrastructures
- Sustainable human resources and skills

The new paradigm for Capacity Building in surveying and mapping offers a wide range of principles and options such as:

- redefining the current market potential including existing competition
- redetermining available/potential sources of funds for surveying and mapping
- re-examining surveying and mapping specific manpower and equipment needs
- Making surveying departments as core income generation area

3. OPPORTUNITIES FOR SURVEYORS

The emergence of current economic environment has focussed the Surveying business on the need for large long-term investment in manpower, equipment and particularly job sourcing in order to exploit the opportunities this current environment offers. The face of the Surveying Business has been changing with an ever-increasing acceleration. The Surveying business is now quite different from how it started and we have good reason to expect that, within a few short years it will again look quite different from what is now. We only have to look at the last few years to see how the that technological and political changes have put a lot of external pressure on Surveying business and it would be naïve to expect this pressure to disappear.

The Surveying world is not the same place as a decade ago and the Surveying industry in Nigeria is certainly not the industry of even five years ago. We are in a period of flux, of constant movement coupled with rapid technological advances, legislative changes, constantly changing calls on the skills of Surveyors. Among the opportunites for surveyors include and not limited to the follwing:

Mapping with Satellite Imagery
Provision of Controls with Total Station
Global Satellite Positioning
Global Navigation Satettilte System

4. CHALLENGES FOR SURVEYORS

Inspite of the several years of Surveying and Mapping activities in Nigeria, the surveying industry which should have been the bedrock for sound planning and development have regrettably not been able to respond well to users demands due to inadequate funding of the

sector, poorly trained personnel in modern mapping techniques, dearth of modern instrumentation and lack of sectoral motivation. All these pose significant challenge to Surveyors. Some of these challenges are due to evolution of technology and some are due to institutional changes as a consequence of political and economical development in individual countries. Developments in technology and institutional frameworks may provide new opportunities for the surveying profession, but they will also be the destroyers of some professional work.

The challenges of the so-called information age will be to integrate modern surveying technology into a broader process of problem solving and decision-making. Nigerian Surveyors are yet to assess fully what range of skills will be required of those entering, and continuing within, the modern occupational world of surveying. There is no doubt that the main challenge of the future will be that the only constant is change. To deal with this constant change the educational base must be flexible. The graduates must be adaptable to a rapidly changing labour market.

The point is, that professional and technical skills can be acquired and updated at a later stage in ones career while skills for theoretical problem-solving and skills for learning to learn can only be achieved through the process of academic training at the universities. Universities should focus on educating for life, not for short term skills. Development, maintenance and enhancement of professional competence should be seen as a total process facilitated through an efficient interaction between education, research and professional practice.

4.1 Actualisation of MDGs

The purpose of the surveying and mapping in the actualisation of MDGs is to make accurate and timely geo-spatial data readily available to support sound decisions and to do so with minimum duplication. The surveying and mapping is to promote and improve data sharing as well as measures which ensure that spatial data collected are readily available and useable among potential users of geographic/land information systems such as federal, state and local governments, citizens, private sector organisations, academia etc.

The surveying and mapping in actualization of MDGs places emphasis on harmonising standards for spatial data capture and exchange, the co-ordination of data collection and maintenance activities and the use of common database by different agencies, thereby promoting the use of spatial information in decision making and removing impediments to the use of spatial information. The objectives of the policies are:

- To promote economic development
- To stimulate improved management of resources
- To foster environmental sustainability

4.2 Proliferation of Remote Sensing Images

The legal provision for coordinating the activities of Surveying and Mapping in the country in through the Survey Coordination Act of 1962, (Act No. 28), which was subsequently amended in 1968 and 1973. The Act and specifically designed to cut-off duplication and

minimize wastage of scarce resources as well as enhance the security of the country by preventing unauthorized acquisition of survey data and aerial photography all over the country. In practical terms, while the Act above takes care of participation of the private sector in Surveying and Mapping activities in Nigeria, the Survey Coordination and Advisory Board on Survey Training Conference presents a forum to ensure coordination in the public sector. At the moment Survey Coordination Act has not be able to contro the proliferation of satellite imagery.

4.3 Professional Challenges

The emergence of current economic environment has focussed the profession again on the need for large long-term investment in manpower, equipment and particularly job sourcing in order to exploit the opportunities this current environment offers. The face of the profession has been changing with an ever-increasing acceleration. The Surveying profession is now quite different from how it started and we have good reason to expect that, within a few short years it will again look quite different from what is now. We only have to look at the last few years to see that technological and political changes have put a lot of external pressure on Surveying and Mapping and it would be naïve to expect this pressure to disappear. Furthermore, the e-business is having an undeniable impact on surveyors and surveying companies alike.

4.4 Educational Challenges

Education, like the changing professional environment, must adapt to meet the challenges of the future. Until the 1980's, surveying was defined as the "art" of measuring natural and man made features on the earths surface. Today, the definition of Surveying has gone beyond the art" of measuring natural and man made features on the earths surface because the with the technological advancement the skills of measurement no longer seen as an art form. With this change there is shift in emphasis from the collection of data to the processing and management of information. Therefore, the The skills required by the surveyors in Nigeria include:

Excellent Communication Skills: the ability to effectively listen and communicate with both operational staff and management, prepare and present reports;

Information Technology Skills: with virtually all survey data being captured digitally it is essential that surveyors be conversant in end user computing, data processing, manipulation and management;

Data Presentation Skills: the ability to present and transform data for a range of clients including the interface of other information systems, graphics presentation;

Business Management Skills: increasingly the surveyor is required and expected to be able to manage projects and people;

4.5 Professional Competence

Professional competence" is, however, extremely hard to define, although it is something with which all surveyors are familiar with. The professional competence combines knowledge competence, cognitive competence and business competence with a central core of ethical and/or personal behaviour competence:

- *knowledge competence*: defined as "the possession of appropriate technical and/or business knowledge and the ability to apply this in practice";
- *cognitive competence*: defined as "the abilities to solve using high level thinking skills technical and/or business related problems effectively to produce specific outcomes;
- *business competence*: defined as "the abilities to understand the wider business context within which the candidate is practising and to manage client expectations in a pro-active manner"; and
- *Ethical and/or personal behavioural competence*: which is the core to the other three parts; defined as "the possession of appropriate personal and professional values and behaviours and the ability to make sound judgements when confronted with ethical dilemmas in a professional context.

In Nigeria, different areas of surveying practice tend to place different weighting on these elements, thus for some areas of surveying practice, business competence may be a larger or smaller component of the whole. However, the ethical and/or personal behavioural competence has been identified as a vital component, which can also be defined as the defining characteristic of a true "professional" with all that entails.

Today's fast moving Surveying business environment demands Surveyors with a variety of skills to perform a range of tasks. The more skills, a Surveyor has, the more valuable such Surveyor becomes to his or her employer and the greater his or her personal potential.

4.6 Enhancing Professional Competence

To date, the Surveyors Registration Council of Nigeria (SURCON) has registered 1074 Surveyors, 357 pupil surveyors, 310 Technologists and 42 Technicians. Most of the qualified survey personnel are not current in modern mapping technology.

4.7 Institutional Challenges

Most of the surveying and mapping equipment in the country today both in the private and public sectors are generally obsolete and are no longer serviceable as the manufacturers are no longer producing them. Therefore, the organizations and institutions responsible for surveying and mapping need to be transformed into modern organizations which can produce digital Surveying and Mapping products that will satisfy the needs of all current and potential users of such products. At the moment, organizations and institutions responsible for surveying and mapping are full of institutional and organizational deficiencies which need to be should be tackled in order to perform their duties efficiently and in particular be able to respond promptly to the ever changing and improving users' requirements.

If one total station costs N2m and a differential GPS receiver set goes for N10m and these are just a few of the many basic tools required by a survey team for project implementation in mapping, there is no gainsaying in the fact that the Survey and Mapping sector which is

capital intensive requires government priority attention in funding. In view of its immense benefits to many sectors of the economy.

4.8 Funding

Modern Instrumentation and equipment in the Surveying and Mapping sector are technology based. This requires huge capital outlay in foreign exchange and consistency in funding in order to meet the requirement for critical capacity building in terms of instrumentation, personnel and manpower development. The Federal and State budgetary allocation for Surveying and Mapping operations had declined steadily over the past two decades. Over this period the approved annual allocation by government to Surveying and Mapping activities through the Federal and State Surveys Department were always less than 10% of the capital budget proposals of the department. Thus the Federal and State budgetary allocation to Surveying and Mapping sector had remained less than 0.3% of the total capital budget as against the United Nation's recommendation of 2% of the Gross National Product (GNP). The poor funding of Surveying and Mapping accounts for the current poor status of survey personnel and equipment. The plight of the state Survey Departments is much worse.

5. THE WAY FORWARD

Implementation of Vision 2010 for Surveying and Mapping in Nigeria

The goal of VISION 2010 is to chart an economic, social and technological program that would put Nigeria on the path of sustainable development for the benefit of the citizens of the country. The Surveying and Mapping community fully identifies itself with this aspiration and therefore wishes to bring to light a crucial but often neglected service of **Surveying and Mapping** which is the bedrock of all physical and socio-economic development of all nations, and which we believe will eventually enhance the realization of the goals of VISION 2010 in a sustainable manner.

For Surveying and Mapping to have a positive progress in Nigeria like other developing countries there is an **URGENT** need for the implementation of the Vision 2010 report. The statutory functions on Surveying & Mapping need to be distributed among the three tiers of government for successful execution of government programmes. Such a distribution of function is not currently in place.

In order to move forward, Surveyors in Nigeria must avail themselves of the opportunity and challenges presented by modern mapping technology to speedily locate, take stock, study and explore her land and marine resources for their orderly management; and make available Surveying and Mapping product needed by the other sectors of the economy. The effective use and application of Surveying and Mapping products to our national development will assure among others:

Efficient and sustainable national planning and development driven by a nation Geographic Information System (GIS) – an information technology which stores, analyses and displays geo-information.

Improved national revenue generation through efficient tax collection and proper monitoring of customs and immigration based on cadastral information systems.

Effective inventory and monitoring of the environment: desertification, coastal and land degradation, and environmental impact assessment.

A boost in agricultural products through efficient cultivation inventory, production vegetation and soil maps; crop yield and marine resources monitoring and prediction.

Higher revenue generation from petroleum resources through efficient planning, exploration, monitoring and marketing of oil and gas and allied products through the use of National and State **Topographic Databases**.

A boost in Tourism through the production of road network maps, street guides, tourist centre and hotel locations.

Efficient political Administration of the nation through effective delineation and mapping international, interstate and local government areas and constituency delimitation.

Improved Health-Care, Educational and Sports facilities planning, development and delivery through Topographical, Cadastral and National Atlas Information Systems

Therefore, in view of the foregoing, the implementation of the vision 2010 for the Surveying and Mapping sector in Nigeria will **develop Surveying and Mapping products and services, fully by using current technology to support Nigeria's physical, political, and socio-economic planning and sustainable development**".

The vision will be realized when the country pursues and achieves the following strategic objectives:

Encourage and maintain a virile Private sector – whose contributions to the growth of the economy could be comparable to that of its counterpart in developed countries;

Equip and modernize the Surveying and Mapping **training institutions** to keep pace with advancing technology, and **develop adequate staff training** and retraining programmes in order to provide the country with competent manpower who can meet the ever changing needs of this sector.

Establish and maintain National and State Cadastral as well as Topographic Databases with contributions from the outlets in States, LGAs, the private sector and other relevant organizations; and a National Atlas Information System which shall indicate the natural and man made features, climatology, transportation pattern and modes, records of place names and their locations and various images of the country among other information.

6. CONCLUSION

Over the last few years, the pace of changes in the Surveying and Mapping industry has accelerated. These changes are being driven by a number of forces, the most important of these is the promotion of spatial data infrastructure as a basic component for good governance. This is leading to a demand for geographical information and geographically enabled applications from very rapidly growing markets and sectors.

Under the auspices of the Millennium Development Goals, a basic geographic data set or “framework” is being produced. The framework will be a consistent set of digital geospatial data and supporting services that will satisfy the needs of users to maintain and manage the variety of common information being collected by the public and private sector.

Therefore, the Office of the Surveyor-General should ensure that the surveyors’ professional skills are used to promote environmentally sound planning and management of natural resources and human settlements as defined in Millennium Development Goals. Surveyors are challenged to contribute to the planning and management of urban, rural and marine development in order to avoid potential disasters of the gravest scale and to preserve and improve the quality of life for present and future generations. The expertise of surveyors is essential in the actualisation of MDGs for example monitoring environmental changes, in management of resources, in planning and construction.

Surveyors can only achieve these through continuing advances in modern surveying and mapping technology, such as remote sensing and geographic information systems, which can significantly increase the information available to decision makers and society in general. New technologies in the field of positioning and navigation such as GNSS will help to in disaster management. The Office of the Surveyor-General should figure prominently in the implementation of MDGs. This is because surveyor has an ethical duty to advise and inform the Federal Government of Nigeria in relevance of Surveying and Mapping to MDGs. The goals and objectives for the Office of Surveyor General and State Survey Departments should include but not limited to the following:

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