EFFECTIVENESS OF e–LAND DOCUMENT MANAGEMENT SYSTEM IN NIGER STATE GEOGRAPHIC INFORMATION SYSTEM AGENCY

BY

AHMAD, Usman Pai

M.Tech./SET/2017/7402

DEPARTMENT OF ESTATE MANAGEMENT AND VALUATION
SCHOOL OF ENVIRONMENTAL TECHNOLOGY
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THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF POST GRADUATE DIPLOMA IN THE DEPARTMENT OF ESTATE MANAGEMENT AND VALUATION

FEBRUARY, 2022

ABSTRACT

Land is one of the essential commodities of any nation's development and it is essential to device methods for improving its management. The effect of the pressure on land and other natural resources is that communities develop a need to own land exclusively. This facilitates the emergence of various types of rights to use and develop the land as more permanent holdings. e-land documentationas a tool used in digital maintenance and keeping of land recordsandhelped to reduce the chance of corruption magnificently has been bedeviled with inherent challenges that impaired main focus. It is on this basis the study assess the significant impact of challenges associated with e-land documentation process in the Minna metropolis. The utilized simple random technique to sample 340 digitized title holders through closed ended questionnaires. The study utilized descriptive and inferential method of analysis to analyze the responses from the respondents. The result of the analysis revealed that Inadequate public education and enlightenment on new digital certification process, inadequate proper identification of parties to transactions and the lack of proper authentication of documents were identified as most important challenges associated with e-land documentation process. The study therefore recommends that the process should ensure proper enlightenment to the government and stakeholder's perception on the simplicity and easiness in digital certification for clearer delivery of land administration in Niger State.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Land is the core of a nation's development and it is essential to device methods for improving its management. In this respect, the implementation of proper management tools and policies with respect to land results in efficient land transactions and land markets (Atilola, 2010). However, this is only possible if the rights pertaining to different land units are well defined and properly documented. E-land documentation is a digital maintenance and keeping of information on land records, selling and buying of the land, ownership transfer of the land in various ways, creating the land deeds and their maintenance, Land related disputes management, updating the land map and information, tax and revenue collection and many other things (Zevenbergen, 2002). Digital documentation ensures ease of storage and back up, information sharing by different departments, secure storage and remote access to information while allowing the possibility for performing some but not all land transactions in real time.

The most crucial part of e-land document management system is to represent land information in such a way that splitting, merging and querying updating and retrieving of land information become easier, and also collecting and digitizing land data should be cost effective (Zhou, 2002). A document is recorded information or object which can be treated as a unit while document management is how an organization stores, manages and tracks its electronic documents (ISO, 2012). A document management system (DMS) therefore, is a system based on computer programs in the case of the management of digital documents used

to track and store documents. It is usually also capable of keeping track of the different versions modified by different users.

A document management system could also be considered as the software that controls and organizes documents throughout an organization. It incorporates document and content capture, workflow, document repositories and output systems, and information retrieval systems. Also, the processes used to track, store and control documents (Arnot, 2006). Beginning in the 1980s, a number of software sellers began to develop software system to manage paper-based documents. These systems dealt with paper documents, which included not only printed and published documents, but also photographs, prints, among others (Oboli, & Akpoyoware, 2010). Later developers began to write a second type of system which could manage electronic documents, meaning, all those documents, or files, created on computers, and often stored on users' files.

The Niger State Geographical Information System (NIGIS) as an agency is saddled with the responsibility of managing subsequent transactions in land such as deed of assignment, mortgages, transfer, sub leases, land registration, stamping and Ground rent among others. It was usually a herculean task searching for files since many times the files would not be returned to the land registry (shelves) where they were previously taken and treated by the former users. Sometimes files were hidden by staff for their selfish reasons and corrupt tendencies. The wisdom of the State in establishing Niger state geographic information system (NIGIS) came as a deliberate Government solution to the menace described above.

After the commissioning of Niger state Geographic information system (NIGIS), staffs were required to signify their interest in a training course for proficiency in the document management system in the Agency. Evidently in the Agency, some of the staff was exposed to document management system. This also revealed some of the problems of operations and

challenges this study intends to discuss. This study also tends to appraise the effectiveness of e-document management system in NIGIS.

1.2 Statement of the Research Problem

Population growth is directly associated with an increase in pressure on land and the environment. The effect of the pressure on land and other natural resources is that communities develop a need to own land exclusively. This facilitates the emergence of various types of rights to use and develop the land as more permanent holdings. To ensure secure land holdings to the community, there is need to document the land rights in some form of legal register. This essentially brings into light the need for proper and up-to-date e-land documentation and information systems for managing land. Thus, requirement of an automated digitized land or e-land management system, an infrastructure that will replace the current, insecurity, slow, messy, unreliable system for good is imminent (Babalola *et al.*, 2015).

This requires the new tenure arrangements that emerge with modernization and sophistication of society. As a result, cadastral models should be dynamic and adaptive rather than static (Zevenbergen, 2002; Barry *et al.,* 2013). Collecting, recording and retrieval of land and related transaction information in the course of implementing land policies cannot be achieved without a proper data management system. This study seeks to assess the effectiveness of NIGIS operation with a view to ascertaining the effectiveness and impact of e-Land Document Management System on land transactions in Niger State.

1.3 Aim and Objectives of the Study

The aim of this study is to examinethe effectiveness of e-land documentation management system in Niger state geographical information system (NIGIS).

This aim will be achieved through the following specific objectives:

1. Assess the process of e-land document management in NIGIS for securing land title.
2. Examine the effectiveness of NIGIS operations in e-land documentation.
3. Examine the challenges encountered in the process of e-land documentation.
4. Recommend viable solutions to enhance effective e-land documentation.

1.4 Research Questions

1. What are the processes of e-land documentation in (NIGIS) for securing land titles in Niger State.?
2. How effective is the operation of NIGIS in e-land documentation management?
3. What are the inherent challenges encountered in the process of e-land documentation?
4. What are the possible ways to enhance effective e-land documentation?

1.5 Justification of the study

The study of e-Land document management System (eLDMS) uses an automatic online system for managing the land issues of the country rather than following the traditional system. The instant and easy access to the online land information services gives the land owners and other stakeholders a well manageable interface through which they can accomplish their land related tasks sitting on their home (Zhou, 2002). e-land document management of the land properties helps to reduce the chance of corruption magnificently since the tasks are performed by the land owners directly.

The cadastral surveying of land is done through GPS which reduces the chance of errors in measuring the land. In addition to this, the automatic drawing of land maps ensures the accuracy of maps which is not possible in the traditional system. In a nutshell, the study of e-land document gives land owner ability to manage their land properties online at anytime from anywhere of the world (Atilola, 2010).

In spite of the introduction and establishment of Niger State Geographic Information System (NIGIS) to effectively coordinate and enhance land use administration and documentation process, as well as leveraging on same to improve revenue generation in the State. The views of what constitutes an effective and robust e-land document management in terms of how it is designed, built, and operated, and choices made over the years have left several gaps in land administration service delivery.

This is complicated by the fact that the environment in which e-land document management system is carried out is subject to changes in the social, cultural, political, legal, and economic systems that influence how government and stakeholders perceive land administration service delivery.

1.6 Significance of the study

The success of an effective land administration system is necessary to secure and give information about land concerning its ownership, value and use. The system of land allocation, acquisition, development and uses must be accurately managed.

Immense investigation of the study is relevant to e-land documentation systemand best practices as it attempt to investigate the level of standards in the operations of e- land documentation presently attained by various State's agencies with the ultimate goal of ascertaining the extent to which NIGIS is adhering to the standard of a built, designed and operated e-land documentation in the state and attempt to recommend viable solution to enhance effective e-documentation system in Nigeria.

Finally, this investigation will be to a great extent helpful to specialists, understudies and educators of land registration, e-land documentation, LIS/GIS, land specialists and experts, administrative specialists and land operation standard setters and every single other gathering in the land world.

1.7 Scope of the Study

This research study is restricted to Minna Niger State. The research study covers the role of Niger State Geographic Information System (NIGIS) Agency in the process of land title documentation; therefore, land title registration system adopted by (NIGIS) will be evaluated covering the year 2011 to 2018. The reason for this is that researcher requires the inputs of the participants or applicants with some vital information such as cost of registering their title, duration for registration process and challenges encountered during the period among other details. The significance of title registration, regularization, re-certification; the procedure for obtaining land title registration, requirements involved examined, benefits of GIS application to land title documentation will be discussed.

1.8 Development History of the Case Study

The immediate past administration led by the Chief Servant, Dr. Mu'azu Babangida Aliyu (CON) took a giant step by the introduction and establishment of Niger State Geographic Information System (NIGIS) Agency to effectively coordinate and enhance land use administration and documentation process, as well as leveraging on same to improve revenue generation.

NIGIS Agency was commissioned by the President and Commander in Chief of the Federal Republic of Nigeria, Dr. Goodluck Ebele Jonathan GCFR in 2011, NIGIS as an agency is poised to provide the tool for modernizing and improving the management system, making it more efficient, functional and flexible.

Niger State Geographical Information (NIGIS) is one of the new agencies that use GIS in providing a common platform for data sharing, which enhances workflow, decision making, and coordination across the state and with federal and local government.

1.8.1 Niger State Geographical Information System

The installation of Niger state Geographic information system was preceded by the setting up of a laboratory for the creation of a land information system (LIS) for Niger state in 2007. The firms of Babatunde & Company and M.B Nuhu & Co were commissioned to develop an LIS for the State. It was this concept that later metamorphosed to NIGIS.

1.8.1.1 Design, Installation and Operations

NIGIS officially commenced work in December, 2009 (NIGIS Services, 2019). The project scope was to computerize the land and cadastral registry. The entire registry has been transformed from analogue to digital form with it corresponding textual and geo-spatial data. NIGIS can now issue new-titles, process the recertification of existing titles and handle subsequent transactions such as sub-lease, assignment, and transfer etc. the system enables easy storage, retrieval and processing of titles. Auditing and accounting reports can now be automatically generated and legal searches can easily be conducted. A GIS (Geographic Information system) integrated module enable linkage between the geographical plot of land boundaries and its ownership information. NIGS billing module provides intuitive tool to manage all land related financial transactions.

1.8.1.2 Backups:

NIGIS has a remote server for storage of digital files for use and an FTP (File Transfer Protocol) web space for these files in case of any hazards aside from our external devices. A File Transfer Protocol (FTP) is the standard procedure for transferring files. The procedure allows one computer to transfer files to and from another over a network such as the internet.

1.8.2 Description of the Study Area

Minna Township is the capital of Niger state and comprises Chanchaga and Bosso Local Government Councils. It occupies a total land area about 6,784 square kilometres. It is located on Latitude 9 37' North and 6 33' East. The Mean annual rainfall is 1334mm with

September recording the highest rain of 3300mm. The town enjoys a typical climate of middle belt zones of Nigeria. The rainy season lasts between 190-200 days; starting on an average from 11th -20th of Aprils. The mean monthly temperature is highest in March at 37 c and lowest in August at 25 c.

Moreover, Niger state covers a total land area of about 76,469.903 square kilometers which representing about 8% of the Nigeria land mass, and about 85% is arable. It also records a distinct wet and dry season; the minimum temperature is within December and January while the maximum is within March and June. It experiences a varying annual rainfall of 1,100mm in the northern part and 1,600mm at the southern part of the state. The fertile soil cum climatic conditions support the cultivation of most Nigeria's staple crops like rice, yam, corn and cassava among others, and still allow sufficient opportunities for grazing, fishing and forestry.

Since then, the status of the town began to change from the hither to hill top settlement whose inhabitants were in constant search of security from their more populous and powerful neighbors. With the extension of railway line, the settlement started to expand and which expansion also took another turn with the choice of the town as a district headquarters by the colonial Government in 1924, with this, Minna started to take over from Bosso as the most important town within its immediate vicinity. The political status of the town was further consolidated in 1957 when the colonial administration created Minna emirate with an emir as its traditional ruler (Nuhu, 2008).

1.8.2.1 Historical Development

Minna Township can be described as one of the newly urbanized centers in Nigeria. The town was originally on the hill at Sayako and had ‘Ganuwa’ walls built around it. The natives are Gwari by tribe. The name ‘MINNA’ means to spread the fire which is a yearly ritual performed by the Gwaris. The usual practice is that the natives will converge and put together

a large quantity of firewood to make fire. Three days before the end of the year, members of the traditional council, the chiefs and the chief priests would embark on a journey to Lafiyaji village- a Gwari speaking village in the Nupe kingdom and come back with fire to light up the firewood. There and then people take from the fire and light their respective homes to mark the New Year. This ceremonial event became known with the town and the name 'Minna' came to stay till today.

Minna witnessed four developmental stages before it eventually became a city of its own today. In the year 1905, the construction of rail line from the Southern part of the country was extended into the town. The local laborers who were the Hausas, the Nupes and the Gwaris were accommodated in various locations such as Limawa, Kwangila and Keteren-Gwari respectively. The second was in 1908 when judge (Alkali) was the established for the Gwari camp. A house was built permanently for the judge with a prison yard been provided within the same compound. After which contingents of police were firstly established.

The third transformation took place when the Gwari settlers moved down from the hill top and settled at a place presently known as 'Paida'. The construction of the rail line within Minna was completed in 1911 with the arrival of the first locomotive engine. In view of fast development of railway workers camp into permanent settlements, the Minna Town Council was established in 1944. This was short-lived and the Gwari Federation Native Authority was formed. And by November 1950, Alhaji Ahmadu Bahago - chief for the whole Minna was enthroned.

The forth transformation took place on the 3rd of February 1976, when North-Western region was split by General Murtala Mohammed led administration; Niger State was carved out and Minna became the state capital. Successive governments transformed the town from small traditional settlement to an urban centre with modem infrastructures and facilities.

1.8.2.2 Administrative Structure

Minna Town is made up of Chanchaga and Bosso local government Areas. Chanchaga Local Government is made up of eleven (11) wards namely, Limawa A, Limawa B (Dutsen-Kura Gwari & Hausa, Zarumai, Tabi, Shanu), Makera, Minna Central (kongila, Keteren-Gwari), Minna South (Kpakungu, Gbenganu, Nyikangbe, Albishiri, Barkin-Sale), Nassarawa-A, Nassarawa B, Nassarawa C, Sabon-Gari, Tudun Wada North (Tunga Top Medical) and Tudun Wada South (Sauka- Kahuta, Tunga Low-Cost). Bosso Local Government however, consists Ten (10) wards namely; Beji, Bosso Central I (New York, Radan-Ruwa, Emir's palace), Bosso Central II (Bosso Low-Cost, Piau), Chanchaga, Garatu (Gidan Mangoro, Gidan Kwanu, Shata) Kampala, Kodo, Maitumbi, Maikunkele and Shango.

However, the headquarters of these Local Governments are Minna and Maikunkele respectively. Administratively, elected Chairman is the head in the local government who appoints the Secretary while Councilors are elected from ward levels. The state administration comprises the executive, the legislatures and judiciary while the executive council is made up of the governor, the deputy governor and the secretary to the state government, the commissioners and the head of civil service. The Judiciary is made up of the chief judge of the state, high court judges, the registrar of the High court, the Chairmen of Rent Tribunal. Legislature comprises the members of the state house of assembly.

Both the modern and traditional authorities today govern Minna city. The traditional authority is represented by the emirate in council and assisted by the emirate in council and assisted by the village heads (HAKIMIS), district heads (DAKACIS) and ward heads (MAI-ANGUWAS).

The modern administrative structure is represented by the Local Government council with its various departments and operates the ward system in its organizational structure. The state in its own operation oversees the affairs of both local government and the emirate council.

1.8.2.3 Economic Base

The state is endowed with varieties of mineral and agricultural resources which attest to its economic potentials. Agriculture is the major occupation of Minna inhabitants including nearby towns such as paiko, Gwada, Kaffin-Koro. They are main sources for staple food in the country hence; people always come from far and near to trade in farm produce. Economic activities also include rearing of cattle, Shea-nut processing and mining of gold while leather and metal works form the basis of their traditional and craft industries. Mineral resources found in the State include: Talc, Gold, Ball clays, Silica, Sand, Marble, Copper, Iron, Feldspar, Lead, Kaolin, Casserole, Colum-bite, Mica, Quartzite, and Limestone. Three Hydro Electric Power Stations situated in Kanji, Jebba and Shiroro are all in Niger State.

Moreover, being the state capital, Minna has attracted governments' attentions in terms of public utilities and services when compared with other places. Also, the existence of numerous state governments' ministries, departments and agencies including federal parastatals has attracted other private services, public institutions and commercial institutions. This has contributed the economic development of the town in a positive way.

1.8.2.4 Population

Available figures show that in 1934 Minna had a population of 5000. In 1954, there were 3005 male tax payers in Minna (Nuhu, 2008). The political activities that preceded and followed independence and their spillover effects in economic activities attracted people into Minna. The effect is a large population of 59,989 obtained in 1963 national population census. In 1979, the population of Minna was estimated as76,480 at an annual growth rate of less than two percent (1.5). The population census of 1991, gave the population of Minna metropolis as 190,750. This gives an annual growth rate of 7.9 percent which is far above the national average of 3.4 percent. However, the total population of Minna in 2006 census was 201,429.

Today, the importance of Minna has been further enhanced with the movement of the seat of Federal Government from Lagos to Abuja. It is the closest state capital to the Federal capital territory. Since then, both the population of Minna and its economic land shape have been affected. There is a growing territory sector of the economy. All these have impacts on the spatial extent of the town. Hence, Minna is now undergoing a process of sprawl, a phenomenon that is having impacts on the legal status of development activities and on the quantity of these activities.

1.8.2.5 Socio-Economic Setting:

The economy of Minna is basically sustained by formal activities as opposed industrial activities with which urban areas are usually associated. A large number of residents are employee in the city service with the presence of the Federal, State and local government secretariat together with an additional institution from primary to tertiary levels significant number of people also finds employments in banking, insurance and few private firms.

1.8.2.6 Educational Facilities:

Minna being a rapid growing urban areas and state capital, always witness creation of a new educational centre. The number of nursery and primary school is always on the increase basically owned by private individuals. In the recent time, the number of primary and post primary school is recorded to be around sixty (60) both public and private.

Apart from the upsurge witnessed in the number of primary and post primary schools in the town, there are quite a number of territory institutions that cater for the need of the teeming youth populace. These institutions include federal university of technology, college of education, school of health technology, school of midwifery and college of arts and Islamic studies. The town also witnesses the presence of many satellite campuses affiliation of other states universities and also a center for Open University.

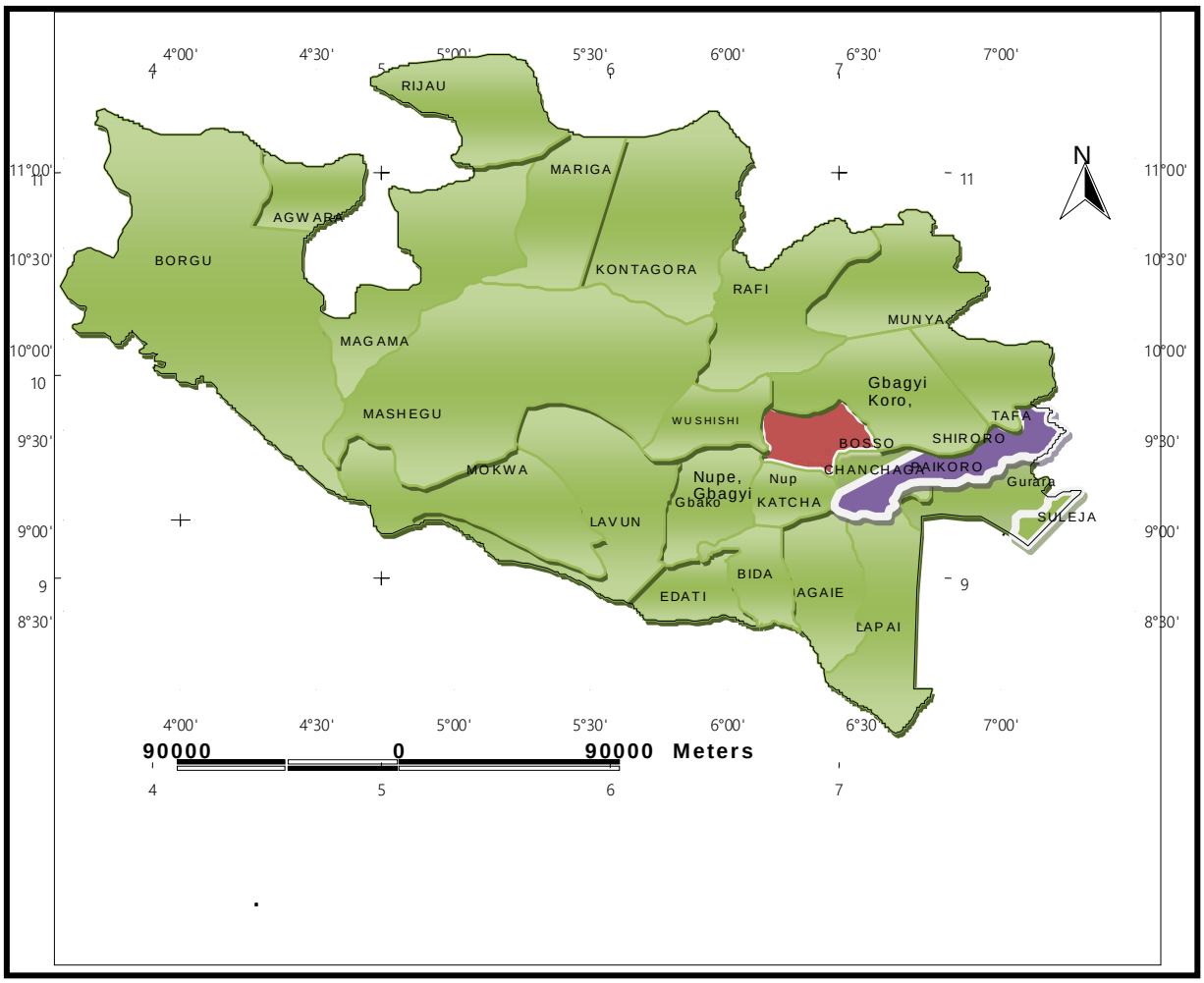

Figure 1.1: Map of Niger State Showing the Two Local Governments in Minna

Source: Niger state Ministry of Land and Housing.

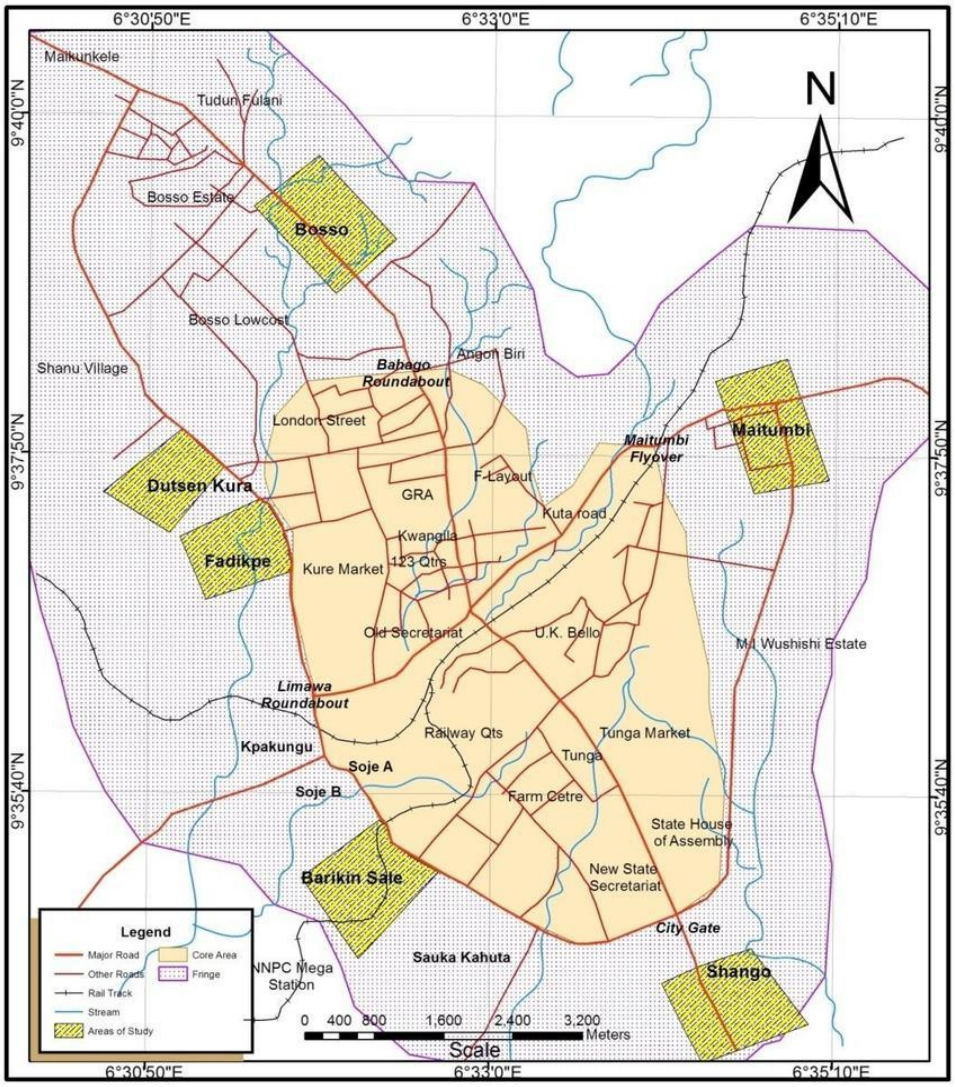

Figure 1.2: Map of Minna Township
Source: Niger state Ministry of Land and Housing.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Concept of Land Ownership

The law vests ownership of all land within a state (except those vested in the Federal Government or its agent) in the Governor of the state. He holds land in trust for the people and allocates same as far as the urban area is concerned. This allocation may be to individuals and corporate entities for residential, commercial, agricultural and other purposes allowed by law. Land located in rural areas is under the control of local government authorities. The documentary evidence of ownership in Nigeria is called title deeds or title documents (Awolaja, 2013).

Ownership of land before the Land Use Act was either by the settlement. With the promulgation of the Land Use Act, ownership acquired by the above methods became extinguished and vested in the Governor of the state. Freehold interest acquired prior to the Act became convened to leasehold. A lease granted by the Governor is usually for 99 years, and it is subject to review upon expiration. The terms of the lease are under the Land Use Act, contained in a Certificate of Occupancy (C of O) granted by the Governor.

2.1.1 Land Conveyance

Land conveyance or land transfer is the process of moving the legal ownership of land from one person to another. It is achieved either by agreements (selling, buying, leasing and mortgaging) or by social events (death, birth or divorce). It can be either freehold or leasehold. The procedure is usually initiated by a transferee who signs the transfer agreement together with the transferor in the presence of a witness. The process of land transfer starts when the parties to a land transfer enter a sale agreement stating the terms of transfer that include the sell price, payment method, names and addresses of the buyer and seller including the location of the land. The sale agreement is signed by the parties in the presence of an

advocate of the high court. After verifying the duly signed forms and the necessary consent by the Land officers, the Land officer affects the transfer in the Register and the process of issuing a title deed to the buyer begins.

2.1.2 Land registration and titling

Land registration refers to a system whereby ownership and land-related rights are recorded by a government entity. These records provide evidence of title, facilitate transactions, and prevent fraud. Out-dated land registry systems introduce delays in ownership verification, slow down legitimate transactions, and in the worst-case scenario, could enable land misappropriation (Dobhal & Regan, 2016). According to the World Bank, 70% of the world's population lacks access to land titles. For citizens, the status of land rights can affect their access to economic opportunities.

For governments, records of land ownerships are essential to collect taxes, provide services, and establish its territorial authority. Given the importance of land registration for economic development, the World Bank has been spearheading efforts to improve land registration in several countries. It also sponsors an annual Land and Poverty Conference and various Land Registration projects to improve and modernize out-dated registration systems (Heider & Connelly, 2016).

Land registration plays an important role in a nation, especially when they function effectively. Every country of the world possesses country specific land registration regulations and laws. A land registration system in Nigeria involves three principal systems of recording the rights/ownership to the land.

i. Private conveyance

ii. Registration of titles

iii. Registration of Deeds

The title is, however, a description of a land parcels, details, and description contain within usually includes the followings:

1. Description of location or boundary, bearing and distances, survey description, meters and public land survey system reference, plot number in platted subdivision coordinates, etc).

2. The Method of conveyance warranty deed and quit claim, etc. The financial implication of providing its essential foundation – a plan of sufficient accuracy of the area whereby every parcel registered can be clearly identified has delayed its establishment in some countries.

2.1.3 Land registration process

The Land registration is a five day process at the Deeds Registry that can be summed up into the following steps:

1. Lodgment and 1st examination
2. 2nd examination – general exam and compliance with law.
3. Registration – numbering, entries into registers and endorsement
4. Execution – check if registration is done properly and sign deeds
5. Sealing and dispersion of deeds (floating copies) other filed (deed)

This process is said to normally take a minimum five days to complete, although practitioners claim that the process is much longer than claimed. As stated earlier there are a number of key players and documents required to execute a deed and sign it off.

2.2 e-Lands Administration System in Nigeria

Nigeria covers an area of 923,768 km² on the coast of West Africa. The land use pattern comprised of arable land of about 33% of the total land area. The pastures land covering 44%, permanent crops covering 3%, forest and woodlands 12% and others 8%. Thus, the land is still the main asset of rural Nigerians with over 80% being peasant farmers. Land administration in Nigeria is based on the British system, which came into existence in 1862 but has been in use in Nigeria since (Suzan, 2012).

This computerization will lead to improved transaction management at the Deeds Registry and in many respects is within the ambit of the national e-government strategy which aims for a transformed government by 2016 in which government shall provide on-line transactions to citizens as well as providing on-line information access (Kjeme, 2000). Land Administration involves a lot of use of information which is becoming digital in nature. Williamson *et al.* (2009), state that the arrival of new technology offers new opportunities for delivering the Land Administration Systems.

Williamson *et al.* (2008) proposed a framework for re-engineering Land Administration systems. It suggests that any conceptual system must be informed by the social system in which the Land Administration operates and is affected by the global drivers such as globalisation, urbanisation, technology and micro-economic reform.

2.2.1 e-Land Document Registry

The e-Land register is a convenient accessible service which allows quick and easy verification of general data, size, owners, restrictions and encumbering mortgages or immovable properties. The Process of digitalization of land registry and land documentation requires more than just personal computers, but also serves to house the databases (Oboli & Akpoyoware, 2010).

More efficient backup has been made possible through the advent of cloud computing whereby information and servers can be hosted on the cloud. Personal computers are required as the desktop access points to the system within the use of client server technology to enable communication with the database.

Through interviews and analysis of secondary data, we provide evidence of the origin, trajectory, and eventual stoppage of a promising project in some country, which at the time was the forerunner in the area of land registry (Colindres *et al*., 2016). The administration of land and property involves a vast array of documents and supporting data. Existing land

information systems are typically centralized ledgers (databases) that provide a system of record of a nation's land transactions. A digital repository affords greater capabilities than the paper-based counterpart but, by itself, digitalization provides no intrinsic transformation to the land registration process. Nevertheless, digitalization of paper-based land records adds redundancy, concurrency, and consistency, characteristics of database systems. Ultimately this can lead to automation and introduce efficiencies to the process at the application layer (e.g., availability of information, protection against catastrophic loss or man-made disasters (Glaser, 2017).

Any record keeping system may be regarded as an information system. Information technology facilitates the process of transforming raw data into information that is useful to the recipient see figure 2.1. The transition from a digital to a paper based to a digital land information requires many considerations such as human, technological (hardware, software, peripherals), social andorganizational factors including change management.

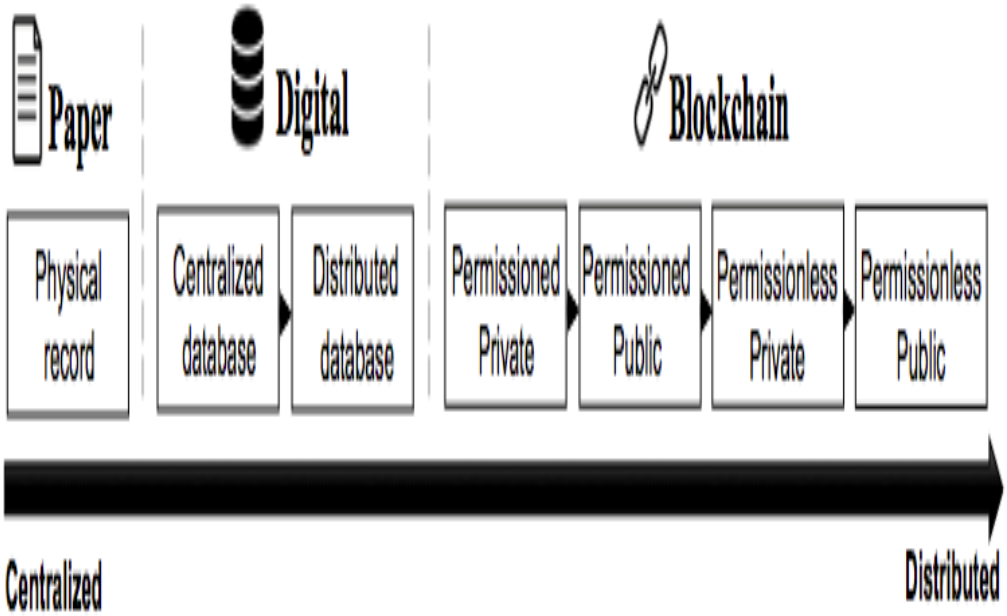

Figure 2.1: Land Registry digitization
Source: Glaser (2017)

Kurwakumire (2013) develops a pilot web GIS application to enhance spatial data availability and sharing within and outside municipalities. Modernization of cadastral processes in the context of this paper relates to the adoption of ICT in the automation of the cadastre (see figure 2.2). The basis of the modernisation is the transition from a manual and now inefficient cadastral system to an automated system which can incorporate new tenure arrangements. This proposed implementation attempts to resolve problems such as security, information management, access, storage, compatibility, interoperability and sharing of cadastral information. The modernized system should be extended to digital lodgement of cadastral data.

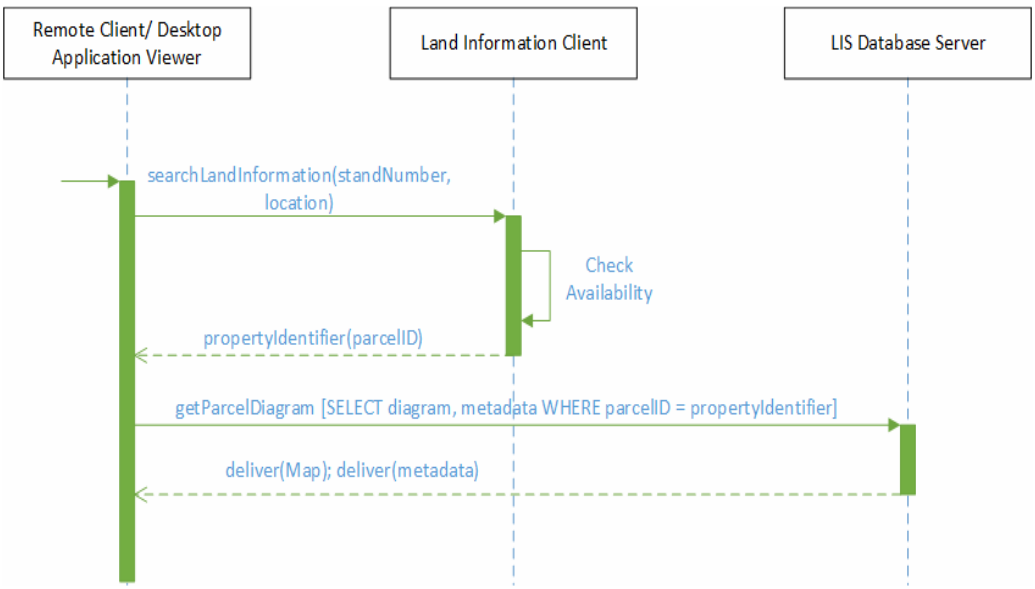

Figure 2.2: Modernization of Cadastral Processes
Source: Kurwakumire (2013)

2.3 e-Land Document Management and Information in Nigeria

The idea of Geographic Information System is believed to have been conceived in the early 1960's. It is a common view that Canada Geographic Information System was the first full scale GIS to be implemented. In Nigeria, according to Ibraheem (2008) opined that GIS Technology is relatively new in this country. It starts filtering into the Nigeria society in the 1980's Notable users of GIS in Nigeria are United Nations especially UNICEF, IFAO,

UNDP and UNESCO, oil prospecting industries especially Shell, Chevron, Total Oando and Mobil, and some Federal Ministries and Parastatals such as Federal Ministry of Environment, Housing and Urban Development, Defense, Agriculture, and National population Commission. Some private establishments and individuals are also known to use and/ or market GIS facilities/software in various parts of the country. Some studies have been conducted with positive result on the use of GIS for property related matters and land administration".

2.4 e-Land Document Registration and Challenges

Sandberg (2010) argues that e-conveyance enhances the accessibility of the general public to land registration and may have a fundamental impact on the efficiency of land transactions. A number of countries have implemented e-registration and these include South Africa, UK, Canada and Australia. Sandberg (2010) has indicated the main challenge in e-registration is the problem of identifying parties to transactions and the authentication of documents. He states that an electronic system might be more vulnerable to hackers and electronic fraud or disruption.

It can be argued that these challenges are inherited in any electronic system but it does not stop people transacting on e.g. the stock market. In Botswana, another challenge is with respect to the legal framework which in its current form does not allow the submission of e-documents. Bramate and Jones (2006) have discussed various methods of recording documents to be used for registration to include semi-automated methods using scanned images of documents, to use of XML and finally to the use of XHTML which allows for data to be automatically checked, accepted or rejected and also allows for electronic signatures.

2.5 Concept of Land Information System (LIS)

A land information system is a tool for legal, administrative and economic decision making and an aid in planning and development. It consists, on the one hand, of a database containing

spatially referenced land related data for a defined area, and on the other hand of procedures and techniques for the systematic collection, updating, processing and distribution of data. The basis of a land information system is a uniform spatial referencing system for the data in the system, which also facilitates the linking of data within the system with other land-related data (Atilola, 2010). Since automation has greatly increased the ability to handle masses of data, the challenge is to develop a good and computerised Land Information system (LIS) as opposed to a manual one.

LIS has been defined as a combination of human and technical resources together with a set of organizing procedures, which result in the collection, storage, retrieval, dissemination and use of land information in a systematic manner. Land Information System (LIS) is defined by International Federation of Surveyors as a tools for local administrative and economic decision-making as an aid for planning and development which consists on one hand a database containing spatial referenced Land related data for a defined area, and on the other hand a procedures and techniques for the system collection, updating, processing and distribution of the data. It is also seen as a computer-based Land, (Babalola *et al.*, 2015) Administration System designed specifically for recording and managing land ownership, tenure and all subsisting rights thereon. All LIS are said to be GIS. Although, while differentiating LIS with GIS, Colindres *et al.* (2016) stated that GIS are focusing upon large area, regional, national or even global i.e. generalised data. LIS on the other hand focuses on small area and more detailed data, with land ownership having an eminent domain.

2.6 Geographic Information System (GIS)

Geographic Information System (GIS) is described as any manual or computers based set of procedures to store and manipulate geographically referenced data. He further defines a GIS as computer based system that provides the following sets of capabilities to handle geo-referenced data:

1. Input

2. Data Management (Storage and Retrieval)

3. Manipulation and Analysis and;

4. Output of useful information

Kjeme (2000) defined a GIS as a 'system of hardware, software, data, people organisations and institutional arrangements for collecting, storing, analysing, and disseminating information about areas of the earth.' GIS differs significantly from general Database Management Systems (DBMS). DBMS do adequately handle the spatial data requirements of land. Spatial data have two components; a geographic reference and an attribute. GIS therefore provides a mechanism for maintaining information about land. Gathering information is the first and most important step in developing a GIS, followed closely by updating and maintaining information as features of land change (Zhou, 2002).

A GIS frequently is described in terms of hardware and software, but it should be thought of as a general system with inputs, outputs and a context. The input component is the most expensive part of computerised land information development. Capturing, registering, interpreting, and converting spatial data frequently comprises up to 60 - 90 per cent of the expense of operating a GIS. Advantages of GIS over other databases include efficient and effective means of storing and retrieving both attribute and geographically reference of spatial data stored in the system. This new information includes such things as the distance to the nearest stream, road, or the continuous blocks of forest land. A GIS is an approximate model of the real world that uses computer systems to abstract three key pieces of information about features of the land required for management decisions.

Often the application of GIS is termed Land Information System (LIS). Kenneth and Barton Delacy (2007) described Land Information System (LIS) and Geographic Information System (GIS) as containing data primarily describing land records. Vonderohe *et al*. (2008) described

the process of maintaining records on land as having a Land information system. A Land Information System does not necessarily have to be computerised but can be manual as well. GIS must apply computer technology in its use.The concept Geographic Information System (GIS) is as diverse as the background of the protagonist who described it as a set of software tools that is capable of input, store, manipulate, analyze and display geographic information. Technically, it is a computer Aided Design (CAD) with an integrated database.

Arnot (2006) agreed that there were four basic approaches to distinguish GIS from other types of information system i.e the process oriented, the application, the tool box and the data base approaches. The process oriented approach emphasis the information handling capabilities of GIS. The application approach divides information system on the basis of the problem they seek to solve (e,g baking, management, transport, rating etc). The tool box approach emphasize the generic aspects of GIS while the data base approach is probably the most widely used because of the influence of database theory and practice on GIS Notwithstanding these concepts and more, it is pertinent to know that GIS itself is a set of tools to be applied by people to solve varied problem.

A GIS is most often associated with a map. A map, however, is only one way that can work with geographic data in a GIS, and only one type of product generated by a GIS. A GIS can provide a great deal more problem- solving capabilities than using a simple mapping program or adding data to an online mapping tool (creating a “mash-up”). A GIS can be viewed in three ways:

1) The Database View.
2) The Map View.
3) The Model View.

Together, these three views are critical parts of an intelligent GIS and are used at varying levels in all GIS applications. Data needed for GIS can be obtained in various ways and are

stored in a digital form, they are known as digital data in GIS today. Digital data are obtained primarily by the following means (Ibraheem, 2008):

1) Incorporating remotely sensed data into GIS.

2) Digitizing existing maps and plans.

3) Digitizing Ariel photographs (mono or stereo).

2.6.1 Components of GIS

Geographical information system (GIS) possess five (5) essential components, these are:

(a). **The Hardware:** This is used to acquire, store, process and to subsequently display the information. It consists of:

i. The computer (PC, MAC, or UNIX)

ii. Input Device (hard drives)

iii. Output device (Printer, Plotter, CD Recorder, DVD RAM)

(b). **The software:** This refers to the computer programs and provides the functions and tools needed to store, analyze, and display geographic information. Key elements include;

i. Data input Substem: (GIPS, digital Maps, remote sensor, and Arc pad).

ii. Database management, Query and analysis subsystem: (Dbase IV, arc GIS, arc/info, MGE, arc GIS, Geo Medial, MapInfo, Oracle, SQL,).

iii. Data storage and retrieval subsystem: (micro station, K,M & G stand, adobe illustration, map publisher, AutoCAD).

(c). **The Spatial Data:** refer to as the heart of GIS. It consists of;

i. Location data of object (points, lines areas etc).

ii. Attribute data (non-spatial information about the objects).

(d). **The Procedure:** these are the algorithms and rule for integrity checks, transaction control, and database updating.

(e). **The Expertise:** the people who provide the intelligence to use the system.

2.7The Roles and Benefits of GIS/LIS in Land Titling and Documentation as a Form of Land Administration

Arnot (2006)asserted that with the emergence of this GIS tool, data collection, retrieval, security and data sharing has been simplified and made easier. It has also helps in checking the activities of quacks and criminals in land titling and registration. Insufficient information and fake documents can easily be checked. Arnot, 2006 further identified some of these benefits and roles to include:

2.7.1 Roles of (GIS) and (LIS)

1. To enhance the process of title documentation or registration.
2. Speed up the processing of Certificate of Occupancy.
3. Decrease the cost and space required for storing land transaction records.
4. Prevent unnecessary duplication of land records.
5. It guarantees a reliable and secured land rights to the land owners.
6. GIS land based title provides security for credits to land owners by banks.

2.7.2 Benefits of (GIS) and (LIS)

1. To support landed property for credit
2. To create a sound database that will be giving signals to the property market.
3. To create a robust register for the structure of Land Use and Land Use Restriction.
4. To monitor developmental projects and the impact they create on the environment.
5. To facilitate sustainable and standing Land Reform.
6. To subsidise the initial creation cost of Land Administration System.
7. It helps drastically to reduce disputes in land transactions.

2.8 Procedures for Land Documentation/Registration in Niger State

As opined by World Bank (2013) the steps, cost and time that is required are as follow;

2.8.1 Legal Searches on Land and Property Title Document

It is usually done by prospective property buyer on the property title document under negotiation to ascertain the validity of the said property, it is usually carried out by a lawyer, an estate surveyor or any representative instructed by the parties involved. All they need to submit is an application letter to conduct search which will serve as letter of introduction containing the name of the title holder and certificate of occupancy number. The search fees of N5,000 is expected to be paid into Niger State TSA consolidated bank account before the search can be conducted in the NIGIS headquarters.

2.8.2 Registration of Consent for Assignment, Mortgage, Leases or Sub-Lease

1978 Land use act made it mandatory that for transaction in land to be valid it must be assented to by the governor or any person appointed by him to do so on his behalf (Griffith, 2004). So for any alienation, mortgage of one's interest in landed property to be legally valid you must apply for consent approval. The following are required;

i. Consent form which cost N3,000 must be picked up from NIGIS desk officer and filled with necessary information dully signed by the title holder before submission.
ii. Payment of outstanding ground rent up to date into Niger State consolidated TSA account.
iii. Settlement of six (6) per cent of the consideration for the alienation or assignment of an interest in landed property; i- Consent fees is one (1) per cent of the consideration. ii- Registration fees is one (1) per cent of the consideration. iii- Stamp duty fees is one (1) per cent of the consideration to be paid Niger State board of internal revenue. iv- Capital gain tax is three (3) per cent of the consideration. While it is only two (2) per cent of the consideration is paid for the consent to mortgage an interest in landed property that is Consent fees and Registration fees each at one (1) per cent

respectively. In case of consent to mortgage the stamping is carried out at federal in-land revenue.

iv. Submission of a copy of current valuation report prepared by registered estate surveyor and valuer to ascertain the proper market value of the subject property.

v. Submission of three (3) copies of deed of assignment or deed of legal mortgage in case of any consent in negotiation.

After the entire conditions above are made, the letter of approval will be prepared by the consent officer for honourable commissioner's signature on behalf of the executive governor of the state, registration of the deeds at (NIGIS) registry. After payments of the required fees at the designated bank account, stamping of the deeds of assignment at board of internal revenue and subsequent confirmation by deeds registrar, the transaction can then be registered in the deeds registry book. He then issues a new registration particular for the transaction before it becomes binding on both parties.

2.9 Document Management and Effective National Development

Chigbu*et al.* (2013) seesdocument management as essential for the effective and productive functioning of public organizations. Records document the decisions and activities of governments and public institutions, and serve as a benchmark by which future activities and decisions are measured. They document fundamental rights and obligations, and differentiate the rule of law from the actions of arbitrary states. Without good document management there can be no rule of law and no accountability, public officials are forced to take decisions on an ad hoc basis without the benefit of an institutional memory, fraud cannot be proven, meaningful audits cannot be carried out, and government actions are not open to review. In national development process, the effectiveness of development projects could suffer as there will be no means of verifying that the development project falls within acceptable legal,

financial and cultural boundaries of a client government. There will be no means to verify that funds for development are used as intended.

2.10 Global Land Administration Perspective

The International Federation of Surveyors (FIG,2010) defines a Cadastre as a parcel based and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, ownership or control of those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes (valuation and taxation), legal purposes (conveyancing), to assist in the management of land and land-use planning (planning and administration), and enables sustainable development and environmental improvement.

The cadastral infrastructure includes a unique identification of the land parcels deriving from the cadastral surveys. The cadastral identification is then seen as the core component of any land information system. It is argued that within the next ten years such land information systems will form an integral part of a model of our manmade and natural environment. The model will build on the core cadastral and topographic data sets which will be complete on a countrywide basis and kept up-to- date. The focus will be on providing land information to the mass market to support the land market, financial and business sectors, environmental management, land administration, urban systems and community information systems (Williamson, 1997).

A vision for the future role of the cadastre in a global land management perspective should reflect this scenario of IT development, and the design and maintenance of cadastral systems must reflect this multi-purpose use. The systems supported by the cadastral infrastructure are:

a. Land Tenure System, to secure legal rights in land such as titles, mortgage and easements

b. Land Value System, to assess the value of land and properties and to levy land taxes

c. Land-Use Control System, to enable comprehensive and detailed land use planning

d. Land Development System, to enable regulation and implementation in change of land use.

These systems are interrelated. The actual economic and physical use of land and properties influences the land value. The land value is also influenced by the possible future use of land as determined through zoning and land-use planning regulations. And the land-use planning and policies will, of course, determine and regulate the future land development.

The design of adequate systems in the area of Land Tenure and Land Value should lead to the establishment of an efficient land market; and the design of adequate systems in the areas of Land-Use Control and Land Development should lead to an effective land-use administration. The combination of an efficient land market and an effective land-use administration should then form the basis for a sustainable approach to economic, social and environmental development. The success of a cadastral system is a function of how well it achieves these broad social and economic objectives.

2.11 ModernLandAdministrationSystems:TheRoleofGovernment,IndustryandCitizens

Traditional land administration infrastructure has tended towards being a rights based framework. In its current iteration as a parcel based framework, such a system exerts limitations pertaining to the type of information that can be collected and managed, which is proving to be limited in its use, especially as a tool to deliver sustainable development. A modern land administration system needs to be able to provide not just a platform to integrate all types of information about the functions of land (tenure, value, use and development), but also the relevant processes and activities (Williamson *et al.*, 2010).

More importantly, as Enemark *etal.* (2005) noted, a modern land administration system (particularly those in more developed countries) should "facilitate sustainable development the triple bottom line of economic, social and environmental sustainability through public participation and informed and accountable government decision making in relation to the built and natural environments". The administration of land and property plays a vital role in any market economy. Therefore, governments will continue to play a central coordinating role in the modern land administration system, manifest as the cadastral component of the system, which accounts for the administrative, legal and fiscal processes of land and property. Rajabifard *et al.* (2006) observed that while such a coordinating role will likely be the domain of national governments, state and local governments will increasingly perform more operational functions. Additionally, developments in information and communication technologies (ICT) are rapidly changing the overall dynamics of land and property data demand and supply (echoing a general trend in spatial data use and consumption) such that industry and citizens are increasingly becoming both producers and consumers of this information, albeit to differing extents. This changing dynamic will foster greater linkages between the land administration systems and the people it directly affects thereby ensuring that sustainable development objectives are delivered at all levels.

This widespread use of ICT is an important factor in considering the specifications of modern land administration systems for urban areas. ICT is facilitating the development of new land administration processes between government, industry and citizens. For example, a 2010 study conducted by the Economist Intelligence Unit (EIU) on the use of ICT for city management (Janssen, 2014) found that ICT has become a basic infrastructure of cities and its use not only facilitated new ways of addressing urban challenges but also nurtured an environment for government initiatives to be implemented.

This is an important aspect for supporting land administration governance processes as it will improve interactions between government, private industry and citizens. Increased participation by citizens, fuelled by ICT developments, has also led to a change in their roles as purely data consumers to dual roles in production and consumption. Consequently, both industry and government are looking to increased engagement as part of modern land administration systems (Ibraheem, 2008).

Citizen reliant initiatives abound, with Open Street Map a frequently cited example of how user generated content can produce an authoritative or quasi authoritative product. The EIU study also showed a strong trend in user-generated content that focused on urban applications. Citizens were increasingly consuming official datasets and mobile technologies to produce new applications that were relevant to their cities. In a similar vein, increased citizen participation is likely to improve the cycle of information between users, be it government, private industry or citizens. This is critical if land policies are to remain relevant (Bennett *et al.*, 2011).

The modern land administration system therefore needs to effectively engage and promote participation of government, industry and citizens, particularly in urban areas. It also needs to evolve with, and harness, developments in ICT to improve the efficiency of its processes. The concept of a 3DLPIS is effectively that of a multi-level infrastructure that will enable all parties with an interest in land and property information to record, access, discover, share and manage information about RRRs that is not limited by parcel boundaries. By facilitating access, discovery, and sharing of land and property information, this system will support the processes and broad governance objectives of modern land administration systems and provide the foundation for realizing a spatially enabled society (Enemark *etal.*, 2005).

Also, this has been investigated in the context of Australia and the following section will demonstrate how government, industry and citizens have roles to play in a land administration system if urban development is to be sustainably managed. It will use specific challenges and issues to show how a 3DLPIS can provide a platform to connect all levels of society to achieve sustainable urbanization.

2.12 Electronic Document Imaging Can Improve Land Records Management

Susan (2012) see**e**lectronic document imaging can streamline land records management, giving oil companies faster, more accurate, and more reliable access to millions of records.These imaging systems can preserve deteriorating files and facilitate recovery from disasters like flooding or fire. Other benefits include the elimination of unnecessary records, easier duplication of necessary records, and reduced storage costs. Land records are a large volume of a company's overall collection of documents, and storing paper records takes up much of a company's premises or requires off-site storage at commercial facilities.

Most of these documents are legal instruments on letter and legal-size paper and are retrieved frequently by various departments in the company. Land administration in the oil and gas industry depends on accurate and accessible records. With millions of pages of documents in storage, petroleum companies are eager for faster ways to retrieve files, more accurate records management systems, and space-efficient storage. For many companies, paper is simply no longer adequate because age and handling cause damage.

Some land professionals can spend up to 30% of their work time searching for a relevant piece of paper. Cisco & Associates surveyed 15 upstream petroleum companies to investigate how they manage active and inactive land records. The companies surveyed are either considering or in the process of redesigning their land administration departments.Two of the companies have installed electronic document imaging systems for land records; both

systems run on ViewStar. One company is in the process of implementing an imaging system, and the remaining 12 rely predominantly on paper as the storage medium for land records.

2.12.1 Legal Records

Quality land administration is pivotal for oil and gas corporations. The legal rights to explore, drill and produce hydrocarbons are spelled out in a wide variety of land records (leases, royalty agreements, checks, prospects, etc.). Leases are the most voluminous type of land record, and they are legal instruments granting the right to exploit the land for minerals. The next most common records are agreements, division orders, and contracts, all of which are legal instruments. Correspondence, right-of-way records, and property sales are other frequently used land records.

Oil and gas companies maintain huge volumes of records. Each company in this study stores between 500,000 and 62.7 million pages or images. (This article refers to records stored on paper, microforms, and optical disks, not those on magnetic media.) The 15 companies store a total of 249.4 million pages or images of land records. To exacerbate the problem of volume, the overwhelming majority (88% in the survey) of records are stored on paper, most of which are letter or legal size. About 11% of land records are kept on optical disk, while only 1% is on microforms. Fewer land records are maintained on site (44%) than off site (56%), such as at company and commercial records storage facilities (Rajabifard *et al.,* 2006).

Most land records (around 76%) are in good condition, but the rest are in poor shape from a lack of organization, loose bindings, or rain damage. Even some records classified in good condition show signs of overuse, like torn pages and holes from stapling.The oldest land documents date from the 1880s to the 1940s; many are considered active records because the

land still produces oil or gas. About 45% of land records are dated before 1969 and only 17% after 1990.

2.12.2 Administration

Land administration requires precise organization because operations involve paperwork and legwork at headquarter offices and in field sites. Seven of the companies in the study organize the land administration function by combining centralized and decentralized management structures. The most prevalent tendency is to separate domestic and international operations. In domestic operations, lands records frequently are centralized in headquarter offices, and the individuals who negotiate the rights with landowners are located (decentralized) in field offices (United Nations, 1996).

Furthermore, United Nations (1996) stated that each company has its own organizational traditions. One company commented that its records are centralized, with working copies stored in the field offices. Another said that deals are made at the division level by the negotiators (landmen) and that records are sent in to headquarters from these divisions. Another company has centralized records for exploration land, but decentralizes records for its production land. ln 13 of the companies, the land administration departments have been restructured at least once since 1990. The land records workload decreased in five companies, stayed the same in four, and increased in three. The staff in charge of the land records was cut in ten companies, some by as much two thirds. The employees also underwent upheavals in their workload. The records staff at one company, for example, now has to address training issues as well as its regular work.

2.12.3 Data Users

Petroleum companies exchange land information and records with a wide variety of entities. The most frequent user is another department of the company, such as accounting, exploration, or operations. Other customers include other petroleum companies, government agencies, law firms, and title companies. The U.S. Department of the Interior's Bureau of Land Management, considered a land records customer, is currently automating its administrative, land, and mineral records. The prime contractor for the 10-year project is Computer Services Corp., and IBM will supply up to 7,000 RS/6000 workstations (Price Waterhouse Coopers, 2017).

Price Waterhouse Coopers (2017) opined that, most land records are used on a daily basis by at least one of the customer groups. When a property no longer has value, a petroleum company will sell, farm out, or abandon it. Such properties are released weekly in four of the companies, and even daily in four others. The remaining companies release properties only from time to time. Most of the companies duplicate records when a property is sold or released. The methods include in-house duplication with company or contract personnel or duplication off site with a contractor. Companies with imaging systems give the new owners of the property the original records, if those are retained, or paper prints made from images on the optical disks. For these large companies, property acquisition occurs less frequently than does a sale or release of land. Five of the companies said they acquired property infrequently, and four said they did so, on a monthly basis. Only one acquired new property weekly.

Companies have established procedures to access new land records. The properties are entered in a computerized lease data base and each is assigned a unique identifying number. Documents are arranged into file folders. Several companies use bar or color coding to facilitate filing and retrieval of hard copy or physical records.

2.12.4 Handling Records

Nearly all petroleum companies have established procedures for handling land records. The procedures differ from organization to organization and range from records management manuals with detailed instructions to simple informal memos.

According to Strom *et al.* (2010) changes are made to land records daily in 12 of the companies. The changes include accounting functions, name and address changes, and activities based on individuals' lives (such as marriage or death). Other changes result from legal actions. Changes generally are made to a computerized land administration data base, and new hard copy documents are printed, then filed. No formal audit requirements seem to exist for making changes to the records, although audits are held. Internal auditors may look at hard copy documents, for example to verify rental checks against payment schedules. Most companies have retention schedules for documents because laws require that certain documents be retained for prescribed periods. The requirements determining retention vary by state, according to contract laws: in Alabama, 11 years; in Florida, 21; in Arkansas, 6; in Louisiana, 11; in Mississippi, 7; in Texas, 5; in Virginia, 20; in South Carolina, 21; and in Maryland, 20 years (Strom *et al.*, 2010).

Most companies retain a document for 10 years after the termination of the lease although there are exceptions. Some companies keep certain records for as long as 30 years because the records themselves are considered real property. Others send their records for inactive properties off site, and destroy them after 10 years. One company retains an optical disk copy of the records after the physical files are released or sold.

Strom *et al.* (2010) further revealed that, for a large number of businesses, the bulk of the action involving records take place soon after they are received, typically within the first 90 days. As time passes, requests dwindle. Four of the petroleum companies in the survey

followed this pattern of activity with land records. For four other companies, the activity level remained steady for as long as 10 years, while the remaining respondents said records activity fluctuates with activity on the property itself. For auditing purposes, divestitures, and address changes, old files need to be pulled. Some old leases may be active because of lawsuits for environmental problems or property sales.

2.12.5 Vital Records

Certain records are considered vital records-those that a company absolutely must have to resume business after a disaster. Normally, vital records form only a small portion (3-5%) of a company's total collection of records. For some companies, 100% of the documents are considered vital. For others, only those documents containing original signatures and involved in a sale are considered vital. Leases and key files which contain complete information on property owners also are vital (Bello, 2013).

One company, however, considers no documents vital because the legal instruments can be obtained from courthouses where the contracts or leases were processed. This company did acknowledge that reconstructing files in this manner would be a major effort. One company is working with an attorney on vital records to verify the legality of optical disk storage. The problem record type is a division order because the original document contains signatures.

2.12.6 Duplicates

Duplicates of land records, including vital records, are stored in other company locations as well as in central storage by 11 of the 15 respondents. Six of the companies keep duplicates in field or regional offices. One of the companies with an imaging system exchanges backup optical disks with its division in another state. Duplicates also are maintained in non-company locations, such as with commercial records storage facilities, clerks of court, title companies, the Minerals Management Service, and even individual landowners (Bello, 2013).

Because most companies still rely on paper-based records, an efficient classification and indexing system is essential to locate and retrieve documents. Ten of the companies studied use a numeric classification system, usually incorporating a geographic code and a unique lease or contract number. The other five companies use an alphanumeric system.

The petroleum companies using numeric systems index documents by a number of parameters (Price Waterhouse Cooper, 2017):

i. Lease number
ii. State code and base number
iii. Offshore lease number
iv. State number plus lease number plus sub number (10-digit code)
v. Sequence of numbers representing geographic area, division, state, and registration number
vi. Land department file number.
vii. The alphanumeric classifications use the following parameters for indexing:
viii. Area name then lease or division order number
ix. State code then lease number
x. State code then property number
xi. State code then numerically within each state
xii. State and county then numerically by lease or contract number.

Most of the companies have some sort of index to look up land records. Five of them rely on their computerized property administration data base. If the property is listed in the data base, it is assumed there must be a corresponding file. Another five companies have data bases

which index hard copy land records at the file level. One company can index by record type. The two companies capable of indexing at the document level use imaging systems.

2.12.7 Misplaced Records

Many petroleum companies have difficulty with lost records. Once a record leaves the file room, the users sometimes pass it on to someone else or to another department. Another problem occurs when employees take files without checking them out properly. In land records work, people often have to hold files and wait for additional records to arrive. Sometimes land men negotiate leases, and the leases enter the lease system without the original having reached central files(Sayne *et al.*, 2015).

The companies generally agreed that management must instill a greater sense of responsibility for records among records users. One company suggested that a full-time person assigned to the file room would provide tighter security. Also, it should be easy for users to notify central files when a document is being transferred (Bello, 2013).

Optical disks reduce the problem of misplaced files, and many companies are moving to imaging technology. Some companies believe that the margin for human error remains and that typographical errors and mistakes in transcribing numbers also are a possibility.

2.12.8 Document Imaging Systems

Three of the petroleum companies in the survey have implemented or are in the process of setting up imaging systems for their land records shows the date the systems began operating and the number of users.

Three other companies already have investigated imaging technology within the last year, and four others plan to analyze systems and compare vendors (small vendors and large vendors such as FileNet, IBM, and Wang) within the next 24 months. At another company,

land personnel are trying to justify electronic document imaging technology to management-a new imaging system would cost about the same as updating the existing microfiche system.

The remaining five petroleum companies studied do not plan to evaluate vendors of imaging technology. They stated several problems, such as a high cost for imaging technology when budget restrictions hamper additional spending or a reshuffling of staff within the company that changed previous plans to implement imaging systems. One company investigated optical disks because of a merger of the division order/title department with the land records department, but decided it was cheaper to assign temporary staff to the task for the next 25 years than to install imaging technology. Other perceived obstacles were operational, such as the difficulty of flipping from one file to the next when accessing multiple files(Sayne *et al.*, 2015).

The companies converting to imaging technology have generally set up a committee to investigate the various vendors and systems. The multidiscipline committees often include land representatives, local information systems people, exploration and production staff, customers from the land business unit, data base managers, and consultants.

The indexing scheme (indexing parameters such as document type and document date) is typically chosen by a committee of people who use land records: landmen, land records staff, and people who handle units. In one company's index for example, each land agreement is tied to the agreement number in a small table. When the user pulls up the land information system, that number is the key(Sayne *et al.*, 2015).

Several system attributes are very important in analyzing and comparing optical disk storage and imaging technology. The most highly rated factors in selecting a document imaging system are price and processing speed, and the least important factor for oil companies is

compatibility of the system with UNIX. The most popular features of document imaging systems are faster access to land records and improved accuracy of data.

2.13 Land Registration System: Global Perspectives

The act of recording a deed gives notice to the public of a claimed interest in land and establishes priority against other possible claimants to the same interest although there is usually no statutory compulsion for parties to a transaction to record their documents although it is prudent for them to do so while it is risky if they do not. Registration systems, involve deeds recording, and title registration (Didigwu, 2010). A Deed recording is a system of giving publicity to land transactions and helping to prevent concealed dealings.

Sayne *et al.* (2015) stated that, in a system of deeds recording, a document presented for entry is normally accepted at face value and not subjected to detailed technical scrutiny by registry staff. Unless a survey plan accompanies document it may be very difficult to determine the size, shape and location of the land in question. Boundary descriptions that attempt to define parcel limits solely by citing the names of adjoining owners, who may have departed long ago, are among the possible sources of confusion in interpreting deeds, also are the frequent ambiguities in metes and bounds descriptions.

The multipurpose cadastre is also independent centralized, decentralized or both and it may be implemented by one or more agencies at the local, regional, provincial or even at the national level. This parcel-based and information system otherwise referred to as Cadastral Information System (CIS) has been positively affected by the advancement in computer and space technology and greatly improved methods of information gathering, storage, dissemination, Cadastral information system is a sub-set of Geographic Information System (GIS), which is concerned with the provision of spatially reference data. As an immediate member of the set of Land Information System (LIS) it can also be referred to as involving

the acquisition, and assembly of data, their processing, analysis and dissemination and use of land information in a systematic manner (Dale & McLaughlin, 1989).

The task of any Cadastral Information System (CIS) is to register in a condensed manner ownership, rights and other relationship between man and land, Many human activities are related to land. Public knowledge about ownership of land provides legal protection and security. Every country considers the protection of the land parcel and rights to land to be a government task. Cadastral systems play a key role on this respect, Zevenbergen (2001). They consist of mainly two parts: cadastral and land registration. The cadastre represents an entry to public land registration. Basically it contains in text as well as in map format, essential data stemming from transfer acts and other legal documents. The map may be used as a basic source for a multitude of geo-application.

The land registration, building and apartment of legal rights and of rightful claimants. This land registers has to be in digital formation which will contain all administrative information on the legal status of land and building). All these information are stored in a central database and GIS technologies and its query tools can be used in solving any cadastre related problem (Deininger, 2005). This article is an attempt to develop such, within the topic area. Though it requires huge amount of financial support in maintaining CIS, the authentic and electronic copy of record will aid in keeping up-to-data information about land.

2.14 Requirements for Land Title Registration

A number of issues are expected for appropriate title registration, these are legislation, cadastral survey, and adjudication(Didigwu, 2010). In respect of legislation, a comparative analysis of land titles legislation in other jurisdictions can assist a country in enacting its own laws for that purpose, and the object should be to find solutions that are based entirely on local needs and circumstances. The uncritical adoption of legislation that appears to apply

satisfactory under different conditions elsewhere may lead to a forced conformity that proves unworkable in the country of its reception (Kakulu, 2007).

Following the initial registration of the title to a parcel, the registration of all future transactions affecting that parcel should be compulsory by legislation. If this is not done the register will no longer reflect the true state of the title. This is because it can be readily appreciated that unless there is a legal obligation to register all such transactions the registry itself• will lose its integrity. In the course of time, the recorded information will become incomplete and unreliable, thus destroying the very purpose for which the registry was originally created(Didigwu, 2010).

In terms of cadastral survey, a legal cadastre provides the geographic underpinning of a land title registration system. Cadastral index maps show all the parcels in a registration district in their correct relationship to each other. Parcel boundary dimensions and superficial area can be shown numerically on the map or derived from scaling. The map will not normally portray contours or other topographic information, except where a natural feature, such as a stream, forms a parcel boundary. Each individual parcel is represented on a large-scale cadastral plan; which, in addition to numerical boundary and area data, usually shows buildings, fences and other enclosures, and boundary markers (Nuhu, 2008).

The composition of a legal cadastre may rely on a number of surveying and mapping techniques that can be employed independently of, or in conjunction with, each other. The choice of air photography will depend upon such factors as flying conditions, cloud coverage, the existence of boundaries that are marked by physical features, and the presence of vegetation that may obscure the visibility of those boundaries from the air. The object of a legal cadastre should be to ensure that parcels are shown in their correct topological relationship and that their boundaries and areas can be determined to a degree accuracy that is sufficient for land title registration purposes (Nuhu, 2007).

Land adjudication (or land settlement as it is sometimes called) enables the state to determine and confirm the ownership of, and the legal interests in, individual parcels of land. It also provides for the physical demarcation of parcels boundaries. The need for adjudication may arise from dispute or simply from uncertainty. Even where land is unoccupied and is apparently owned by the state. Adjudication provides a convenient method of cleansing the title by making sure that no adverse claims exist or if they do exist, they are properly dealt with (Mulolwa, 2002).

Adjudication is concerned with existing rights to land. But it can also be the prelude to subsequent distribution to private persons. Adjudication can be carried out systematically, area by area, or sporadically for isolated parcels, Systematic adjudication is more efficient and less costly than sporadic adjudication, but the political, social or economic pressures of local circumstances may compel the simultaneous adoption of both methods. It is often advisable to undertake adjudication in a pilot area of manageable size that contains different types of property, to allow some experimentation with procedures and to gain valuable experience for the extension of adjudication to other regions (Didigwu, 2010).

Procedures for adjudication require special legislation under which a team led by an adjudication officer is empowered to visit a designated site to hear and settle claims, and to demarcate and survey parcel boundaries. The date and time of the visit must be well publicized in advance by a written or other appropriate notice. The notice should state that every claimant to ownership of, or interest in, any of the land referred to in the notice must appear in person or by authorized agent before the adjudication officer. It should also require every such claimant to present all documentary and other evidence to support the claim, including the oral testimony of witnesses (Kakulu, 2007). If the claimant and the owners of

adjoining land accept in writing the adjudication, the parcel boundaries are demarcated and surveyed.

Demarcation and survey should be carried out simultaneously and as soon as possible after the decision. If the time interval between demarcation and survey is too long there is a risk that unscrupulous persons might surreptitiously remove boundary marks. The methods of surveying and demarcation may vary according to local needs and practices, but each adjudicated parcel should be given unique number that can then form the legal description of the parcel for land title registration purposes (Van der Molen, & Lemmen, 2004). Cadastral systems are used to provide information for various uses in society. The data often has great legal, social, and economic importance. Therefore the information should be accessible and the cadastre should be open to the general public. Cadastral managers also have a responsibility to ensure that the information can be relied upon with confidence (Viitanen & Kakulu, 2008).

On the other hand, the information can be missed and the system must protect the interests of individuals from misuse. Misuse can include; for instance, provision of incorrect information about a person. It also includes the combining of harmless information in such a way that a threat is created. Therefore, a balance must be established between open access to information and the protection of individual interests. This may be achieved through legislation, management policies, security access code, etc. However, it should be emphasized that unless information is readily available to users and the general public, the real benefits of a cadastre cannot be realized (Magel, 2006).

The major problem of the implementation of Cadastral Information System (CIS) in Nigeria is identifying land use pattern and modeling the user's requirement such that the system will be capable of answering some questions such as "where is what" and "what is where". The

need for the development of these models became necessary so that the digitally acquired data could be modeled for storage in a database. CIS has received a boost over time and considering the emphasis placed on information management, every effort must be made by concerned organization in implementing the cadastral land information system for better land management(Kakulu, 2007).

2.14.1 Associated Benefits of e-Document Registration

The improvement in land registry service delivery has a number of consequences for the population in the State. Firstly, proper registration of land is essential for all land proprietors. Land has great economic value and proper registration will give the proprietor a state guaranteed title which can be used to access bank loans for small business development. This will encourage business and commerce to flourish which may contribute to the alleviation of poverty in the state. Secondly, it will improve the revenue generated for the state budget (Didigwu, 2010).

This will have a direct impact on various sectors of state service delivery such as health, education and environmental protection. This is in line with the Lagos State Economic Empowerment and Development Strategy (SEEDS) which is the major strategy to sustainable economic .growth in the state. Thirdly, registration of documents means there is an up to date official record of the Landowner and this makes conveyance work much simpler in the event of a sale by the landowner (Zevernbergen, 2001).

Buyers can make an official search on-line before completing a purchase. Finally, registration procedures are straight forward and efficiently carried out. A simple and easy to read Registration Procedures booklet which explains all registration procedures and informs applicants of the requirements for our various processes was produced. The booklet is obtainable free of charge at the registry and is a viable method of disseminating information to the public (Kakulu, 2007). In Lagos State land registry this process of reform,

refurbishment and transformation has been an intensive and demanding process but has led to a situation where Lagos is a pioneer in land registry development in Nigeria.

2.14.2 Challenges of Land Title Registration

Noticeable discrepancies on the drafted law especially arose, based on non-consultation with stakeholders and are listed here under. There were emphases on ownership of land, rather than ownership of interest in landed property. This emphasizes on ownership is in conflict with the Land Use Act 1978, which recognizes leasehold interest only in land; The objective of title registration should not only be universal, but should be compulsory and certain deemed grand title and village excision should be accommodated in the land registry (Mulolwa, 2002) and following are challenges:

i. Non recognition of title registration, indeed emphasis is placed on deed registration;
ii. Reservation of the registrar of title position to legal practitioners only as against professionals who are knowledgeable in land administration;
iii. Non anticipation of technological advancement that makes EDMS less reliable in this modern world;
iv. Non-capturing of all parcels of land in the state through proper and efficient cadastral surveys;
v. Non recognition of land administration experts such as Estate Surveyors and Valuers as Registrars of Titles;
vi. Haphazard storage of land documents at the registry;
vii. Non-cooperation of land owners especially "omo oniles" in ensuring proper land titling registration;
viii. Inadequate funding of the land registry; and
ix. Propensity to commit fraud by stakeholders in land registration.

2.15 Empirical Research Review

Field survey conducted in Kongila, Minna Niger State by Nuhu (2008), where the researcher adopted descriptive statistics to analyse the data showed that,the outcome of the study reveals that regardless of the fact that Kongila's social status as an urban area, almost greater part of its residents only hold customary right of occupancy instead of statutory right of occupancy; majority of the residents expressed ignorance to the effect that urban lands are controlled by the state government as deemed fit by Nigeria's land policy document; greater parts of land parcels in Kongila were acquired through inheritance from settlers even though about one-third alienate to fresh owners; major portion of the land sold are subjected to commercial uses due to their proximity to busiest routes within the town; great extents of the land possessed in Kongila are still using local title not the current statutory right of occupancy demanded by the Land Use Act 1978; substantial number of parcels were acquired over 30 years ago as at the time of this study; and almost 50% of the residents responding to this study claimed to have development approval from the district head before development even though none of them were able to present such document to prove their claim(Zevernbergen, 2001). This shows the urgent intervention from Niger State Geographic Information System NIGIS to play the role of sensitization, educating the residents on the benefits of land title registration and documentation, or in cases to ensure re-certification of their titles.

Likewise, Nuhu (2008)on the study title Land Administration Problems in Nigeria, the study cover Oyo and Niger states of Nigeria. Using descriptive methods identified poor record keeping as one of the major problems of land administration in Niger State, which has inadvertently caused multiple issuance of certificate of occupancy (C of O) on states land. Therefore, the implication of poor record keeping as shown in the study has made the existing practices of land administration a mockery of the ideals of the land use act causing uncoordinated and cumbersome land administration processes.

Birmer and Okumo (2012) in finding out the challenges of land governance in Nigeria opined that poor Land Governance is the major challenge that impedes the goal of land registration. The empirical section of the study dwells on two cases of land registration and two cases of land acquisition in Ondo State using a participatory mapping method called "Process Net-Map" to identify the actors and process involved. The study reveals that landowners incur very high cost in the process of land registration due to governance problem inherent in the current land administration institutions (which it described as bribery and elite capture). It further reveals that in line with the existing processes of land registration especially when land owners have access to intermediaries and can afford to pay for privately provided land services in cash, obtaining land title costs more than 10% of the subject land value.

Awolaja (2013) conducted a detailed study of the processes involved in land registration at the Lagos State Lands Registration. The study revealed about eleven (11) hurdles encountered in the process of land re-certification to include:

1. Noticeable discrepancies on the drafted law especially occurred due to non-consultation with the stakeholders, there were great emphases on ownership of land rather than ownership of interest in landed property. This emphasis on ownership is in conflict with the Land Use Act of 1978, which recognises leasehold interest only in land;
2. The objective of the registration should not only be universal, but should be compulsory and certain deemed grand title and village excision should be accommodated in the land registry;
3. Non-recognition of title registration, indeed emphasis is placed on deed registration;
4. Reservation of the registrar of title position to legal practitioners only as against professionals who are knowledgeable in land administration;

5. Non-capturing of all parcels of land in the state through proper and efficient cadastral surveys;
6. Non-anticipation of technological advancement that makes EDMS less reliable in this modem world;
7. Non-recognition of land administration experts such as Estate Surveyors and Valuers as Registrars of Titles;
8. Haphazard storage of land documents at the land registry;
9. Non-cooperation of land owners especially "Omo-Oniles" in ensuring proper land titling registrations;
10. Inadequate funding of land registry; and
11. Propensity to commit fraud by the stakeholders in land registration.

Lemieux (2016)on effect of land administration on tenure security in Niger State, a study conducted to examine its impact in the state. The study adopted questionnaire and oral interview as the tools to collect data; the questionnaires were administered to the various property owners in the selected areas of Bosso, Dutse-Kura, Sauka-Kauta and Tunga in Minna Niger State. The sampling technique for data analyses in the study is simple random sampling for effective and reliable findings. It was discovered in the study that majority of the land owners in the area access their land through direct purchase from individuals and traditional family heads.

Furthermore Lemieux (2016) stated thatpredominantly land title held in the area is sales agreements normally executed by the owner of land (seller) and the buyer, main challenges face by them are cost of land and duration of acquiring title registration are not encouraging. Lack of title registration does not encumber land owners from carrying out their transactions; it was revealed in the study that non-registration of title by land owners in the area does not a major threat to their tenure security (ownership status). The study suggest that the existing

land policies be reviewed and carefully monitored to reduced bureaucratic tendencies with a view to lessen the time taken to obtain Certificate of Occupancy (C of O) at affordable cost.

On the other hand, Nuhu (2008), on the "study of effective land administration as a tool for poverty reduction in Kaduna" focuses on objectivity in mode of land ownership and how land titling affects its income earning potentials in the study area. Primary and secondary data were collected from the four (4) selected areas of the town namely; Romi new extension, Karnazon, Gorin Gora and Ungwan-boro. The sampling technique adopted in the study for data analysis is simple random technique also known as descriptive analysis. The discover that about 74.30% of the respondents acquire their land through direct purchase, while only 41.72% of them uses the property to earn income by rent on buildingLemieux (2016). It was also reveal that about 54.84% of the respondents could not access land due to high value attached to the land. The study also uncovers that land administration meant to be a source of poverty reduction could not be actualized due to prolong title processing, high cost of registration and ignorance on the part of land owners who do not realise the benefit of title registrationLemieux (2016).

Although despite the unavailability of a registered title all uses their land(s) to earn income but the unregistered are limited to a certain extent. The study recommends that Kaduna State should adopt a common standard of computerized system of land administration that will contain all detail land records in the state. Also, to mandate land administrators to be pro-active in enlightenment of general public on the benefits and advantages of land title registration to ensure equitable land market and sustainable land uses (Nuhu, 2008).

Based on the analysis of the abovementioned literatures, it is noticeable that most authors dwelled mainly on land administration system, and mostly uses descriptive methods. This study focuses on the examination of the role of Niger State Geographic Information System

(NIGIS) on land titling and e-land documentation using both inferential and descriptive methods.

2.15.1Knowledge - Gap

It is evidenced that the choices made over the years in the operation of e-land documentation by various State's agencies has left a gapin land administration service delivery due to the environment in which e-land document management system is carried out which is complicated and subject to changes in the social, cultural, political, legal, and economic systems that influence how government and stakeholders perceive land administration service delivery.

This present research tends to explore more at the knowledge content in the operations, process and challenges encountered by NIGIS in e-land documentation system with a view of bridging the gap of past choices made that has influenced the government and stakeholders perception on land administration delivery and recommend viable solutions to enhance effective e-land documentation with best practice in land administration delivery that will stand the test of time.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Population for the Study

The population of this study represents the land title holder total number of applicants or land title holders who have applied and passed through the process of e-land documentation for digital certification of ownership. The population for this research also comprises of the staff of Niger State Geographic Information System (NIGIS) as at the time of this study are about fourty (40) in number and applicants digital land title holders in the three (3) selected areas of Minna, Niger State respectively. The landed allottees in these selected areas who applied for both certification and regularization in NIGIS for the year 2011 to 2018 are 394 (NIGIS and Field survey 2019).

3.2 Sources of Data Collection

3.2.1 Primary data

Primary data comprised of the raw data sourced directly from respondent through structured questionnaires. The primary data comprises of respondents' responses to questions relating to process, challenges and way forward towards better e-land documentation in Minna metropolis. The questionnaires were in two forms, one was directed to applicants of the digital land certification and other questionnaire was directed to the staff of the NIGIS.

3.2.2 Secondary data:

Secondary data are second hand information and they are materials from published and unpublished sources. The sources of secondary data consulted are the published and unpublished works from journal, conference proceedings, textbooks which are relevant to the study.

3.3 Method of Data Collection

The methods of data collection involve the use of observation and field survey, interview and administration of questionnaire in order to explore the various avenues to get reliable data for the study; these methods are described as follows:

3.3.1 Questionnaire Design

A structured or closed ended questionnaire was designed to obtain relevant data from the respondents for this study. This required administering of questionnaires to both the land title holders and the staff of NIGIS.

3.3.2 Interview

The essence of this interview method was to have enough information and compare the tenants' submissions to the questionnaires. This source of data collection provided a means of collecting first-hand information which served as a useful purpose. The checklist was also used designed in such a manner as to attract vital answers which are expected to help the researcher in analysing the situation at hand. Specifically, two sets of questionnaires were designed which were administered for technical staff of NIGIS and land title holders or applicants in order to collect factual information. Each group of respondents will have their questionnaire designed to suit the information expected from them.

3.4 Sampling Techniques

In this research, simple random sampling technique was used in the selection of the target population. The choice of this techniques is based on fact that every member of the population has an equal opportunity of been selected. Therefore the study selected available digitized title holders in Minna.

3.4.1 Sampling frame

This comprises of the list of certified digital land owners in Niger State Geographical information System (NIGIS) Minna. This population is made up of approximately 5000 members of public.

3.4.2 Sample size

A sample is a smaller group of subject drawn from the population in which a given study was conducted for a purpose of drawing conclusions about the population targeted. For example, Kothari (2004) argued that the result from the sample can be used to make generalizations about the entire population as long as it is truly represented. The population for this study is determined using a sample size model. The number of questionnaires to be administered and the sample size for the study population was determined using Kothari's formula model.

The formula for the sample was given in equation (i) at the confidence interval of 95% with significance level of 5%

The Formula for sample size: $n = \frac{N}{1+N(e)^2}$ ---------- (i)

Where:

n = Sample size to be studied

N= Population size

e = margin of error

From the above formula, the sample size for this study was:

$$\text{n} = \frac{5000}{1 + 5000(0.05)^2}$$

$$n = \frac{5000}{1 + 12.5}$$

$$n = \frac{5000}{13.5}$$

$$n = \quad 370.370$$

The sample in this study is 370.

From the above formula, the required sample for this study was 370.people from the 5000 approximate population of digitized land owners in Minna. The number of retrieved questionnaires 340 which constituted about 92% of total samples were analyzed and 30 questionnaires were not returned which constituted about 8%

3.5 Technique for Data Analysis

In the presentation, analysis and interpretation of data both descriptive and inferential statistical tools were used. The tables, charts and percentage were used to describe data collected while, Likert Scale was used to analyze the respondent opinion.

3.5.1 Simple Percentage

This is used to show the frequency of occurrence of an event with respect to the total occurrences. number of observed cases (n) and Simple percentage = total Number of expected cases (N)

3.5.2 Likert Scale

Analysis of data will be done using a statistical formula to calculate the mean item score (MIS). The higher the value of MIS, the more important is the factor becomes.

Five point Likert rating scale will be used in the analysis of collected data from the questionnaire. The rating is as follows;

Strongly agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree =1.

The data will be analyzed utilizing the frequency table and Mean Index Score (M.I.S)

This is given as:

$$MIS = \frac{5n5+4n4+3n3+2n2+n1}{(5N)}$$ ---------- (ii)

Where: n5= Strongly Agree (SA); n4= Agree (A); n3= Unsure (US); n2= Disagree (DA); n1=Strongly Disagree (SDA); and N = number of respondents.

Values from questions will be weight and composite index will be obtained to serve as the consensus opinion of the respondents. The sum on each item will be divided by the total number of respondents to arrive at the average or mean value.

3.6 Data Analysis Techniques

The following techniques was employed in analysing the data collated from the field in achieving all of the stated objectives are tabulated as shown below in Table 3.1;

Table 3.1 Analysis of Data Techniques

Objectives	Data sources	Methods	Techniques
Assess the process of e-land document management in NIGIS for securing land title	Primary	Simple descriptive	Percentages, cross tabulation and simple bar charts
Examine the effectiveness of NIGIS operations in e-land documentation	Primary	Simple descriptive	Likert mean scaling, Relative Important Index, bar charts and pie chart
Examine the challenges encountered in the process of e-land documentation.	Primary	Simple descriptive	Likert mean scaling, cross tabulation and Relative Important Index
Recommend viable solutions to enhance effective e-land documentation.	Primary	Simple descriptive	Likert mean scaling, cross tabulation and Relative Important Index

Source: Field survey, 2019

3.6.1 Technique for Assessing the Process of e-Land Document Management for Securing Land Title in the Study Area

The technique that was used to achieve this objective is questionnaire. Questionnaires were administered to respondents in order to obtain data on the effectiveness of the e-land document management process in for securing land title within the study area.

Statistical descriptive tools such as tables, frequency, percentage distribution and charts was then employed in the process of summarizing the raw data obtained from the questionnaire and displaying same in a compact form of orderly arranged columns, rows and also in a graphical representation in form of bar charts.

3.6.2 Technique for Examining the Effectiveness of Operations in e-Land Documentation in NIGIS

Technique employed achieving the above objective is with use of questionnaire, checklist and descriptive statistical tools like tables, charts, mean, sum and relative important indexin the process of summarizing the raw data obtained from the questionnaires and displayed in form of orderly arranged columns and rows.

3.6.3 Technique for Examining the Challenges Encountered in the Process of e-Land Documentation in the Study Area

The technique that was used to achieve this objective is questionnaire and descriptive statistical tool like likert mean scaling, table, and relative important index.

3.6.4 Technique for Recommending Viable Solutions of Enhancing Effective e-Land Documentation

The technique that was used to achieve this objective is questionnaire, literature reviews and descriptive statistical tools like likert mean scaling, tableand relative important index displayed in orderly form.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter comprised of result of analysis of data collected and discussion of the results. The basic demographic information of digitized land owners was derived from the first section of the questionnaires administered. The demographic information which is significant to the study was examined in order to establish its appropriateness vis-à-vis the objectives and the result forming part of further analysis of the study is descriptively illustrated in Table 4.1.

Table 4.1: Demographic Information of Digitized Land Owners

Demographic Information		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	312	91.8	91.8	91.8
	Female	28	8.2	8.2	100.0
	Total	340	100.0	100.0	
Marital status	Single	2	.6	.6	.6
	Married	314	92.4	92.4	92.9
	Widow	20	5.9	5.9	98.8
	Widower	4	1.2	1.2	100.0
	Total	340	100.0	100.0	
Occupation	civil servant	234	68.8	68.8	68.8
	private servant	85	25.0	25.0	93.8
	self employed	21	6.2	6.2	100.0
	Total	340	100.0	100.0	
Education	ND/NCE	36	10.6	10.6	10.6
	HND/Degree	277	81.5	81.5	92.1
	PGD	15	4.4	4.4	96.5
	Master Degree	9	2.6	2.6	99.1
	PhD	3	.9	.9	100.0
	Total	340	100.0	100.0	
monthly income	#19,000- 49,500	6	1.8	1.8	1.8
	#50,00–100,000	48	14.1	14.1	15.9
	above #100,000	286	84.1	84.1	100.0
	Total	340	100.0	100.0	

Source: Field survey, 2019

The result of demographic information of respondents presented in Table 4.1 showed that 91.8% majority of the sampled digitized land owners were males, 92.4% of digitized land owners were married, 68.8% majority digitized land owners comprised civil servant who acquired their land through purchase. 81.5% majority of digitized land owners had first degree/Higher national diploma in different field of study and finally 84% majority of digitized land owners received average monthly.

4.2 Assessing the e-Land Document Management Process for Securing Land Title in the Study Area

Table 4.2: Effectiveness of e-Land Document Process in NIGIS

Effectiveness of the e-Land Documentation		Frequency	Percent
Timing of e-land document process in NIGIS	Very Effective	202	59.4
	Effective	40	11.8
	not effective	98	28.8
	Total	340	100.0
Cost of e-land registration	Very Expensive	197	57.9
	Affordable	30	8.8
	not affordable	113	33.2
	Total	340	100.0
avoidance of fraudulent activities of land grabber and speculators	Very Effective	276	81.2
	Effective	45	13.2
	not effective	19	5.6
	Total	340	100.0
Reducing the level of bureaucracy in the process	Very Effective	302	88.8
	Effective	23	6.8
	not effective	15	4.4
	Total	340	100.0

Source: Field Survey, 2019

The result of effectiveness of e-land documentation is presented in table 4.2 59.4% of the majority claimed that process of e-land document process is effective because it saves time.

57.9% majority of digitized land owners claimed that cost of e-land registration very expensive. The e-land document has been very effective in avoiding of fraudulent activities of land grabbers as claimed by 81.2% majority of digitized land owners. E-land document has also been so effective in reducing the level of bureaucracy in the process as 88.8% majority of digitized land owners claimed.

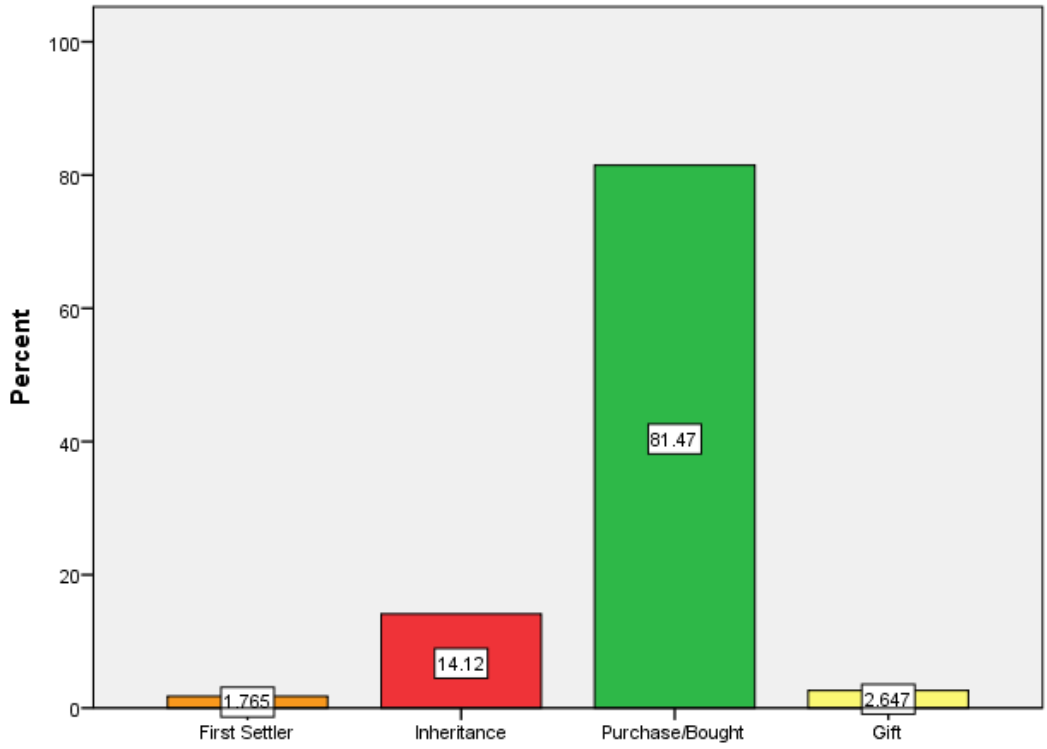

Figure 4.1: Process of Land Acquisition by Digitized Land Owners in the Study Area**Source:** Field Survey, 2019

The process of land acquisition by digitized land owners is presented in figure 4.1above.The result revealed that 81.47% of digitized land owners purchased their land, 14.12% of digitized land owners inherited, 2.647% and 1.75% of digitized land owners acquired their land by gift and first settler respectively. This result indicates majority of digitized land owners acquired their land through purchase and they comprised bulk e-land documents.

4.3 Examining the e-Land Document Management Operation Process in NIGIS for Securing Land Title in the Study Area.

Table 4.3 Effectiveness of the e-land document Operation Process in NIGIS

Effectiveness of the e-land document	N	Sum	Mean	RII	Rank
Time-saving in the Process of e-land document in NIGIS	340	576	1.69	0.56	3
Cost-saving of e-land registration and documentation	340	596	1.75	0.58	2
Avoidance of fraudulent activities of land grabber and speculators	340	423	1.24	0.41	6
Reduction in bureaucracy in the process	340	393	1.15	0.38	8
Reduce the problem of analogue land document in the registry	340	424	1.24	0.41	6
Easy digital certification process	340	438	1.28	0.43	4
Operation of e-land document in settling dispute	340	412	1.21	0.40	7
e-land document has been able to reduce the problem of analogue land document in the registry	340	430	1.26	0.42	5
simplification in the digital land system	340	599	1.76	0.59	1
Valid N (listwise)	340				

Source: Field survey, 2019

TheEffectiveness of the e-land document operation process is presented in table 4.3. the analysis of three-point likert scale (very effective, effective and not effective) revealed that simplification in digital land system is ranked first as one the effectiveness of e-land document in NIGIS at 59% relative important index. Cost and time saving in process of e-land documentation is ranked second and third at 58% and 56% relative importance index. This is also followed by easy certification process ranked 4th at 43% relative importance. the relative importance level of effectiveness is found very low in area of reducing the problem

of analogue land document in the registry, avoiding fraudulent activities of land grabber and speculators, Reduce the problem of analogue land document in the registry and Operation of e-land document in settling dispute.

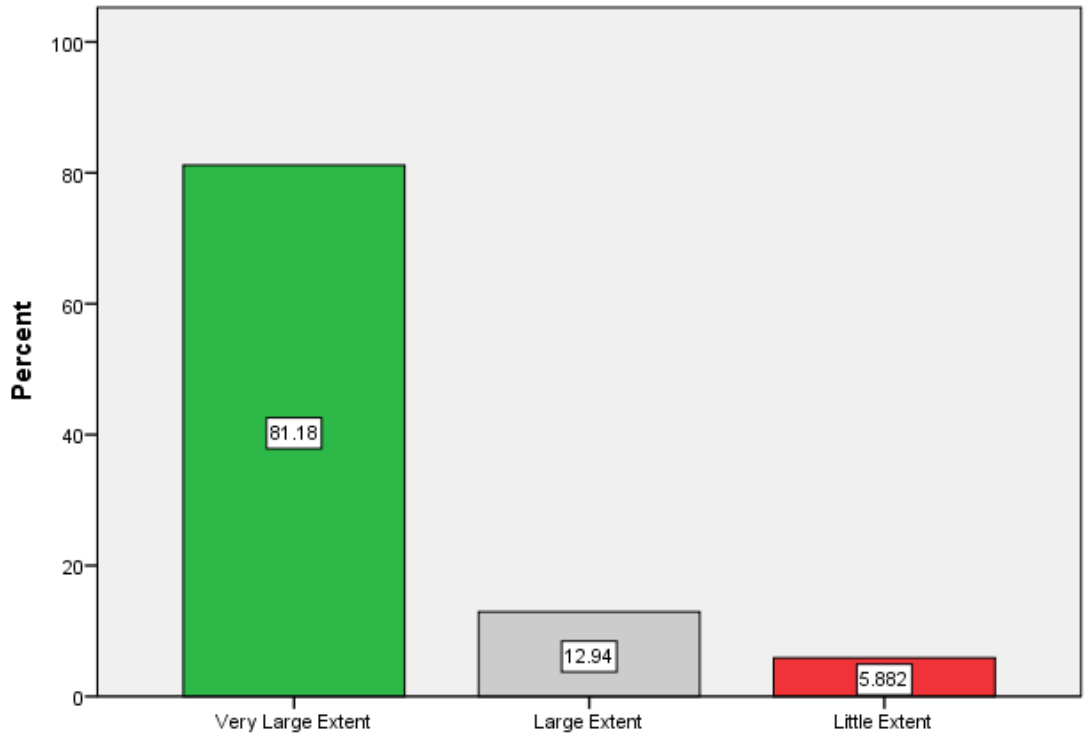

Figure 4.2: Extent of Reduction of Analogue land document Problem in NIGIS
Source: Field Survey, 2019

The extent of reduction in the problem associated with analogue land document in the registry is presented in figure 4.2. 81.18% of the respondents claimed that the problem associated with analogue land document has reduced to a very large extent. 12.94% claimed to have reduced to large extent and 5.88% to a little extent. The indicates that e-land document has helped in reducing analogue problem to a verry large extent.

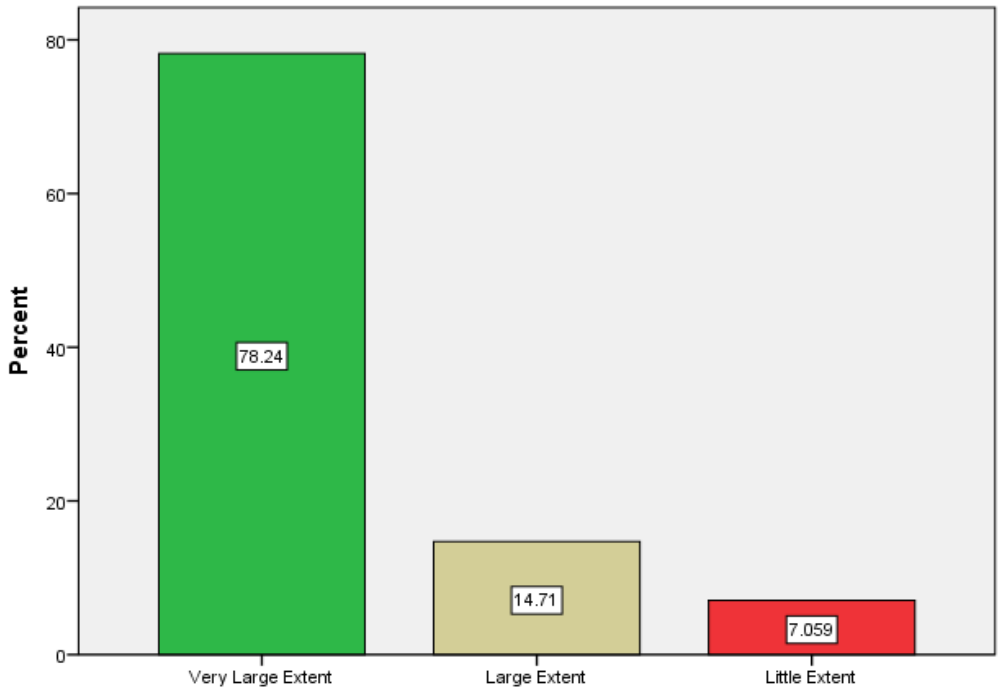

Figure 4.3 Extent Reduction in Bureaucratic Process of land Certification in NIGIS
Source: Field survey, 2019

The extent of reduction in bureaucratic process of land certification is presented in figure 4.3. 78.24% of the respondents claimed that bureaucratic process of land certification has reduced to a very large extent. 14.71% claimed to have reduced to large extent and 5.88% to a little extent. The indicates that e-land document has helped in reducing bureaucratic process of land certification to a verry large extent.

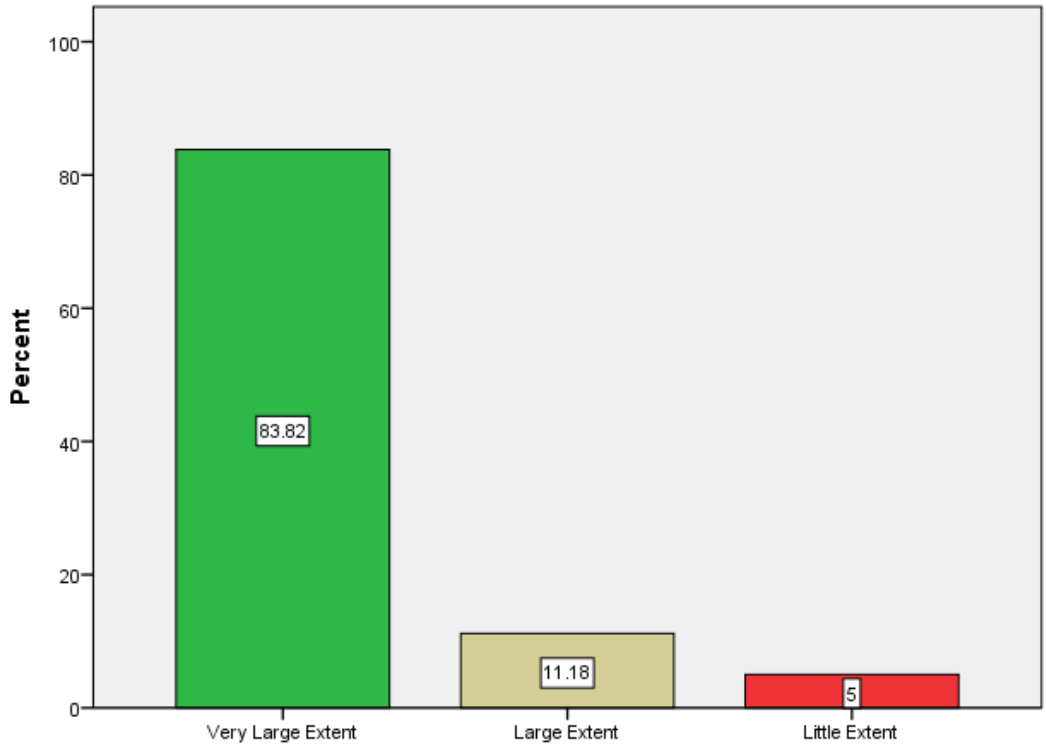

Figure 4.4: Extent of e-land Document in Settling and Preventing Land Dispute in NIGIS.
Source: Field survey, 2019

The extent of e-land document in settling and preventing land dispute is presented in figure 4.4. 83.83% of the respondents claimed that e-land document in settling and preventing land dispute has been reduced to a very large extent. 11.18% claimed to have reduced to large extent and 5% to a little extent. The indicates that e-land document has helped in e-land document in settling and preventing land disputeto a verry large extent.

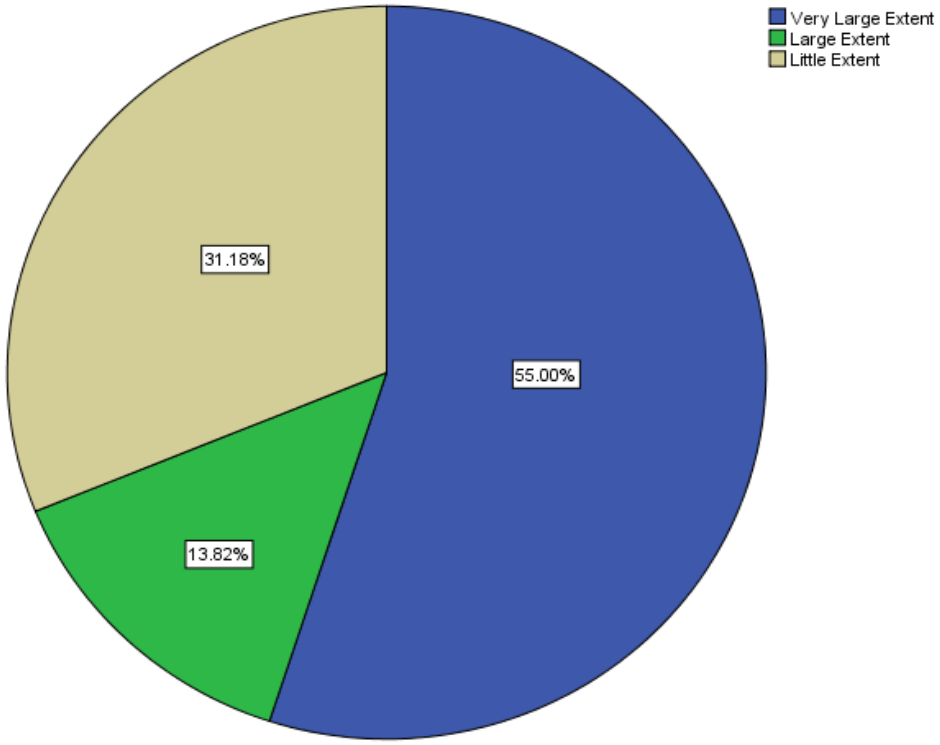

Figure 4.5: Extent of Simplicity in land digitization land system Operation in NIGIS
Source: Field survey, 2019

The extent of simplicity in land digitization system is presented in figure 4.5. 55% of the respondents claimed that e-land document has to a very large extent ensure simplicity in land digitization system. 13.82% claimed to have reduced to large extent and 31.18% to a little extent. The indicates that e-land document has helped in e-land document in simplifying land digitization system to a verry large extent.

4.4 Examining the Challenges Encountered in the Process of e-Land Documentation in NIGIS

Table 4.4: Challenges in the Process of e-Land Documentation

Challenges	N	Sum	Mean	RII	Rank
inadequate security in land registry	340	1551	4.56	0.91	4
Inadequate public education and enlightenment	340	1636	4.81	0.96	1
poor identification of parties to transactions and the authentication of documents	340	1570	4.61	0.92	3
Non anticipation of technological advancement that makes EDMS less reliable	340	1609	4.73	0.95	2
Non recognition of land administration experts such as Estate Surveyors and Valuers as Registrars of Titles	340	1707	4.02	0.80	8
Inadequate funding of the land registry	340	1552	4.56	0.91	4
Inadequate land transaction document at land registry	340	1447	4.25	0.85	6
Lack of openness and trust in land administration process	340	1508	4.43	0.89	5
Encroachment into right of ways	340	1632	4.80	0.96	1
Lack of cadastral infrastructure	340	1409	4.14	0.83	7
Valid N (listwise)	340				

Source: Field survey, 2019

Thechallenges to the process of e-land documentation are presented in table 4.4. the analysis of Five-Point Likert Scale (strongly agree, agree, indifferent, disagree and strongly disagree) revealed that Inadequate public education and enlightenment on new digital certification

process is ranked first as one the challenges to the process of e-land documentation in NIGIS at 96% relative important index. Non anticipation of technological advancement that makes EDMS (e-document management system) less reliable and poor identification of parties to transactions and the authentication of documents were ranked second and third at 95% and 92% relative importance index. This is also followed by inadequate security in land registry and Inadequate funding of the land registry were ranked 4th at 91% and 91% relative importance respectively. The relative importance is found high in area of Lack of openness and trust in land administration process, Inadequate land transaction document at land registry, Lack of cadastral infrastructure, and Estate Surveyors and Valuers as Registrars of titles. This implies that state government has so much to do to improve the challenges identified as a way forward to sustainable e-land documentation in NIGIS.

4.5Recommending Viable Solutionsin Enhancing the Effectiveness of e-Land Documentation in NIGIS

Table 4.5: Way Forward for Sustainable e-Land Documentation

Ways	N	Sum	Mean	RII	Rank
e-Land title registration be made compulsory especially to deemed grand title	340	1577	4.63	0.93	2
Reservation of the registrar of title position to legal practitioners and Estate surveyors	340	1587	4.66	0.93	2
Computerization of the land registry court	340	1518	4.46	0.89	5
continuous training of staff	340	1528	4.49	0.90	4
adequate enlightenment on documentation system	340	1704	4.01	0.80	5
Decentralization of the land registry;	340	1442	4.24	0.85	6
deployment of modem technological system such as geographical information system (G.l.S), GPRS	340	1523	4.47	0.89	5
enactment of the right legislation to make e-land titling accessible	340	1613	4.74	0.95	1
consultation with all stakeholders in land title registration systems	340	1548	4.55	0.91	3
Valid N (listwise)	340				

Source: Field survey, 2019

Theways forward for sustainable e-land documentation are presented in table 4.5 above. The analysis of Five-Point Likert Scale (strongly agree, agree, indifferent, disagree and strongly disagree) revealed that enactment of the right legislation to make e-land titling accessible is ranked first as one the ways forward to sustainable e-land documentation in NIGIS at 96% relative important index. Reservation of the registrar of title position to legal practitioners and Estate surveyors and Land title registration be made compulsory especially to deemed grand

title were ranked second at 93% and 93% relative importance index. This is also followed by consultation with all stakeholders in land title registration systems and continuous training of staff was ranked 4th at 91% and 91% relative importance respectively. The relative importance index is found high in area of adequate enlightenment on documentation system, deployment of modem technological system such as geographical information system (G.l.S), GPRS, and Decentralization of the land registry. Also from the related literature explored, thisimplies that government has so much to do to improve the identified ways forward to sustainable e-land documentation in NIGIS.

4.6 Summary of Findings

1. The study revealed that process of e-land document is very effective. The study discovered that the process is cost effective and time savers as responded by 59.4% and 57.9% of digitized land owners. It was also discovered that most the digital land owners preferred this method of land certification as it time saver and cost effective.
2. The study found that e-document has brought about simplification in the digitized land information management through computerized method, time and costs saving in the process have been found to easy certification process. The e-land document has also found to have reduced the problem of analogue land document in the registry, preventing fraudulent activities of land grabber and speculators, and land settling dispute.
3. The study further discovered that inadequate public education and enlightenment on new digital certification process is one the challenges to the process of e-land documentation in NIGIS and it relative important is shown at 96%. Non anticipation of technological advancement that makes EDMS (e-document management system) less reliable and poor identification of parties to transactions and the authentication of documents, Lack of openness and trust in land administration process, Inadequate

land transaction document at land registry, Lack of cadastral infrastructure were found to have challenged the process of e-land document in NIGIS.

4. The study found that enactment of the right legislation to make e-land titling accessible is major head way forward to sustainable e-land documentation in NIGIS at 96% relative important index. Reservation of the registrar of title position to legal practitioners and Estate surveyors, Land title registration be made compulsory especially to deemed grantee, adequate enlightenment on documentation system, deployment of modem technological system such as geographical information system (G.l.S), GPRS, and Decentralization of the land registry have been identified for sustainable e-land documentation in NIGIS.

4.6.1 Land Administration Services Provided Before (NIGIS)

In line with Section 5 of the Land Use Act (1978), the Governor of each State grants a right called Statutory Right of Occupancy (R of O) to a citizen for Land situated in urban areas. As specified in the Land Use Act, the right is usually witnessed by a Certificate of Occupancy (C of O). The Ministry of Lands and Survey (MLS) was responsible for the processing of Statutory Right of Occupancy before the establishment of (NIGIS).

Another Land Administration service operated before (NIGIS) (and to date) is the processing of consent to alienate Land. This is a process to secure the consent to alienate (for example through transfer or sublease) a Statutory Right of Occupancy. The Land Use Act stipulates that during the term of a Statutory Right of Occupancy, the holder of the rights shall have the sole right to absolute possession of all the improvement of the Land. However, the transfer, assignment and mortgage of the improvements on the Land are subject to approval of the Governor.

However, the land registration system in Niger state before the establishment of NIGIS is characterized by ordinary file system, information card system and manual procedures which are normally accompanied by some challenges. Among these challenges are:

1. Slow, tasking and time consuming
2. Lack of openness and trust in land administration process
3. Encroachment into right of ways
4. Paper based records which is susceptible to termites, wear and tear due to constant handling
5. There was no comprehensive data base with regard to land ownership and land uses in the state
6. Data related to revenues generation and land uses was not comprehensive for reference making
7. With the manual process, revenue tracking was cumbersome and prone to all sorts of errors of commission and omission.
8. Constant and continuous disputes on land and related transactions.
9. The process only gave rise to minimal revenue going to government coffer
10. Payments of compensation to landowners were not logically determined, processed and implemented.
11. There was no database for disputes resolution, disaster management and loss assessment in times of natural disasters like erosion, floods.

4.6.2 Workable Solution to the Challenges ofLand Title Registration

a. The land registry;
b. Setting up Tele Kiosks in strategic locations to enable users to have easy access to information on land registration;
c. Computerization of the land registry court;

d. Continuous training of staff to include in-house training; increase in revenue generation; plugging all revenue leakages and zero tolerance for corruption;
e. Carrying out global cadastral survey of lands and capturing same i.e. Data in the land registry;
f. Ensuring adequate enlightenment of the people on land registration system;
g. Ensuring that professionals estate surveyors and valuer are made registrar of title;
h. Decentralization of the land registry;
i. The deployment of modem technological system such as geographical information system (G.l.S), GPRS to replace Electronic Data Management System (EDMS);
j. Enactment of the right legislation to make land titling accessible; and
k. Ensuring regular consultation with all stakeholders in land title registration systems (Magel, 2006).

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study e-land document has opened up the nature of process in e-land document in NIGIS. The process has been found to be time-saver and cost-effective to low income group. The study understood that time and cost saving benefit in e-land document has made easiness in digital land certification and in reducing the activities of grabbers and fraudulent translation in land. The study has understood that e-land document is a tool for settling land dispute in other word; it has become inevitable tool for settling land dispute.

Despite the benefit associated with e-land document, it has also been understood that challenges in the process is inevitable. Inadequate public education and enlightenment on digital certification process has challenged the application e-land document in NIGIS, in that, majority of the land owners have no knowledge of new method land digitization. Lack of technological advancement has also challenged smooth process of digital documentation and certification process. Every technology required to be updated regularly, otherwise ineffectiveness becomes inevitable. Lack of cadastral infrastructure has also challenged e-land document digitization processes, the information about a parcel of land required for proper capturing and regularly updated without this e-land document application may not be able to achieve the objectives of the process. Conclusively, e-land document in NIGIS has been challenged on the ground of inadequate cadastral infrastructure and information capable developing effective database e-document for addressing land –human related problems.

5.2 Recommendations

Based on the analysis of finding and conclusion, the following recommendations were made as follows:

1. For any sustainable e-land document system, cadastral infrastructure must be adequately provided in order to ensure a robust e-document database for effective processing retrieving and updating of cadastral information.
2. In order to address the challenge associated with inadequate public education and enlightenment on digital certification process, it is therefore recommended that adequate public enlightenment on e-land documentation system should provided.
3. The enactment of the right legislation to make e-land titling accessible to general public is hereby recommended, therefore this will easy land registration process which capable preventing fraudulent activities in land translation.
4. E-land document as tool for settling land related matters, it is therefore recommended that the process must ensure simplicity and easiness in digital certification for clear identification of ownership.

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APPENDIX

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA
DEPARTMENT OF ESTATE MANAGEMENT

This questionnaire forapplicants of the digital land certification in Minna, Niger State and the staff of Niger State Geographical Information System Agency.

Dear Sir/Madam

This questionnaire is for a research titled "**Effectiveness of e-Land Document Management System in Niger State Geographic Information System Agency".** The researcher is a Masters student of the Department of Estate Management, Federal University of Technology, Minna. Kindly respond by ticking (√) objectively and honestly please. You can tick more than one option where necessary. All the information you provide will be used solely for academic purpose and your opinion(s) will be treated strictly in confidence.

AHMAD, USMAN PAI (Researcher).

SECTION I

Socio-Economic Status of Digitized Land owners in NIGIS Platform

1. Gender: Male ( ) Female ( )
2. Marital Status; Single ( ).
   Married ( )
   Widow ( )
   Widower ( )
3. Occupation: Civil Servant ( )
   Private Servant ( )
   Self Employed ( )
4. Education: ND/NCE ( )
   HND/Degree ( )
5. Monthly Income: ₦19,000 – 49,000 ( )
   ₦50,000 – 100000 ( )
   Above ₦100,000 ( )

SECTION II

A. Effectiveness of e-Land Document Process in NIGIS

1.Timing of e-land document process in NIGIS	Very Effective	( )
	Effective	( )
	Not effective	( )
2.Cost of e-land registration	Very Expensive	( )
	Affordable	( )
	Not affordable	( )
3. avoidance of fraudulent activities of land grabber and speculators	Very Effective	( )
	Effective	( )
	Not effective	( )
Reducing the level of bureaucracy in the process	Very Effective	( )
	Effective	( )
	Not effective	( )

B.Challenges in the Process of e-Land

Challenges	YES	NO
inadequate security in land registry		
Inadequate public education and enlightenment		
poor identification of parties to transactions and the authentication of documents		
Non anticipation of technological advancement that makes EDMS less reliable		
Non recognition of land administration experts such as Estate Surveyors and Valuers as Registrars of Titles		
Inadequate funding of the land registry		
Inadequate land transaction document at land registry		
Lack of openness and trust in land administration process		
Encroachment into right of ways		
Lack of cadastral infrastructure		

C.Possible Solutions in Enhancing e-Land Documentation in NIGIS

Solutions	**YES**	**NO**
e-Land title registration be made compulsory especially to deemed grand title		
Reservation of the registrar of title position to legal practitioners and Estate surveyors		
Computerization of the land registry court		
continuous training of staff		
adequate enlightenment on documentation system		
Decentralization of the land registry;		
deployment of modem technological system such as geographical information system (G.l.S), GPRS		
enactment of the right legislation to make e-land titling accessible		
consultation with all stakeholders in land title registration systems		