A STUDY OF LAND INFORMATION SYSTEM AS A VERITABLE TOOL FOR PROPERTY MANAGEMENT IN LAGOS STATE

A DISSERTATION

BY

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ABSTRACT

Geographic Information System is a computer system which is quite capable of capturing, checking, editing, storing, manipulating, analysing, integrating, transferring and displaying land related information. It is an application (tool) which allows users to make enquiries (searches), look at spatial information, make analysis of these information and edit data to obtain results that aid in decision-making. In a situation whereby such a system is used typically for recording and managing land ownership, tenure and all subsisting rights therein, it is thus referred to as Land Information System (LIS). This research is strictly concerned with establishing the extent of significance of LIS to property management in the country. With the important feature of LIS being its capability to store large volume of data with a multi-user functionality and system entities linked together, coupled with up-to-date geospatial information and statistics which can be viewed via a graphical interface such as a computer system so that inferences can be drawn to aid sound policy and decision-making.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Real Estate management involves some planning, directing coordinating and controlling of human and material resources in order to secure the optimum achievement of a set of objectives. During the age of agriculture, when settlements were at the rural settings, the immediate needs of the society were very simple and easily met. However, the needs of contemporary society have become complex and therefore difficult to understand as it has transformed from a simple agriculture-based society to information driven society. Thus, the need to adapt to the modern day system and approach towards management in order to suit present time challenges.

The most significant element in effective management of real estate is up-to-date geospatial information and maps from which "land records are derived and used for different purposes" (Atilola 2000).

The starting point for bringing the real sector into modern economy is the re-organization of data that can be obtained from different land parcels in such a way that would facilitate the adoption of service oriented approaches to producing information; such information would aid decision making by answering the important questions of: What property is where and for whom?, What manner of ownership is exercised over the property and for what duration of time?, What other lesser interests exists in the ownership and to what extent using the appropriate electronic tools?

Information is data which has been organized. The process of organization of this data and its eventual interpretation now depends on the approach adopted to bring about the storage and retrieval or display of the results. The analysis and eventual comprehension of this result is known as inference or information. Information Technology Advisory panel in the United Kingdom, in 1982, recommended that Government should recognize "information as a resource" Ukaejiofo (2008). Another U.k. committee on future handling of geographic information in 1985, came to the conclusion that "Government as the main supplier and user of geographic and land information has a critical role to play in its gathering and dissemination and should therefore give the lead." This buttresses the fact that information is quite important in the society today and could be used for varying degrees of purposes. Conventionally, there are two basic approaches for the storage and retrieval of information; the analogue and digitized systems. The analogue system

is the traditional method of storing and retrieving information and is usually in printed form. However, this format is one-side in effect because it is not interactive and so must contain all the necessary details that a user might find useful; this makes the storage cumbersome and inflexible. Despite the disadvantages of the analogue system of storing information, it is still largely used by Estate firms as an aid in their day-to-day operations. Information is critical to an Estate Surveyor and Valuer, it helps him with his decisions as regards the estimation of property values, buying and selling of land and landed properties, property maintenance and/or management, agency and the likes.

It is therefore significant and safe to introduce a computerized system with none of the disadvantages of the analogue system of storing land record information that is not only accurate but concise, and interactive; hence the emergence of the concept of Land Information System and the need for its integration in property management practice is not out of the question.

This research work aims at ascertaining the importance of the LIS in relation to the Estate Management practice in the country with particular emphasis on its application to property management.

However, information comes with a time dimension and as such, is subject to becoming outdated, inconsistent and inaccurate and results in poor planning and management decisions. In consequence, the need for a system that will ensure the following:

- Clarity and conciseness of data representation;
- Quick access to data and ease in data updating; and
- Ability to use data for mapping, modelling and management.

In effect, the Land Information System (LIS) is designed to perform land surface simulation and data assimilation on parallelized computing platforms, at very high spatial resolutions (up to ~1km) and in near real-time. It imports a continuous flow of atmospheric forcing data and a collection of land surface parameter datasets, and produces a huge amount of land surface data to satisfy the needs of diverse users. Such an operation poses many challenges to the data handling functionality of LIS, and requires a highly reliable and efficient data management design. Land

Information System (LIS) which is a kind of subsidiary of the Geographic Information System was devised to satisfy the above needs "Geographic Information System (GIS) is essentially an extraction of the spatial details of a geographically referenced object associated with the attribute details concerning the specific location. Simply put, it relates to a geographic entity with identifiable location on the earth's surface. GIS in its strictest sense is a computer system capable of capturing, sharing, storing checking, editing, manipulating, analyzing, integrating and displaying geographically referenced information. It is a tool or application that allows user to create interactive queries (user created searches), analyze spatial information and edit data to obtain results that aid policy decision. Where this is designed specifically for recording and managing land ownership, tenure and all subsisting rights therein, it is referred to as Land Information System (LIS). In operation, LIS integrates property rights information with information of uses values and distribution of natural and cultural resources to help record management". Ukaejiofo (2009).

1.2 STATEMENT OF PROBLEM

The relevance of information in our contemporary society cannot be over emphasized as it is evidently transformed and run by good information processing, aided by a series of technological advancement especially in the areas of Information Communication Technology. The growth and development in this area has made the use of traditional storage and retrieval of information outdated and inadequate, therefore making the adoption of a system that allows for easy assemblage of data, auto-updating, manipulation and display of the data sets a necessary step to embrace.

The Estate Surveyor and Valuer have to keep up with the changes that occur in our society today; this poses a serious challenge. In estate surveying and valuation firms, the use of computer in their relevant field of practice is alarmingly low coupled with the fact that most computer systems in these offices are essentially of general application and may not completely satisfy the peculiar needs of property management.

Another challenge is little or no knowledge of the operations of LIS on the part of Estate Surveyors and Valuers and stake holders coupled with a general low level of computer literacy and application in the estate surveying and valuation firms and an absence of digitally experienced

staff to advise and guide them.

More so, Estate Surveyors and Valuers give advice to their clients under the presumption that the spatially referenced data on which their information is based remains valid. However, the credibility and veracity of their advice must be so valid in order to boost client's confidence and avoid destroying the long-standing good reputation of the Estate Management profession.

This research work therefore emphasizes the usefulness of LIS systems to real estate practice in full applicability with the practice of property management aspect of the profession; by so doing, creating room for efficient and effective property management and this generally leads to an increased level of specialization and professionalism of the practice through the production of quality decisions.

1.3 AIM OF STUDY

The aim of this study is to establish the importance of Land Information System (LIS) in property management.

1.4 OBJECTIVES OF STUDY

Objectives of this research work are as follows:

1. To find out the current level of technical-know-how on LIS by practicing Estate Surveyors and Valuers in Lagos metropolis.
2. To address current challenges to the effective use of GIS/LIS in the country especially Lagos state.
3. To ascertain the various advantages of LIS with respect to property management.
4. To proffer solutions on the challenges in order to improve on the application of LIS in property management.

1.5 RESEARCH QUESTIONS

1. What is the current level of technical know- how of LIS system by Estate Surveyors and Valuers in Lagos?
2. What challenges beset the prospects of effective use of LIS in Nigeria?
3. What are the advantages of LIS to property management?

4. What measures must be taken to ensure the continuous use of LIS in property management activities for effective sustenance and maintenance of income maximization?

1.6 SIGNIFICANCE OF STDUY

This study will be of considerable benefit to property management firms/companies in the country as it will help them to solve problems in the core functions of the property management practice such as record keeping and updating, advertisement, rent computation and collection, periodic reporting and maintenance scheduling, rendering accounts, determination of budget and expected property values over a period of time etc. all geared to meet the client's investment motives. With the key features of LIS such as its ability to store large volume of data with a multi-user functionality and system entities linked together- C of O to land, to owner and to subsequent transaction; it generate relevant statistics and reports for policy action by decision makers.

1.7 SCOPE OF STUDY

Examining the various opportunities that LIS provide to the property management practitioner is quite a broad exercise. In order to adequately answer our research questions, the researcher will focus on emphasizing the various benefits of LIS to property management practice in Lagos state, examine the various challenges of LIS application in the state through the evaluation of the questionnaires distributed, and proffer solutions. However, the software types and the LIS components may not be satisfactorily evaluated; the study solely aims at pointing out the benefits that comes with the usage of the system in the practice of property management as a profession, paying little attention to the mode of operation of the software.

1.8 LIMITATIONS OF STUDY

Due to the nature of the study, certain setbacks were encountered during the course of the research. The dearth of finance took a major toll against the smooth execution of the work, coupled with a limited amount of literature available as a result of the recently emerging works in the field of study.

CHAPTER TWO: LITERATURE REVIEW

2.1 LAND

Umeh (as cited in Okolo, D. C. 2012) explained that Land even though difficult to define, has its full meaning charted and clearly focused in the physical, spiritual, socio-political, economic, abstract and legal conceptions of land. The physical concept of land is the layman understanding of land to mean the solid surface of earth. Land in this restricted sense excludes air and water which is the free gift of nature. The physical concept of land makes land the most precious of commodities because the amount available is fixed and non-transferable. Population growth means increased demand for land but while ways of utilizing land may change, the amount of land remains fixed. Thus the society and indeed government have been faced with the question of the control of land upon which the welfare and dignity of people depend.

The religious concept of land is concerned with the idea of sacredness of land. In our rural societies, there is the general belief that there is a founding deity of land which ensures fertility of land and protects the community. In many of our rural communities, shrines are built for deities. The strong belief is that these deities guard the land and occupy a pride of place in the community. Land is therefore viewed as a uniformed space where different economic and social activities take place under the guardianship of the deity of land. This sacred attribute of land is the study and practice of estate management in Nigeria.

With the abstract concept of land, we are concerned with all the rights and interests exercisable in, on or over land as against the physical concept. The fundamental importance of the abstract concept to the study of estate management lie in the incontrovertible fact, that it is the right over land which confers on the owner, the power to make use, and decisions as to what use to put the land. Land use decision can therefore, only be taken by those with proprietary rights over the land in question, irrespective of whatever, the physical or economic conditions might be. It is therefore important to have a grasp of the nature and extent of a property rights as well as the attitudes, motives and financial resources of those who own the land. For man therefore to apply the factors of production to land he must first and foremost acquire a genuine and indefeasible title, right and interest on or over the land in question. This is the importance of the abstract concept of land to the study of estate management.

The socio-political concept of land is more concerned with the community which inhabits a particular place rather than the physical land itself. It is distinguished from other lands by ethnic

characteristic of the people who live there, rather than by the physical characteristics. Such terms like Nigeria or Igbo land or Nnewi refer to a particular geographical area. Land in this sense can either expand or contract over many years due to political or other factors. Members of the community generally refer to such land as their home.

Economics is how man use and combine his resources to satisfy his wants. The economic concept of land inevitably deals with how labour and capital are used with land to produce goods and services. It is how man manipulates the attributes of the physical environment to achieve his aims. The importance of land to the study of estate management rests in the fact that land is the sum total of the natural and manmade resources over which possession of the earth surface gives control. This definition of land encompass all the earth's surface including water and involves access to climatic conditions and influences, location of sites relative to other areas of land and all man-made improvements attached to the surface of the earth.

The legal concept looks at land as extending from the centre of the earth to the limit of the sky and is expressed in the latin phrase *"eius est solum, euis est usque ad caelum et ad inferos*" which means that whoever owns the surface, also owns the land right up to the heavens and down to the depth of the earth. Land also includes man-made features in, on and below the earth, in addition to the natural features. It is a basic principle of both English and Nigerian Land Law that "*Quic quid plantatur solo solo cedit*" i.e whatever is fixed to the land becomes part of the land or real property.

2.2 LAND USE PLANNING AND LAND EVALUATION

Land use planning can help decision-makers (such as government or land users) to use land in such a way that current land use problems are reduced and specific social, economic and environmental goals are satisfied (sustainability, income generation, self-sufficiency, etc.). The main objective of land use planning is to identify the uses that best satisfy specific goals for different tracts of land and the formulation of projects, programmes or management plans to implement these uses. Land use planning becomes important when the government or land users feel that there is a need for land use change. This requires not only the political will and the ability (instrument, budget, manpower) to support and implement the plan. It is also essential that the planned changes are acceptable to the people and land users involved (FAO, 1993).

Land evaluation provides essential information on land resources. However this information is often not used in the planning and implementation of better land use systems or land use practices,

for a number of reasons. Firstly, the information produced is frequently incompatible both to government's objectives and/or the preferences of the local people. Secondly, data processing is inadequate, resulting in low quality information. Thirdly, land evaluation is based on a top-down approach; such an approach does not take sufficiently into account the aspirations, capabilities and constraints of the local land users. Added to which, land use plans tend not to consider sufficiently the limitations of interventions (subsidies, policy prices, input supply, extension, credit etc.) (Bronsveld et al., 1994).

Land evaluation is defined as the process of assessing the potential production for various land uses (Beek, 1978). This approach is based on the matching of qualities of different land units in a specific area, with the requirements of actual or potential land use. The results of land evaluation should be useful for rational land use planning (FAO, 1993). Burrough (1996) states that in the top-down approach to land evaluation, the direction of reasoning is always from resource base to land utilization, a perfectly adequate approach where there is plenty of land, and the market is unconstrained.

In general, the conditions for agriculture will be initially created by the modification of the natural physical resources. This may be done by irrigating, fertilizing and other practices; as the cost of inputs increases, however, physical land resources become less important and factors such as access to the market, infrastructure, skilled labour and organization are more important. Added to this are other aspects concerning social habits and traditions. For example in Mexico, 'almost all farmers grow maize because their culture requires it (any maize is better than none)' (Corbett, 1995). Rossiter (1996) discusses a theoretical framework for the classification of land evaluation models and concludes that there is no single land evaluation modelling approach. The choice of technique affects the reliability and scope of the application, and also the predictions and purpose.

Rossiter added that predictions on land performance are useful only if they are used by decision makers to make better decisions. 'We should take a step back, away from the question "What predictions can we make with the data we have?", i.e. a data-driven approach, to the question "Who are the decision-makers, who actually affect land use, how are they making their decisions, and how could their decision be better informed?", i.e. a demand-driven approach'(Rossiter, 1996, p186). Burrough (1996) states that we need to look more at the interactions between how the various tools for land evaluation can be used in different circumstances, and how physical, economic and social factors can be combined. A demand driven approach to selecting a land

evaluation method would help to reveal what predictions are really needed and at what level of certainty. The process of land evaluation could be improved in several ways. Firstly, by involving local users in the plan formulation so that their preferences and constraints are taken into account. This would include both the assessment of the impact of interventions by market or government, for example, of inputs (input supply, extension, credit), as well as the economic, social and environmental outputs of the implementation of the land use plans. Secondly, using existing data but changing the methods of data processing by the use of more flexible data processing methods. Thirdly, by the optimal use and better integration of the existing data like remote sensed data and field data. Finally, by a clear presentation of land evaluation and land use plans in non-technical terms (Bronsveld et al., 1994).

2.3 MANAGEMENT

It is very difficult to give a precise definition of the term 'management'. Different scholars from different disciplines view and interpret management from their own angles. The economists consider management as a resource like land, labour, capital and organization. The bureaucrats look upon it as a system of authority to achieve business goals. The sociologists consider managers as a part of the class elite in the society.

2.4 NATURE OF MANAGEMENT

To understand the basic nature of management, it must be analyzed in terms of art and science, in relation to administration, and as a profession, in terms of managerial skills and style of managers.

2.5 MANAGEMENT IS COMBINATION OF ART AND SCIENCE

Management knowledge exhibits characteristics of both art and science, the two not mutually exclusive but supplementary. Every discipline of art is always backed by science which is basic knowledge of that art. Similarly, every discipline of science is complete only when it is used in practice for solving various kinds of problems faced by human beings in an organization or in other fields of social life which is more related to an art. Art basically deals with an application of knowledge personal skill and know-how in a specific situation for efficiently achieving a given objective. It is concerned with the best way of doing things and is consequently, personalized in nature.

During the primitive stages of development of management knowledge, it was considered as an art. There was a jungle of managerial knowledge. It was not codified and broken up into systems.

People used it to get things done by others, in their own way giving an impression that whosoever uses it, knows the art of using it. This kind of loose and inadequate understanding of management supported the view that it was an art.

2.6 MANAGEMENT AS A SCIENCE

Science means a systematic body of knowledge pertaining to a specific field of study. It contains general principles and facts which explains a phenomenon. These principles establish cause-and-effect relationship between two or more factors. These principles and theories help to explain past events and may be used to predict the outcome of actions. Scientific methods of observations, and experiments are used to develop principles of science. The principles of science have universal application and validity.

Thus, the essential features of science are as follows:

(i) Basic facts or general principles capable of universal application

(ii) Developed through scientific enquiry or experiments

(iii) Establish cause and effect relationships between various factors.

(iv) Their validity can be verified and they serve as reliable guide for predicting future events.

To what extent does management satisfy the above conditions:

(i) Systematic body of knowledge: Management has a systematic body of knowledge consisting of general principles and techniques. These help to explain events and serve as guidelines for managers in different types of organizations.

(ii) Universal principles: Scientific principles represent basic facts about a particular field enquiry. These are objective and represent best thinking on the subject. These principles may be applied in all situations and at all times. Exceptions, if any, can be logically explained. For example, the Law of Gravitation states that if you throw an object in the air it will fall on the ground due to the gravitational force of the earth. This law can be applied in all countries and at all points of time. It is as applicable to a football as it is to an apple falling from tree. Management contains sound fundamental principles which can be universally applied. For instance, the principle of unity of command states that at a time one employee should be answerable to only one boss. This principle can be applied in all types of organization-business or non-business. However, principles of management are not exactly like those of physics or chemistry. They are flexible and need to be modified in different situations.

(iii) Scientific enquiry and experiments: Scientific principles are derived through scientific investigation and reasoning. It means that there is an objective or unbiased assessment of the problem situation and the action chosen to solve it can be explained logically. Scientific principles do not reflect the opinion of an individual or of a religious guru. Rather these can be scientifically proved at any time. They are critically tested. For example, the principle that the earth revolves around the sun has been scientifically proved.

2.7 PROPERTY

There is no internationally accepted definition of the term. It may be difficult to define "property" even under the domestic law of a particular country. In fact, most of our course in property is devoted to defining what "property" means in the country. In Nigeria, we broadly define "property" as legally enforceable rights among people that relate to "things." The particular "thing" might be land, or a tangible object (such as this book), or an intangible item (such as the goodwill of a business). Thus, to understand the meaning of "property" in our system we ask two questions: (1) what rights are legally-protected? and (2) what are the "things" that one can hold legally-protected rights in? Of course, this two-step approach is not an international standard. Legal scholars in many nations would approach the definition of "property" from quite different perspectives. However, for the purpose of this research, property referred to here in this literature are landed property (residential buildings and other building structures).

2.8 PROPERTY AS LEGALLY-ENFORCEABLE RIGHTS

Property in Nigeria is classically viewed as a "bundle of rights." The rights in this bundle include, at a minimum: (a) the right to possess and use; (b) the right to exclude others; and (c) the right to transfer. As Ownership rights comprise the right to possession, the right to use and the right to disposal with respect to the property of the owner in accordance with the provisions of law. An owner may be an individual, a legal person or another entity having all three rights which are the right to possession, the right to use and the right to disposal of that property so owned. The right to possession is the right of an owner to keep and manage by himself/herself the property under his/her ownership. The right to use is the right of an owner to exploit the utility and to enjoy the fruits and profits from the property. The right to disposal is the right of an owner to transfer his/her ownership right over a property to another person or persons or to renounce such ownership right. An individual has the right to possession, use and disposal of

his/her privately-owned property for the purpose of serving the needs of daily life and consumption, or production and business and other purposes in accordance with the provisions of law.

2.9 PROPERTY MANAGEMENT

Property management is a very important department in the practice of estate management in Nigeria. With the increasing awareness of the benefits of having income yielding properties managed by professionals, property owners are now handing over their developed properties to estate surveyors to manage. This involves the direction and control to which the property is put to ensure the interest of the landlord is protected and that of the tenant guaranteed. To carry out this function effectively the estate surveyor has to ensure that the relationship between the landlord and the tenant is clearly spelt out in a contract document called the Tenancy Agreement. It is a planning process for documenting property resources and management practices, and designing property changes. The end result is a farm plan, property plan or property management plan that can be used to:

- Assist in developing and managing a property sustainably and profitably
- Record information and decisions that demonstrate a duty of care to the environment and natural resources.

A plan for property management should consist of four main components dealing with:

- Natural Resource Management
- Human Resource Management
- Financial Management
- Production and Marketing.

These guidelines assist in preparation of a plan for property resource management —the natural resource management component of a property management plan. In most cases, the preparation of a property management plan is a voluntary undertaking to improve business management. However, it may be a prerequisite for obtaining financial assistance, or for undertaking works that require approval, or it may be the core component of an Environmental Management System (EMS) for a property. Regardless of the reasons for its preparation, the most important outcomes of such a plan are a more efficient, profitable business and improved management of natural resources through a better understanding of their limitations, and how management decisions affect them.

The purpose of this management and management plan is to provide guidelines on:

- How to prepare the natural resource management component of a property—the process
- What to include in it—generally acceptable standards for the content.

The standards for content are based on current recommended practice and, if adopted, should result in a plan that is adequate for environmental management, highest and best use (HBU) and subsequently, for sustainable production purposes. It is in a landholder's best interest to ensure that the final product complies with contemporary environmental standards and has ongoing benefits based on a regular cycle of review and continuous improvement. Therefore, in order to achieve this, a computerized information system which could derive spatial information from the general environment is necessary for good management decisions, thus the need for an automated Land Information System.

Property managers need to be able to summarize the financial performance of their portfolios in determining the adequacies of their management strategies. GIS/LIS can play the following roles:

- GIS/LIS allows easy data updating, address matching and geocoding so as to maintain map database of property holdings.
- Geospatial factors affecting property performance can be identified using thematic mapping, data and spatial queries to graphically compare property performance, GIS/LIS maps allows a portfolio manager to track income relationships from a distance.
- GIS/LIS thematic map can provide a quick and easy way of performing property management tasks.

2.10 INFORMATION

The World of Information Systems

Let us first consider the world of information systems practice, focusing on methods and techniques that have been in use since before the Internet. What kinds of tasks and processes do Information Systems professionals engage in? What products do the processes produce? What quality concerns drive their daily work and improvement initiatives? How is the division of work organized among professional specialties, and within and across project organizations and industry sectors? Which areas of work can be automated, and which are retained as human tasks? The predominant overarching organizing concept in most Information Systems curricula is that of the system development lifecycle [Gorgone et al., 2002]. The overall process of creating and deploying an information system is broken down into a number of well-defined inter-dependent

processes. These typically include planning, requirements elicitation, analysis, specification, design, implementation, operations and support, maintenance and evolution. Verification and validation, including testing, is another set of activities that needs to be carried out in parallel with the main production processes. Some of the lifecycle activities involve participation from users and stakeholders. For example, technical feasibility and business priorities and risks are reviewed at predefined checkpoints. When externally provided components or subsystems are involved, there are processes for procurement and integration. Processes are also needed to manage the information content -during system development, as in defining the schemas, and during operation, as in ensuring information quality [Vassiliadis et al., 2001].

2.11 INFORMATION TECHNOLOGY (IT)

A discussion on the automated Land Information Systems in Nigeria would be incomplete without mention of the wider context of Information and Communications Technology. Information Technology (IT), as defined by the Information Technology Association of America (ITAA), is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." IT deals with the use of electronic computers and computer software to convert; store; protect; process, transmit, and securely retrieve information. Computers have been around for a while and are currently used by different professionals for a variety of purposes in the execution of their professional assignments.

In the field of Environmental Sciences, Quantity Surveyors use software programmes to prepare bills-of-quantities, Architects and Planners use Automated Computer Aided Design (AutoCAD) programmes to produce building designs and layout planning, Land Surveyors use Global Positioning Systems (GPS) to undertake surveys, the list is by no means exhaustive. In Nigeria today, we are all witnesses to the ongoing ICT revolution in the Nigerian banking industry and the change from the use of manual filing and record keeping methods less than a decade ago to automated practice methods. Just a few years back, ATM machines have been introduced into the Nigerian banking industry as well. The question to ask regarding the valuation profession in Nigeria is how we have fared, and what our current ICT literacy level and utilization as a profession, is?

2.12 INFORMATION SYSTEMS

The meaning of "information systems" has been growing in diversity and complexity. Several authors have pointed out this fact, described the phenomena and tried to bring some order to the perceived chaos in the field. Cohen (1997, 1999, 2000), for example, after describing the attacks on the Information Systems (IS) field, for "its lack of tradition and focus" and the "misunderstandings of the nature of Information Systems," examines "the limitations of existing frameworks for defining IS" and re-conceptualizes Information Systems and tries "to demonstrate that it has evolved to be part on an emerging discipline of fields, Informing Science" (Cohen, 2000). Part of the objective in this paper is to participate in the process of conceptualization and re-conceptualization required in the area of Information Systems and in Cohen's proposed Informing Science. We will try to do that making a first step in the description of a systemic notion of information, by identifying, first, the meaning of information. We are using the word "meaning" in its pragmatic sense, i.e. in the sense formulated in order to ascertain the meaning of an intellectual conception one should consider what practical consequences might conceivably result by necessity from the truth of that conception; and the sum of these consequences will constitute the entire meaning of the conception." Ackoff (1962) talks about "consequences," So accordingly, in analyzing the antecedents, by means of Ackoff's approach to conceptual definitions, these definitions will try to relate them to the respective consequents. In this way the meaning for the term "information" will be both its conceptual definition, as well as its respective practical consequences in the field of Information Systems and Informing Sciences. This will provide the input for establishing the direction of a systemic meaning of the notion of information.

The term "information" has been widely and increasingly used, but not always with a clear idea about its meaning. As Dretske (1981) and Lewis (1991) pointed out, few books concerning information actually define it clearly. And Mingers (1997) adds, "Information systems could not exist without information and yet there is no secure agreement over what information actually is". The word "information" is one of the most used, and abused words. Different scientific disciplines and engineering fields provide diverse meanings to the word, which is becoming the umbrella of divergent, and sometimes dissimilar and incoherent homonyms. When concepts are not clear, the use of homonyms might be intellectually and pragmatically dangerous. In making an initial step-attempting first a conceptual definition, using "conceptual definition" with the meaning Ackoff (1962) described for it, and with the role he ascribed to it as a first step both in scientific inquiry

and in systems analysis and synthesis. It is wise to also follow the method suggested by Ackoff, but with the space restrictions of this paper. It can be found, in the last years, a growing number of research studies directed to establish the meaning of "information." Some of these research studies will be cited below. Although there are studies where the defining process has the objective of finding practical consequences in the area of information systems development, there is no knowledge, either, of any kind of efforts made for the elaboration of a systemic notion of information. In the opinion of some intellectuals of Information Systems, these two lacking aspects in the literature are very important, both from the intellectual and scientific perspective, as well as from the pragmatic one.

2.13 THE SUBJECTIVE CONCEPTION OF INFORMATION

Information has been frequently defined as "interpreted data" and, as such, the same data might cause different interpretations. Different persons might associate different meanings to the same data. This kind of definition is frequently found in Information Systems textbooks, especially those oriented to Information Systems development and Managerial Information Systems (MIS). Data in a MIS should provide some meaning to some manager in order to fulfill its ***raison d'etre*** i.e. its reason or justification of existence. An interpretation is, by its own nature, subjective, i.e. related to a subject, a "mind, ego, or agent of whatever sort that sustains or assumes the form of thought or consciousness." (Merriam-Webster, 1999). Consequently, it is easy to conclude that according to this kind of definition there is no IS without a subjective sub-system, i.e. any IS should have at least two subsystems: an objective (mechanical and/or electronic data processing subsystem) and a subjective one (biological/human data/information processing: a user, a manager, etc.).

Some authors are a little bit more explicit and precise in their definition of information. They describe it as "data plus meaning" or "meaningful data" (Checkland and Scholes, 1990; Mingers, 1997). The term "data" etymologically means "things given or granted." Data are the plural of "***datum***," a Latin term, which is the past participle of "dare" (to give). On the other hand, the term "mean" derive from the Middle English "menen," akin to Old High German term "me/nen," i.e. "to have in mind." (Merriam-Webster, 1999). This etymology of the term has been mostly maintained to the present time. So, "to mean" is defined as "to have in mind as a purpose" and as "to serve or to intend to convey, show or indicate; to signify" (Merriam-Webster, 1999). "To signify" is the Latin rooted term equivalent to the Old High German root "to mean."

Consequently, the term "meaning" has been defined as "the thing one intends to convey especially by language" or "the thing that is conveyed especially by language"; and "meaningful" is defined as "having a meaning or purpose" "full of meaning" "significant" (Merriam-Webster, 1999). Consequently, "information," as "meaningful data," would be defined as "significant data", "data full of meaning", "data having a meaning or purpose," and as "data plus meaning" would be defined as "data plus significance," "data plus the thing conveyed by it in the mind." Then, it is easy to make the same conclusion as did above: since information is something that should be in the mind of someone, information is always in a person, in a subject, i.e. it is subjective.

The concept of "meaning" has been researched and studied by several authors in a very detailed, analytical and profound way. Elsewhere (Callaos 1995), trying to make a systemic definition of "meaning" and to find the meaning of "definition", made a thorough description of these researches and studies, and his conclusions was the one briefly made here. A similar conclusion might be derived from the etymology of the word "information." "Inform" originated from the Middle English term ***"enforme",*** derived from the Middle French term "***enformer***", which evolved from the Latin term "***informare***" (Merriam-Webster, 1999). This Latin term means "shape, form an idea of' (Hoad, 1993). To form an idea is always in the mind of a person, of a subject. On the other hand, "***informare***" is a composite of ***"in"*** and —***form***." The last term means "shape, mold" The term "***in***-" is used in combination mainly with verbs and their derivatives, with the senses of 'in, into, within'." (Hoad, 1993). Accordingly, "to inform" would mean "to form in", "to form into", "to form within" a person, a subject, or as Boland (1987, referenced by Cohen, 2000) concluded "...information is the inward-forming of a person that result from the engagement with data."

The conclusion made, from the etymological analysis of the term converge with the conclusions made by several authors by means of other kind of analysis. Dervin (1983), for example, points out that, "Since it is assumed that all information producing is internally guided and since it is generally accepted that all human observing is constrained, sense-making further assumes that all information is subjective" (Dervin emphasis). Information is understood not as a thing but as a construction (Dervin, 1981) She recognizes that there is objective information, but places it in quotation marks as " 'some information' out there, external to human beings, but created by them." So, what she is saying is that any information originates in a subjective source and is transformed by other subjective processes, performed by the receiver. What might be called

'objective information' is a representation of the real information, which always is a subjective one in its origin and essence. Neill (1992) makes the same kind of emphasis: "knowledge representations are not knowledge but rather representation of knowledge". Therefore, the conclusion is evident: information is generated inside the mind of a person, a subject. It is not an objective entity independent of any person. It is dependent on the person where it is generated by the data stimulus, as well as on his/her individual experience. This is a very important conclusion, that many authors of IS books, or papers, do not seem to be taking into account. Koshen (1983) defined information as "decision-relevant data", which makes of it something requiring a special kind of subjectivity, a strict subjectivity that exclude the possibility of inter- or trans-subjectivity, due to the personal nature of "decision" and "relevant decision." Decisions are always subjective, and relevancy is always related to a given subject.

Consequently, we can observe that for some authors subjective reception of the data is a necessary condition for information generation, but it is not a sufficient one. To receive data related to my first name does not generate information in me. To have the data related to the first name of a person I just met, does generate in-formation "in" me, especially if I have some kind of interest in such a person and in knowing his or her first name. So, not any kind of data in any person generates information in him, or in her. The received data should generate a new idea, or a relevant cognitive content, in the receiving subject, in order to produce information in his or her mind. Therefore, it is important to find out the additional conditions that data should comply with, in order to be informative.

Floridi (1999) provides us with an essential condition. He points out that information is provided when data answer an explicit or an implicit question made by the data receptor. "To become informative for an intelligent being...a datum must be functionally associated with a relevant query." (Floridi, 1999, p.106). Accordingly, data, to be informative, should be associated with a relevant question, and - in Floridi's terms - information consists of "datum and relevant question. Computers certainly treat and 'understand' data; it is controversial whether there is a reasonable sense in which they can be said to understand information."

Computers might process data, but information can be processed just by the computer user, the individual, the person, the subject. To Floridi (1999) "A datum is anything that makes a

difference: a light in the dark, a black dot in a white page, a 1 opposed to 0, a sound in a silence...A datum can be defined as an answer without question: '12' is a sign that makes a difference, but it is not yet informative, for it could be the number of astrological signs, the size of a pair of shoes or a name of a bus route in London. We do not know which...'12' become informative when once we know it is the answer to the question 'how many apostles were there?" (Floridi, 1999; p.106). As a way of doing an additional step in our attempt to pinpoint the nature of information and data, as well as the contrast between both concepts, it is good to try to integrate our conclusions above with Floridi's erotetical definition (i.e. definition made according the logic of question and answers, the erotetic logic) Doing so, we can draw the following conclusions:

• A datum is a "given" thing, not any "given" thing, but the one that makes a difference**.** So, the genre of datum is "to be given" and the characteristic that makes it a specific specie in such a genre, is that it should make a difference.

• Information is a cognitive content, not any cognitive content, but the one related to the association of data and a relevant question, be it implicit or explicit. So, the genre of information is cognitive content and the characteristic that makes it a specific specie in such a genre, is the relevant question that the data answer.

• Data and information are two sides of the same coin: Datum is the objective side of the coin and information is its subjective side. This relation might be seen as analogous to the relation between the signifier (the objective/material side of a sign) and the signified (its subjective/mental side).

The web on-line Tech-Encyclopedia, for example, affirms that information is the "summarization of data. Technically, data are raw facts and figures that are processed into information, such as summaries and totals. But since information can also be raw data for the next job or person, the two terms cannot be precisely defined. Both terms are used synonymously and interchangeably" (Tech-Encyclopedia, 2000). It is true that both terms are being used synonymously and interchangeably, but this does not mean that they are synonymous. To use them as synonymous is to abuse them **t**hus, theoretically incorrect and pragmatically dangerous. On the other hand, the Tech-Encyclopedia definition of information is incorrect and misleading: information is not summarization of data, nor summarization of data is information. "Summarization of data" is summarization of data. In the best case, it would be informative data,

not information. To summarize a data might make it informative, if it is associated with an explicit or an implicit question made by the data receiver. A very important practical consequence we can draw here is: Informative systems are not the same as Information Systems. Informative Systems are part of Information Systems**.** What is usually referred in the literature as electronic information processing is, rigorously speaking, informative data processing. To develop information system, requires necessarily the development of an informative system, but this will not assure the development and use of the respective information system. The human part of the system should also be "developed" in order to assure the existence of the information system. This very important and necessary aspect for successful information systems development is lacking in university and industry courses, papers and books, as well as in the professional/corporative MIS development. This fact would explain most of the IS practical failures.

The International Federation of Surveyors (FIG, 1995) 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 landed property as well as land-use planning (planning and administration), and enables sustainable development and environmental improvement.

2.14 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

A GIS has been defined as a computer assisted system for the acquisition, storage, analysis and display of geographic data according to user-defined specifications (Laurini and Thompson, 1992). It has a digital database management system designed to accept large volumes of spatially distributed data from a variety of sources (Jensen and Christensen, 1986). The most powerful characteristics of GIS centre on their ability to analyze spatial data based on descriptive attributes. The use of GIS software can help to eliminate data integration problems caused by the different geographic units to which different data sets are related (Burrough, 1986). GIS allows overlaying of maps with different thematic data (e.g. soil and land use, watershed, district, village maps) and thereby facilitates map integration and analysis.

GIS distance modelling makes it possible to assess the interaction of (potential) land uses, and the physical infrastructure and market. It also permits the combination of maps with data generated by models (Bronsveld, et al, 1994). In short, the primary goal of a GIS is take raw data and transform it, via overlay and other analytical operations, into new information which can support decision-making processes. GIS was introduced into developing countries during the 1980's, the key agents of delivery being various UN agencies. The approach adopted in the use of GIS was essentially top-down, with ArcINFO used on mini-computers as the principal schema. As GIS developed, however, more inexpensive systems were introduced using micro-computers. As these various GIS systems were taken up by both universities and research centres, so a change took place in the application of GIS, with bottom-up approaches being developed, (Taylor, 1991). The introduction of GIS, whether top-down or bottom-up, has usually come from outside and so far GIS has been only marginal to the solution of development problems. Hence Taylor (1991) argues that it is a necessary first step for indigenous scientists to gain a greater degree of knowledge and control of this technology.

There are several restrictions to the implementation of GIS for planning in developing countries. Firstly, few attempts have been made to apply GIS in deriving planning scenarios, in allocating regional investment and in evaluating development proposals. Secondly, the state-of-the art in planning has not advanced much in relation to how planners could employ GIS in conjunction with new planning. Thirdly, the acute shortage of manpower and training have greatly restricted its use. Fourthly, there is a dominance of GIS technocrats in the use of GIS. Finally, there is an over concentration of GIS development and technology at a few key universities and research centres and finally, developing countries need GIS most, but generally do not have the necessary funding to acquire it. (Yeh, 1991). Yeh (1991) added that in developing countries it is necessary to improve the institutional arrangements and the application of GIS rather than the technology, and that successful implementation of GIS will depend upon a clear understanding of the functions and needs of planning that are translated to system applications.

2.15 LAND INFORMATION SYSTEMS AND PLANNING

The utilization of LIS for research, planning, and project evaluation, in the mode of top-down" data creation and expert "policy making" empowers the powerful and disenfranchises the weak, where it is being used in a planning and/or decision making capacity. LIS can be integral to defining and implementing agency decision and often reflects the internal rules and value

systems of the agency controlling it. Decisions regarding what issues to address, what data to obtain and how the data should be classified and analyzed, and what interpretations are drawn from them, all suggest that value-neutral LIS do not exist (Weiner et al, 1995). LIS as part of a "rational planning discourse" can be a technical legitimization of historical power relations (Aitken and Michel, 1995; Harris et al., 1995; cited by Weiner et al, 1995). LIS, it is claimed, produces representations tied to the discourses of the status quo (Taylor, 1991; Pickles, 1993; Goss, 1993, cited by Weiner et al, 1995). Moreover, due to lack of equitable access to GIS data and technology, small users, local governments, non-profit community agencies and non-mainstream groups are disadvantaged in their capacity to engage in the decision-making process (Edney. 1991). Weiner et al (1995) in the construction of a LIS in Kiepersol, South Africa argued that it is concerned with multiple realities and the politics of resource access and the use of different scales of analysis. The LIS production process is informed by two bodies of literature that are not generally associated with GIS and remote sensing: political ecology and post-developmentalism. Political ecology encompasses a number of loosely configured areas of scholarship (Thrupp, 1993; Bryant 1992; cited by Weiner, 1995).

Specific social relations of resource use are then put into context more broadly in terms of their relations with each other and other land users within the state and the world economy Regional Political Ecology is concerned more with connecting scales of analysis than with the regional scale per se. Other important RPE concerns include the politics of resource use, environmental knowledge production and representation, the agency of nature, and multiple meaning and practice of sustainable development (Weiner et al 1995). With participatory LIS the structural distortion can be reduced by the inclusion of local knowledge from socially segregated communities whose everyday lives are tied to local conditions. This requires an approach to complement more traditional planning methodologies with the expertise and knowledge of communities who have a long standing relationship with the land (Weiner et al, 1995).

2.16 DECISION-MAKING PROCESSES

Many traditional systems are adaptations to long-term ecological and economic forces (Bartlett, 1980). Thus the transition from "traditional" to more "developed" management practices is a transition to a different framework for decision-making. New politics can change the dominant relations of production, the whole structure of income opportunities and necessary access qualifications and hence the land use decision-making process (Bartlett, 1985). The political

economy thus both determines and provides the changes in the structure, which is reflected in the change of circumstances of the land manager. This change may also alter land use and management (Bartlett and Brookfield, 1987). Bartlett (1985) proposed a bottom-up approach for the understanding of decision-making, the focus being placed on land, land users and the causes of the studied process, starting with the actual people making decisions on how to use land. The scheme conceives of individual decision-making units each of which chooses a form (or forms) of income generation to fulfil some objective function. The income opportunities are expressed in terms of alternative land uses such as specific cropping patterns, communal grazing lands, and other uses. Bartlett and Brookfield (1987) proposed a land use decision-making approach for land management based on the cumulative land decision approach of Bartlett (1985) and outlined above. It focuses on a different set of decisions and provides a simple decision-tree that traces through the stages in decision-making. They propose that a number of social-environmental data form the initial designated data for land use and management practice. The data consist of the socio-economic characteristics of the decision-makers and their access to resources. The intrinsic properties of the land system (soil, fertility, slope, etc.) are also essential elements. These models are concerned with present investments to maintain or enhance a future income stream and.

2.17 INTEGRATION OF INFORMATION IN A GEOGRAPHICAL INFORMATION SYSTEM

The available information exists in a range of formats, some already digitized but much in the form of paper from different government agencies. All this requires transformation to a digital format and standardization to the same cartographic (mapping) system before it can be integrated into a Geographical Information System (GIS). In Figure 1 the stages for inputting the information and the relevant modules in a GIS are shown.

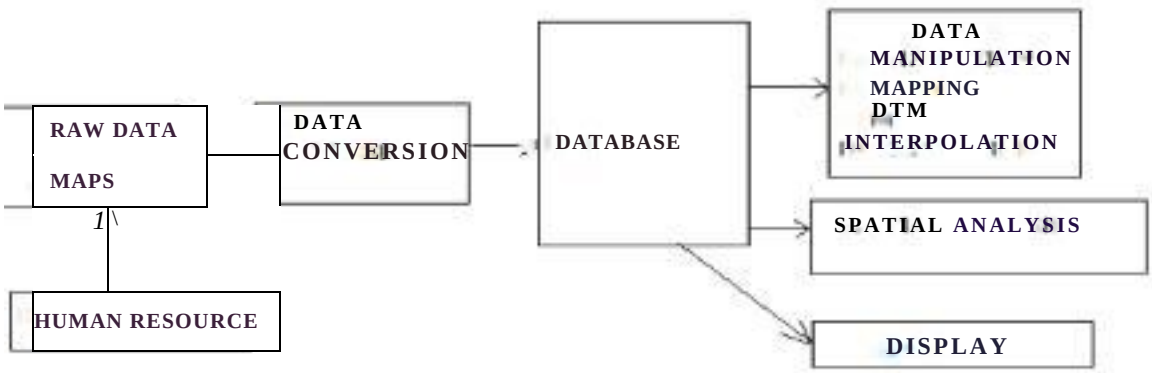


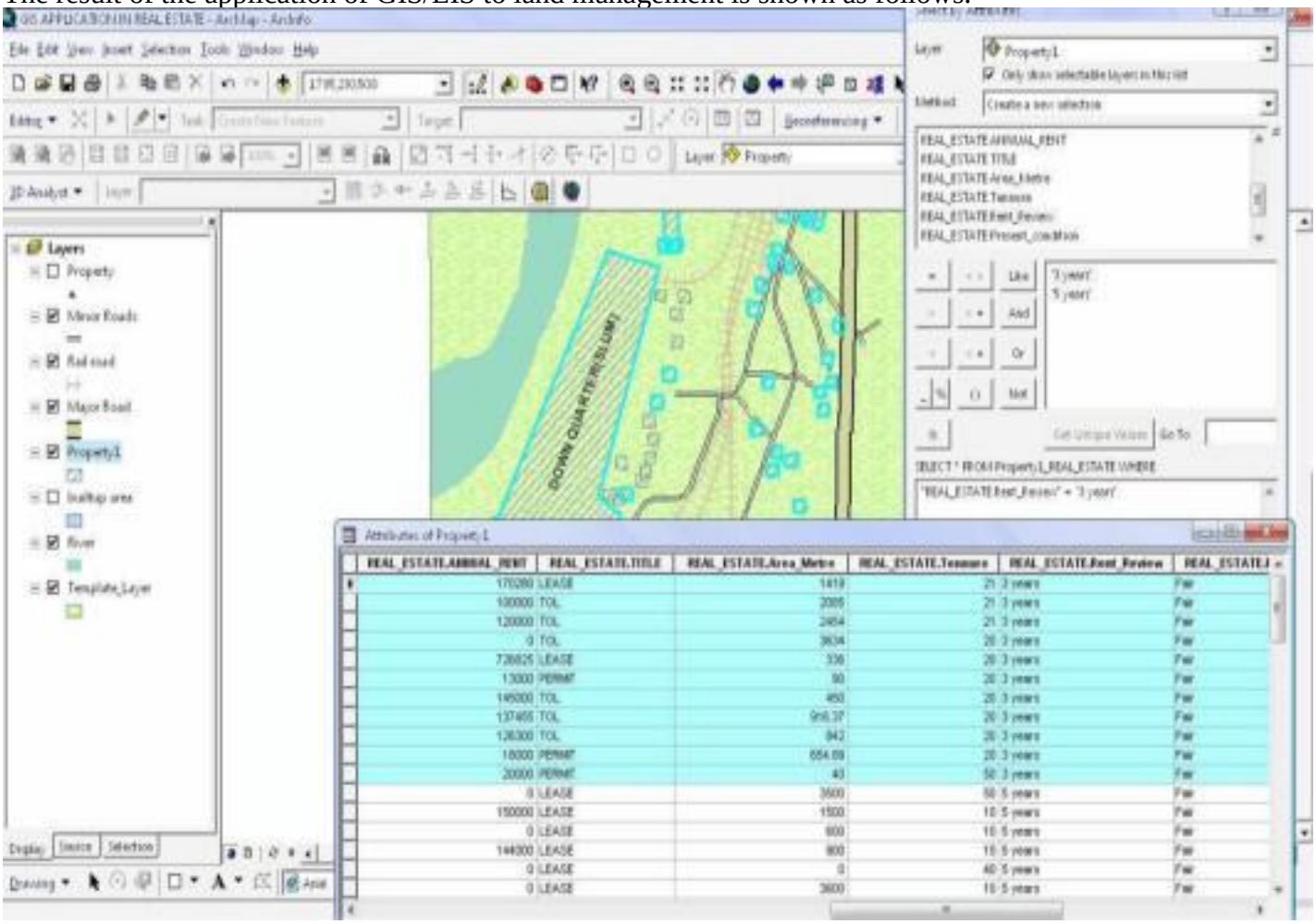
Figure 1: General procedure for inputting raw data into the database and the modules of the GIS for generating, displaying and analysis of information.

2.18 APPLICATION INTERFACE/INTERFACE TO THE DATABASE Graphic user interface to a GIS database is necessary, to enable users understand and make use of the information and function provided by the system. For this study, interface to the database was implemented using Esri ArcMap® (software applicable for both GIS/LIS). ArcMap is a very robust module of ArcGIS® and supports a number of GIS functions required in land management.

2.19 APPLICATION AND RESULTS

Plate 1: shows the display format of a typical Land Information System via a graphical interface

The result of the application of GIS/LIS to land management is shown as follows.



such as a computer system. Here, the query is that of properties whose rent reviews are due after three years.

Taking the municipality data as an example the following procedures will be carried out for the inputting and integration of information in the GIS: maps of subject boundaries, and land resources, soils, vegetation and land use at a scale of 1:50,000 will be digitized and the digital information about satellite images (SPOT, 1989 and1994) and Digital Elevation Model will be input in the GIS. With the transformation of maps and digital data into the same cartographic system and the mapping and overlay procedures of GIS the inventory, availability and location of the attributes and their resources can be achieved at municipality level. This information can then be used for a number of purposes e.g. for the location of forest areas, agriculture, grazing and

irrigated land; for identification of the main land use types in the attribute data, and for the identification of the areas with main restrictions for agriculture. All these involve map overlay of different layers such as crops, soil units, land phases (salinity, depth of soil) and slope. Finally this analysis will enable a spatial stratification of data attractive and the identification of them with different resource base, from which representative samples will be selected for field study and data gathering concerning land use and decision-making.

2.20 BENEFITS OF GIS/LIS USE IN ESTATE MANAGEMENT PRACTICE

GIS is a tool that allows information to be linked to a geographical location. Information from maps is converted into digital form and can be used to benefit everyday life. Its usefulness goes beyond that of traditional paper maps and GIS is fast becoming an established and powerful branch of information technology. GIS makes it possible to link or integrate information that is difficult to associate through any other means. Thus, a GIS can use combination of mapped variables to build and analyze new variables toward effective land/property management.

A well designed land management system with a comprehensive database can provide information to support and facilitate land market and management. In fact, land management GIS can provide data to predict land transaction performance and keep track of estimated and actual costs for various land, thereby assisting in generating reports on land resource inventory. Effective land management involves:

- Understanding the importance of having good, consistent information readily available;
- Understanding the need to manage our information in a consistently known manner, so that it can be used for a variety of purposes;
- Reducing the barriers of sharing information with many different organizations;
- Agreeing on what information is important, what standards are appropriate, who should be responsible for collection and to what precision.

All above factors find place in GIS use for land management.

Furthermore, GIS has the capability of bringing hitherto separate disciplines for the purpose integrated analysis. The ability to integrate spatial data of different themes and resolutions, as well as non-spatial data makes GIS a powerful tool for effective land management. Spatial data sets makes GIS a powerful tool for effective land management. Spatial datasets can be integrated and

spatial analysis performed on them for informed spatial decision-making.

Moreover, GIS is relevant for effective management of the built environment. Geospatial information and maps are basic requirement for sustainable development, and research has shown that the best mapped parts of the world are the most developed in a sustainable manner and vice versa. In other words, any nation that is very serious about any meaningful development and management of her land resources (of course, when you touch on land you touch on everything) and the environment can afford to neglect surveying and mapping.

GIS offers a range of benefits in terms of quick access to data (both old and new), security and improved data management capability. It is relevant to any organization devoting its resources to record keeping, asset management, planning, monitoring and analysis of geographic data. Utility companies can monitor their assets, pipeline locations and underground services and access information more quickly and easily with the aid of GIS.

Developing GIS has the following benefits:

a. Quick access to large volume of data.
b. Ability to prepare an up-to-date large scale map in real time with more functionality
c. Organize data to make access more flexible and consistent such as customized maps (map designed to meet user's specific needs) in digital or analogue form.
d. Ability to access common map based information for any scale or area
e. The ability to obtain information more quickly in relation to the existing filing system
f. An improved basis for gathering statistics on land, property or any geographic feature
g. The ability to analyze the spatial features of data and to search for data on any area or place and to correlate difficult data sets relating to the same point or area.

The LIS constitute the land attributes such as records of allocation, (name of allottees, plot numbers, plot sizes, uses and locations). It also includes records of all transaction such as power of attorney, deed of assignment, Mortgages, Subleases, Releases, devolution, etc. Knowledge of land surface water, energy, and carbon conditions are of critical importance due to their impact on many real world applications such as agricultural production, water resource management, and flood, weather, and climate prediction. Land Information System (LIS) is a software framework that integrates the use of satellite and ground-based observational data along with advanced land surface models and computing tools to accurately characterize land surface states and fluxes. LIS

employs the use of scalable, high performance computing and data management technologies to deal with the computational challenges of high resolution land surface modeling.

The LIS is a valuable tool and powerful decision support system for the Computerization of Property records for the following reasons:

- Effective property administration
- Efficient resource allocation for property administration
- Sustainable land development and planning
- Improved physical storage facilities for property related matters
- Automation of indexes to provide quicker document retrieval
- Computerization of title documents to provide quicker access to land information.

To make the LIS products transparently available to the end users, LIS includes a number of highly interactive visualization components as well. The LIS components are designed using object-oriented principles, with flexible, adaptable interfaces and modular structures for rapid prototyping and development. In addition, the interoperable features in LIS enable the definition, inter-comparison, and validation of land surface modelling standards and the reuse of a high quality land surface modelling and computing system. The establishment of the above implies the creation of a stronger, broader, safer and more sophisticated Land Data Archives.

CHAPTER THREE: RESEARCH METHODOLOGY

The research started off with the formulation of hypothesis, which will be tested for validity through gathering of information relevant to the study. The hypothesis guided the researcher in planning the course of inquiry for selecting the type of data needed for deciding the proper statistical treatment and examination of the results of the study.

The data used were obtained from two sources; Primary and Secondary sources. The sources of data include interviews, workshop materials, text books, journals, web materials and some unpublished materials. The data gathered will enable the researchers to:

- Assess the opportunities that LIS systems would make available to its users if implemented.
- Determine the extent of GIS/LIS systems used in the practice of Estate Management, with particular reference to the aspect of property management; and
- Make valid extrapolations.

3.1 Historical Background Of Study Area

Lagos State was created on May 27, 1967 when Nigeria was restructured into 12 States. Before this period, Lagos municipality was under the administration of the Federal Government through the Federal Ministry of Lagos Affairs as the regional authority. The city of Lagos was under the Lagos City Council. The regions of Ikeja, Agege, Mushin, Ikorodu were under the former Western Region. Lagos State lies approximately between longitude 2°42'E and 3°42'E, and latitude $6^0$22'N and 6°52'. The state is located on the South-Western part of Nigeria with the southern boundary of the state framed by about 180 kilometre along Atlantic coastline while the northern and eastern boundaries are framed by Ogun State. The Republic of Benin formed the western boundary. The state is the smallest state in Nigeria in land area with an area of about 358,861 hectares or 3577sq.km (Odumosu, 1999). This represents only 0.4 per cent of the entire area of the country. This size accommodates about 13 per cent of the entire 140 million appropriate population of the country. The state is also the most urbanized in Nigeria (Ayeni, 1979). Only about 5 per cent of the state's total population are of rural areas. This has serious

consequences on land use planning in the state especially in urban areas. It also has great implication on infrastructure such as housing, water supply, storm drainage, roads, electricity, telephone, waste management and other socio-economic, cultural and administrative issues. Ironically except for Abuja, Lagos stands out to be the best served with infrastructural facilities in the country yet it is where these facilities are most inadequate due to the high population density. The state is also the most affluent in spite of its small size.

3.1.1 Physical And Environmental Challenges In Lagos State

Physical and environment challenges in Lagos can be viewed from both socio-economic and environmental perspectives. Increase in the urban population has resulted in the proliferation of slums and shantytowns. The proliferation of these shantytowns results in the unwieldy expansion of the urban centres, which poses a major planning problem as the provision and management of roads, drainage and sewage systems among other infrastructure, proves very difficult. Furthermore, shantytowns generate a high rate of poverty, diseases and epidemics, environmental pollution, urban conflicts and crime as typified by Mushin, Ajegunle, Isale Eko, Makoko, Oshodi, Ojo and Orile amongst others.

Addressing the problems of the Lagos Metropolis requires a holistic approach. The prevalent problems are physical/environmental, cultural/sociological and management of the interaction of both aspects of the environment [Mabogunje (1981), Egunjobi (1999), Olayiwola (2000), Oduwaye and Ogundele (2006)]. Incidentally, UN-Habitat (2004) outlines these problems to be the major challenges to poverty reduction in Nigeria. Therefore, these issues must be the fulcrum for any meaningful intervention to the urban development problems of Lagos State.

3.1.2 Physical And Environmental Challenges

Physical and environmental challenges in Lagos State include conflicting land uses such as the infiltration of commercial land uses on housing as is the case in Festac town; compete succession on Allen Avenue and Awolowo roads; poor aesthetics and unsightly cityscape, high building density and high rate of building collapse and invasion of shanties in planned areas. Infrastructural problems include narrow and poorly constructed roads, mostly without provision for drainage. Other environmental problems include traffic congestion, pollution (Noise, atmospheric and water), flooding and ocean surge etc. These problems are particularly prevalent in areas that are inhabited by the poor. Due to the rapid population expansion and rapid

urbanization being witnessed in the metropolis, more people, especially the poor are living in ecologically vulnerable areas such as Ijeh, Amukoko, Makoko amongst others. Atmospheric pollution is high in Olusosun and Ojota; Ajegunle and Orile are prone to flooding while building

collapse is high in Ketu, Ebute Metta, Ajegunle and Orile. **Plate 2:** Map of Nigeria showing Lagos State

MAP OF NIGERIA SHOWING LAGOS STATE

Source:
Department of Surveying and Geoinformatics University of Lagos

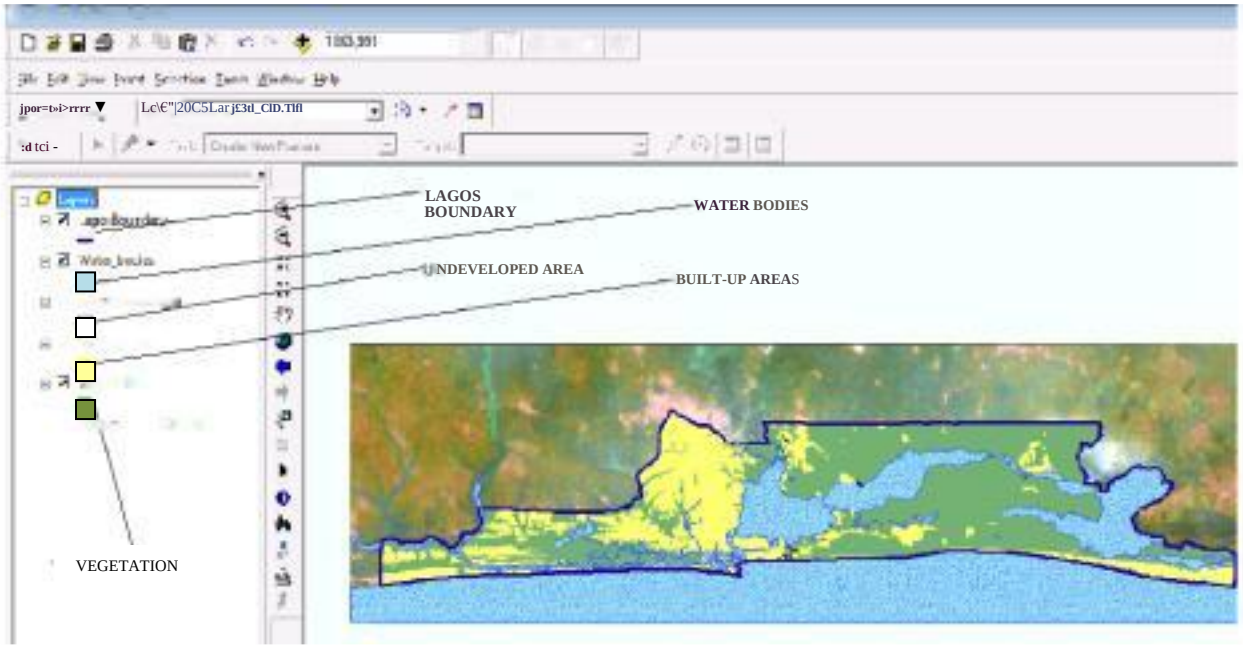


Plate 3: Detailed map of Lagos showing its boundary, water bodies, undeveloped and built-up areas.

3.1.3 Sociological and Cultural Challenges

Prevalence of miscreants i.e. area boys, crime and juvenile delinquency, ethnic clashes, high population density, political violence, public ignorance and apathy, environmental-health crises are common. All these issues are dominant in the shanty towns. Area boys are mainly located in the slums of Mushin, Oshodi, Ketu, Onipanu, Yaba, Shita and Isale Eko. Land disputes and extortion, usually accompanied by widespread violence are quite common among the Omo-Oniles of Ajah and other emerging settlements around the metropolis. Ethnic clashes usually occur in the shantytowns of Idi-Araba and Ladipo-Mushin. Environmental health crises are quite common in low income areas. High incidences of Sexually Transmitted Diseases were recorded in the low income settlements of Ipodo-Ikeja and Tolu-Ajegunle (Nwokoro and Okusipe, 2002). Political skirmishes are also widespread in low income areas. Crime is also higher in the low income areas of Agege and Somolu, compared to the middle and high income areas of Surulere, Apapa and Eti Osa.

3.1.4 Environmental Management Challenges

This includes legislative bottlenecks, technical inadequacies and lack of manpower, lack of public participation and corruption. Furthermore, the loopholes in the Land Use Decree of 1978 are yet to be revised- close to three decades later; selective implementation of the Urban and Regional

Planning Decree 88 of 1992, paucity of qualified officers on the field and the inability of government to remunerate workers adequately. Community participation is also not fully implemented. Planning is still basically "for the people", rather than being "by the people". Therefore, planning ends up not being sustainable. Furthermore, the problems of the Lagos Metropolis are compounded there is an overlap of functions and activities by all levels of governments, and consequently, friction, conflicts and waste of public funds. Overlap of functions of the various environmental management agencies is also an issue. The case of Lagos State Traffic Management Authority, Federal Road Safety Corps and Federal Road Maintenance Agency is an example. The populace has also lost confidence in their elected representatives and so many of them do not have a sense of responsibility to their environment or communities. Vandalism and destruction of government projects are quite pronounced, especially in the slums and shanties.

In summary the major challenges confronting physical planning and development in metropolitan Lagos include the following; communication gap, non-integration of socio-economic goal with physical development planning objectives, fragmentation of planning and planning related agencies, and low level of application of information technology in the planning process.

3.2 RESEARCH DESIGN

This chapter presents methods and procedure used in carrying out this research. It discusses the design and methodology used which forms the background against which the reader can evaluate and understand the findings and conclusion.

A descriptive research is essential for this research work in aiding the researcher to correctly assess the situation as a condition precedent to making inference and generalizations that provide the basis for making predictions. This is because all research studies are concerned with observation of certain relationship whose validity can be tested or verified.

3.3 SOURCES OF DATA

Data for this research were gathered from two sources: primary and secondary data sources.

3.3.1 Primary Sources of Data

These are referred to as "first hand" information gathered for a specific research. They have an advantage of giving the exact information wanted and which best addresses the subject. Under this,

the researcher engaged in a face-to-face interview with real estate practitioners and collaborators. Data was also collected through questionnaires administered upon practicing Estate Surveyors and Valuers actively involved in the property management aspect of the profession. In addition, the researcher made report based on reasoned extrapolations from observation of respondents interviewed.

3.3.2 Secondary Sources of Data

These refer to data collected from works of others on related literature. They include data sourced from textbooks, GLS/LIS workshop materials and conferences, journals, web materials etc.

3.4 METHODS OF DATA COLLECTION

The methods of data collection for this research are as follows:

3.4.1 Direct Observation

This provides primary data that carefully fit already determined categories which the researcher has laid out. This involves entirely the researcher's direct observations of the phenomena or situation. Under this, the researcher's observations on conducted interviews for this research were used.

3.4.2 Indirect Observation

Here, data was gathered from those with a general and relevant idea of the GIS/LIS systems as used in land/property management in the country, especially in Lagos metropolis. Here the researcher had interviews with practitioners who have relevant knowledge of the application of the GIS/LIS system is in real estate practice.

3.4.3 Analysis of Records

Various methods of statistical data analysis were used to analyze the data collected. The frequencies were recorded in tally and the resulting table and charts were used to show disparity among variables.

3.4.4 Sample Size Determination

The sample size of the targeted populations is amongst Estate Surveyors and Valuers both in public and private practice in Lagos metropolis. This will determine the number of questionnaires to be administered in each of the various municipalities (Local Government Areas) that make up the study area.

The projected population for the study area is 17,552, 940. The sample size will be determined with respect to this population using Bourley's rule (Yamane).

The formula for Bourley's rule is **n = N/ [1+N (e)]**

Where	N	=	Sample size
	N	=	Population
	E	=	Error margin
	1	=	Constant

n = 17,552,940/ [1+ 17,552,940(0.05^2)]

= 17,552,940/ [1+17,552,940(0.0025)]

= 17,552,940/ [1+43,882.35]

= 17,552,940/ [43,883.35]

= 400

With respect to the above formula, a total number of 400 questionnaires will be administered. However, only a fraction of 324 questionnaires were successfully administered.

Local Government	**Population**	**Percentage**	**Sample size**
Agege	1,058,969	6.033	24
Ajeromi-Ifelodun	1,471,287	8.382	34
Alimosho	2,098,454	11.955	48
Amuwo Odofin	538,173	3.066	12
Apapa	522,384	3.051	12
Badagry	390,026	2.222	09
Epe	331,751	1.890	08
Eti-Osa	1,008,241	5.744	23
Ibeju-Lekki	101,983	0.581	02
Ifako-Ij aiye	762,851	4.346	17
Ikeja	664,905	3.788	15
Ikorodu	706,330	4.024	16
Kosefe	958,039	5.458	22
Lagos-Island	881,333	5.021	20
Mushin	1,354,736	7.718	31
Ojo	965,061	5.498	22
Oshodi-Isolo	1,163,058	6.626	27
Somolu	1,050,895	5.987	24
Surulere	1,511,308	8.610	34
STATE TOTAL	**17,552,940**	**100**	**400**

3.5 SAMPLING TECHNIQUES

The type of sampling technique that was used for this study is stratified sampling. Here, each local government was taken as a stratum and questionnaires were administered based on the sample size.

3.6 PERCENTAGES

Percentages were used to show the corresponding differences with respect to a given variable(s) in relation to one hundred (100).

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

The success or quality of any research work depends on the soundness of data collection and analysis. This chapter reveals how data was analyzed in the course of the research using the appropriate statistical tool.

Data for analysis relate specifically to those acquired questionnaires administered upon respondents at the choice municipalities.

4.1 ANALYSIS OF THE STUDY QUESTIONNAIRE

Table 1:

Questionnaire Distribution

Options	Questionnaire Given	Percentage Given (%)	Number Returned	Percentage Returned (%)	Not Returned	Percentage Not Returned (%)
Real Estate Firms	216	66.67	201	53.93	15	12.20
Government Parastatals	108	33.33	99	26.56	9	7.31
Total	324	100	300	80.49	24	19.51

From ***Table 1***, it is observed that out of 324 questionnaires administered on Estate Surveyors and Valuers in real estate firms and government parastatals. 300 questionnaires representing 80.49% were returned while 24 representing 19.51% were not returned.

Table 2:

Age Distribution

Options	Response	Percentage (%)
Under 32	61	20.33
32 – 42	121	40.33
42-52	100	33.33
52 and above	18	6.01
Total	300	100

From ***Table 2***, 61 respondents representing 20.33% are under 32 years of age, 121 respondents representing 40.33% are between the ages of 32-42, and 100 respondent representing 33.33% are between ages of 42-52, while 18 respondents representing 6.01% belong to ages 52 and above. This implies that a good number of the respondents fall under to 32 - 42 years age bracket.

Table 3

Qualification

Options	Response	Percentage (%)
M.Sc.	46	15.33
B.Sc.	154	51.33
HND	88	29.33
Others	12	4.01
Total	300	100

From ***Table 3*** above, 46 respondents representing 15.33% indicated M.Sc., 154 respondents representing 51.33% indicated B.Sc., and 88 respondents representing 29.33% indicated HND while 12 respondents representing 4.01% indicated other qualifications different from the above. This is indicative of the fact that more of the respondents are B.Sc. holders.

Table 4

Question 4:

How long have you been in practice?

Options	Response	Percentage (%)
More than 10years	157	52.33
Less than 10years	143	47.67
Total	300	100

From ***Table 4***, 157 respondents representing 52.33% have spent more than 10 years in practice, while 143 respondent representing 47.67% are otherwise.

Table 5

Question 5:

Do you use computers in practice?

Options	Response	Percentage (%)
Yes	300	100
No	-	-
Total	300	100

From ***Table 5***, all respondents replied positively to the use of computers in practice.

Question 6:

If your answer to no. 5 is "yes", does your area of computer application also include property management?

It was observed that all respondents in both private and public practice ticked "yes" to question No. 6 above.

Table 6

Question 7:

Have you heard of Land Information System (LIS) before?

Options	Response	Percentage (%)
Yes	203	67.67
No	58	19.33
Not sure	39	13
Total	300	100

From ***Table 6***, 203 respondents representing 67.67% indicated "Yes", 58 respondents representing 19. 33% indicated "No", while 39 respondents representing 13% indicated "Not sure". This might be suggestive that the knowledge of GIS/LIS technology as a concept is on the increase amongst Estate Surveyors and Valuers in the state.

Question 8

If your answer to no. 7 is "yes" what do you understand by LIS?

The researcher had to design question no. 8 for the purpose of confirmation of the respondents whose claims were affirmative in question no 7. From analysis, it was observed that out of all who indicated "yes" in question 7, about 57% got the definition of LIS, 38% had little idea of the concept, while the rest were not really sure of what it meant.

Table 7

Question 9:

Do you use LIS in your property management practice?

Options	Response	Percentage (%)
Yes	85	28
No	215	72
Total	300	100

From ***Table 7***, it is observed that 85 respondents representing 28% indicated "yes" to LIS use in property management practice while 215 respondents representing 72% indicated "No". It was observed that most respondents whose claims were affirmative were staff of the states government parastatal.

If your answer to no. 9 is "No", please answer questions no. 10 —12. Otherwise, skip 10-12 and answer question no. 13 only.

Table 8

Question 10:

What is the reason?

Option	Response	Percentage (%)
Cost involved	78	30.23
No need for it	49	18.99
Others	131	50.78
Total	258	100

From ***Table 8***, 78 respondents representing 30.23% gave reasons for not applying LIS in practice; most reasons being that they are yet to develop and apply it in their area of practice; 49 respondents, most of which serves in government parastatals, representing 18.99% indicated

"cost involved", 131 respondents representing 50.78% indicated "No need for it", the rest left no remark or comment on the issue.

Table 9

Question 11:

Do you plan on employing LIS in your property management aspect of the profession in the future?

Option	Response	Percentage (%)
Yes	248	87.63
No	35	12.37
Total	283	100

From ***Table 9***, 248 respondents representing 87.63% have future plans of employing LIS in practice, while 35 respondents representing 12.37% do not seem to have future plans of using the LIS in practice.

Table 10

Question 12:

When do you think you could effect this plan?

Options	Response	Percentage (%)
This year	31	11.40
Next year	81	29.78
Later	160	58.82
Total	272	100

From ***Table 10,*** 160 respondents representing 58.82% indicated "Later" and included statements like "when I know more about it", "when the organization deems if fit", "in another 3 to 5 years", "Not sure" etc. 81 respondents representing 29.78% indicated "Next year" for plans to LIS application; while 31 respondents representing 11.40% indicated "This year".

Question 13:

If your answer to no. 9 is "yes" what is your opinion about its results, so far?

Most respondents were positive about the results of the use of LIS in property management practice. A cross-section of the interview commended the use of the system (LIS) in property management. Most of the adjectives used to describe the extent and usefulness of the Land Information System were "accurate, innovative, effective, wonderfully quick, quite supportive etc.

Table 11

Question 9

Do you use LIS in your property management practice?

Options	**Response**	**Percentage (%)**
Yes	85	28.33
No	215	71.67
Total	300	100

Table 12

4.2 STATISTICAL ANALYSIS OF PROBLEMS ENCOUNTERED IN PROPERTY MANAGEMENT.

Table 12: (PROPERTY MAINTENANCE)

	No of Respondents	**Percentage (%)**
Difficulty in planned maintenance because data relating to each property are stored using the traditional filing system (filing cabinet) thus, there is no way of being reminded when the property is due for maintenance. ***A***	100	33.33
Cost and time tracking necessary for budgeting and administrative planning. ***B***	76	25.33
Lack of transparency in maintenance history of each property and at such recurrent faults which indicate an underlying problem. ***C***	124	41.34
Others (specify)	0	0
Total Number of Responses	**300**	**100**

From ***Table 12***, 100 respondents representing 33.33% encounter difficulty in planned maintenance because data relating to each property are stored in the property's own file manually thus, there is no way of being reminded of the maintenance at the due date. 76 respondents representing 25.33% face challenges in establishing the cost and time tracking necessary for budgeting and administrative planning. 100 respondents representing 41.34% experience difficulty in establishing the maintenance history of each property which invariably leads to recurrent faults thus, indicative of an underlying problem.

Table 13

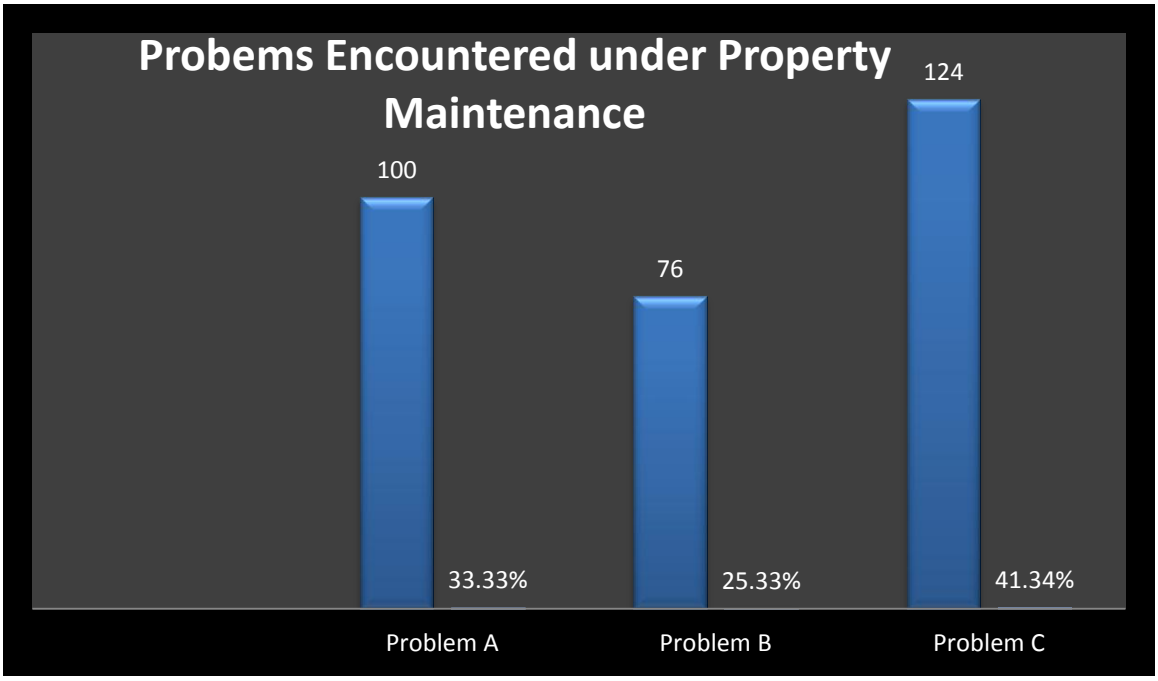
PROBEMS ASSOCIATED WITH FILING OF RECORDS

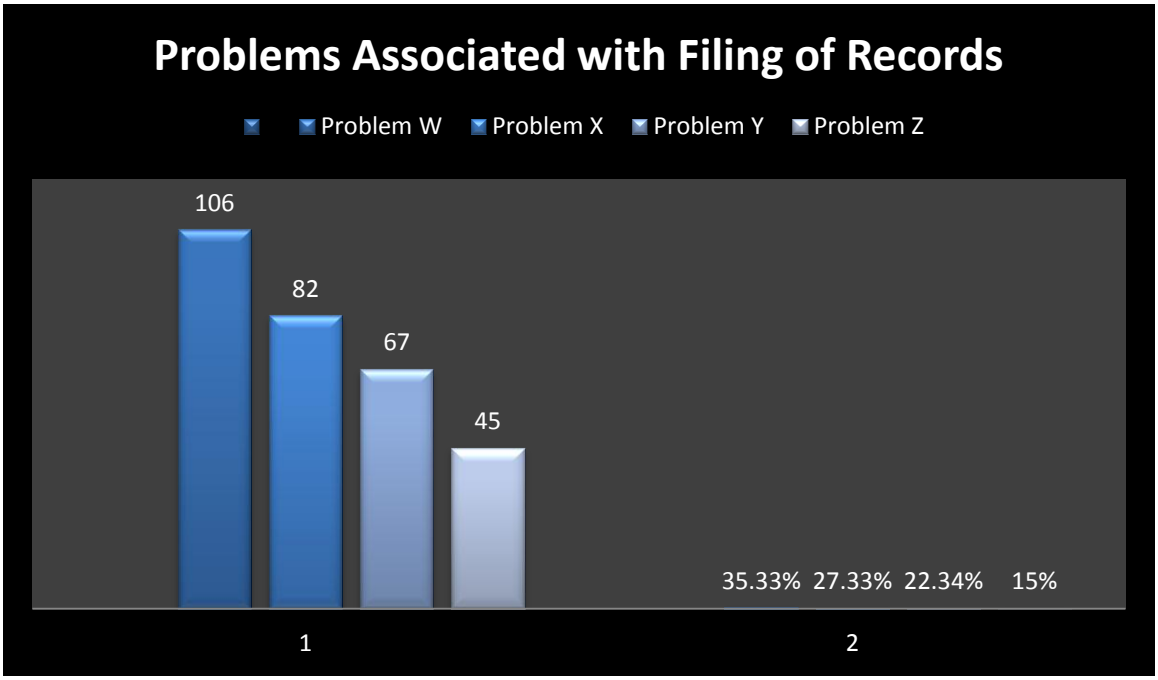
	Number of Respondents	**Percentage (%)**
Only one person can work on a file at a time. ***W***	106	35.33
Updates made to a file by one section will not reflect in the files kept by other section on the same property or client X.	82	27.33
Information can only be retrieved by sifting and sorting through the files manually. ***Y***	67	22.34
Other sections requiring information have to call the records section or department first. ***Z***	45	15
Total No. of Response	**300**	**100**

From the ***Table 13*** above, the problems encountered by respondents in the filing of records indicate that 106 respondents representing 35.33% affirmed that "only one person can work on a file at a time", 82 respondents representing 27.33% indicated agreed that "updates made to a file by one section will not reflect in the files kept by other sections on the same property or client". Sixty-seven (67) respondents representing 22.34% declared that information can only be retrieved by sifting and sorting through the files manually. While forty-five (45) respondents representing 15% confirmed that "other section requiring information has to call the records section/ department first" before proceeding any further. These problems have attendant consequences which invariably militate against the firm's performance profile and reputation, and this could be traced back to the use of the manual system of recording information. Whereas, if the automated system (i.e. LIS) were to be applied, all of these problems could be solved or

significantly reduced, leading to a relatively high level of professionalism and trustworthiness on the part of the firm. This is so, because LIS fosters an efficient service delivery and sound and quality decision-making for policy action.

GRAPHIC REPRESENTATION OF STATISTICAL FINDINGS





CHAPTER FIVE: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

The essence of this chapter is to give a general overview the most important features and factual information about the results. It also creates a link between what the study sets out to achieve and what it actually succeeded in achieving.

5.1 SUMMARY OF FINDINGS

The findings of this study are as follows:

- That there must be need for capacity building on ICT awareness in the property management profession.
- A lack of software programs in circulation to handle specific property management tasks and functions instead of those that are of general application.
- There must be the political will at the executive level to bring about genuine reform in the land registry systems.
- The status of people on fact-finding missions must be such that they can influence decision makers when they return to their states.
- There must be the financial, human and other resources available to support replication of the lessons learned.
- The public now has increased confidence in the land transfer and acquisition process - which has led to increased revenue for the State Government. This could also be the case for Property Management firms if they applied LIS in their operations.
- The integrated computerized systems in use at the Land Department mean that State land revenue projections are now possible.
- The new ways of working at the Land Registry have blocked the corrupt activities of unscrupulous staff and touts.
- The spasmodic nature of capacity building initiatives;
- The failure of initiatives to fund maintenance capacity (e.g. upgrade, procurement/ replacement of equipment, software and hardware).
- The short time frames of land survey support projects given the enormity of the initiatives;

• The dearth of skilled land survey, LIS and management staff; and

- Lack of coordinated baseline data systems for environmental assessment and state of the environment monitoring (including data collection, interpretation, updating, storage and retrieval, and user-dissemination mechanisms);

- Lack of tools to ensure data capture, generation, aggregation, enhancement, extrapolation and maintenance of quality; and

- Need to recognize uses and applications of environmental data that extend beyond Environmental Impact Assessment (EIA), requiring the combination of socio-economic layers that are also useful for development planning of the LIS.

5.2 RECOMMENDATIONS

The Need for Capacity Building

Using Nigeria as a case study, the level ICT awareness in the land management profession to date is minimal (Kakulu, 2003). Capacity building training and the provision of necessary infrastructure should be accelerated to the point where the end-users in various state and local government land divisions and departments can be part of the systems analysis phases in development of their systems. This would provide the missing gap in any proposed automation system and guide the product manufacturers in their development of workable GIS and other software programs for use.

With the aid of digitization, manual searching can be eliminated. Documents are more secure-originals can be kept in a strong room and cannot be altered or removed by users. Access to land and property records would become faster and more transparent. Land and property professionals in private practice, continue to face ICT challenges in the delivery of their professional duties. Being in competitions with allied professions, the need to keep abreast with technology cannot be over emphasized.

In Nigeria today the banking industry has gone fully automated and professional valuers serving this industry are unable to keep pace with their professional counterparts in other professions. The reason for this is not farfetched and can also be traced to a weak foundation or no foundation at all depending on their year of graduation. This should not be an excuse because professional

associations like the Nigerian Institution of Estate Surveyors and Valuers do not make light of their Continuous Professional Development (CPD) training. Valuers serving the banking sector in the preparation of mortgage valuations, investment analysis or feasibility and viability studies should be able to perform these tasks matching the level of technological sophistication of their banking clients.

CPD efforts should be channelled towards ICT as a matter of urgency including deadlines for compliance as much as possible so that the sustainability and relevance of the profession is sustainable. The absence of dedicated professional software designed and developed for use within the Nigerian real estate; land administration and property management environment also contributes to the lack of interest in acquiring the technology. Imported professional software developed in different practice environments outside Nigeria; do not accurately reflect the local practice methods and so its users have to first of all understand the principles behind the software before it can be applied effectively with a lot of adaptation. This makes the process a bit cumbersome and discourages adult learners.

The Need for Mainstreaming ICT into Academia

Dixon (2005) citing Perez (2002) and Gordon (2000) notes that in over hundreds of years, periods have occurred when technological change has brought about radical changes to market boundaries, increasing the scope to exploit intellectual capital. Examples include printing, steam power (including electricity), canals, and railways, mass media, and more recently Information and Communications Technology. Rowlatt et al. (2002) assert that the new economy of the twenty-first century is different from any other new economy, and highlight three main aspects as follows: Infrastructure to assemble, analyze, communicate and manage information within "computer mediated networks". Transactions to purchase goods and services carried out through Electronic Data Interchange (EDI) or over the internet.

There have been studies to examine how increasing use of ICT will impact on professional firms' operations and activities that include productivity, staffing structure and requirements, adoption of working practices, quality of customer service, and importance of a central meeting place have been addressed (Sing, 2005). Capacity building needs in some universities and other institutions of learning which offer courses in estate management, land economy or land surveying is threefold. Academic staff responsible for teaching core departmental courses who may need to

mainstream ICT into various aspects of the syllabus lack the capacity to do so and need to be trained or re-trained to enable them update the course content in such a way that ICT is fully integrated. ICT courses are offered to students in a very general way and on an awareness level only. This might have been sufficient in the past when the dependence of the corporate world on ICT was not as high as it is in Nigeria today.

The applications element where students are introduced to specific professional software and grounded in its use is not very effective due to lack of capacity and professional software developed in line with local practice procedures and methods. The method of delivery of ICT as a stand-alone subject in most institutions where it is taught by a computer centre or ICT department only and where estate management and other land professionals are taught with students offering different courses with different learning needs makes it impossible to be applications oriented. As a result, students are not able to relate information acquired in a meaningful way.

There is an urgent need for mainstreaming ICT into the core subjects in estate management and other land related courses. By mainstreaming, the ICT component of each course should be taught as part of the particular subject and preferably by the course lecturer or resource person who delivers the course. Separating it in the manner in which it currently occurs may be convenient but discourages lecturers from acquiring new skills which are vital for sustainable development of the estate management and land management profession.

Property Management courses need to be expanded to include the use of data base management packages such as access or other dedicated software. Students need to be introduced to relational databases and also the role of the internet as a marketing tool in property letting and sales. Teaching of the principles and theory alone without relating it directly to computer applications is not sustainable.

Property Management embraces a wide variety of interrelated activities associated with leases. It involves performing certain services on behalf of the property owner such as rent collection, serving of notices to tenants for renewal or termination of leases, negotiation of rent reviews, maintenance inspection schedules, supervision of maintenance work and rates. Property management also involves keeping track of local government levies, rates and other taxes on the property. This process deals with large volumes of data requiring safe and efficient methods of collection, storage, retrieval and manipulation. Property management records need to be updated

regularly and proper track of expiry and renewal dates need to be kept.

In a large property portfolio such as government records in various ministries, housing authorities or development boards, or even in a small collection of properties managed by a professional firm, there are obvious challenges in property management. Where the volume of property data is high, depending on memory alone might lead to expensive mistakes or only a small number of files may be accessed where decisions have to be made. There may be the inability to remember and prepare for important events such as renewal dates or planned maintenance work which are buried deep within files in a filing cabinet. Computer applications to property management can provide the professional property manager with an extremely powerful and flexible information management tool for property management and lease administration. It enables proper documentation of virtually everything about a property. Information about the owners, construction details, photographs, sketches, lease agreement including financial records of receipts and payments may be made. Information about any property can be called up at any time and in a variety of ways. It can also be programmed with handy reminders - shortlists of which administrative actions are due or are pending at all times reducing the incidence of failing to keep appointments of sending out belated reminders.

Where Surveyors in the Property Management specialty are sufficiently trained, a computerized approach to property management will assist the property manager to maintain a lively and active property database which would be useful for planning and budget preparation. Information may be found whenever it is required. It can automatically extract and highlight important dates such as lease renewal dates and also prepare letters, reminders and demand notices.

Property Management embraces a wide variety of interrelated activities associated with leases. It involves performing certain services on behalf of the property owner such as rent collection, serving of notices to tenants for renewal or termination of leases, negotiation of rent reviews, maintenance inspection schedules, supervision of maintenance work and rates. Property management also involves keeping track of local government levies, rates and other taxes on the property. This process deals with large volumes of data requiring safe and efficient methods of collection, storage, retrieval and manipulation. Property management records need to be updated regularly and proper track of expiry and renewal dates need to be kept. Hence, the need for the use of LIS for perfect ease in the execution of the property management tasks.

5.3 CONCLUSION

Curriculum and instruction with special reference to Estate Management in higher institutions in Nigeria lacks sufficient content and context to provide undergraduates with sufficient grounding on ICT to enable them utilize the skills upon graduation. Lecturers are in urgent need of capacity building to enable them cope with the ICT age. University graduates absorbed in the private or public sector are unable to handle ICT challenges because of a weak foundation and the absence of focused career development programmes that adequately address the learning needs of mid-career professionals. The public sector lacks the political will to provide on-the-job training. At this time in our national development, the public sector; private sector; and corporate sector would need to have an extensive audit done to ascertain their capacity building needs within the context of ICT.

The results of such an audit should form the basis for the development of capacity building programmes designed for the real estate sector. Some of the general business applications programmes that are available on most operating systems such as windows are spreadsheets, databases, word processors and computer aided design programmes. Although changing business conditions all around us motivate a request for new or improved computer system support, the first real step in this process is to recognize the need to change and clearly define what changes are needed.

Finally, I would like to say that the computerization process and the move toward automation at the national level should be a collective responsibility of the Estate Surveyors and Valuers Registration Board of Nigeria, The Nigerian Institution of Estate Surveyors and Valuers, Universities and other Higher Institutions as well as the individual Valuer as part of his/her personal continuous professional development efforts. Intervention at the national level is also required by way of infrastructure and capacity building.

The LIS information revolution has considerable potential to support society's evolving humankind/land relationship by providing information for decision makers that will enable them to make decisions favourable to sustainable development in the context of land administration and management.

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Appendix I

Department of Estate Management
Faculty of Environmental Studies,
University of Nigeria Enugu Campus
23rd June, 2013.

Dear Respondent,

I am a final year student of the above named department and institution conducting a project research "A STUDY OF LAND INFORMATION SYSTEM AS A VERITABLE TOOL FOR PROPERTY MANAGEMENT", for the award of Bachelor of Science (B.Sc.) degree in Estate Management. The purpose of the questionnaire is therefore strictly academic thus its confidentiality is secure.

Yours faithfully,
Project Researcher

Appendix II

QUESTIONNAIRE

Please tick [√] in the appropriate apace where necessary.

1. Indicate your institution

a) Real Estate firm. [ ]

b) Government parastatal. [ ]

2. Indicate your age

a) Under 32years. [ ]

b) 32 - 42years. [ ]

c) 42 - 52years. [ ]

d) 52years and above. [ ]

3. Indicate your qualification.

a) M.Sc. [ ]

b) B.Sc. [ ]

c) HND [ ]

d) Others [ ]

4. How long have you been in practice?

a) More than 10years [ ]

b) Less than 10years [ ]

5. Do you use computers in your practice?

a) Yes [ ]

b) No [ ]

6. If your answer to no. 5 is “Yes", do your area of computer application also include property management?

a) Yes [ ]

b) No [ ]

7. Have you heard of Land Information System (LIS) before?

a) Yes [ ]

b) No [ ]

8. If your answer to no. 7 is "Yes", what do you understand by LIS?

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.....,.....

9. Do you use LIS in your Property Management practice?

a) Yes [ ]

b) No [ ]

If your answer to no. 9 is " No", please answer questions no. 10 - 12. Otherwise, skip 10-12 and answer question no. 13 only.

10. If your answer to no.9 is "No", what is the reason?

a) Cost involved [ ]

b) No need for it [ ]

c) Others [ ]

11. Do you plan on employing LIS in your property management aspect of the profession in the future?

a) Yes [ ]

b) No [ ]

12. When do you think you could effect this plan?

a) This year [ ]

b) Next year [ ]

c) Later [ ]

13. If your answer to no.9 is “Yes", what is your opinion about its results?

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.....

14. We would want to hear from you if you have any further

comments.....

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.....

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Appendix III

PROPERTY MAINTENANCE

1. Do you experience difficulties because data relating to each property are stored using the traditional filing system (filing cabinet), thus there is no way of being reminded when the property is due for maintenance?

a) Yes [ ]

b) No [ ]

2. Do you encounter difficulties in cost and time tracking necessary for budgeting and administrative planning?

a) Yes [ ]

b) No [ ]

3. Do you observe any lack of transparency in maintenance history of each property and as such, recurrent faults which indicate an underlying problem?

a) Yes [ ]

b) No [ ]

4. Other related problems? (Please specify)

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.....

FILING OF RECORDS

1. Is the issue of having only one person working on a file one at a time a recurring problem?

a) Yes [ ]

b) No [ ]

2. Do you experience problems whereby property file updates made by one section do not reflect in the files kept by other sections on the property?

a) Yes [ ]

b) No [ ]

3. Is retrieval of information on property files by sifting and sorting through files manually a continuous problem?

a) Yes [ ]

b) No [ ]

4. Do other sections of the firm who require information have to call the records section first?

a) Yes [ ]

b) No [ ]