

Full Length Research Paper

MIS channels for effective information provision to managers of agricultural extension programmes

ADEDOKUN, O. Aderonke^{1*} and GBAJE, E. Shiloba²

¹Kashim Ibrahim Library, Ahmadu Bello University, Zaria, Nigeria.

²Department of Library and Information Science, Ahmadu Bello University, Zaria.

Received 13 April, 2015; Accepted 24 February, 2016.

Agricultural extension programmes play significant role towards achieving sustainable Agricultural growth. This they can achieve by all managers having adequate information provided by MIS to make effective decisions. This study examines the MIS channels for effective information provision to managers of agricultural extension programmes in Ahmadu Bello University. An interview guide was administered and used as a focus group on the target population comprising a total of 18 heads of programmes and 4 heads of MIS units. The findings of the study showed that the channels used were the Email, paper files, prints and phones there existed no intranet, extranet, interactive website or a specific discussion forum for the Extension program heads. Recommendations were proffered for better information provision to managers.

Key words: Management information system, information, channels, managers, agricultural extension programmes.

INTRODUCTION

Every society and organization requires adequate information to survive in the 21st century. Information is a basic and important resource needed to develop other resources in any thriving organization. Changing circumstances and environments has necessitated the need for access to information for effective decision making at various levels of management in the organization. Thus, the development and use of Management Information Systems (MIS) is a modern phenomenon concerned with the use of appropriate information that will lead to better decision making, hence better results. A manager's effectiveness is largely dependent on the existence and use of an effective assistance such as a management information system.

Management Information System is basically concerned with processing data into information which is then communicated to the various departments, in an organization for appropriate decision-making. A management information system essentially produces information that supports the management functions of an organization (Davis and Olson, 2005; Lucas, 2000; McLeod, 2005). In essence, management information system is the link required to connect all the organization's components together, hence providing better operation and survival in a competitive environment.

As enumerated in the MIS Handbook (2007), Information Technology (IT) infrastructure or facilities which are specifically, computers and other networking

*Corresponding author. E-mail: aoadedokun@yahoo.com.

equipment have been emphasized as prerequisites for an effective MIS operation and information provision. Hazzan (1999) aptly summarized the importance of this information equipment that without computers, their peripherals and other communications equipment, organizations could not access information offered through world-wide web. Undoubtedly, it can be asserted from various findings on the use of MIS that it is an inevitable tool or system in the provision of information in the 21st century. In order to meet up with the demands on the Agricultural extension programmes, the information channeling by the MIS needs to be appropriate for effective and timely decision making.

Scope of the study

The scope of the study is limited to only the heads of the programmes and management information managers/ staff of the various agricultural extension programmes in NAERLS and NAPRI, Ahmadu Bello University, Zaria. IAR was excluded because it doesn't have a MIS unit or a similitude of it.

Objective of the study

The specific objective of the study was to identify the types of channels used in the provision of information to managers in Agricultural Extension Programmes.

Significance of the study

The study is significant because the findings will reflect the types of Management information system channels appropriate for information provision to managers in agricultural extension programmes in ABU Zaria, bringing about a general awareness of how the use of these MIS channels is beneficial in the Agricultural extension programmes of Ahmadu Bello University and the Nation at large.

Agricultural Extension Programmes in Ahmadu Bello University

The Ahmadu Bello University, Zaria has Agricultural Extension programmes in National Agricultural Extension and Research Liaison Services (NAERLS), National Animal Production and Research Institute (NAPRI) and Institute for Agricultural Research (IAR). These Agricultural extension programmes are put in place to ensure extensive agricultural research, capacity development for effective delivery services, increased agricultural productivity, sustainable agricultural growth and wealth creation in Nigeria at large (NAERLS, 2012). An

agricultural extension organization is a formalized structure of programmes, roles or position targeted at achieving extension activities. These programmes represent the various crops, animals and fields of agriculture.

REVIEW OF RELATED LITERATURE

Management Information System (MIS) in agricultural extension Organizations is a process of generating and providing information to its clients. MIS is a computer-based system that provides managers with the tools for organizing, evaluating and efficiently running their departments (Gupta et al., 2010). Automated MIS have had relatively little success in providing management with the information it needs. With particular reference to Badragheh (2010) that there existed a MIS in agricultural extension services, that lacked internal communication network management and programming of extension departments and or organizations. This Lack of internal communication therefore hinders fast and free flow of information across and within necessary links.

Channels of information provision by MIS for managers

Effective MIS should ensure the appropriate presentation formats and time frames required by operations and senior management is met. MIS can be developed and maintained by either manual or automated systems or a combination of both. The MIS gathers data and ensures it is duly processed. This data processing consists of identifying each item of data and systematically placing it within a scheme that categorizes data items on the basis of some common characteristic or feature. For example, field training reports will be categorized separately from improved crop technologies, even though it falls under general research and extension. Data not organized into a meaningful pattern and timely provided can serve almost no useful purpose to those who must use them to make decisions.

A computer can help in processing the data effectively. As far back as nineteen years, Rao (2005) suggested the use of computers in agricultural extension in India. He proposed that computer programmes be focused on the different managerial levels. As noted by Asadi et al. (2008) that effective deliveries of the institution's products and services are supported by the MIS. With increased globalization, organizations, firms and establishments have teams around the globe in different time zones, working on the same problem, so the need for continuous interaction, communication and information flow round the clock has greatly increased. This involves a much larger group of managers in different zones all over the

country.

This is the typical scenario of the Agricultural extension programs in Nigeria with zonal offices in the ecological zones of the Federation. There are some information that need to be shared as soon as possible and decisions taken for appropriate action. Provision of information by MIS can be done by documenting and then retrieving and also through a number of channels, some of which will enhance communication and collaboration which is an essential part of both information systems and agricultural extension.

This documentation involves storing items of information in an orderly manner, through the use of storage media. Storage media are materials such as office paper, office paper files, metallic file cabinets, magnetic tapes, magnetic disks, microfilms, film strips, and a few other devices. Once the information is recorded on these storage media, the system can generate, on demand, information required for making decisions, solving problems, or performing analyses and computations. Gladner (2007) asserts that hard disk and magnetic tapes are the most reliable storage media. A properly designed storage and retrieval system matches the related variables efficiently and accurately. In some cases, it even suggests alternative courses of action for management to take. This is best done by the use of a database.

Database

The term database is any central controlled collection of organized data that might serve the extension programs within the complex. Data is stored in an organized and structured way to facilitate sharing and improve availability to those who need it (McLeod, 2005). The database improves efficiency of processing by providing all required data in a single file rather than separate files. This also improves efficiency of information retrieval. Data as affirmed by Keen and Morton (2008), are usually generated at the field level through transaction-processing systems, but once the data are captured, any echelon along the organizational hierarchy may use them, provided that information requirements have been well defined, appropriate programmes have been implemented, and a means has been arranged for the sharing of the data. This implies that the same data can be used by different sets of programmes, otherwise known as applications.

The idea of a large corporate database that can be flexibly shared by several applications or model bases has been realized by means of software packages specially devised to perform such tasks. These packages, called database management systems (DBMSs), are available in the market under different trade names such as ORACLE, SYBASE, INGRES, FOXBASE, and DBASE.

Information Communication Technology (ICT)

There is an increased recognition of the vital role that information can play in development and of the potential for the use of new information and communication technologies (ICTs). The rapid spread of information and communication technologies (ICT) in developing countries over the past decade offers a unique opportunity to transfer knowledge via private and public information systems (Aker, 2010).

ICTs have become an important way of handling the complex and rapidly changing information, needed for effective and sufficient management. Moreover, extension has the mission of distributing tremendous quantities of useful information in dozens of subject matter areas to stake holders and extension workers in every part of the country. Thus, extension ought to adopt an information system that will account for transferring quantities of relevant and timely information between the information sources (mainly research) and each extension office/centers. Where applicable, ICT's provide easily accessible information on warning systems or relief activities. And, most importantly, they generate networking among people and reduce cost of transactions/finding information (Bertolini, 2004).

Recent ICT developments in developing countries including Nigeria, such as the expansion in the use of cell phones, have opened up the possibility for speedier transmission of information. Extension Information Systems (EIS) have been an established part of Extension for many decades, around the world (Richard, 2007). These established systems have traditionally relied on face-to-face contact, printed materials, radio, workshops, and other media. ICTs are a support to such systems, with an electronic network in an organized way to enhance and not to create a new research/extension system or even alter the existing system, but to support its linkages and enhance its work.

Information produced by a management information system in extension programs can take a variety of forms, including paper reports, visual displays, documents, messages, graphics, posters, video and audio. A MIS can use all these kinds of data/information, but with the right application of tools – software and network configurations. ICTs have many features to support most kinds of communication, which simulate the established processes or sometimes enhance the performance of those processes. Each of the ICT tools has its special features that fit a certain use or specific users. It is also possible to make combinations of suitable tools according to the kind of communication needed.

Internet services

The internet is based on client/server technology. A client

computer connecting to the internet has access to a variety of services. These services include the discussed under listed.

The World Wide Web

The Web is the most popular internet service. It is a system with universally accepted standards for storing, retrieving, formatting, and displaying information using a client/ server architecture. Web pages are formatted using hypertext with embedded links that connect documents to one another and that also link pages to other objects, such as sound, video or animation files. A typical web site is a collection of web pages linked to a home page.

Internet-based collaboration environments

Teams of employees who work together from many different locations around the world need tools to support workgroup collaboration. Chatting enables two or more people who are simultaneously connected to the internet to hold live, interactive conversations. These tools provide storage space for team documents, a space separate from corporate e-mail for team communications, group calendars, and an audio-visual environment where members can meet face to face in a live video conference. The use of chat software (e- conference) provided by the MIS for the extension managers will reduce travel rates in meeting researchers, and other agricultural organizations.

The use of list servers or Internet forums (threaded discussions/video conferencing) to discuss specialized topics for a longer time instead of conducting a round table that may or may not include the best experts who might only be available for a limited time. Products such as IBM's Lotus and Internet conferencing systems such as WebEx, Microsoft office live meeting, and Adobe Acrobat Connect are especially helpful.

E-mail and Instant Messaging (IM)

E-mail enables messages to be exchanged from computer to computer, with capabilities for routing messages to multiple recipients, forwarding messages, and attaching text documents or multimedia files to messages. As stressed by Alabi (2001) and Richard (2007), that these are being embraced by corporations and organizations as a major collaboration and communication tool supporting interaction and managerial jobs. The use of e-mail to submit reports (including photos) about an infection that has occurred in the area within a few minutes instead of taking several days to produce and deliver a written report.

Instant messaging is a type of chat service that enables participants to create their own private chat channels. The instant messaging system alerts the user whenever someone on his or her private list is online so that the user can initiate a chat session with other individuals. IM systems include Yahoo! Messenger and AOL Instant Messenger.

Newsgroups are worldwide discussion groups posted on internet electronic bulletin boards on which people share information and ideas on a defined topic. Anyone can post messages on these bulletin boards for others to read.

Social networking

Social networking sites such as Myspace, Facebook, LinkedIn. com provides networking services to business professionals. They feature tools to help people share ideas and interact. Some have features that enable users to set up profiles, blog, tag documents, and use online forums to communicate with other co- workers about their ideas and interest. These sites provide access to a wide variety of information to agricultural organizations in new formats such as alerts e.g. results from crop and farm models, maps etc. Individuals and agricultural institutes will also generate and contribute data and information through datasets related to production and answers to queries, blogs etc. Social networking tools have become corporate tools for sharing and collaborating among interaction- based jobs in the firm.

Web 2.0

This refers to these second generation interactive internet based services. As enumerated by Laudon and Laudon (2010), the technologies that distinguish web 2.0 include cloud computing, software mashups, wikis, blogs and RSS.

1. Wikis is a type of Web site that makes it easy for users to contribute and edit text content and graphics without any knowledge of Web page development or programming techniques. The Wikipedia is the most well-known wiki in the world. Wikis are ideal tools for storing and sharing organizations or company's knowledge and ideas.
2. RSS (Rich Site Summary) is a technology using aggregator software to pull content from websites and feed it automatically to subscriber's computers.
3. A blog is a popular term for weblog, designating an informal yet structured Web site where individuals can publish stories, opinions, and links to other web sites of interest.
4. Cloud computing is a Web based application that is stored on remote servers and accessed via the 'cloud' of

Table 1. Response rate.

S/NO	Institutes	Category of staff	Sample size	Response rate
1	NAERLS	Heads of Progs	9	9
		MIS/IT staff	2	2
2	NAPRI	Heads of Progs	9	9
		MIS/IT staff	2	1
Total			22	21

Source: field data.

Table 2. Summary of response rate by institution in percentage.

Name of institution	Response rate in %
NAERLS	50.0
NAPRI	45.46
Absent	4.54

the internet using a standard Web browser.

5. Mashups are composite software applications that depend on high- speed networks, universal communication standards, and open-source code.

Cell phones and smartphones

These are the new mobile platforms that have emerged for coordinating and running organizations, including cell phones and smartphones such as iphones and Blackberrys. Over the past decade, mobile phone coverage has spread rapidly in Africa (Aker, 2010). It was also deduced from literature that over 12 million BlackBerry subscribers use messaging, phone, and wireless internet connections. Of the 300 million cell phone subscribers in the United States, one-third are business subscribers (Telecommunication Industry Association, 2008). In Nigeria, according to Mavtrevor (2013), the smartphone culture is fast growing; probably the fastest growing in Africa, in a country with over 70 million phone users, the percentage of smartphone users is seriously improving. He further stated that the versatility and functionality of the Android smartphones, particularly the Samsung products, are quite impressive. Cell phones are today a basic part of firm's tele-communications infrastructure, especially for managers who need to do a lot of talking and messaging through SMS and MMS. The data generated by these digital phones may be stored in large corporate systems for later review and use in legal proceedings. It could also be used as a new networked model flow, using a wide variety of media, individually and as a combination (video on cell phone, radio through Internet).

RESEARCH METHOD ADOPTED FOR THE STUDY

The study adopted the qualitative methodology approach. Qualitative methodologies include "interviewing; observing; artifacts, documents, and records; visual methods; personal experience methods; data management methods; computer-assisted analysis; and textual analysis". The case study methodology which allows the researcher explores in depth the use of these MIS channels was adopted. The instruments used to collect data for this study were direct observations, focus groups and interview guides. One of the research instruments used to collect the needed data were interview guides, which were in two sets. One of which was designed for the MIS staff while the second was designed for the management staff.

Out of the 22 sampled staff members in the MIS/IT unit and heads of research programs from each of the two Institutions (NAERLS and NAPRI), a total of 21 staff participated in the semi-structured interview. After several visits, the researcher found out that one of the respondents in NAPRI was undergoing a course as at the time of data collection for this study. Table 1 shows the response rate.

This high response rate was achieved because of the population being small. The researcher had to formally seek for permission from the Institute Secretary at the various Institutes and also had to establish good rapport with the respondents (Table 2 and Figure 1).

RESULTS

The result of the study and the interview revealed that the MIS channel mostly used is the E-mail, mobile phones (calls and bulk sms), office papers, office files and printed reports. The Institutes (NAPRI and NAERLS) has most of the facilities required for the MIS to be functional and which will aid the channeling of information to the managers - computers, scanner, printer, digital cameras, generator, multimedia projector and internet service. NAERLS is one of the foremost research bodies given the national mandate for all agricultural extension support services in Nigeria, which executes and focuses its extension activities/research through the following programs: Crop and forestry, Livestock and Fisheries, Agricultural Engineering and Irrigation, Agricultural extension and economics, food technology and rural home economics and the Agricultural Media. While NAPRI engages in extension research on a range of animals and their feeds such as Small Ruminants, Beef, Poultry, Swine, Forage and Crop Residue, Animal

Response rate in %

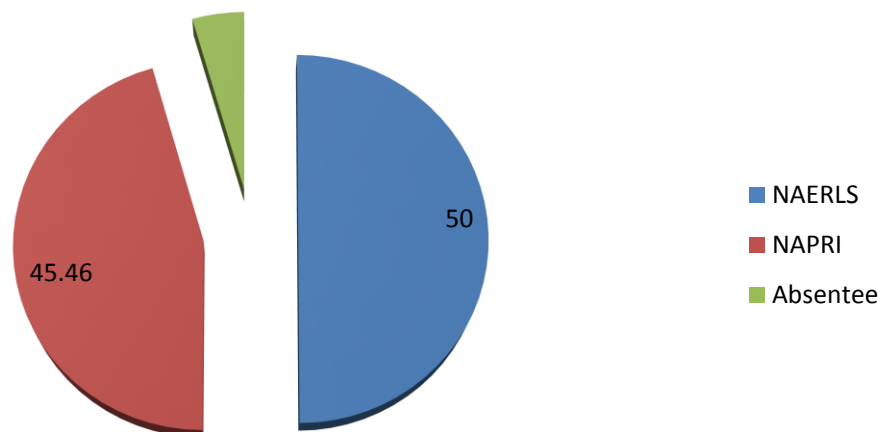


Figure 1. Summary of response rate in percentage.

Production, Livestock System and Animal Reproduction. However, the two Institutes serve within the university, as places to enhance agricultural research in different fields.

Availability of MIS facilities

Availability of some major facilities remains paramount in the effective running of any MIS in the 21st century. In order to ascertain the availability of these facilities, the respondents were asked to ascertain this question. The outcome of the enquiry showed that the Institutes under study had one facility or the other, necessary for the proper running of the MIS unit, especially the connection to the internet. However, computers, scanner, printer, digital cameras, generator, multimedia projector and internet service are found to be the most available facilities (Table 3). The researcher noticed that none of the selected Institutes had telex, fax, intranet, interactive website, integrated database or a customized building for its MIS.

Channels of MIS

The information in Table 4 shows that NAPRI and NAERLS always makes use of E-mails, mobile phones, office papers, office files and printed reports as channels for managers. In addition to this is the chat channel which is also always used in NAPRI, while it is frequently used in NAERLS. The rarely used channels in both Institutes are the Instant messaging, video/tele conferencing, smart phones and networked computers. In addition to the rarely used channels for NAPRI include the database,

social media, wiki, RSS feeds and web 2.0. All other channels were indicated never to have been used for the purpose of channeling information to the managers.

DISCUSSION

The study revealed that there is non-existence of telex, fax, intranet, interactive website, integrated database or a customized building for its MIS (Table 3). This is in contrast to Akintunde (2006), Lucy (2005) and Elliot's (2010) research findings which assert that these facilities are needed for optimum and current services, integration of information, collaboration and effective interaction. This was strongly indicated by ISNAR (2004) that for sustainable development of the agricultural sector, there is the need for integration of all available information into a comprehensive up-to-date and easily accessible information system to aid informed decision making. The two Institutes have a web page where information is uploaded from time to time by the MIS staff. This information is usually gotten from the research bulletins of the Institutes. This clearly shows that these institutions' do not make use of the major facilities that will serve as a linkage between them and the stakeholders to facilitate trans-border data flow. All these facilities like the, intranet, interactive website, and an integrated database will work hand in hand to ensure that up to date information is made available remotely to relevant stakeholders.

For information to be usable by a manager, it must be transmitted by a means or a channel. These channels ensure that information is sent to the managers for useful decision making and priority setting. Some of these channels include telephone, emails and prints e.t.c. As

Table 3. MIS facilities available for Agricultural Extension programs in ABU Zaria.

S/N	facilities	NAERLS	NAPRI
1	Computers	✓	✓
2	Server	✓	✓
3	Communication satellite	✓	✓
4	Telex	x	x
5	Telephone	x	✓
6	Fax	x	x
7	Files	x	✓
8	Scanner	✓	✓
9	Printer	✓	✓
10	Internet Service (www)	✓	✓
11	LAN	✓	✓
12	Intranet	x	x
13	Digital cameras	✓	✓
14	Multimedia(power point projector	✓	✓
15	Inverter	✓	✓
16	Generator	✓	✓
17	Customized MIS structure/ building	x	x
18	Interactive Website	x	x
19	Integrated database	x	x
	Others (specify)		

= Available; x = Not Available.

Table 4. Channels of information provision.

Channels of information provision	NAERLS					NAPRI				
	AU	FU	RU	NU	NC	AU	FU	RU	NU	NC
E- mails	✓	x	x	x	x	✓	x	x	x	x
Chat	x	✓	x	x	x	✓	x	x	x	x
Instant messaging	x	x	✓	x	x	x	x	✓	x	x
Video/ Tele conferencing	x	x	✓	x	x	x	x	✓	x	x
Mobile Phones(via bluetooth/ bulk sms)	✓	x	x	x	x	✓	x	x	x	x
Office Paper	✓	x	x	x	x	✓	x	x	x	x
Office files	✓	x	x	x	x	✓	x	x	x	x
Printed reports	✓	x	x	x	x	✓	x	x	x	x
Database files	x	x	x	x	x		x	✓	x	x
Social media egfacebook, twitter	x	x	x	x	x	x	x	✓	x	x
Wikis	x	x	x	x	x	x	x	✓	x	x
RSS feeds	x	x	x	x	x	x	x	✓	x	x
Web 2.0	x		x	x	x	x	x	✓	x	x
Cell phones/ smart phones	x	x	✓	x	x	✓	x	x	x	x
Networked Computers	x	x	✓	x	x	x	x	✓	x	x
Others specify	x	x	x	x	x	x	x	x	x	x

= Available; x = Not Available; Key AU=Always used; FU=frequently used; RU= Rarely used; NU=Never used; NC= No comment.

depicted in Table 4, the study revealed that E – mails, mobile phones, prints and paper files were the most used channels by the MIS unit in NAERLS and NAPRI. This corroborates what was stressed by Alabi (2001) and

Richard (2007), that the use of E-mails are being embraced by corporations and organizations as a major collaboration and communication tool supporting interaction and managerial jobs. The typical output of a

formal information system is a printed report or tabulation format. These have their uses, but there is research evidence that managers, especially at senior levels, obtain most of their information aurally (Lucy, 2005). This was clarified during the interview that most of the managers preferred to be given a quick call, sms or sent an email rather than waiting for piles of printed report. Other channels like the wiki, web 2.0, RSS feeds, instant messaging, chats and social media were indicated to be rarely used. The implication of this is that on-line collaboration, threaded discussions and interactive team work cannot be achieved regularly. This is in contrast to Laudon and Laudon (2010) who stated that particularly Chats/discussion forums, enables two or more people who are simultaneously connected to the internet to hold live, interactive conversations. These tools provide storage space for team documents, a space separate from corporate e-mail for team communications, group calendars, and an audio-visual environment where members can meet face to face in a live video conference. Another very important channel is through networked computers by the reason of intranet put in place. None of the Institutes make use of it. There is some private information that will be needed to go to a particular manager's computer. This cannot be achieved without the use of the intranet.

Concluding remarks

1. The study revealed that the channels of information provision used include the E-mail, phones, prints and paper files.
2. There existed no intranet, extranet, integrated database, interactive website or a specific discussion forum for the Agricultural Extension programme managers.

RECOMMENDATIONS

1. The Institutions should ensure that an interactive website is developed and the intranet to be put in place, are fully functional.
2. The channeling of information by MIS to the managers should be majorly through the intranet, extranet and database files for as long as the managers are within the premises of the Institutions. This will block out all unauthorized traffic and users. The other channels come in handy when urgent information needs to be passed across outside the Institution premises.
3. Collaborative and interactive team work should be encouraged among the staff. This can be achieved by creating/developing interactive websites, blogs discussion forums and chats, specifically for their official assignments. This will enable them work round the clock and also get immediate responses for very urgent and pressing problems.

4. The MIS staff should ensure that the newly developed interactive website and the already existing website should be regularly updated with current information.

Conflicts of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Aker JC (2010). Dial 'A' for Agriculture: Using ICT for Agricultural Extension in developing Countries. Tufts, Medford.
- Alabi AT (2001). MIS equipment Utilization in Federal and State Universities in Nigeria.
- Asadi A, Abdolmotalleb R, Ahmad R (2008). Improvement Mechanisms of Management Information System (MIS) In Iran's Agricultural Extension Organization. *Am. J. Agric. Biol. Sci.* 3(2):462-467.
- Badragheh A (2010). Challenges and Necessity Applying of Information Management (MIS) in Agricultural Education and Extension System of Iran. *Am.-Euras. J. Agric. Environ. Sci.* 8(6):758-766.
- Bertolini C, Brenner P, Fernandes A, Sales AF, Zoro AR (2004). Structured stochastic modeling of fault-tolerant system. In *MASCOTS Proceedings. 12th Annual Symposium.* pp. 139-146.
- Davis GB, Olson MH (2005). *Management information systems: Conceptual foundations structure, and development.* New York: McGraw-Hill.
- Gladner MH (2007). Digital Preservation in a National Context: Questions and Views of an Outsider. *D-Lib Mag.* 13(1/2).
- Gupta CLP, Shalini S, Sudhakar T (2010). Importance of Management Information System in Electronic- Information Era 1(2).
- Hazzan O (1999). Information technologies and objects to learn with. *Educ. Technol.* 39a(3):55-59.
- Keen PGW, Morton MSS (2008). *Decision support systems.* Reading, MA: Addison-Wesley.
- Laudon K, Laudon J (2010). *Managing the digital firm.* 11th edition, USA: Pearson Inc.
- Lucas Jr. HC (2000). *Information System: Concepts for Management.* 5th Edition. New York: McGraw-Hill.
- Lucy T (2005). *Management Information systems.* 9th edition, USA, Pearson Prentice hall.
- Management Information System: Hardware and Software* (2007). The Unity Production handbook.
- Mavtrevor N (2013). Top selling Smartphone brands in Nigeria. www.netmediablog.com. Retrieved 10th January, 2014.
- McLeod Jr. R (2005). *Management information systems: A study of computer-based information systems* (6th ed.). New Delhi: Prentice Hall of India.
- National Agricultural Extension and Research Liaison Services (NAERLS) Anonymous (2012). *NAERLS at a Glance.* National Agricultural Extension and Research Liaison Services, Federal Ministry of Agriculture and Rural Development, Ahmadu Bello University, Zaria, Kaduna State, Nigeria. NAERLS Printing press.
- Rao CSS (2005). Agricultural extension management system in India: Past, present and modalities in future. *Indian. J. Extens. Educ.* 21(1& 2):32-35.
- Richard B (2007). *Agricultural Information System Development for Land Use Planning.* Makerere University.
- Telecommunications and Industry Association (2008). *Telecommunications Market Review and forecast.* www.tia.com. Retrieved 12th December, 2013