ACCESSIBILITY AND UTILIZATION OF ELECTRONIC INFORMATION RESOURCES FOR RESEARCH AND ITS EFFECT ON PRODUCTIVITY OF ACADEMIC STAFF IN SELECTED NIGERIAN UNIVERSITIES BETWEEN 2005 AND 2012

by

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DECLARATION

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I declare that this study **Accessibility and Utilization of Electronic Information Resources for Research and Its Effect on Productivity of Academic Staff in Selected Nigerian Universities Between 2005 and 2012** is my own work and all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

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Okon E. Ani Date

DEDICATION

This work is dedicated to the glory of GOD, the less privileged in Africa, the memories of my late parents Mr. Gabriel Edet Ani and Madam Sarah Ani who lovingly and passionately laid the solid foundation for my educational development.

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ABSTRACT

The study investigated the effect of accessibility and utilization of electronic resources by academic staff on productivity at the University of Calabar and the University of Ibadan, Nigeria. In order to determine the effect of accessibility and utilization of e-resources on productivity of academic staff, a lone hypothesis was formulated thus: there is no significant correlation between accessibility and utilization of e-resources and productivity of academic staff in Nigerian universities. The study adopted quantitative approach as research paradigm; with survey and bibliometrics as research methods. Questionnaire was used as the primary instrument for data collection on accessibility and utilization of e-resources and productivity of academic staff in the study. The population of 2035 academic staff and sample size of 586 academic staff were used for the study, and a response rate of 55.29% was obtained for data analysis. The data for the study were analysed with SPSS. The finding of the study revealed that there is significant correlation between accessibility and utilization of e-resources and productivity of academic staff at the surveyed universities (r=0.135; p=0.004), especially at the level of international publication (r=0.158; p=0.004). The study concluded that there is a positive effect due to accessibility and utilization of e-resources on productivity at the surveyed universities. Further findings of the study revealed a low level of electronic information environment at the surveyed universities in relation to global practices; although, the University of Ibadan was found to have a better electronic information environment than the University of Calabar. The result from questionnaire survey revealed that the University of Calabar was more productive than the University of Ibadan; the converse was obtained with bibliometric analysis as the University of Ibadan was found to be more productive than the University of Calabar. From the findings of the study the influence of demographic variables (discipline, gender, age, education and professional rank) on accessibility and utilization of e-resources was not significant at the surveyed universities. The study recommended increased investment in ICT facilities at the surveyed universities to promote increase in accessibility and utilization of e-resources by academic staff in research.

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CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1   BACKGROUND OF THE STUDY

One of the basic goals of a university is to provide enabling environment for the conduct of research and dissemination of knowledge for societal development. Access to information is imperative to successful conduct of research in the universities. Moon, Hossain, Kang and Shin (2012) in discussing the role of access to information in the research, opined that access to relevant information is necessary for academic staff to take efficient decision in his/her research. This view is affirmed by Adeloye (2000: 282) that access and use of information is needed "for problem solving and decision making" in research process. Thus, Moon *et al.* (2012) used the term informatization to describe countries/institutions (universities) that provide wider access to information to aid research process. Hoq (2012) also viewed access and use of information as being vital in efficient research process. Aina (2012) in his discourse argued that access to information is critical in agricultural research in Africa.

However, a recent report by Foster, Heppensta, Lazarz and Broug (2008) has revealed a low level of research productivity by academic staff in African universities; which they attributed to the poor state of accessibility and utilization of electronic information resources. Publication output of academic staff in African universities in international journals was used as the indicator of research productivity in the study. According to Foster *et al*., (2008), the low publication output from African universities is essentially linked with lack of/inadequate accessibility and utilization of electronic information resources by academic staff in research. Frankor and Akussah (2012: 32) affirmed that academic staff in African universities "had little access to relevant and reliable information when making decisions" on their research activities.

This accounts for why African universities are reportedly lagging behind their counterparts in advanced and industrialized countries in research productivity, as they are not "information friendly"; that is they do not value information and invest in it as a vital resource for research. Since African universities are unable to provide equitable access to modern research tools – the

information and communication technologies (ICTs); particularly reliable Internet connectivity that enhance information handling and management, their publication output is said to be impeded, and of course, is apparently and significantly not quantified in international arena. The provision of timely information in the universities due to the modern ICT infrastructure has reportedly led to maximal benefit and increased research productivity in developed nations, even though this still poses a question as to whether given equal opportunity of accessing and using electronic information resources can lead to comparative increase in research productivity in African universities.

However, from the findings of Foster *et al*., (2008) and Frankor and Akussah (2012), it is likely that if academics in African universities have access to relevant electronic information resources, the quality of their research will improve and this will bring corresponding increase in their research productivity or publication output at the international scene.

The postulation of possible increase in publication output of academic staff in African universities due to access and use of electronic information resources is corroborated by Meadows (1989) who opined that there is reasonable statistical evidence to show that access and use of electronic information resources has a significance correlation with research productivity. Brittain (1990) argued that, researchers were productive more than 40 years ago without access to computers and electronic information resources, but however observed that the advent of electronic information resources has had relative impact on research process and productivity. Vakkari (2008) also reported the existence of a positive relationship between electronic information resources and productivity of academic staff but with a degree of variation from discipline to discipline. He observed that there is correlation between accessibility and utilization of electronic information resources with publication output of researchers. This proposition has therefore posed the need to investigate the extent of accessibility and utilization of electronic information resources by academic staff in African universities and to determine its possible effect in productivity in the present study.

The investigation of possible effect of accessibility and utilization of electronic information resources would not be done in isolation without pondering over the level of electronic

information environment in African (Nigerian) universities. Accessibility and utilization of electronic information resources is a factor that is considered to be largely influenced by the nature of electronic information environment that is available and prevalence in a given university. The electronic information environment is enabled by widespread application of information and communication technologies (ICTs) in the university towards effectiveness and efficiency in research process. Angello and Wema (2010) simply defined information and communication technologies as tools used to access electronic information resources; while Ani and Biao (2005) described ICTs as globalizing tools for researchers/academic staff. But, Africa is said to be lagging behind developed countries in the diffusion, adoption and integration of ICTs in research process in the universities. This comparatively may hinder the extent of accessibility and utilization of electronic information resources in African universities with a wider implication on research productivity.

Observably, accessibility and utilization of electronic information resources is enabled by the state of ICT or electronic information environment in a given university. In this perspective, African universities are apparently not at par with their counterparts in advanced information societies. The existence of digital divide, inequitable access to and use of ICTs in African universities is the issue of major concern that needs to be addressed if academic staff in African universities must be integrated into global/international research community. The implication is that African universities must key into the international best practices in the provision of institutional ICT policy/strategy that will relatively improve their electronic information environments and thus promote access and use of relevant electronic information resources by academic staff towards efficient and sustainable research process.

1.2   CONTEXTUAL SETTING

There are basic concepts that are central to the study, which need some explanation on their contextual usage, though they will be further elaborated in subsequent chapters in the study. These are research, information, electronic information resources, information and communication technology, digital divide, electronic information environment, information literacy, university education in Nigeria, university libraries, and digital libraries.

1.2.1 Research

Universities around the world have been agents of development of their immediate communities and the world at large through research that leads to advancement in knowledge in different areas of human existence (agriculture, science and technology, medicine, law, religion, politics, arts among others). Research is the fundamental process of acquisition of knowledge; it is a systematic enquiry to the world of the unknown in every field of human endeavour by experts and professionals in the field. According to Ochai and Nedosa (1998: 90), "the fruits of research and scholarship are new knowledge or facts and these are disseminated to the academic community through publications". Babbie, Mouton, Vorster and Prozesky (2001) described research as scientific enquiry where observations and interpretations of phenomena are made. Welman, Kruger and Mitchell (2005) defined research as a process of obtaining scientific knowledge by means of systematic methods and procedures. Dane (2011) viewed research as a critical process for making enquiry about the universe or society.

Essentially, the outcome of research is the production of new knowledge, which is used in societal development and betterment of human existence. Thus, Nwagwu (2010) viewed research as a process that facilitates the contribution of knowledge by scientists towards finding solutions to societal and human problems; Okafor (2011) equally affirmed that the goal of research is to improve the advancement of societal/human knowledge, and this role is basically vested in the universities.

In view of the fact that Africa has lagged behind the rest of the world particularly the developed countries in most aspects of development indicators, African universities have been called upon to be pragmatic in their research towards rebuilding the continent (Abrahams, Burke & Mouton, 2009/2010). The implication of this advocacy is that African universities should begin to invest meaningfully in research as this would have a corresponding positive impact on the continent and her people. In order to be integral part of global/international research, Abrahams, Burke and Mouton (2009/2010) called for institutional change and attitude towards research in African universities. This involves putting in place effective initiatives that would allow information flow from the developed world to African universities, and the transfer of scientific and technological

knowledge to enable Africa to be beneficiary of the global research outcome. The institutional changes and initiatives that allow the conduct of quality research would make African universities to compete with their counterparts in the developed countries in productivity measure.

Research productivity is primarily measured in terms of the number of publications (journal articles, books, conference papers among others) within a given period of time (Ani, Esin & Inyang, 2003; Bottle, Hossein, Bottle & Adesanya, 1994; Dulle, Mulimila, Matovelo & Lwehabura, 2002). Since a journal article is the primary medium of publishing research findings, attention would be given in the study to journal articles as indicators of publication output or research productivity by the academic staff in African universities.

1.2.2   Information
Some scholars have described information as the life-blood of organizations (Opara, 2003; Moahi, 2009), while Gray and Perry (1975) considered information as an "indispensable resource" for research, and research is therefore said to be information driven. Thus, access to information is essential in the research process in universities. Information is vital in the conceptualization of the research, formation of research problem/hypotheses, and review of literature, research design/methodology as well as data analysis and reporting of research findings. A researcher needs adequate funding to support his/her research project, and access to appropriate information is required to secure the enabling funds. Hence, information is a critical resource that enables not only a university but any organization/institution to achieve its set goals (Opara, 2003). The goal of a university is to generate knowledge through research towards societal development, nation building and well-being of people. The realization of this goal is met by the provision of effective and efficient access to information to all academic staff in the university.

In Information Science, information is conceptualized as data used in decision-making. Opara (2003: 2) conceptualized information as "data that have been transformed into a form that is meaningful and intelligible to the recipient (*academic staff*) and is of real or perceived value in current and future decision" in research process by individual academic staff, department/faculty

or the university in general. This confirmed the view posed by Rubin (2000) that "information is processed data" which conveys certain meaning to the user (academic staff) which enables him/her to decide in the first instance the desirability of embarking on a given research. Thereafter, at every stage in the research process, every academic staff needs certain information to help/guide him/her to make a decision in what to do or what not to do – for example, appropriate information is required by academic staff to take decisions on which research design/methodology he/she would use for a research study and why?

The nature of information (such as quality or currency) has significant effect on research process. It is required that academic staff should have basic understanding of the nature of information in order to appreciate the use of information in research (Opara, 2003). Again, each academic staff needs to have unlimited access to information in his/her daily research routine, he/she must therefore, understand different factors that affect access to information within the university and try to overcome these inhibiting factors in relation to his/her research. Rubin (2000) discussed these factors, which include: familiarity, distance, transport, access requirements, availability of relevant literature, and searching technique. A proper understanding of these factors by the academic staff will enhance access to information and promote its optimal utilization in research in African universities. However, Gray and Perry (1975) opined that effective use of information in research depends on the nature of its selection, analysis and interpretation by individual academic staff in the university. This brings the need for the provision of information literacy programme by the university to assist academic staff in their attempt to access and use electronic information resources in research process.

According to Moahi (2009: 198):

> Information is what set organizations apart from each other. Organizations that place value on information and manage it accordingly generally tend to do well in their delivery of services and products.

Thus, it is advocated that African universities should be encouraged by stakeholders to appreciate the need to integrate modern digital technologies or the information and communication technologies (ICTs) to support efficient and quality research process. This would

enable the academic staff to have access to relevant information to enhance their research activities.

1.2.3 Electronic information resource

Printed information sources have been in use for centuries unlike electronic resources, which are of recent history. According to Rubin (2000: 6), "print materials have been around since the invention of written languages and paper" and this has led to the development of the printing press "in Germany in the mid-1400s". Thus, over the centuries, print materials have been the major sources of information available, accessible and used for research in universities. But, with the advent of information and communication technology (ICT), and electronic publishing, information that was available only in print materials (books, journals, theses/dissertations) are now available in electronic format.

By definition, electronic information resources or simply electronic resources (e-resources) are information stored in electronic format in computer or computer related facilities (CD-ROMs, flash drives, digital libraries or the Internet). Thus, Haridasan and Khan (2009: 118) defined electronic information resources as "resources in which information is stored electronically and which are accessible through electronic systems and networks". This is consistent with the description of electronic information resource as a generic term "for electronic information stored both offline or online" (Thanuskodi, 2012: 326).

Electronic resources are now used to supplement printed information sources in the university libraries. The major benefit of electronic resources in the university library besides ease of access to the needed information is that access can be done remotely by academic staff in their offices/laboratories or at homes without physical visit to the library. Thus, electronic resources promote efficiency in dissemination of information for research purposes in the universities (Thanuskodi, 2012). Again, e-resources are more easily updated than the print resources. Ellis and Oldman (2005: 35) opined that electronic information resource "is more of a tool to assist in conducting research, a way of scanning a lot of materials quickly". The act of providing access to electronic resources by the university library to the patrons is referred to as electronic

information services. Appleton (2006: 620) defined electronic information services as delivery of information tools/products to "requesting users electronically" usually by computer mediation.

In view of the potential advantages and benefits of e-resources over the print in modern electronic information environment, accessibility and utilization of e-resources is fast becoming a norm in research in the universities around the world. Hence, "access to electronically stored information in computers has been increasing regularly" in the universities to aid academic staff in their research (Rubin, 2000: 11). Different types of electronic resources include: e-journals, e-books, online databases, e-theses/e-dissertations, electronic conference proceedings, electronic technical reports, electronic reference documents, CD-ROM databases (Appleton, 2006; Costa & Meadows, 2000; Dadzie, 2005; Lee, 2002; Parameshwar & Patil, 2009; Swain, 2010). Basically, e-resources that are accessible on the Internet are described as Internet resources. Appleton (2006: 620) classified Internet resources into "freely available web-based resources" and "scholarly web-based resources such as electronic journals". The scholarly web-based resources – electronic journals, electronic books and online databases are relatively invaluable e-resources that brought great innovations in research process in universities.

Typically, a journal is a primary source of information and scholarly communication among academic staff in the universities. According to Meera and Ummer (2010: 540), "the transition from print-on-paper journals to electronic journals is among the most fascinating developments in the information field". With the emerging electronic information environment, electronic journals have brought a new paradigm in research in the universities (Kumar & Ansari, 2012; Ungern-Sternberg & Lindquist, 1995). E-journal can be fee-based or open access journal. Open Access Journal is a form of electronic journal that is free, and accessible on the Internet by academic staff for research. According to Christian (2008: 2):

> The concept of open access emerged in response to restrictive access to knowledge in scholarly and scientific journals imposed by commercial publishing houses via subscription fees…The actualization of open access to research journals and literature will accelerate research, enrich education, and share the knowledge of the rich developed countries of the world with the poor and less developed countries.

Observably, there is relative accessibility and utilization of open access journals in African universities due to poor budgetary allocation to libraries for subscription of fee-based

journals/e-journals. Academic staff in African universities can directly access the open access journals on the Internet as there is no financial restriction. So, it is plausible to say that open access journals promote accessibility and utilization of information in research in the universities. Over the years, with the dwindling financial fortunes or economic depression in most African countries, journal crisis has impacted negatively on accessibility and utilization of information resources in the universities. This constraint has been alleviated by the emergence of e-journals particularly the open access journals. Therefore, and since no financial cost is incurred, the open access journals have added value to innovative research in African universities.

Besides, e-journals, online databases are vital in modern day research in the universities. Online databases are usually collections of e-journals and e-books in order to provide cost effective access to these e- resources to the end-users (academic staff). The contents of each database vary from discipline to discipline. Examples are MEDLINE, ScienceDirect, AGORA, HINARI, Lexis-Nexis, EBSCHO HOST among others.

1.2.4   Information and Communication Technology (ICT)

Information and communication technology (ICT) is a modern tool that provides access to information, in specific terms, electronic resources. Vickery and Vickery (1987) postulated that, there is a widely held view that the development of new information and communication technology (ICT) will lead to significant improvement in the availability and accessibility of information in different organizations/institutions including the universities. They asserted that access to all kinds of information in electronic format including bibliographic references, online databases (such as EBSCO HOST, Emerald database), factual and numeric data, theses/dissertations, abstracts and full text will relatively improve the quality of research carried out in the universities. The implication is that every academic staff will generally take advantage of the wider access to information which the emerging ICT can provide in tackling his/her research problems.

The emerging ICT involves "the application of computer and communication technologies to information handling" (Oketunji, Daniel, Okojie & Abdulsalam, 2002: 3). Grace, Kenny and

Qiang (2004: 2) described ICTs as "tools that facilitate the production, transmission, and processing of information". The World Bank (2002: 3) defined ICT as consisting of "hardware, software, networks, and media for collection, storage, processing, transmission, and presentation of information". Basically, the components of ICT (now a preferred terminology for information technology, IT) are the computers and the Internet, and these would include the CD-ROMs and digital networks (Intranet, digital libraries). Invariably, ICTs are the platforms that provide access to electronic resources, and are therefore very essential in research process in the universities. Moahi (2009) opined that ICTs have allowed information to be effectively managed and harnessed in the universities and this has obviously led to enhanced access to information. Hence, the degree in which ICTs are adopted within a given African university (in different departments/faculties, libraries/computer centers) will definitely determine the extent/level of accessibility and utilization of electronic resources by academic staff in their research; and this can increase efficiency and competitive advantage in research process (Moahi, 2009).

Observably, in spite of the widespread applications of ICT and its impact on research in universities in advanced countries, scholars are unequivocal in reporting the poor state of ICT infrastructural facilities that is prevalent in African universities. For instance, Missen *et al.,* (2010: 1) reported that "African universities are years, perhaps decades, away from reliable and robust full Internet connectivity" than what is obtainable in the western nations. Besides, most university libraries are yet to embark on library computerization, and where this is done, the number of computers available to the users (academic staff) is usually low. Availability of Intranet/campus network is also not appreciably widespread in African universities. It is posited that for Africa to make significant impact in international research and publications in the information age, the present state of ICT infrastructure in African universities must be redressed and overhauled.

There are different ICTs tools that provide access to electronic resources. These tools include the computers, the Internet, electronic networks, the digital libraries and the CD-ROMs. The computer has been a major tool that enables access and use of e-resources. According to Hawthorne (2008:1), the library profession has "recognized the potential of computers to make library resources more accessible early in the development of computer technology".

Computers are electronic devices that do not only help in the processing of data, but are useful tools in the management, preservation, storage and retrieval, and dissemination of information. In the electronic information environment, computers are veritable tools for accessing and utilizing electronic resources for research, whether in personal office, university library, department or laboratory. For examples, a vast number of e-resources are stored, retrieved, and disseminated with computers; and in the laboratory, huge amount of scientific data/information that is stored in the computer and can be retrieved by academic staff for research purposes. The use of computers as tools that provide access to e-resources cuts across every academic discipline/field of specialization. Wren and Wren (1993) discussed application of computers as tools to access e-resources; and how optimally they can be used at each stage of the research process − especially during information gathering, processing, storage and retrieval.

Another ICT tool that provides access to e-resources is computer network. A computer network consists of interconnection of two or more computers together to exchange information. The computer networks that provide access to e-resources in the universities are typically the LAN, the Intranet or the Internet. Hence, existence of computer networks in the universities promotes efficiency in accessibility and utilization of e-resources. This is why Abels, Liebscher and Denman (1996:146) asserted that:

> If any group of faculty (*academic staff*) resists adopting and using the network, the potential benefits of the network and its services will not be realized for the institution as a whole.

This is affirmed by Kaminer (1997) who stressed that the use of network can help overcome obstacles that are associated with geographical location of academic staff in accessing and utilizing e-resources for research. Hence, Johnson and Tahan (2002) counseled that universities should provide all academic staff access to relevant electronic networks, Intranet and the Internet to enhance their research activities.

The Internet is a special form of computer network that connects millions of computers globally, and is thus being described as a global information infrastructure, global communication network, global information system, information superhighway, network of networks, international network, and cyberspace (Basque, 1995; Biehl & Calishain, 2000; French, 1996;

MacDonald, 1997; Ngulube, 2010; Whittaker, 2002). Basque (1995) specifically described the Internet as an exciting technological tool for accessing electronic resources that has brought innovation in research process. Thus, the Internet is commonly referred to as global information resource that contains all sources of information across every academic discipline. The World Wide Web (WWW) has been the most robust feature on the Internet that helps academic staff to navigate easily though different e-resources. Besides, the Web, other Internet facilities/services that promote accessibility and utilization of e-resources are: email, telnet, FTP, Usenet (news group); and recently, the Web 2.0, popularly referred to as social networking tool (Nwagwu, Adekannbi & Bello, 2009).

According to Missen *et al.,* (2010: 1):

> the Internet poses a historically unique chance for African universities to gain more equal footing with their sister institutions in the more developed countries. Given that more and more academic resources are moving to the Internet – and in some cases being made available only on the Internet – it is imperative that African universities become connected soon if they are not to be rendered irrelevant in modern academic world.

However, in spite of the potential benefit of the Internet as a tool to access and use e-resources in African universities, Africa is reportedly lagging behind the rest of the world in access and usage of the Internet. The recent figure of Internet usage in Africa is only 7.0% of the world total usage (Internet World Stats, 2012). The distribution and users' statistics for Africa are shown in Table 1.1. The table shows only the ten top African countries with relatively high Internet users' statistics with Nigeria significantly leading the rest of African countries with 28.9% of African users. However, globally, Nigeria's statistics is significantly low, as indicated by Watts and Ibegbulam (2005), where only 0.5% of the population is the Internet users, compared with 54% for the United States (U.S.). In response to the proposition by Ngulube (2010) the Internet is now a defining factor of how information is being accessed and used in academic environments, there is need to encourage improved Internet utilization statistics in Africa, Nigeria in particular.

Table 1.1 **Internet users statistics for Africa (Africa Top 10 Internet countries 2012 Q2)**
(Adapted from Internet World Stats, 2012)

Sn	Country	Internet Users 30-June-2012	Penetration (% Population)	% Users in Africa
1	Nigeria	48,366,179	28.4	28.9
2	Egypt	29,809,724	35.6	17.8
3	Morocco	16,477,712	51.0	9.8
4	Kenya	12,043,735	28.0	7.2
5	South Africa	8,500,000	17.4	5.1
6	Sudan	6,499,275	19.0	3.9
7	Tanzania	5,629,532	12.0	3.4
8	Algeria	5,230,000	14.0	3.1
9	Uganda	4, 376,672	13.0	2.6
10	Tunisia	4,196,564	39.1	2.5

1.2.5   Digital divide

ICTs offer equal opportunities for research anywhere in the world, especially in African universities. Access to ICTs and e-resources has reduced inequality to academic and research information in universities around the world. The ICT has quickened global access knowledge by academic staff in universities with improved research outcome (Grace, Kenny & Qiang, 2004). Ani and Biao (2005) described ICTs as tools for globalization of research in Africa, and thus integrate African universities with their counterparts in the developed countries. Adeyeye and Iweha (2005) postulated that ICTs potentially offer diverse benefits for African universities with respect to research and publication and thus promote access to knowledge and information. According to Ojo (2006), access to ICTs essentially makes African universities to be an integral part of the information society and knowledge-based economy. Thus, access to ICTs and electronic resources has tremendously reduced the level of information paucity among academic staff in African universities.

However, in spite of these developments Grace, Kenny and Qiang (2004) noted that there are still disparities, especially among African countries, in terms of access to ICTs. Recently, Mahmood, Hartley and Rowley (2011) observed that Africa is a region that is associated with

poor ICT infrastructure; and that ICT infrastructure is least developed in African universities. In other words, African universities are reportedly lagging behind their counterparts in advanced nations of the world in adoption, integration, diffusion and application of basic ICT infrastructures – computer, the Internet and other digital technologies in research process.

Observably, the term digital divide is used to describe the inequality in accessibility and utilization of ICT infrastructure between different regions/countries in the world, particularly, between developed and developing countries. Although, the digital divide is a global phenomenon (Arunachalam, 2002; Gamage & Halpin, 2007), its impact is relatively well pronounced in Africa.

The inequality of access and use of ICTs by extension leads to inequality to accessibility and utilization of electronic resources between countries, universities, faculties/departments and even individual academic staff. Adeogun (2003: 11) had discussed and explained the implication of the digital divide in African, and specifically that "if the barriers to accessing and synthesizing information can be removed, African scholars and researchers can contribute significantly to global knowledge development".
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Accordingly, the digital divide is otherwise known as information divide (Huang & Russell, 2006). Another dimension of the digital divide describes inability of individual academic staff to access and use ICTs or electronic information resources due to lack of appropriate ICT skills such as IT literacy, information literacy or network literacy (Ani & Ottong, 2010; Ellis & Oldman, 2005; Fourie & Bothma, 2006; Gamage & Halpin, 2007; Ngulube, 2010). According to Fourie and Bothma (2006: 471):

> The most widely accepted description of the digital divide concerns the difference between those who have access to information (the have's) and those who do not have access to information (the have not's).

This definition is affirmed by Aqili and Moghaddam (2008) who opined that the concept of digital divide has been used to describe differences in access to information through ICTs in terms of knowledge, skills, and abilities to use information by academic staff in research.

In the context of the present study Kiplang'at (2002: 349) described digital divide as the gap that exists in most countries or universities between academic staff who have access to ICTs/e-resources and those who do not. Put differently, the digital divide is a gap between those academic staff that can access and use ICTs/electronic resources, and those who are unable to access and use ICTs/electronic resources in their research. Since access to information is imperative in research and its outcome, the digital divide is therefore viewed as a menace to efficient research process in African universities. Consequently, Foster *et al.*, (2008) is unequivocal in advocating on the need to bridge the digital divide in African universities towards improved accessibility and utilization of ICTs and e-resources. In view of this Sever (1989) expressed concern on the menace associated with the digital divide in African countries as due to their inability to provide enabling electronic information environment to access information from the developed countries, and including those produced within their academic environments.

Thus, Grace, Kenny and Qiang (2004) argued that the emerging electronic information environment requires a technologically competent academic staff, and prescribed the need to combat and bridge digital divide in African universities in all ramifications. This implies the need for academic staff in African universities not only to be provided with access to ICTs/electronic resources but should also be equipped with appropriate information literacy skills. These would definitely put the academic staff in a position to optimally access and use electronic resources in research. This presupposes that academic staff in African universities must be exposed to the rudiment of making ICT and e-resources their research tools, if they are to compete in the knowledge economy and information society where there is internationalization of research and publications.

The provision of relevant ICT policy/strategy has been adjudged by scholars as being vital in bridging the digital divide in African universities towards effective integration of Africa into global research community (Aqili & Moghaddam, 2008; Fourie & Bothma, 2006; Huang & Russell, 2006; Gamage & Halpin, 2007; Mutula, 2008). Interestingly, it has been reported that countries with low digital gaps have increase in publication output or productivity (Foster *et al.,* 2008; Mutula, 2008), so Africa must not be isolated in participating in the advancing knowledge

economy. Consequently, Mutula (2008) highlighted various initiatives that are put in place by African governments towards bridging the digital divide in Africa in order to promote equitable access to ICTs, electronic resources and information for research in the universities. In spite of these initiatives toward bridging the digital divide in Africa, Mutula (2008: 475) is still pessimistic that:

> Bridging the digital divide in its multifaceted forms between Africa and Western world may now be a pipe-dream, given that economic gaps have never been effectively narrowed between developed and developing countries despite protracted interventions by multilateral financial institutions such as the World Bank and the IMF.

So, it is advocated that university managements in Africa and other stakeholders must work concertedly to tackle the menace of digital divide as a way of guaranteeing equitable access and use of e-resources by academic staff in research.

1.2.6   Electronic information environment

The emergence of digital age has brought about a great dependency on information and communication technologies (ICTs) in the conduct of research in the universities (Byamugisha, 2010; Ngulube, 2004) particularly in developed nations and recently in Africa. With the adoption, diffusion, integration and application of information and communication technologies in African universities, access and use of information is now done electronically by academic staff in their research. Thus, there has been a change in information environment in African universities to electronic information environment. Aina (2012) described the information environment as the environment that enables academic staff to access and use information to tackle his/her day-to-day research problems. Electronic information environment is significantly characterized with applications of ICTs in the universities to support efficiency in access and use of information in research. In other words, the major feature of electronic information environment is the pervasiveness in accessibility and utilization of electronic resources by the academic staff in research. This is why Pullinger (1999) argued that the nature of information environment in the university is likely to affect the extent of use of electronic resources in research by the academic staff.

The major problem associated with the traditional information environment which is virtually dominated by the printed sources is that of "availability" of information without its corresponding "accessibility". But with the computerized library services, CD-ROM/online databases, the Internet, Intranet/campus networks and digital libraries, there is relative ease of accessibility and utilization of information by academic staff in research than obtainable in the traditional information environment. Thus, the impact of the paradigm shift from the conventional information environment to electronic information environment in the research process in African universities cannot be overemphasized. The emergence of electronic information environment has ameliorated the barriers of information access usually associated with distance and time, both within and outside the university environment. Hence, access to information is cost effective than obtainable in the traditional information environment. It is therefore innovative to observe that African universities are joining their counterparts in the advanced information societies to provide relevant ICT infrastructure to support academic research in terms of access to both national and global information resources in the digital age, although at slow pace. Specifically, the Internet has played a very significant role in the transformation of traditional information environment to electronic information environment, and its role in timely information access and use is unprecedented in the history of research in African universities.

1.2.7 Information literacy

Information literacy is a concept that has overbearing influence on the extent in which academic staff, can access and use electronic resources in his research in the university. According to Ashoor (2005), information literacy is a concept that was formally articulated in the U.S. in the 1990s which has made dramatic impact on information accessibility and utilization due to advancement in ICT. Kinengyere (2007) said that effectiveness and efficiency in research process in the digital age rely on the level of information literacy of individual academic staff and on the nature of information accessible to them. Information literacy provides the academic staff the required skills to access and use the needed information in research. Thus, with the emerging electronic information environment, information literacy is a vital and prerequisite tool that academic staff in African universities need for active participation in international research and publication.

Information literacy "is generally defined as the ability to identify an information need, locate and access the required information, evaluate, organize and apply it to address the need in question"(Kinengyere, 2007: 329). Information and communication technologies and electronic information resources are comparatively new research tools to most academic staff in African universities, thus, the need for them to be information literate toward enhanced access and use of these tools, and be integrated into the modern information society. Information literacy is also required for appropriate and ethical use of information in research and includes the competency of information handling by the academic staff. Kinengyere (2007: 328) asserted that information literacy has played a crucial role on the utilization of electronic resources and therefore advocated that "information professionals are needed to pass on IL skills to library users (*academic staff*), while library users (*academic staff*) should endeavor to find out what is available online for their consumption". In the light of this, Ashoor (2005) opined that information literacy is concerned about the need to teach academic staff appropriate skills of accessing and evaluating electronic information resources and how to use them effectively in research.

This therefore calls for the need for all academic staff in African universities to strive to be information literate in order to enhance their effectiveness and efficiency in accessibility and utilization of electronic resources. Ngulube (2010: 47) affirmed that for academic staff to be effective participants in the information economy, he/she "needs to be information literate". According to Kinengyere (2007: 329):

> Being information literate requires knowing how to clearly define a subject or area of investigation; select appropriate terminology that expresses the concept under investigation; formulate a search strategy that takes into consideration different information sources (*especially e-resources*) and various ways information is organized; analyze the data collected for value, relevancy, quality and suitability; and subsequently turn them into knowledge.

From the discourse, information literacy is a prerequisite for knowing about the capabilities of ICT in information management, acquisition, organization, processing, storage and retrieval, and transfer. Thus, academic staff must be information literate so as to be up-to-date with research

information, which is now available and accessible on the Internet and other electronic networks (Crawford, 2006); and "they must completely retool" (Adeyoyin, 2006).

Basic components of information literacy that academic staff need to acquire in order to be competent to access and use electronic resources effectively include computer literacy, Internet literacy, and network literacy (Ani & Ottong, 2010; Ngulube, 2010). Ani and Ottong (2010) described computer literacy and Internet literacy simply as information technology (IT) literacy. Information technology (IT) literacy refers to the ability of academic staff to access and use e-resources on computer and the Internet in research process. According to Ngulube (2010: 45), network literacy refers to the ability of academic staff "to identify access and use electronic information resources from information network".

However, it has been recognized that academic staff in African universities have low levels of information literacy especially in respect of IT literacy and network literacy than obtainable in the developed nations. Ashoor (2005) basically attributed this to three inherent factors in Africa: low literacy level, problems (quality) of educational system, and low levels of book production. The one that is most central is the poor quality of education that has not allowed Africa to acquire appropriate technical-know-how in information technology and its wider applications. It is expected that if academic staff in African universities must acquire appropriate information literacy skills, these inhibitors must be tackled to their roots. The teaching of information literacy skills to the academic staff in African universities should involve all stakeholders, the librarians and administrations. In view of the importance of effective information literacy towards access and use of e-resources, scholars have recommended user education on IT literacy and network literacy in African universities (Ani & Ottong, 2010; Ngulube, 2010).

1.2.8   University education in Nigeria

University education in Nigeria began with the establishment of the University of Ibadan as a University College of London in 1948 basically to support the manpower need and development of the country. At independence, between 1960 and 1970, five additional universities were established by the federal government to further improve the educational and manpower development of Nigeria. These six pioneer universities in Nigeria are commonly referred to as

the "first generation" universities. With increasing demand for education and the need to bring university education nearer to the citizenry in all parts of the country, additional seven universities were established in 1975, and this marked the era of the "second generation" universities in Nigeria. The early 1980s to the 1990s witnessed the period of establishment of specialized universities in Nigeria – federal universities of technology, and federal universities of agriculture, and the universities in this category are referred to as the "third generation universities".

The democratic period of 1979-1983 in Nigeria known as the "second republic", witnessed the establishment of universities by the state governments, as the existing federal universities could not meet the admission needs of the people due to increasing demand for university education in the country; and the Rivers State University of Science and Technology, Port Harcourt established in 1979 became the first state university in Nigeria. In 1993, the federal government provided the law for the establishment of private universities in Nigeria; and in 1999, three pioneer private universities were established: Babcock University, Ilishan-Remo; Igbinedion University, Okada; and Madonna University, Okija. Thus, universities in Nigeria are managed by the federal, and state governments, as well as individuals/organizations depending on ownership. The universities that are managed by the federal/state governments are referred to as public universities, while those own by individuals/organizations are private universities. Presently, there are about 124 universities in Nigeria, 74 public universities (37 federal universities and 37 state universities) and 50 private universities (National Universities Commission, 2012a).

The National Universities Commission (NUC) is the federal government agency that is responsible for regulation and monitoring of national academic standard in Nigerian universities. The commission was established in 1962 as an advisory agency in the Cabinet's office, and achieved autonomy in 1974. The functions of the NUC include (National Universities Commission, 2012b):

1. Approval of all academic programmes run in Nigerian universities,
2. Granting approval for establishment of any university in Nigeria, and
3. To ensure quality assurance of all academic programmes offered in Nigerian universities

The administration of each university in Nigeria is jointly managed by the university council (the highest policy making body) and the senate (Association of Commonwealth Universities, 2008)**.** The Vice-Chancellor is the Chief Executive Officer of any university in Nigeria. Due to relatively poor ranking of Nigerian universities globally in recent times, the National Universities Commission (NUC) has begun to articulate national indicators that may improve global ranking of Nigerian universities especially in area of research and publication.

1.2.9   University libraries

Globally, university libraries are saddled with the task of providing information to academic staff for teaching and research. ICT has brought about innovation in librarianship where access to information is made available to library patrons (academic staff) beyond the physical boundary of the university library.   According to Pullinger (1999: 164), "the academic information environment is changing for the librarian" and similarly for the patrons (academic staff) as most of the information sources are now available and accessible in electronic format; electronic resources have had unprecedented impact on library collections.

Pather and Stilwell (2008) observed that usage patterns of information sources in the universities have changed considerably in favour of electronic resources. In efforts to satisfy users' information needs and demands in the changing information environment, electronic collection development policy has been developed by librarians to tackle the challenges posed by the new information seeking behaviour of academic staff in the university. The new paradigm is that academic staff now requires access to library resources electronically – such as full text electronic journals at their desks. With the emerging scenario, Adeyoyin (2006) proposed that university libraries must develop appropriate strategies to provide electronic resources towards efficiency in research process. Thus, books, journals and theses should be complemented with their electronic counterparts in the university libraries, and made accessible to academic staff through networks in their offices and other terminals. Additionally, digital libraries should be developed.

According to Adeogun (2003: 17), "libraries are challenged to provide access to relevant information by applying ICTs to facilitate quick, efficient access, integrate and repackage

information for the end-user". It is therefore apparent that, the innovations brought about by ICTs in librarianship and information profession are changing the nature of library collection development from print to electronic collections (Pullinger, 1999). In view of this, it is imperative for the university libraries to provide sufficient ICT infrastructural facilities to support accessibility and utilization of the acquired e-resources (Ramzan & Singh, 2010) to satisfy the changing information needs of academic staff in the electronic information environment.

How are African university libraries responding to ICT revolution towards the provision of electronic resources and attendant electronic information services to their academic staff? This question is necessary because the attitudes of African librarians toward ICT innovations and emerging electronic information environment have decisively played a significant role in the provision of e-resources to support research in African universities. Adeyoyin (2006) answered this question in affirmative that in Africa, a good number of university libraries have begun to integrate the use of ICTs in the provision of electronic information services to their library users (academic staff). Provision of ICT infrastructure is one thing and this is different from acquisition of relevant electronic resources which according to the Foster *et al.* (2008) report, African (Nigerian librarians in particular) are not doing better. The report sponsored by Emerald Publisher noted with concern that:

> Nigeria is an interesting example of a country whose authors contributed hundreds of articles to our journals. Despite this, we have no customers with subscriptions to our electronic collections in that country (Foster *et al.*, 2008: 4).

If academic staff in African universities must access and use electronic resources, these resources must be made available and accessible in the universities libraries. This must be followed with the teaching of the information skills to them by the librarians to enhance effective accessibility and utilization of the acquired electronic resources. This is in line with the findings of Kinengyere (2007: 328) that:

> Availability of information does not necessarily mean actual use. The study shows that some of the available resources have not been utilized at all. This means that users are not aware of the availability of such resources, they do not know how to access them, or they do not know what the resources offer. And this calls for continued information literacy programs.

Thus, university libraries are key players in the quest for access and use of electronic resources by academic staff towards improved level of research in Africa, and they should brace up to the challenges of meeting the changing information seeking behaviour of academic staff in the emerging electronic information environment.

1.2.10 Digital libraries

With the emergence of information and communication technologies (ICTs) and the migration of information from print to electronic format, experts consider that it is expedient to provide appropriate and efficient platform to make electronic information resources accessible to academic staff throughout the world beyond geographical and time barriers. Thus, the digital libraries also known as virtual/electronic libraries become the new platforms that provide access to electronic information resources in universities without the need for academic staff to make physical visits to the university libraries. According Gbaje (2007), a digital library is one of the major access points for e-resources in university. Thus, with the development of digital libraries in universities, library resources can be accessed remotely by academic staff in his/her office or outside the university.

Okebukola (2002: 4) defined a digital library "as a collection of library resources in electronic form which can be accessed and used with great ease with the aid of computer technology" to promote learning, teaching and research in the university. Magara (2002) described a digital library as a medium of accessing information without limitation of physical location by the academic staff. Onyeneke (2007) viewed a digital library as a library without wall, and an integrated system which provides access to electronic resources with relative efficiency. Gbaje (2007) opined that a digital library is a collection of Internet resources and digitized materials by the university library which can be accessed through the Internet or other digital networks by academic staff remotely in their offices without visiting the library. Ajayi (2003) described a digital library as a library that uses digital technologies as tools for collection, storage and dissemination of cultural, historical and scientific information for research purposes. Unlike the physical library, electronic resources are stored in virtual space, and access is provided through the ICTs – the computers, the Internet and related networks – LANs/Intranet.   According   to   Deb   and   Kar   (2005:190-191):

an electronic library may be defined as a system that is accessible from anywhere via the Internet, to deliver knowledge directly to their users, without being confined to the contents of a physical library nor being caught up in a web of unorganized, unmanaged information…the goal of an e-library is to perform online all the functions of the traditional library.

Thus, Magara (2002) opined that the major benefit of the digital library is the ease of accessibility of e-resources; where remote access is provided to library collections anywhere in the world instantaneously. Hence, a digital library is a library that facilitates access to library resources - electronic resources in a cyberspace. This is possible because library collections that were formerly obtained in printed form are now being made available in digital format through computerization and digitization, in addition by subscription of electronic books/electronic journals and databases (Lawal & Ani, 2008). Library computerization is now a common practice in African universities, library catalogues can now be accessed electronically, and online public access catalogues (OPACs) are made accessible to academic staff in their offices or anywhere through the Internet. The use of OPAC provides quicker access to available e-resources – electronic journals or e-dissertations/e-theses in the digital library.

In the emerging digital age and trend in technological advancement, there is rapid evolution of digital libraries in African universities (Ani, 2005); postgraduate students are now made to submit their dissertations/theses in electronic form, while the old ones are digitized into the electronic format. So, academic staff in any African university does not need to travel to another university in other to have access to PhD theses of interest, but can do so electronically through digital library with appropriate access parameters. Through library computerization and digitization, local information is made available on the Internet. Besides, computerization and digitization of library resources, African university libraries have begun to subscribe to electronic journals and online databases and making them available and accessible to their academic staff in the digital libraries. In Nigeria, there is Nigerian Virtual Library (at www.nigerianvirtuallibrary.com); which is run by the National Universities Commission (NUC) which is accessible to academic staff in all Nigerian universities. The National Universities Commission (NUC) has collected local journals in Nigerian universities and digitized them into

the national virtual library and therefore making these accessible to academic staff in the universities for research; and they can also be accessed beyond Nigeria's borders. Essentially too, international journals are subscribed by the National Universities Commission (NUC) and make them available and accessible to Nigerian universities through the national virtual library to improve the quality of research in Nigeria.

An important digital library in Africa, is the African Digital Library (ADL) (at www.africandl.org.za), a South African based institution, that provide free access to electronic resources to academic staff that are resident in Africa to support research in the continent. According to West and Schutte (2000: 2):

> The African Digital Library (ADL) is an online library, containing full-text ebooks. These ebooks are available free of charge to residents of Africa in the spirit of an African renaissance.

Another notable virtual library that provides access to electronic resources to academic staff in Africa is the African Virtual University (AVU) (http://www.avu.org) online library. The African Virtual University through Internet connections has provided access to academic staff in 22 countries in Africa to use its virtual library with enormous academic and research resources to improve their research outcome in Africa (Ajayi, 2002; Grace, Kenny & Qiang, 2004). In addition to these, The World Bank has also provided access to electronic resources to promote research in developing countries through its digital library at http://www.worldbank.org/elibrary. Thus, Iwhiwhu and Eyekpegha (2007) affirmed that development of digital libraries has brought tremendous revolution in the provision of electronic information resources and services to academic staff in African universities.

1.3   STATEMENT OF THE PROBLEM

Access to information is key to research productivity of academic staff in Nigerian universities, Africa in general, as obtainable in advanced economies. Essentially, universities are the centers for the generation and propagation of knowledge through research, towards nation building. However, scholars/researchers in Nigerian (African) universities are reportedly lagging behind their counterparts in western countries in terms of research productivity (Foster *et al*., 2008;

Adams, King & Hook, 2010). Thus, Nigerian universities seem to be alienated in global research and publications in spite of digital revolution in research. Part of the problems has been attributed to inadequate diffusion of modern ICT infrastructural facilities in Nigeria leading to low levels of accessibility and utilization of electronic information resources by academic staff in Nigerian universities.

In view of the reported low level of publication output from Nigeria in international research community, the main research problem of the current study is phrased in a question format as follows: would accessibility and utilization of electronic resources ameliorate the problem of low research productivity among Nigerian scholars/researchers, and more specifically the academic staff? Is lack of accessibility and utilization of electronic resources a factor that has resulted in Nigerian scholars' or researchers' low publication output? If so, what are the possible remedies?

In order to proffer solutions to the research problem, the study took a holistic look at the prevailing electronic information environment in Nigerian universities that may foster access and use of electronic resources among academic staff and explored if this has appreciably enhanced academic productivity in Nigerian universities.

1.4   PURPOSE OF THE STUDY

With the changing information environment, from print to electronic, accessibility and utilization of electronic resources has been identified by scholars and experts in recent times as the likely indicator that may impact positively on research productivity of academic staff in universities around the world, Africa, Nigeria included (Angello & Wema, 2010; Foster *et al*., 2008; Pullinger, 1999; Tsakonas & Papatheodoru, 2006). Some scholars however, have denounced this postulation as discussed subsequently in the literature review (Jimba & Atinmo, 2000; Ehikhamenor, 2003a). Thus, the basic aim of the study is to investigate the likely effect of accessibility and utilization of electronic information resources among academic staff in Nigerian universities on their research productivity.

1.5   OBJECTIVES, RESEARCH QUESTIONS, AND HYPOTHESIS OF THE STUDY

The study was guided by the following objectives, research questions and hypothesis:

1.5.1   Objectives of the study

The study investigated the following specific objectives:

1. to investigate the electronic information environment in Nigerian universities;

2. to determine if accessibility and utilization of electronic information resources depends on demographic variables of academic staff in Nigerian universities;

3. to assess the extent of accessibility and utilization of electronic information resources among academic staff in Nigerian universities;

4. to establish different institutional ICT policies/strategies that are put in place toward effective accessibility and utilization of electronic information resources among academic staff in Nigerian universities;

5. to investigate the level of research productivity of academic staff in Nigerian universities;

6. to determine the effect of accessibility and utilization of electronic information resources on productivity by academic staff in Nigerian universities; and

7. to make appropriate recommendations toward effective accessibility and utilization of electronic information resources in Nigerian universities.

1.5.2   Research questions

The following research questions guided the study:

1. What ICT infrastructural facilities are available to support effective accessibility and utilization of electronic information resources by academic staff in Nigerian universities?

2. Does accessibility and utilization of electronic information resources depend on demographic variables of academic staff in Nigerian universities?

3. What is the extent of accessibility and utilization of electronic information resources among academic staff in Nigerian universities?

4. What are the institutional ICT policies/strategies that are put in place towards effective accessibility and utilization of electronic information resources by academic staff in Nigerian universities?

5. What is the level of research productivity of academic staff in Nigerian universities?

6. What is the effect of accessibility and utilization of electronic information resources on research productivity of academic staff in Nigerian universities?

1.5.3 Hypothesis

The study tested a single hypothesis thus:

There is no significant correlation between accessibility and utilization of electronic information resources and research productivity of academic staff in Nigerian universities.

1.6 SCOPE/DELIMITATIONS OF THE STUDY

The study was focused on academic staff in Nigerian universities. The choice of Nigeria for the study was informed by Adams, King and Hook (2010) study, which indicated that Nigeria is among the three most productive countries in Africa, besides South Africa and Egypt. A study by Onyancha (2007) particularly on "LIS research in Africa" had similarly revealed South Africa and Nigeria as two leading nations in Africa in research productivity with South Africa yielding a total of 439 papers and Nigeria coming second with 239 papers between 1986 and 2006. So, Nigeria was selected for the study as one of most productive countries in Africa.

Duque, Ynalvez, Sooryamoorthy, Mbatia, Dzorgbo and Shrum (2010) argued that knowledge is not produced under the same conditions and circumstances between developed and developing countries, even within Africa. There are variations in socio-economic, political, cultural and technological settings that affect research and publications in each country. Smart, Pearce and Tonukari (2004) decried the state of ICT infrastructure in Africa which according to them does not support effective and efficient research process in the universities that may enhance productivity. The present study therefore allowed the researcher to have a specific investigation

into Nigeria's situation; explored the state of the electronic information environment in Nigerian universities, and the extent of access and use of electronic resources in relation to productivity.

Two universities, University of Ibadan – a first generation university, and University of Calabar - a second generation university, were used for the study. In Nigeria, the first generation universities receive relatively better funding towards infrastructural and personnel development than the second generation universities (Ani & Edem, 2012). The study by Ani and Onyancha (2011) revealed University of Ibadan as the most productive university in Nigeria in terms of publication output, while University of Calabar is reported to be less productive. Thirdly, the 2012 webometric ranking of world universities indicated that University of Ibadan ranked 30th among the top 100 universities in Africa, and leads other Nigerian universities on this list followed by the University of Benin in the 32nd position, while University of Calabar is not listed (4International Colleges & Universities, 2012). In a related ranking of world universities by Cybermetrics Lab CSIC (2012), University of Ibadan ranked 38th behind two Nigerian universities: University of Benin (22) (first generation) and University of Agriculture, Abeokuta (35) (third generation) among top 100 universities in Africa. Again the University of Calabar is not on the list. So the choice of these two universities was to allow for comparison of the findings of the study in respect of electronic information environment, accessibility and utilization of electronic resources, and productivity among the academic staff.

In terms of indicators of publication output which include journal articles, conference proceedings, books, chapters in book among others; only journal articles published by the surveyed academic staff were used for the study since journals are the primary sources of communication of research findings among researchers universally (Meera & Ummer, 2010)

The study focused on the effect of accessibility and utilization of electronic resources on productivity between 2005 and 2012; as the period witnessed the pervasive awareness on access and use of e-resources on research by academic staff in Nigerian universities. Although, adoption and integration of ICTs into research in Nigerian universities began in the 1990s through early 2000s, only a few academic staff could boast access to these facilities during this period, not to talk of its impact on research, if any as reported by Ehikhamenor (2003a).

According to scholars (Ani & Edem, 2012; Tibenderana & Ogao, 2009; Rosenberg, 2005), the trend towards the provision of access to electronic information resources through ICT in the university libraries gathered momentum in Africa in the early 2000s. Thus, the widespread access and use of electronic resources in research and possible impact on productivity of academic staff in Nigerian universities could be traced to the period 2005 and 2012, hence the choice of this period for the study. Another reason is the need to harmonize the period of productivity measure in the study for all categories of academic staff, in order to see how they fare within certain period (2005-2012), rather than determining the productivity from the point of entry into research in a continuous form, in which long serving academic staff would seemingly have relative advantage.

1.7   JUSTIFICATION/SIGNIFICANCE OF THE STUDY

Justification or significance of study is an important feature of a research as it provides the basis or rationale for undertaking a particular research project or study. Nworgu (1991) asserted that justification/significance of a study is necessitated by the fact that it tries to establish whether the research is of some professional or practical value to the society or not. That is, the study must make significant contributions to theoretical or practical development of a given field of knowledge (such as Information Science) in the society. Woodwall (2012) explained that significance of study seeks to establish why the research is important and what contribution of new knowledge the research would offer to the field of study. Furthermore, the significance of study provides the context for understanding the importance of the research.

The present study was intended to raise the consciousness of academic staff, university administrations, university librarians and other stakeholders in Nigerian universities to the fast changing information environment due to ICT revolution and emergence of electronic information resources. The study will raise the level of awareness of academic staff in Nigerian universities on the need to access and utilize ICTs and electronic information resources as modern tools for global research and integration. The findings of the study would provide the platform for the integration of academic staff in Nigerian universities into international research community and the emerging knowledge economy.

The study would significantly provide information on the state of the art in terms of ICT infrastructural facilities in Nigerian universities, and the extent of accessibility and utilization of electronic resources by academic staff for their research in relation to their productivity. The findings of the study would make a significant contribution towards proffering solutions to the ongoing debate in the field of Information Science on the need of accessing and using electronic resources to ameliorate the relative low level of research and publications of academic staff in Nigerian universities (African in general) in international journals. Thus, the study would provide the basis towards proffering solution to the problem of non-utilization of electronic resources in Nigerian (African) universities even where they are available and accessible. The findings of the study would then help in the planning for rapid diffusion of ICTs and provision of electronic resources in Nigerian (African) universities by university managements, university librarians, relevant government ministries/agencies (such as National Universities Commission, NUC), and donor (international/local) organizations/agencies.

Hence, the study will be of benefit to university managements and university librarians in being proactive in developing relevant ICT policies/strategies toward effective and sustainable electronic collection development in Nigerian (African) universities, as well as promoting accessibility and utilization of relevant electronic resources by academic staff in research in these universities. In the final analyses, the study will stimulate not only the academic staff, but all stakeholders on the need to work concertedly to improve research output in Nigerian (African) universities and be competitive in international scene.

The research findings will invariably have theoretical and practical implications in the overall development of the field of Information Science in respect of accessibility and utilization of electronic resources and research productivity of academic staff in Nigerian (African) universities. And this will be useful in the formulation of likely theoretical relationship between accessibility and utilization of electronic resources and research productivity alongside existing knowledge in the field.

1.8 LITERATURE REVIEW

The study looked at the concept and significance of research with a brief discourse on productivity, factors affecting research productivity of academic staff in the universities, and then placed emphasis on the effect associated with accessibility and utilization of electronic information resources, which was a major independent variable in the study. The study basically and holistically reviewed relevant literature on the extent of accessibility and utilization of electronic resources by academic staff in Nigeria (Africa) and internationally in view of the emerging electronic information environment. Concepts of information and communication technology and electronic resources were explained, thereafter, existing relationships between accessibility and utilization of electronic resources in literature were reviewed in order to fill the apparent knowledge gap by the present study.

1.9 THEORETICAL FRAMEWORK

A number of theories/models were used as theoretical framework to guide the study. These were classified into two groups: motivation theories/models and user acceptance of information technology theories/models. The motivation theories/models include Maslow's Hierarchy of Needs Theory, McClelland's Achievement Theory, Herzberg's Motivation-Hygiene Theory, and the Hawthorne Studies. And the user acceptance of information technology theories/models are used to guide the study are: Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Information Technology (UTAUT).

1.10 RESEARCH METHODOLOGY

The research design used in the study was quantitative approach, due to its strength on objectivity, generalization of results, and testing of hypotheses as against the qualitative approach, which is prone with prejudices in research process. Survey method was used in the study with questionnaire as the instrument for data collection, supplemented with the interview. Similarly, bibliometric method was used to supplement the survey method in area of productivity measure of the academic staff in the study. The questionnaire was designed and structured into

five sections: section one captured bio-data information of the academic staff (respondents), section two captured data on electronic information environment in the surveyed universities, section three captured data on extent of accessibility and utilization of electronic information resources by the academic staff in the survey, section four captured data on institutional ICT policies/strategies, and section five captured data on productivity of the academic staff. The data was analyzed with the help of SPSS, and correlation analysis was used to test the lone hypothesis (and sub-hypotheses) in the study.

1.11   ORIGINALITY OF THE STUDY

Originality is a major criterion for evaluation of a doctoral research/study. However, experts seem to agree that the word "originality" is a complex term and is usually misunderstood as what constitutes originality to one individual person (for example, research student, supervisor or examiner) may mean a different thing to the other (Academic Skills Unit, 2010; Cryer, 1996). Another word for originality in research study is "novelty" which denotes that the study in question must have significant contribution(s) to the existing knowledge in the given field.

Cryer (1996) discussed basic areas in which originality can be applied to include: research methodology (techniques/procedures), investigation of new knowledge, "exploring the unanticipated", data analysis, and research outcome. The Academic Skills Unit (2010) outlined 19 criteria a research study must fulfill in order to merit originality. However, there occurs a degree of overlap between these criteria with those of Cryer (1996). The criteria that the researcher considered to be of relevance to the present study as listed by Academic Skills Unit (2010: 3) are outlined below:

- demonstrating originality by testing someone else's idea;
- carrying out empirical work that has not been done before;
- using a different methodological approach to address a problem;
- repeating research in other contexts, for example, a different country;
- applying existing ideas to new areas of study;
- adding to knowledge in a way that has not previously been done before; and
- conducting a study on a previously unresearched area or topic.

The present study was based on the report of Foster *et al*., (2008) that proposes that access and use electronic resources may impact positively on the publication output of African researchers in international journals but with no empirical study to substantiate the proposition. According to Foster *et al.* (2010: 4-5):

> Our project has spent a good deal of time looking at the potential and actual obstacles African researchers must overcome to successfully publish with us…If we want to increase the number of successful article submission in Africa, we need to make sure that more tertiary institutions subscribe to our electronic collections. Many institutions are not ready yet for access to electronic resources…We published articles by authors from all corners of the world but vast majority are from Europe, North America and Australia.

The originality of this study constitutes testing of the above mentioned proposition with empirical investigation in Nigerian universities. The study is also unique in the sense that there is paucity of literature on accessibility and utilization of electronic resources and its (perceived) effect on research productivity, as most studies on this subject have been focused directly on impact of ICTs (for examples, computers and the Internet) on productivity with mere extrapolation to electronic resources. The study is then a novelty in its attempt to specifically investigate the subject of electronic resources and its possible effect on publication output of academic staff in Nigerian setting.

There is no known empirical research study that has been conducted on access and use of electronic resources and how they influence research productivity of academic staff in Nigerian universities quantitatively, as existing studies (such as Ehikhamenor, 2003a) are based on mere perception of the impact of ICT facilities on productivity. The study took the model of the research conducted by Duque *et al*., (2010) which investigated the effect of collaboration on productivity in developing countries, including India, Kenya and Ghana, with affirmation that there exists degree of variation in research process from developed countries to developing countries. According to Duque *et al.*, (2010), the level of association of collaboration with productivity in research in developed countries is at variance with that of developing countries. By extrapolation, the present study was focused on the degree or extent of access and use of electronic resources and its possible relationship with productivity; and would examine if there is

variation of the findings with that of the international communities. So, the originality of the study is also derivable by "applying existing ideas to new areas of study" (Academic Skills Unit, 2010), that is from "collaboration" and productivity to "accessibility and utilization of electronic resources" and productivity.

Finally, the originality of the study would also be revealed in the research outcomes which will invariably and significantly contribute to the existing knowledge in Information Science vis-a-vis access and use of electronic resources and productivity in a way distinct from previous studies. At this juncture, the puzzle and analogy of the nature of research outcome presented by Cryer (1996) of Sir Walter Raleigh who brought a potato to "England from America" as a novelty is worthy of note in evaluation of originality in research. Even though the potato was not a new commodity in America, but it was a novelty in England (Cryer, 1996). Thus, according to Cryer (1996) originality of research outcomes may not be new in absolute terms; but they can be new in terms of settings, research tools/techniques, or theories from one academic discipline being applied and evaluated in another discipline.

1.12   DEFINITION OF TERMS

Academic staff: A person that is in an employment of a university with a responsibility to teach and conduct research (Bassey, 2006). Academic staff essentially was defined in the study as an employee of the university with a responsibility to conduct research.

Accessibility: Ability to get, locate or obtain electronic information resource with ease in the conduct of research (Borgman, 2000; Polonsky, Jones & Kearsley, 1999). Thus, accessibility is considered in the study as a process in which academic staff can easily locate e-resources aided by ICTs in research.

Electronic information environment: University environment that is characterized by applications of ICT infrastructures to support research (Grace, Kenny & Qiang, 2004; Watts & Ibegbulam, 2006). Electronic information environment involves a wider access and use of ICTs by academic staff in universities.

Electronic information resource: Information resource for examples journal, database that can be accessed on the Internet, computer, CD-ROM, digital/virtual libraries or related computer/electronic networks (Watts & Ibegbulam, 2006). Electronic resource is therefore defined as any information source than can be accessed by academic staff through ICTs.

Research: Systematic process of finding out new fact or knowledge (Ochai & Nedosa, 1998). A process employs by academic staff to facilitate the discovery of new knowledge in university.

Publication output: Number of publications – for example number of journal articles, conference papers or books published by individual academic staff in the university (Ani, Esin & Inyang, 2003; Ochai & Nedosa, 1998). In this study, publication output was operationally defined in terms of journal articles.

Productivity: A measure of publication output of an academic staff over a period of time (Ani, Esin & Inyang, 2003; Agyeman & Kissiedu, 2006; Bottle *et al*., 1994). In this study, this will be measured by counting the number of journal articles published by each academic staff in the surveyed universities

Utilization: Ability to use electronic information resource in the conduct of research (Borgman, 2000). Utilization expresses the ease of use of e-resources through ICTs.

1.13   ORGANIZATION OF THE STUDY

The study is organized and divided basically into seven chapters. In Chapter One, the introduction to the study is presented. The contextual setting, purpose, objectives and research questions and hypothesis are highlighted and discussed. Scope/delimitation, justification/significance, justification, originality of the study and ethical considerations are also discussed in the chapter. Finally, definition of terms used in the study is presented. Chapter Two discussed the literature review, while theoretical framework is presented in Chapter Three. The research methodology for the study is presented in Chapter Four. In Chapter Five, the results of the study are presented, while interpretation and discussion of the findings of the study is in Chapter Six, Finally, summary of the findings, conclusion and recommendations are presented in Chapter Seven. Thereafter, the references and the appendices are presented.

1.14   CHAPTER SUMMARY

Research is important in the university as it is the means by which knowledge is generated and disseminated to the society for development. Research productivity of academic staff in African universities is reportedly low compared with that of the developed nations. Accessibility and utilization of e-resources has been proposed as a factor that may ameliorate research problems in African universities and thus lead to relative increase in productivity. Consequently, the study is aimed at exploring if there is a possible correlation between accessibility and utilization of e-resources and productivity with focus on Nigerian universities. Salient ethical issues have been outlined to guide the study.

CHAPTER TWO: LITERATURE REVIEW

2.1   INTRODUCTION

The chapter presents the literature review for the study. The need for a literature review in doctoral study cannot be overemphasized. Basically, a literature review makes a researcher to be familiar with previous work or research in his/her discipline, in addition for the need for the researcher to gain knowledge on how to find, analyze, evaluate and integrate information from existing research (Gastel, 2012). Besides, a literature review is helpful in assisting the researcher to know different approaches/methods that he/she can adopt in his/her own research. A literature review primarily sets the foundation for a new research/study, guides the researcher through the research process, and is also relevant in the choice of theoretical framework for the study.

2.2   ELECTRONIC INFORMATION ENVIRONMENT IN UNIVERSITIES

In view of the digital revolution in academic environments, researchers have expressed varying degrees of interest to investigate the state of electronic information environment in universities around the world within the past two decades. Rolinson, Meadows and Smith (1995) emphasized the need for the use of computer-based information in research, and thus carried out a survey to investigate the state of electronic information environment that is providing support to biological research in academic and research institutions in the United Kingdom (UK). It was found that most of the academic staff in the survey were reported to have computers in their offices and at homes, although the percentage of those with access to computers at homes was lower than those with access in the offices. There was a wider access to electronic networks by the academic staff but this varied from one institution (university) to another. De Vicente, Crawford and Clink (2004) in a survey of electronic information environment at Glasgow Caledonian University, reported that 56 % of academic staff has access to the Internet in their offices, 34% at home, 9% at the library and 1% for other access points. This is a reflection that

majority of the academic staff has enabling information environment to access and use e-resources in their research.

Al-Shanbari and Meadows (1995) did a survey of electronic information environment in four universities in Saudi Arabia. Highlights of the findings of the study showed that about 38% of the academic staff had access to computers in their offices with 81% of these computers being stand-alone; while 86% of the respondents had access to computers within the departments. It was found that networking was new and in rapid progress in the surveyed universities, with increasing impact on research activities of the academic staff.

Kaminer (1997) studied the prevailing electronic information environment in the U.S. through a questionnaire survey. The study indicated that over 90% of academic staff in the surveyed university were found to have computers in their offices and at homes. Access to the Internet was also high at the two access points – offices and homes.

Parameshwar and Patil (2009) explored the electronic information environment at the Gulbarga University, India in respect to access to the Internet. The findings of the study showed that major access points to the Internet by the academic staff in the survey were the university library (63.55%), department (37.24%), Internet cybercafé (35.51%), and home (18.22%). This revealed that the Internet connectivity at offices of the academic staff was apparently lacking, and this confirmed a poor state of electronic information environment at the university.

Chifwepa (2003) carried out a survey to determine the state of electronic information environment in the University of Zambia. The findings of the study revealed that, the University of Zambia "had a well-developed network for both Intranet and Internet that was established to foster communication and access to both internal and external information" (Chifwepa, 2003: 119). In order to access the Intranet and the Internet, all the departments/units including the library in the university were networked and varying numbers of computers were provided to each department/unit depending on the strength of the staff (academic staff) through CAMAS (Computers for Academic, Management and Administrative Support) Project. Besides, the CAMAS initiative, Chifwepa (2003) found that the University of Zambia Library provided

access to electronic networks (the Intranet and the Internet) through the support of INASP (International Network for the Availability of Scientific Publications). The goal of INASP project was to assist the university library to provide access to electronic resources (e-journals and databases) through PERI (Programme for the Enhancement of Research Information) to academic staff for research purposes. However, and in spite of these initiatives, it was reported that most academic staff did not have access to computers in their offices to use the networks; access was either at "the head of department's office or the computer laboratories" (Chifwepa, 2003:130). The paper concluded that lack of access to computers in personal offices needs to be redressed towards promotion of enabling electronic information environment in aid of efficient access and use of e-resources by academic staff in the university.

The situation at the University of Zambia where academic staff lack access to computers in their offices seems to confirm the poor state of electronic information environment in African universities as reported by Watts and Ibegbulam (2005). According to Watts and Ibegbulam (2005: 2-3):

> Although there is continuing evidence for increased access to ICTs and online facilities in developing world physical access to suitable ICTs and reliable connections remains challenging and costly for many.

However, and in contrast to the assessment of electronic information environment by Watts and Ibegbulam (2005), a study by Ojedokun and Owolabi (2003) had revealed a relatively well developed electronic information environment at the University of Botswana. According to Ojedokun and Owolabi (2003), the Internet was reportedly introduced at the University of Botswana in 1997 to transform the information environment in the university. In view of this, they conducted a survey to investigate the state of electronic information environment at the University of Botswana due to its potential impact of the Internet on research. Academic staff were used as respondents, with 216 academic staff as the sample size. It was found that 100.0% of the respondents were reported to have access to computers in their offices, computers at homes (62.5%), Internet access in offices (94.4%), and Internet access at homes (15.28%). The findings of the study provided a relative better electronic information environment at the University of Botswana than obtained at the University of Zambia (Chifwepa, 2003; Ojedokun & Owolabi, 2003). The comparative enabling electronic information environment at the University

of Botswana was further confirmed when the respondents were asked to indicate the constraints that affect effective use of the Internet, lack of computer with Internet access (6.9%) and lack of Personal Computer (8.3%) were in the least of the factors (Ojedokun & Owolabi, 2003). The high electronic information environment in the University of Botswana as reported by Ojedokun and Owolabi (2003) is consistent with the proposition by Subair and Kgankenna (2002) that academic staff should have computers and Internet access or connectivity in their offices in order to be integrated into global research community.

Manda (2005) investigated the state of electronic information environment in ten research and academic institutions (seven universities and three research institutes) in Tanzania in order to assess how e-resources (PERI resources) are accessed and utilized in research by academic staff in these institutions. The results indicated variations in electronic information environment between the surveyed institutions as earlier observed by Rolinson, Meadows and Smith (1995). It was found that academic staff could access e-resources at the libraries, computer centres, faculties/departments or offices depending on the institutions. Five university libraries reportedly have Library LANs. It was further observed that "although the availability of PCs within the institutions is fairly good, the numbers of computers available to users in the libraries are, on the whole, were not satisfactory" (Manda, 2005: 272). In respect of computers in personal offices, most of the academic staff were reported to have computers with Internet access in their offices in the survey, except in two institutions. In the words of Manda (2005: 272):

> The ratio is almost 1:1 and the PCs are often located in the offices of individual staff members so that they are conveniently available for use.

Although access to the Internet was rife in most of the institutions, it was comparatively high at the University of Dar es Salam and Sokoine University of Agriculture as 92% and 100% of academic staff respectively in these universities reportedly have access to the Internet in their personal offices. However, the major problem associated with Internet access in most of the surveyed institutions was that of low bandwidth except at the University of Dar es Salaam and Mzumbe University. It is therefore pertinent to conclude that there exist robust electronic information environments in Tanzanian universities to support modern day research by academic staff.

A number of researchers have carried out surveys to explore the state of electronic information environment in Nigerian universities (Ani & Esin, 2003; Ani, Edem & Ottong, 2010; Ehikhamenor, 2003b; Emojorho and Adomi, 2006; Nwokedi, 2007; Nwezeh, 2010; Watts & Ibegbulam, 2005). Ani and Esin (2003) studied the electronic information environment in five federal universities in Nigeria. Although it was found that academic staff in the survey have relative access to computers, access to networking and the Internet was apparently poor. The paper concluded that access to IT facilities – computers, electronic networks, and the Internet was a recent development in the surveyed universities and recommended adequate provision of computers and the Internet for academic staff to aid them in their research. A study by Ehikhamenor (2003b) exploring the electronic information environment in 10 universities in Nigeria revealed that 64.4% and 50.4% of the academic staff in the survey have computers and the Internet in their offices respectively, while the prevalence of electronic networks was reportedly poor at these universities.

Watts and Ibegbulam (2005) reported on a study that investigated the state of electronic information environment at the University of Nigeria, Nsukka. The results of the study indicated that the Medical Library, College of Medicine, University of Nigeria is characterized with poor electronic information environment as it lacks access to adequate ICT infrastructure and affordable access to online databases, as Internet connectivity was reportedly poor. However, the study revealed that the university management was making tremendous efforts to improve access to ICT infrastructure not only at the Medical Library, but at the entire university in order to promote accessibility and utilization of e-resources by academic staff in research activities.

Emojorho and Adomi (2006) surveyed the electronic information environment in Delta State University, Nigeria. The findings of the study showed that 72.5% of the academic staff reportedly has ICT facilities including Internet access at their offices, 19.6% have computers at home. Low level of access to networking was also reported in the survey. A similar study by Nwokedi (2007) at the University of Jos, Nigeria indicated that 95.52% of the academic staff surveyed in the medical sciences has computers in their offices, 69.40% have computers at home, and 67.16% have Internet access in office.

A recent study by Nwezeh (2010) showed a high state of electronic information environment in Obafemi Awolowo University, Nigeria. The findings of the survey indicated that 95.7% of the academic staff has computers in their offices, 56.5% have computers at home, 69.6% have Internet access in their offices, and only 8.7% have Internet access at home. But Ani, Edem and Ottong (2010) have reported a very low electronic information environment at the University of Calabar, Calabar, Nigeria as only 3.08% of the respondents have Internet access in their offices. However, it can be concluded in the review that there is improving trend in electronic information environment in Nigerian universities, (although with some fluctuations) which is in tandem with global trend.

2.3 ACCESSIBILITY AND UTILIZATION OF ELECTRONIC INFORMATION RESOURCES

The tremendous change in the nature of information environment in the universities, occasioned by the information revolution, in which information has now migrated from print to electronic form, has made information easily accessible in the universities. Information is now accessible on the computers, the CD-ROMs, the Internet or other digital networks. Due to the relative ease of accessibility of electronic information resources, there have been corresponding innovations and a shift in paradigm in information seeking behavior of academic staff in the universities toward electronic resources from the print. The advancing digital age is therefore characterized with applications, access and use of ICTs and electronic resources in the academic environments for teaching, learning, and research. In the universities the academic staff essentially are involved in research and they need access to modern ICTs and electronic resources to support their research activities. Notably, Arunachalam (2002: 513) argued "that one does not have to use technology because it is there, but one uses it if there is a genuine advantage".

In view of the seeming benefits of ICTs and electronic resources in the universities, scholars have been investigating the pattern of access and use of these new tools and facilities in research process in a global perspective (Abels, Liebscher & Denman, 1996; Ali, 2005; Al-Ansari, 2006; Al-Shanbari & Meadows, 1995; Ellis & Oldman, 2005; Heterick, 2002; Kaminer, 1997; Madhusuudhan, 2010; Philip, 1995; Rolinson, Meadows & Smith, 1995; Shelton, 2011; Swain,

2010; Tenopir, Wilson, Vakkari, Talja & King, 2008) and in African universities (Badu & Markwei, 2005; Chifwepa, 2003; Dulle *et al*., 2002; Kinengyere, 2007; Manda, 2005; Watts & Ibegbulam, 2006). According to Watts and Ibegbulam (2006), although, there are existing research into the provision, access and use of electronic resources in developing countries, there is still need for more research in this area. Observably, the increasing interest in research in this field is attributed to the rising expectation on the potential effect of electronic resources on the information seeking behavior of academic staff in global arena (Abels, Liebscher & Denman, 1996). The present study is a contribution towards this goal in respect of Nigerian universities.

A study by Kaminer (1997) has advocated the need to assess the extent of access and use of electronic resources in research. According to him, scholars have not only began to discuss how to measure and evaluate the use of e-resources in research but emphasize to know about the nature of access of these vital resources in research activities. Thus, a number of user studies in relation to the nature or pattern of access and use of ICTs and e-resources in research by academic staff around the world would be examined and reviewed in this section. Philip (1995) investigated the use of computerized information system in ten universities by academic chemists in UK. The results of the study had shown that 90% of the chemists were using online databases for research. The author concluded with a proposition that computerized chemical information systems are widely used by academic chemists in UK universities.

Ellis and Oldman (2005) explored the extent to which academics in the UK universities are accessing information as a result of the emerging electronic information resources, particularly the Internet resources. The basic aim of the study was to determine the extent of accessibility and utilization of the Internet resources in research in the Humanities. It was found that most of the respondents were accessing and using the World Wide Web and the Internet to search for e-resources in their research. According to Ellis and Oldman (2005: 33), the same study was extended to selected "researchers in the United States, Canada, New Zealand and Australia with the aim of finding out whether or not the attitudes toward electronic information resources vary". The study indicated that compared with the researchers in the UK, overwhelming majority of the respondents were using the electronic journals for research. A large percentage of the respondents were using online database and CD-ROMs as most of them preferred electronic to

the traditional printed materials. It was also found that lack of computing skills was the most inhibiting factor on the use of electronic resources among the respondents. The authors had recommended the need to redress problem of information literacy in relation to access and use of electronic resources in surveyed countries.

A recent study by Shelton (2011) on the use of ICT facilities by academic staff in the UK universities has shown that 87% of the respondents are using ICTs and e-resources in their academic and research activities. However, the paper concluded that, access and use of ICTs by academic staff in the universities is influenced by divergence in cultures and contexts of research.

In the U.S., Kovacs, Robinson and Dixon (1995) studied the use of e-conferences by library and Information Science professionals in research. The study revealed that the use of e-conferences has increased access to professional journals thereby influencing the information seeking behaviour of the respondents. The use of computer-based tools by Members of the Modern Language association of America (MLA) was the subject of investigation by Shaw and Davis (1996). The findings of the study indicated that most respondents have been using computers and e-resources in their research. Over half of the respondents were reportedly accessing and using variety of electronic resources such as MLA International Bibliography and CD-ROM databases. Basic problem against the use of computer-based tools was inadequate skills among the respondents. A survey by Abels, Liebscher and Denman (1996) explored the use of electronic networks by scientists and engineers in the U.S. universities. Their survey has shown that scientists and engineers are deeply involved in access and use of electronic networks to facilitate their research activities in the U.S.

Kaminer (1997) studied the use of the Internet by academic staff in a U.S. university in research. From the findings of the study, vast majority of the respondents were accessing and using the Internet for research purposes. This indicated a high profile of Internet use by the faculty members in the survey. Heterick (2002) opined that the proliferation of electronic resources has significantly affected access and use of information by academic staff in the U.S. universities, as these resources are invaluable tools for research. Thus, he conducted a study that explored how

academics in the U.S. are accessing and using electronic resources in research. It was found that of 32,000 academics that were surveyed, over 60 percent of them responded that they are using electronic resources, since they believe that a variety of electronic resources is invaluable in their research.

Tenopir *et al*., (2008) investigated the extent of use of electronic resources by academic staff in three countries (Australia, Finland, and the United States). It was found that the extent of use of e-resources by academic staff varies from country to country. From the results more than half of the respondents were using electronic resources in the U.S., while two-thirds of the academic staff used e-resources in Australia. Furthermore electronic resources were predominantly used in research activities in all the surveyed universities in the three countries. The paper concluded that the use of electronic resources is an integral part of the research process in Australia, Finland and the U.S. Another study by King, Tenopir, Choemprayong and Wu (2009) in five U.S. universities has also shown that academics are significantly accessing and using e-resources (particularly the electronic journals) that are available in the library collection rather than the print.

2.4   ACCESS TO INFORMATION AND COMMUNICATION TECHNOLOGIES

A recent review by Deng (2010) has shown that electronic resources have been effectively integrated into learning, teaching and research in Australian universities. This has motivated him to explore the patterns and trends of utilizing electronic resources among all categories of staff and students in higher education in Australia. According to his findings, access and usage of electronic resources is common in Australian universities due to rapid advances in ICTs. In specific terms, the findings of the study showed that more than 59% of the respondents accessed and utilized e-resources more than once a week. The basic benefit for using e-resources by the respondents was their accessibility which is not limited by time and location. The indices for the use of e-resources in the study showed the following results: online journals (80.5%), website information (71.2%), online newspapers (51.7%), and electronic books (31.5%).

Al-Shanbari and Meadows (1995) investigated the pattern of access and use of ICT facilities by scientists and engineers in four universities in Saudi Arabia and compared the results with their counterparts in British universities. It was found that academics in the survey were using computer regularly in their research especially for data collection. The findings also showed that access to computers increases the use of CD-ROM search and online databases in research. There was little use of networking by the respondents, as access to computer network was reportedly new among the academic staff in the surveyed universities. The study indicated that increasing access and use of ICT facilities may alleviate some of the information problems that are being experienced by academic staff in the Saudi universities. In comparison with the UK universities, it was found that, general use of ICT facilities in Saudi was below that of the UK; as there was reportedly a greater usage of online searching in the UK. A study by De Vicente, Crawford and Clink (2004) investigating access and use of electronic information services by academic staff at Glasgow Caledonian University, indicated that Internet resources were used regularly by the academic staff in their research. However, further analysis has revealed low level of use of electronic abstracts, electronic indexes and electronic journals by the respondents. Al-Ansari (2006) surveyed the use of Internet by academic staff in Kuwait University, the Internet resources that are used and the purpose for use. He postulated that, the Internet has changed the research process in the universities, but that "the intensity of Internet use varies from individual to individual, institution to institution, and from country to country" (Al-Ansari, 2006: 791). The findings of the study revealed that majority of the respondents have been using the ICTs - computers and Internet for more than five years in research. The study indicated that, the use of the Internet by the academic staff has helped them to save time, find up-to-date information, as well as cooperate with their colleagues in research work. The paper concluded that most academic staff in the survey are keen in improving their information literacy skills on Internet use through formal training to promote the use of e-resources.

Costa and Meadows (2000) in a survey to investigate the extent of access and use of information technology (IT) among social scientists in Brazil, found that 90% of the respondents used IT facilities in research. The use of electronic resources was observed to be common among the respondents with 68% use of e-journals and 72% use of online (bibliographic) databases. Shanahan (2009) investigated variety of electronic resources that are used by health researchers

in Australia. It was found that there are widespread access and use of e-resources among the respondents. There was extensive access and use of the Internet, online journals, health and medical databases by the health researchers in the survey as they considered these resources vital in their research and for updating their professional knowledge. The paper recommended the need to tackle issues that reduced accessibility of e-resources within the offices of the medical researchers so that these resources can be effectively used in research.

A lot of scholars have investigated the extent of access and use of electronic resources in Indian universities (Ali, 2005; Haridasan & Khan, 2009; Kumar & Ansari, 2012; Madhusuudhan, 2010; Sharma, 2009; Sujatha & Murthy, 2010; Parameshwar & Patil, 2009; Swain, 2010). Ali (2005) focused his study on the use of electronic resources by academic staff at Indian Institute of Technology in Delhi, and found that, although the respondents are accessing and using e-resources, 60% of them have problems to access these resources for variety of reasons including information literacy. Sharma (2009) perceived that availability of electronic resources is now common in university libraries in India; and carried out a survey to find out the preferences and frequency of use of online resources among research scholars at the Guru Gobind Singh Indraprastha University. It was found that the use of electronic journals was relatively high among the researchers, with high frequency of use**.** This shows an increasing trend towards access and use of relevant electronic resources. A similar study by Kumar and Ansari (2012) revealed daily use of electronic journals by majority of the academic staff in their research at the Chaudhary Charan Singh University, India.

Parameshwar and Patil (2009) in their review observed that the Internet is redefining how research is conducted in the universities. Their survey exploring the extent of use of the Internet by faculty and research scholars at Gulbarga University, India indicated that most respondents were accessing and using the Internet frequently in research. Further analysis showed that electronic journals were relatively more used by the respondents than other e-resources: e-conference proceeding (27.57%), e-reference documents (22.90%), e-theses/dissertations (22.90%), e-books 23.26%, e-technical reports (9.34%) and online databases (6.07%). The paper however noted that compared with total number of faculty and research scholars in the university, the number of those using the Internet is small. Recommendations were made on the

need to increase user awareness of available electronic information resources as well as teaching information literacy skills to the researchers by the library.

A study by Haridasan and Khan (2009) explored the extent of utilization of e-resources by academic staff and "research scholars" in social sciences in National Science Documentation Centre (NASSDOC), India. The results showed that most respondents accessed and used available e-resources at the centre for research work. Further analysis showed that the use of e-journals (76.92%) was popular among the respondents than other e-resources: online databases 67.31%, e-theses 61.54%, CD-ROM databases 57.69%, and e-books 38.46%.

Madhusuudhan (2010) examined the use of e-resources by research scholars of Kurukshetra University in India. It was found that "electronic resources have become an integral part of the information needs of research scholars at Kurukshetra University" (Madhusuudhan, 2010: 492). In their study, Sujatha and Murthy (2010) surveyed the use of electronic information resources by scientists, research scholars and postgraduate students in the Fisheries Sciences Institutions of South India. The results of the study showed that there has been significant use of electronic resources mainly for research purposes among the respondents. The paper concluded that there was need for user training towards enhanced access and use of electronic resources.

According to Khan and Dominic (2012), the use of the Internet is vital in research in every university. They conducted a survey to assess the extent of Internet use by academic staff in Engineering Colleges of Moradabad, India. The findings of the study revealed increasing use of the Internet in research by the respondents. In a survey by Swain (2010), although focused on the use of e-resources by the students, the findings of the study revealed that the use of e-journals was popular in Business School, Orissa, India. These studies have revealed that, access and use of electronic resources is common in Indian universities, and an integral part of Indian research process.

A study by Riahinia and Zandian (2008) sought to assess the use of e-resources (online databases and search engines) and print materials by postgraduate students in Tarbiat Moallem University and Tarbiat Modares University in Tehran, Iran. The results indicated that, there was more

extensive use of electronic resources - online databases (63.4%) and search engines (24.3%) than printed resources (11.3%) by the respondents in the two universities. In a related study, Asemi and Riyahiniya (2007) surveyed accessibility and utilization of e-resources by the students (postgraduates and undergraduates) of Isfahan University of Medical Sciences in Iran. The findings revealed that 69% of the respondents are using the electronic resources (online databases) in their learning with Ovid Journals as the most widely used database. The students expressed satisfaction with the information they accessed through these e-resources.

A review by Jankowska (2004) showed that academics in Russia are using the Internet to conduct research. She described the emerging electronic information environment as the cyberspace age where access to information everywhere in the world is now done with ease through a variety of ICT tools. This led her to conduct a study to find out if the change in information environment attributable to ICTs has influenced the information seeking behavior of professors in the University of Idaho (UI), Moscow, Russia. In other words the study examined if the professors at the university are accessing and using the ICTs/e-resources in their research. The findings of the survey revealed that all the respondents in the survey are using the computers and the Internet to support their research, but the use of networks was reportedly low. The professors reportedly used ICTs in a number of ways in their research which include working on manuscripts, research proposals and conference papers, videoconferencing, access to e-resources, and web publishing to present research results. The Internet was mainly used to locate, collect and analyze data/information for research by the professors in the survey.

A study by Atakan, Atilgan, Bayram and Arlantekin (2008) examined the level of awareness and use of digital library resources by academics in Ankara University, Ankara, Turkey. The results of the survey showed that many academic staff have awareness of available digital library resources and are using them in their research activities. The *Web of Science*, ScienceDirect and EBSCO HOST were found to be the most used electronic databases among the respondents. The study revealed that 55.2% of the academic staff used electronic databases frequently, 33.6% occasionally, and 11.2% did not use these resources at all in their research.

In Africa**,** Subair and Kgankenna (2002) did a study that explored the level of use of information technology and electronic information resources among researchers in Botswana College of Agriculture (BCA) and Department of Agricultural Research (DAR) in Botswana. It was found that the researchers placed a high value on information technology and electronic resources in agricultural research, but they have insufficient knowledge and skills to appreciably access and use these resources. Another study in Botwana by Ojedokun and Owolabi (2003) surveyed the extent of Internet use for teaching and research activities by academic staff at the University of Botswana. The results showed that most respondents were using the Internet frequently; the use of web-based resources in research was very high in the survey.

A study by Magara (2002) had shown a low level of accessibility and utilization of e-resources by academic staff in Uganda; while Kinengyere (2007) reported an improved level of access and use of e-resources in Ugandan universities. According to Kinengyere (2007), the list of nationally available e-resources in the Ugandan universities includes EBSCO, HINARI, AGORA, Open Access Journals among others. However, further analysis of the findings revealed that some of these electronic information resources in Uganda universities were not optimally utilized by academic staff in research. The paper called for continuous information literacy programme to maximize access and use of e-resources in Ugandan universities.

Dulle *et al*., (2002) and Manda (2005) surveyed the extent of access and use of ICTs and electronic resources in Tanzania. Dulle *et al.*, (2002) focused their study on researchers at 13 agricultural research institutions and centers in Tanzania. The results of the study indicated that majority (69.7%) of the respondents have access to the Internet and frequently use Internet resources in their agricultural research. Further analysis revealed low access and use of CD-ROM databases among the respondents. The paper concluded that "available information technology facilities have not been fully exploited to facilitate agricultural researchers' access to information" in Tanzania (Dulle *et al*., 2002: 157). Recommendation for improved information literacy in Tanzanian research institutions and universities to promote access and use of ICT facilities and e-resources was made.

Similarly, Manda (2005) reported on a study that explored the extent of electronic resource usage in academic and research institutions in Tanzania, the role of PERI (Programme for Enhancement of Research Information) resources was highlighted. According to Manda (2005: 269), PERI was introduced to provide access to "full text electronic journals in the research and academic community in Tanzania". Notably, PERI is a very good academic and research resource that has strengthened research capabilities of academic staff in African universities by bringing affordable global information resources not only to Africa but other developing countries (Ballantyne, 2005). In view of these developments, Manda (2005) surveyed the extent of access and usage of PERI resources and other electronic resources on the Internet by researchers in ten academic and research institutions in Tanzania. The findings of the study revealed that majority of the respondents were using the PERI resources as well as other Internet resources in research. Major access points to PERI resources were offices of the academic staff and the university libraries through Internet connectivity (Manda, 2005). However, it was found that there was variation of access and use of PERI resources from one university to another depending on the nature of the resources. Accordingly, some institutions are reportedly accessing PERI resources that are specific to their disciplines than the general ones.

In Zambia, Chifwepa (2003) surveyed extent of access and use of the Intranet and Internet by academic staff in the University of Zambia. The findings of the study showed that, most of the respondents were using the Intranet and the Internet in their research, although with low frequency. The paper recommended the need for the university to tackle issues that affect access and use of e-resources by academic staff especially that of information literacy and connectivity for global competitiveness in research.

Badu and Markwei (2005) made a review of the Internet resources that can be accessed and used by academic staff to aid their research in Ghanaian universities. They conducted a study that explored the extent of awareness and use of the Internet resources by academic staff in the University of Ghana. It was found that most academic staff (69.9%) were aware of the relevant Internet resources but the frequency of use of these resources in their research was quite low. It was found that the use of library for research was still prevalent among the academic staff than the Internet use; "but the library is still the main source of information for research" (Badu & Markwei, 2005: 267). The main reason for non-use of the Internet by some respondents was due

to lack of training in Internet use which resulted in inadequate skills to access and use the Internet resources by the respondents. This may also explain why the frequency of use of the Internet resources was found to be low among those that used them. Thus, staff training was recommended by the authors for effectiveness and efficiency on the use of Internet resources by academic staff in the University of Ghana.

Mugwisi and Ocholla (2002) did a comparative study on access and use of the Internet and e-resources by academic staff in the University of Zimbabwe and the University of Zululand, South Africa. The findings of the study indicated that a range of Internet resources such as electronic journals, Telnet, Web were used by academic staff in the two universities. It was found that lack of Internet access and inadequate computers were major obstacles against use of Internet resources in the survey. A related study by Mgobozi and Ocholla (2002) explored the extent of use of electronic journals in two universities in South Africa: University of Natal and University of Zululand with academic staff and postgraduate students as respondents. The findings of the study revealed that all the 196 responding academic staff were accessing and using the electronic journals; although the level of access of the electronic journals was reportedly low.

In Nigeria, Tiamiyu (2000) classified access and use of ICTs and electronic resources into stages: pre-ICT era, very early stages, and advanced stages. The paper indicated that the late 1990s was the period that was characterized with very early stages of ICT usage in Nigeria. During this period, adoption of ICT by relevant organizations/agencies/institutions (universities) was observably low. Hence early studies on access and use of ICTs and electronic resources in the early 2000s characteristically revealed low level of access and use by academic staff in Nigerian universities (Ani &Esin, 2003; Ehikhamenor, 2003a, 2003b; Eke, 2006; Jagboro, 2003).

On the other hand, recent studies seem to report increasing level of access and use of ICTs and e-resources (Ajala, Adegun, Adetunji & Oyewumi, 2010; Ani, 2010; Ani, Edem & Ottong, 2010; Azubogu & Madu, 2007; Egberongbe, 2011, Emojorho & Adomi, 2006; Nwezeh, 2010; Nwokedi, 2007; Ojokoh & Asaolu, 2005; Osunade & Ojo, 2006). This is in tandem with the global trend as posited by Khan and Dominic (2012) towards increasing access and use of ICTs

and electronic resources in universities around the world. In specific terms, Khan and Dominic (2012: 1) observed that the use of ICT "is increasing day by day as it is time saving, more informative and less expensive". The present study intends to fill this gap in respect of access and use of e-resources by academic staff in Nigerian universities.

A study by Ani and Esin (2003) revealed extensive use of computers but negligible use of networking by academic staff in Nigerian universities. It was reported that lack of access to IT and inadequate skills were major impediments against use of IT. Ehikhamenor (2003a) surveyed the use and non-use of electronic resources on the Internet by academic scientists in ten universities in Nigeria. The findings of the study revealed that Nigerian scientists were yet to embrace or appreciate the use of Internet and electronic resources in conducting research. It was found that academic staff in the survey made very little use of the Internet resources in their research activities, as they were still relying on the printed sources; access to electronic networks was reportedly minimal. In a related study, Ehikhamenor (2003b) similarly reported a low level of access and use of electronic resources by academic scientists at ten Nigerian universities for research purposes. Jagboro (2003) in a study to evaluate the level of utilization of the Internet resources by academic staff in Obafemi Awolowo University, Ife, Nigeria, found that Internet resources were used sparingly by the respondents. He however concluded that Internet use in Nigerian universities will improve in future.

Eke (2006) surveyed the extent of awareness and use of ICTs by academic staff in tertiary institutions in Imo State, Nigeria; in which one polytechnic, one college of education, and two universities, were used in the survey. The findings showed that while 50% of the respondents were using the computers and the Internet, it was found that access to ICTs was the major problem against use. Emojorho and Adomi (2006) surveyed the use of information technology facilities by all categories of staff (academic staff, senior non-academic staff and junior non-academic staff) of Delta State University, Nigeria for academic and research activities. It was found that academic staff were major users of ICTs as 92.2% of them were using computers, 13.7% of the respondents used local area networks (LANs) and a vast majority used the Internet in their academic and research activities. Ani and Bassey (2009) reported that academic/research information was the basic information need by academic staff in a survey of three Nigerian

universities, and that both the Internet (15.2%) and the university library (15.5%) were comparatively used by the academic staff in satisfying their information needs in research.

Azubogu and Madu (2007) did a survey that explored the use of ICTs among the teaching staff of Imo State University, Owerri, Nigeria; with the results indicating high usage of ICTs. In a survey by Nwokedi (2007) to assess the use of the Internet in research activities by academic staff in Medical Sciences in the University of Jos, Nigeria, it was revealed that majority of the respondents regularly used the Internet in their research.   Conversely, a survey by Popoola (2008) has shown a low level of access and use of electronic information sources by social scientists in 13 Nigerian universities. It was found that, the use of the Internet with a mean score of 1.96 was comparatively low than obtained with printed resources – journals (4.98) and textbooks (3.94) by the respondents. However, another study of the pattern of access of the Internet resources on teaching and research in Obafemi Awolowo University, Nigeria by Nwezeh (2010) revealed high level of accessibility and utilization ICTs particularly the Internet by the academic staff, as 73.9% of them made regular use of the Internet in their research activities.

Ani, Edem and Ottong (2010: 535) asserted that in spite of the apparent impact of ICT revolution in teaching/research in developed countries, that "access to the Internet is not widespread in African universities, particularly in Nigeria". In view of this, they conducted a study to investigate the extent/level of Internet access and use by academic staff in the University of Calabar, Calabar, Nigeria, as teaching/research tool. The findings of the study revealed extensive use of the Internet by the respondents, although official access to the Internet was reportedly low in the university. Most of the respondents reportedly lack access to the Internet in their offices and predominantly use commercial Internet cybercafé off campus to access e-resources for their research.

In a study that aimed to explore the impact of the Internet use on research by academic staff in Ladoke Akintola University of Technology in Nigeria, Ajala *et al*., (2010) found that a vast majority of respondents were using the Internet regularly in research. According to Egberongbe (2011), the emergence of ICT has tremendously affected how information is accessed and used

by academic staff in Nigerian universities. In her study, she surveyed the use of electronic resources by academic staff at the University of Lagos, Nigeria. It was found that 90.6% of the respondents accessed and used electronic journals, WWW (53.6%), e-books (28.6%) and online databases (17.86%) among other resources. Of the available online databases in the university library, ScienceDirect was popularly used by the respondents (53.57%), EBSCOHOST (28.6%) and AGORA (21.43%). User training was recommended as a major tool to facilitate and optimize the use of electronic resources.

The use of the Internet by undergraduate students in Nigerian universities was the focus of studies by Ani (2010), Ojokoh and Asaolu (2005), and Osunade and Ojo (2006). Highlights of these studies indicated that Internet use is widespread among students in Nigerian universities, but that access is mostly through commercial cybercafé within and outside the universities. The findings of the studies amplified the need to improve Internet connectivity in Nigerian universities towards a wider access by the academic community especially the academic staff.

From the foregone, it is interesting to note and observe that, on the average there seems to be increasing trend towards access and use of ICTs and electronic resources in African (Nigerian) universities by academic staff within the past one decade. However, the present study intends to further contribute to this debate in order to bridge the observed accessibility and utilization gap of e-resources, not only in Nigerian universities, but Africa.

2.5   ACADEMIC STAFF'S GENDER AND ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES

Scholars have postulated that there is variation in accessibility and utilization of ICTs and electronic resources by gender whether in academia or in the larger society. Kaminer (1997: 332) reported that "a typical Internet user, as of 1995, is most likely a white male with high socio-economic status". This shows that the relative increase in Internet use by females may be of recent history. According to Costa and Meadows (2000), male economists tended to use electronic resources more than the female ones. Dutta-Bergman (2002) in a study of demographic correlates on Internet use affirmed that, the males are most likely to use the Internet

than the females. Osunade and Ojo (2006) confirmed this as they found that male students used the Internet at the University of Ibadan, Nigeria than their female counterparts for their academic activities. Alao and Folunsho (2008) also reported the existence of gender difference in Internet use. The findings of their study of Internet use in Ilorin, Nigeria revealed that males used the Internet than females. This trend was confirmed by Nwezeh (2010: 690) that the Internet is mostly used by men, "while female users are increasing more slowly". Park (2010) in a survey of social networking sites by university students and faculties in Korea; reported that there is significant relationship between gender and the social networking sites (SNS). He found that, males are involved in the use of SNS than females. The findings of these studies are in line with that of Al-Ansari (2006: 793), who investigated Internet use by academic staff in Kuwait University and found that "males used the Internet more than females". Gamage and Halpin (2007) in their study of how to bridge digital divide in E-Sri Lanka, similarly found that females used the Internet less than males.

But in contrast, other researchers have reported that females used the Internet more than males (Akporido, 2005; Deng, 2010; Fourie & Botham, 2006; Riahinia & Azimi, 2008). A survey by Akporido (2005) on Internet use in Delta State, Nigeria indicated that more females (56%) used the Internet than males (44%). Fourie and Botham (2006) in her study on digital divide reported that male students scored lowest marks in ICT courses than females in the University of Pretoria, South Africa during their assignment grading, but her review indicated that gender differences do not have impact on the use of online resources. Deng (2010) in a study of emerging patterns and trends in use of electronic resources in Australian higher education environment found that females (55.7%) used electronic resources more than males (44.3%); further analysis revealed that there was no significant difference in the use of e-resources by gender.

Riahinia and Azimi (2008: 75) observed that the society is technologically dominated by males, particularly in Iran where there is "a kind of limitation to the use of the Internet by Iranian females" and therefore proposed the need to encourage Internet use among females in Iran in social and academic domains. She did a review that revealed that females make use of the email more than males who reportedly used the web than the females. This implies that gender difference in Internet use is influenced by the nature of the task involved. In specific terms, they

stated that "females reported more computer anxiety, less computer self-efficacy and less stereotypic computer attitudes" (Riahinia & Azimi, 2008: 76).

But most commentators on the Internet use tend to be in favour of males than females (Amkpa, 2007; Dulle *et al*., 2010; EdQual, 2010; Grace, Kenny & Qiang, 2004; Rubagiza, Were & Sutherland, 2011). Dulle *et al*., (2010) pointed out that gender difference has affected the rate of adoption of ICT and electronic resources in developing (African) countries. In view of this, Rhima (2011: 165) opined that technologies are not gender neutral and observed that:

> while there is recognition of the potential of ICT as the tool for the promotion of gender equality and the empowerment of women (*academically*), a "gender divide" has also been identified, manifested in the lower numbers of women accessing and using ICT compared with men.

The observed gender divide in terms of access and use of ICT is in line with the study by Grace, Kenny and Qiang (2004) who in a survey of the use of the Internet in Africa found that 86 percent of Internet users in Ethiopia, 83 percent in Senegal, and 64 percent in Zambia were males. A study by Amkpa (2007) revealed that there exists a significant difference in computer use between male and female students at the University of Maiduguri, Nigeria. The finding was similar in terms of attitude toward the use of computers, as it was found that females' attitude towards computers were comparatively negative. The paper recommended that female students should improve their attitudes toward the use of computers.

EdQual (2010) in a survey of the use of ICT to support science and mathematics education in Rwanda equally observed that there exist gender differences in the use of ICT as boys were said to dominate girls in ICT use. Rubagiza, Were and Sutherland (2011) affirmed the need to address the gender difference in the use of ICT in Rwanda. According to these studies, boy students are better exposed to ICT than the girls, especially during "out-of-school use of ICT", where the girls are confined at homes, while the boys have relative freedom to go out to the Internet cybercafé. This explains why boys are apparently more skilled users of ICT in Rwanda than girls, and thus dominate ICT use. The implication of these finding is that this trend will continue to higher education or post education level where males will continue to dominate females in ICT use in academic and professional use.

Moghaddam (2010: 722) conducted a study to explore the existence of a "gender gap in computer usage all over the world". She reviewed a number of literatures that claimed that women are facing a lot of challenges to access ICTs and accompanied e-resources in the universities for research. She said that in spite of the globalization efforts to promote gender equality to ICT, that "gender disparities persist with regard to ICTs"; this she attributed to the fact that men and women may have been "socially constructed for different tasks and this may influence the pattern of IT usage" (Moghaddam, 2010: 723). In her study of statistics on Internet use between men and women in ten countries, the trend was the same, as the use of the Internet by men surpassed that of women. For example, Brittain has a figure of 63.6% for men, 55.0% for women; men 73.1% in USA, women 69.0%; men 50.4% in Germany, women 41.7%; and the least gender gap occurred in Taiwan with 25.1% men reportedly using the Internet compared with 23.5% for women. Thus, the findings of her study supported the view that there is a gender difference in access and use of ICT around the world, although this is much more pronounced in developing countries and Africa in particular.

According to Deng (2010), the debate on gender use of ICTs and e-resources is a continuous one; he suggested the need for further study on the subject matter. It is therefore hoped that the findings of the present study would make a significant contributions on the ongoing scholarly debate on gender influence on access and use of e-resources for academic research in Nigerian universities.

Rhima (2011) viewed that if the existing gender imbalance in the use of ICTs is not tackled, it will impede the productive capacity of women especially in research and publication when compared with men. She therefore suggested the need to address the ICT gender divide through appropriate ICT policy framework that will spell out gender issues in order to encourage the use of ICTs by the female gender in the society, particular in the educational and academic environments.

2.6   ACADEMIC STAFF'S AGE AND ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES

Influence of age on accessibility and utilization of e-resources has been proposed by scholars (Al-Ansari, 2006; Al‑Shanbari & Meadows, 1995; Alao & Folunsho, 2008; Atakan *et al.*, 2008; Deng, 2010; Kaur & Verma, 2009; Kinengyere, 2007; Rolinson, Meadows & Smith, 1995; Selwyn, 2008; Tenopir *et al.*, 2008; Vakkari, 2008). Rolinson, Meadows and Smith (1995: 139) proposed that "it has been part of computer mythology that younger people are happier using computers than older people". This view is shared by Tenopir *et al.*, (2008: 5), who reported that "it is often hypothesized (yet rarely supported by data) that younger faculty members may be more likely to read electronic articles, while older ones rely on print sources". A study by Al‑Shanbari and Meadows (1995) revealed that access and use of computers was significant among the scientists and engineers below the age of 40 years. In their study of use of electronic resources in three countries: Finland, Australia and the U.S., Tenopir *et al*., (2008) found that there was more use of e-resources by the younger academics than the older ones in the overall results in Australia and U.S.; although, it was statistically observed that age is not significantly associated with the use of electronic resources by academic staff in the three countries surveyed.

Deng (2010: 89) in a survey aimed to investigate the extent of use of electronic resources in an Australian university among academic staff and students, found that respondents less than 29 years were the major users of electronic resources (52.4%), followed by those within the age of 30-39 years (21.8%), 40-49 years (12.8%), 50-59 years (11.1%) and those above 60 years (2.0%). This revealed that the use of e-resources by the respondents decreases with age. His findings were in line with his view that "the age of a user usually has a role to play in using electronic resources as younger generations tend to use computers more effectively" (Deng (2010: 90). Kinengyere (2007) explained that older generation of researchers use ICTs and e-resources less because most of them have a low level of IT literacy. The trend observed by Deng (2010) was also observed by Nwagwu, Adekannbi and Bello (2009) in a survey to explore Internet use by students of the University of Ibadan, Nigeria. They found that, majority of users of the Internet are those within the age range of 19-24 years (45.8%), 25-30 years (33.8%), and 31-36 years (7.5%).

King *et al.*, (2009) in a study of information seeking behaviour reported that older academic staff are more likely to access and use print than e-resources in their research; that is e-resources are less used among the older academic staff in the universities. Gamage and Halpin (2007) in a survey of the use of ICTs found that most of the ICT users are the youths and adults who are below the age of 35 years and the most active group of ICT users are aged 12-25 years. Amkpa (2007) found that there is a significant difference in computer use with age among undergraduate students of the University of Maiduguri, Nigeria. A study by Alao and Folorunsho (2008) showed that the Internet cybercafé in Ilorin were used mostly by people within the age of 21-30 years. Park (2010) opined that the younger people learn about technology easily and found that younger people use the social network site (SNS) more than the older ones. From the literature, the trend in access and use of e-resources is reportedly decreasing with age of the academic staff.

2.7 ACADEMIC STAFF'S DISCIPLINE AND ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES

The study of the use of ICT and e-resources or disparity in use of e-resources across academic disciplines has been ongoing since evolution of the information age in view of its impact on the society particularly in the universities. Historically, the use of computers and later on the Internet was usually associated with scientists. But with tremendous improvement in the technicalities in access and use of information technology or the ICT, ICT facilities and e-resources are now accessed and used across all disciplines/fields of specialization. According to Hartley (2007), the need to study the pattern and nature of access and use of ICTs and electronic resources across academic disciplines is immensely beneficial in designing information systems to support academic activities in regard to disciplines/fields of specialization around the world.

In view of the perceived benefits of the ICTs/electronic resources across academic disciplines, scholars have had vested interest in investigating the extent of accessibility and utilization of these resources in different disciplines/fields of specialization in the universities around the world, especially within the past two decades (Adams & Bonk, 1995; Al-Shanbari & Meadows, 1995; Ehiklamenor, 2003a; Elam, 2007; Hartley, 2007; Heterick, 2002; Jankowska, 2004; Kaur & Verma, 2009; Park, 2010; Philip, 1995; Popoola, 2008; Rolinson, Meadows & Smith, 1995; Selwyn, 2008; Tahir, Mahmood & Shafique, 2010).

A study by Rolinson, Meadows and Smith (1995) has shown that, access and use of ICTs and electronic resources greatly varies across different scientific disciplines, as, for example, researchers in the pharmaceutical laboratory were found to have much higher level of usage of electronic information resources than those in molecular biology. A review by the authors indicated that biology is a scientific discipline with the least use of computers in research. Accordingly, "taking the whole range of the biological science, it seems that the differences in computer-based information-handling within biology are as wide as anything to be found across the sciences as a whole" (Rolinson, Meadows & Smith,1995: 139). In other words, it was observed that access and use of e-resources varies within a single discipline as obtained in a range of scientific disciplines.

In a survey by Al-Shanbari and Meadows (1995) investigating the use of computer facilities in four universities in Saudi Arabia, it was found that engineers used virtually all types of computer facilities more than the scientists; in specific terms, the engineers were reportedly making more significant use of computers for information-handling than the scientists. Analysis of the results revealed that more than 50% of the engineers have computers in their offices compared with about a quarter of scientists. Further analysis within the engineering sub-fields showed that electrical, electronic and computing engineers were making more use of computers than other engineers. Similarly, within the scientific disciplines, chemists and physicists were found to make much more use of computers than scientists from other disciplines; reportedly, mathematics and earth scientists were relatively making less use of computing facilities (Al-Shanbari & Meadows, 1995).

Philip (1995) surveyed the use of computerized information systems by academic chemists in ten universities in the UK. It was found that, there were variations in the use of chemical databases along subject/field of specialization; academic chemists in organic chemistry were the highest users (40%), inorganic chemists (36%) and physical chemists (23%). The author concluded that "regarding subject of specialization, our results showed that organic chemists and inorganic chemists make more use of these systems than physical chemists" (Philip, 1995: 187).

Abels, Liebscher, and Denman (1996) in a study of the use of electronic networks by academic scientists and engineers found that access and use of network (and invariably electronic resources) differ by discipline. It was found that mathematicians and computer scientists make more extensive use of network in their research than the health scientists. Curiously, no significant differences were found by discipline in the use of electronic databases between the scientists and engineers in the study but there was significant difference in the use of FTP by discipline.

Shaw and Davis (1996: 932) in their review reported that scholars in Humanities "are resistant to the idea of using computers in research"; but that the recent development in digital technologies has caught up with the humanists and the status quo has changed. The general belief is that, information seeking behavior of Humanities is distinctly different from that of the scientists and therefore scholars in the Humanities are said to make lesser use of computer-based resources than other disciplines. Thus, the library is usually referred to as the humanities scholar's laboratory; in other words the humanists tend to rather use the traditional library resources than the use of ICT based resources compared with other disciplines (Shaw & Davis, 1996).

Costa and Meadows (2000) in a survey of IT use among social scientists in Brazil, found that academic staff in economics used IT facilities/electronic resources more than their counterparts in sociology. It was revealed that 77.7% of scholars in economics have computers with networking facilities on their desks at work compared with 59.0% for the sociologists. The economists were found to use online databases more than the sociologists. This confirms variation in access and use of IT and e-resources with academic disciplines/fields of specialization in line with their literature. The review of the literature indicated that scientists were early users of IT facilities, and are observably using these tools and e-resources more than the social scientists, and "the latter in turn, employ them more than do scholars in humanities" (Costa & Meadows, 2000: 256).

Mugwisi (2002) in a study to explore patterns of use of the Internet for teaching, learning and research by academics and students at the University of Zimbabwe and University of Zululand, South Africa observed that there was no significant difference between Internet use and

academic discipline. This was contrary to studies in his review where social scientists were found to make use of the Internet more than scholars in the Humanities. In contrast, Heterick (2002: 11) reported that the access and use of electronic resources "varies significantly by field" and that, the social scientists preferably used electronic resources more than the humanists, while the Humanities are relatively dependent on the libraries as earlier found by Shaw and Davis (1996).

Ehikhamenor (2003a) similarly found that there were differences in the use of electronic resources across scientific disciplines in Nigerian universities. Typically, the findings of the survey revealed that chemists and mathematicians make greater use of electronic journals than others, and physicists and computer scientists were the highest users of web resources. However, Ehikhamenor (2003b) explained that the use of e-resources is dependent on whether the content of such resource meets the need of academic staff in a given discipline.

A study exploring the use of ICTs by professors in University of Idaho (UI), Moscow, Russia by Jankowska (2004) indicated higher usage of computers by scientists than the social scientists and humanists. Furthermore, scientists and social scientists were found to make use of electronic networks more than their counterparts in humanities. Elam (2007:4) conducted a research that explored the extent of access and use of electronic resources by the art historian in view of potential "impact of electronic resources and digital image databases on research methodologies of today's art historians". His review had indicated that art historians preferably use the library for research rather than electronic resources. This was essentially attributed to lack of awareness of and skills to use e-resources, besides the fact that e-resources are yet to be fully developed in the area of art history. Elam (2007: 4) expressed that:

> In today's information age it would seem that art historians would only be eager to take advantage of the convenience electronic resources have to offer, but would be fully immersed in the new technologies. However, nearly opposite has been found to be true. Though some art historians are indeed champions of the emerging technologies, the majority *has* proved rather resistant to change, and many are only beginning to adapt to recent innovations.

This position was confirmed by his research findings that many of the art historians he interviewed only accessed and used e-resources as pointers to the print-based resources. In

conclusion, the study made advocacy for the need to address the digital divide that exist among the art historians in respect to the use of e-resources in their research work.

Tenopir *et al*., (2008) in a survey of the use of electronic resources by academic staff in Australia, Finland, and the U.S. found significant variation between the use of e-resources and disciplines. The findings revealed that, in Finland, academic staff in medicine use e-resources than other disciplines, with significant variation when compared with social sciences and humanities. Similar results were obtained in the U.S. as Medical sciences lead in the use of e-resources with score of 20.9%, Science 16.5%, Engineering 14.4%, Social sciences 11.3% and Humanities 7.0% respectively. It was observed that while academics in medical disciplines reportedly make significant use of electronic resources across the three countries; e-resources were significantly less used by the humanists throughout the three countries. This was basically attributed to two reasons; one, greater number of journals in science, technology, medicine, and social science are available in electronic form than do journals in Humanities. Secondly, characteristically, humanities scholars relatively read fewer journal articles even in print than their counterparts in other disciplines. King *et al.*, (2009) in a survey of information-seeking behavior of academic staff in five universities in the U.S. also reported that differences in disciplines affect the use of electronic resources by academic staff.

Shanahan (2009) in her review observed that access to electronic resources vary across and within health professions; and further verified this with an empirical study which confirmed variation of accessibility and utilization of e-resources with area of specialization within the health profession. Popoola (2008) in his review reported that CD-ROM databases are being used more by social scientists than the scientists and humanists in Nigerian universities. This was explained to be due to the fact that wide range of information in the social science is available in CD-ROM databases. Nwagwu, Adekannbi and Bello (2009) observed a variation in Internet use by disciplines among the students of the University of Ibadan, Nigeria. The findings of the study indicated that science students are the dominant users of the Internet especially for academic purposes in the university. He attributed this to inequitable distribution of Internet access in the university.

In a study by Mahajan (2006) to explore the use of the Internet by academic staff at the Panjab University, Chandigarh, India, it was found that all the scientists in the survey were using the Internet in their research unlike their counterparts in Social sciences (70%) and Humanities (20%). This was attributed to variations in the electronic information environments across the three disciplines, as most respondents from the Science and Social sciences' disciplines were making use of the Internet from their departments more than those in Humanities. In terms of electronic journals, similar patterns were obtained as all the respondents in the Sciences were accessing and using electronic journals and other e-resources on the Internet more than their counterparts in Social sciences (40%) and Humanities (5%).

2.8   ICT POLICY/STRATEGY

Development, formulation and implementation of appropriate ICT policies and strategies are necessary for effective accessibility and utilization of electronic resources by academic staff in African (Nigerian) universities. ICT policies are a number of initiatives that attempt to understand and address the problem of digital divide and other factors that affect accessibility and utilization of e-resources in universities, and thus, promote access and use of e-resources by academic staff for research purposes (Watts & Ibegbulam, 2005; 2006). A well articulated ICT policy is desirable to curb the menace of digital divide, and promote integration and adoption of ICTs as well as access and use of e-resources in African universities to support efficient research process.   This is why Ingersoll and Culshaw (2004) opined that ICT policies have help universities to ensure effective and equitably distribution of ICT facilities for research and therefore defines the scope of ICT services that are provided by the universities especially in the libraries in terms of electronic information services.

ICT policy is an extension of information policy; and information policy includes scientific and technical information policy, literacy (information literacy), libraries and archives, and access to government information (Burger, 1993)**.** Information policy is said to affect all aspects of lives in the society or university, academic and research process inclusive. The importance of information policy cannot be over-emphasized, as information policy is a tool that controls information flow not only in an organization/institution (university), but in the larger society;

information policy (particularly ICT policy) regulates how information is accessed and used. Rubin (2000) affirmed that, the information policies of nations, universities or libraries may have a profound effect on access to information in the society, which may have effect on research process. Information policy is therefore a veritable tool used in controlling information flow to academic staff in the university to pursue his/her research activity. Burger (1993) submitted that information policy has affected research in different academic disciplines by controlling information flow to academic staff. He therefore suggested that, in formulation of information policy especially aspect dealing with ICT policy for the university, university management should look beyond academic boundaries in their approach.

Burger (1993) described ICT policy as a set of policies that deals with the creation, production, collection, storage and retrieval, management, and dissemination of information. Policies deal with rules and regulations which spell out how things are done in the society or an institution (or university). For examples, ICT policies will specify how much should be spent on ICT annually (or ICT budget), regularity of ICT training for academic staff, or who should use a given ICT facility.

According to Rubin (2000), in the university libraries, ICT policy provides guidelines and rules regarding the acquisition, organization, preservation, storage and retrieval, and dissemination of e-resources (especially how these resources can be accessed and used by the academic staff in research in their offices). This is why most university libraries especially in developed countries are fast adopting the concept of electronic collection development as part of their ICT policy, by formulating appropriate electronic collection development policy as tool for providing access to e-resources to support efficient research process in the universities. Hence, electronic collection development policy is an aspect of ICT policy formulated by the university library in order to provide reliable, efficient, and equitable access to electronic information resources in the university.

Electronic collection development policy seeks to answer the following questions: What are the relevant ICT facilities that are needed to provide efficient electronic information services in the university library? What types of e-resources are to be acquired in order to meet different users'

needs? How would academic staff have access to these resources, in their offices through appropriate networks or in the library? Or what are the points of access to these resources? What type of training is required by each library user (academic staff) or group of users to be proficient in accessing and utilizing the available e-resources? What are ICT and personnel budget for the library? The questions are inexhaustible, thus, the need for periodic review of various ICT policies (electronic collection development policies) is desirable. Generally, Rubin (2000) highlighted all ICT policies that are put in place by the university library to encourage access and use of e-resources in the library to include user education, information literacy, opening hours, ICT infrastructure, budgeting among others.

Specifically, electronic collection development policy is a component of collection development of a university library which is a general framework for developing the university library's collection goals on how to acquire new library resources, while maintaining the existing ones (Gregory, 2006)**.** Collection development policy deals with the generality of library resources both in print and electronic formats, while electronic collection development policy is only limited to electronic resources. Karpisek (1989) observed that collection development policy specifies the services offered by the library. Thus, electronic collection development policy in African (Nigerian) universities will specify the nature or type of electronic information services that are being provided by the university libraries to the patrons particularly the academic staff to support their research activities. These may include Internet services, computerized library services, CD-ROM databases/search strategy, and digital libraries. Electronic collection development policy will also address different online databases needed for acquisition, whether the library should join a consortium or not towards meeting users information needs and satisfaction. In summary, electronic collection development policy guide librarians/libraries on selection of e-resources (White & Crawford, 1997).

At the university level, ICT policy will spell out guidelines for the provision of ICT infrastructural facilities and how to make them accessible to academic staff in their offices/laboratories. ICT policy will ensure not only equitable distribution of computers to academic staff in their offices/laboratories, but with the needed Internet access with appropriate bandwidth. ICT policy will deal with issues of the provision and maintenance of

computer networks/Intranet in the university campus as well as regular training of academic staff on how to access and use these networks, the Internet or other ICT facilities that are available in the university toward enhanced and efficient research process. Most importantly, formulation of ICT policy by the university management will help the university to have financial budget for the procurement, maintenance, training, and employment of personnel in ICTs. Hence, ICT policy allows proper "allocation of scarce resources" for ICT infrastructures in the university including different units/departments/faculties (Jennings, 2002: 207). Ethical use of ICT is another issue that needs to be included in the formulation of ICT policy in the university. Most importantly, University ICT policy will support the university library's electronic collection development policy (especially in areas of budgetary allocation), ICT infrastructure and personnel in the library, in order to promote and sustain the provision of e-resources to academic staff for research purposes.

Apparently, with proper formulation and implementation of ICT policies as well as electronic collection development policies in African (Nigerian) universities as obtained in the developed countries, the degree of accessibility and utilization of electronic resources will relatively increase. This implies that, relevant ICT infrastructures will be integrated into research process in the universities; similarly, relevant e-resources (e-journals/e-books or online databases) will be acquired by the libraries; and improved information literacy will also stimulate access and use of e-resources.

Consequently, Burger (1993) observed that the degree of accessibility and utilization of e-resources by academic staff is to a larger extent dependent on the nature of ICT policy within and outside the university, nationally, regionally and even internationally.

Watts & Ibegbulam (2005; 2006) discussed and highlighted the role of national/international ICT policy/strategy in providing access to e-resources in the universities. They reviewed different initiatives at the international scene aimed towards the promotion of access and use of e-resources in research including Africa. One of these ICT policies/strategies is *Plan of Action* initiated by the World Summit on the Information Society in 2003. The *Plan of Action* specifically spelt out how access to electronic information resources in the health and related

disciplines could be facilitated and promoted by "bringing international standards for data exchange and encouraging expansion of ICTs to remote areas" (Watts & Ibegbulam, 2005: 3)**.** This is of special interest to Africa where there is need to expand access to ICTs, particularly telecommunications and reliable Internet connectivity to all African universities especially in rural areas.

Policy issues on how to promote access to ICT and electronic resources was also the focus of the G8 Summit in Scotland in 2005, where a Joint Science Academies was put in place to address how to generate ICT policies/strategies toward *Science and Technology for African Development.* Here it is specified that, for effective scientific and technological advancement in Africa, efficient access to electronic resources is crucial. Thus, the policy document spells out the need to provide access to basic ICT infrastructure in African universities to aid research process. Accordingly:

> African countries require the methods and infrastructure to exploit their knowledge, and African universities need to be supported and developed as centres of excellence in this field (Watts & Ibegbulam, 2005: 4).

Another ICT policy issue highlighted by Watts and Ibegbulam (2005; 2006) in their study is the World Health Organization report in 2004 that aimed to provide equitable access to electronic information resources for global research in medical and related disciplines. African universities are expected to be major beneficiaries of this initiative. Similarly, the International Network for the Availability of Scientific Information (INASP) in 2004 has put in place ICT policy which articulates the need to promote accessibility and utilization of e-resources in health and related disciplines in developing countries (Watts & Ibegbulam, 2005; 2006). The implication is that, African universities must take the global ICT policy/strategy as a wake-up call to develop their own individual policy/strategy that would bring unprecedented access and use of e-resources among their academic staff.

However, the review by Watts and Ibegbulam (2006) revealed that only a few African universities are working towards meeting this goal especially in respect of the university libraries. The study showed that only a few libraries had developed ICT policies/strategies geared toward the promotion of sustainable access to e-resources in Africa. For example, Watts

and Ibegbulam (2006) found that there was no written ICT policy in the Medical Library, College of Medicine, University of Nigeria, or that of the university in general. The report indicated that:

> Although no written strategies or policies have been produced as yet, the organization is sensitive to the issue of providing ICTs and Internet access. Departments across the university have been tasked with developing their own strategies, and the intention is that these will inform a university-wide policy on ICT provision (Watts & Ibegbulam, 2005: 7).

Manda (2005) in a survey of ten academic and research institutions (universities) in Tanzania found that there was lack of ICT policy among the libraries in these institutions especially in the area of electronic collection development. In specific terms, it was reported that all the surveyed institutions have no formal ICT policy (or electronic collection development policy) that are used in the selection and acquisition of electronic resources in the libraries. However, the study found existence of framework for the development of strategic plan towards effective library automation and the provision of electronic resources in future by all the surveyed institutions.

The need for inclusion of ICT policy in respect of the training of academic staff by both the university administration and the library on how to use ICT and electronic resources was recommended in the study (Manda, 2005). Chifwepa (2003) has also reported the lack of ICT policy at the University of Zambia especially in respect of marketing and dissemination of e-resources. It was recommended that "there is a need for the University of Zambia to develop a clear policy that will guide the development and integration of ICT in academic work" Chifwepa, 2003: 131).

Observably, and in view of vital role of ICT policy to promote access to scientific and technical information for research as highlighted by Watts and Ibegbulam (2005, 2006), most African countries have embarked on formulation of their national ICT policies. Consequently, and in line with international norms:

> the Federal Executive of Nigeria approved the National Information Technology Policy in March 2001, while the National Information Technology Development Agency (NITDA) was established in April 2001 to implement the policy (Adeyeye & Iwela, 2005: 204).

Institutional Information (ICT) policy in Nigerian universities is linked to national ICT policy. This is why the Federal Ministry of Education in Nigeria in collaboration with National Universities Commission (NUC) approved the establishment of National Virtual Library Project

in 2002 to promote access to electronic information resources in Nigerian universities for teaching and research. According to Borishade (2002: 2), one of the major objectives of the National Virtual Library Project is "to improve the quality of teaching and research in institutions of higher learning in Nigeria" through the provision of access to electronic resources.

Mutula (2008) discussed a number of regional initiatives and ICT policies that are geared towards the promotion of access and use of ICTs and electronic resources in African universities. Recently, the need to have uniform and regulated ICT policies to integrate ICTs and electronic resources in research in African universities has been proposed in a four day Summit of representations of African universities in Nairobi, Kenya (Punch, 2012). The forum identified the role of ICT in improving research outcome and productivity in African universities and sought for harmonization of ICT policies/strategies as the way forward. According to the report of the Summit that was attended by participants from 21 countries (and organized by African Virtual University); it was agreed that the outcome of the Summit will help African governments to initiate ICT policies/strategies that will support integration of ICTs in research process in African universities.

2.9   ACADEMIC PRODUCTIVITY

Academic productivity of scholars in the universities (across disciplines) has been a widely investigated subject, due to the need to advance the frontier of knowledge for the betterment of the society as well as the well-being of citizenry of a given nation. The study of academic productivity is popular especially in areas of science and technology because of its impact on human development. According to Daniel (2005), academic scientists have obligation to publish their scientific findings and therefore contribute to societal knowledge towards scientific progress and advancement. Daniel (2005: 143) observed that:

> Scientists are ethically committed to publish reliable knowledge. For this reason, peer-reviewed publications are the most important measure of scientific advancement and of scientists' productivity – at least for academic scientists.

However, academics in African universities are reportedly lagging behind their counterparts in the developed countries in scientific productivity or productivity measure in its entirety

(Abrahams, Burke & Mouton, 2009/2010; Foster *et al*., 2008). Abrahams, Burke and Mouton (2009/2010) described African continent as a region that is characterized with low research (scientific) productivity, and therefore lacks visibility in global productivity measure. Foster *et al*., (2008) affirmed this by reporting that Africa is under represented in research and publications in international journals. Thus, a study of academic productivity is desirable in African universities in the quest to make African universities visible and competitive in global setting as Africa is said to lag behind the advanced nations due to its comparative low investment in research.

A recent report by Baty (2011) showed that the volume of research activity remains comparatively low in Africa, as only two African universities: University of Cape Town, South Africa (56.1) and Alexandria University, Egypt (51.6) were ranked among the world best universities by *Times Higher Education* (2011). In 2012 ranking only University of Cape Town in South Africa (52.3%) was listed among the 200 best universities in the world (*Times Higher Education,* 2012). Of particular interest in the present study is continuous poor ranking of Nigerian universities even within Africa in the recently introduced annual webometric ranking of world universities. The 2012 ranking revealed that no Nigerian universities are listed among the best 20 universities in Africa (4International Colleges & Universities, 2012; Cybermetrics Lab CSIC. 2012)**.** It is a widely held view that productivity measure is one of the mostly used indicators in evaluation of research performance around the world (Albarran, Crespo, Orttuno & Ruiz-Castino, 2010; Gupta, Kumar & Aggarwal, 1999; Onyancha, 2008).

Academic productivity study has been used significantly to measure the growth and progress of science and technology in developing countries in order to aid in resource allocation to support scientific programmes and projects as well as helping them to know the level of their scientific production and contributions to the global research output (Onyancha, 2008). A study of academic productivity has helped many African nations to design science and technology policy to support their scientific research process towards national development (Albarran *et al*., 2010). In Africa, academic productivity study has also helped in the formulation of policy that is used in tackling inefficiency in research process in African universities by governmental agencies (Ani & Onyancha, 2011).

There are several indicators that are used by scholars to measure academic productivity, these include publication output (or number of published papers), oral presentations, consultancy, patent, number of postgraduate students supervised, and number of research funding received (Agyeman & Kisiedu, 2006; Bottle *et al*., 1994; Goel, 2002; Okafor, 2011)**.** However, publication output has been the most vital indicator of academic productivity measure especially in the universities. Thus, productivity is basically defined as the number of published papers obtained by a given academic staff within a period of time. Productivity measure may also be done in terms of academic disciplines/fields, institutions (universities), countries or regions and even in a global perspective. Elements of publication output usually used in productivity measure include journal articles, books, reports, preprints, articles in conference proceedings, and seminar/workshop papers (Gupta, Kumar & Aggarwal, 1999) among others. Generally, publication of a journal article is considered by experts/scholars as the most vital element of academic productivity, as it is the primary medium of scholarly and scientific communication.

In view of this, Goel (2002) defined productivity as a number of articles published in standard journals; and this is affirmed by Kirlidog and Bayir (2007) who described productivity as the measure of scientific publications which are published in prestigious journals. Usually, publications are classified into international (foreign) publications and national (local) publications (Ani, Esin & Inyang, 2003; Collazo-Reyes, Luna-Morales, Russell & Perez-Angon, 2011; Foster *et al*., 2008; Goel, 2002;   Okafor, 2011; Sanz, Aragon & Mendez, 1995). Academic staff in developing (African) countries preferably published in international journals due to their relative high visibility (Ani, Esin & Inyang, 2003; Bottle *et al*., 1994; Sanz, Aragon & Mendez, 1995), scholarly quality and to have international recognition in their disciplines/fields of specialization. International publication does not only benefit the individual academic staff, but the entire university, as publication output is one of the vital indicators use in the global ranking of universities. This informed the reason why most scientists and science policy administrators or university managements have preference for international publications (Goel, 2002). For example, Okafor (2011) reported that the management of the University of Agriculture Abeokuta, Nigeria requires that academic staff must have a certain number of international publications (articles in international journals) before being promoted to certain academic ranks,

this is also true in respect of the University of Calabar, Nigeria for promotion to senior academic ranks in the university.

Thus, academic staff may be nationally or internationally productive, and the total number of publications therefore consists of the total number of articles in international and national (local) journals (Duque *et al*., 2010)**.** In other words, the total productivity of a given academic staff is a measure of the sum of his/her published articles in national and international journals. The quality of a journal is usually determined at the international level if such journal is covered and indexed by foremost databases such as the *Web of Science* published by Institute for Scientific Information (ISI), *Scopu*s, and *Chemical Abstracts* (Bottle *et al*., 1994; Dore, Ojasoo, Okubo, Durand, Dudognon & Miquel, 1996; Onyancha & Ocholla, 2009; Sanz, Aragon & Mendez, 1995). This may explains why academics in the UK and USA prefer to publish in their respective journals in contrast to those in developing (African) countries who preferably published in international journals especially journals from UK and USA (Bottle *et al.*, 1994). This is exemplified by Bottle *et al.*, (1994), who stated that, unlike Nigerian chemists who preferably published in American journals:

> Over 70% o f the American chemists chose to publish in journals originating in the USA. A similar proportion of the British chemists preferred European journals (Bottle *et al.,* 1994: 213).

This scenario is confirmed by Ani, Esin and Inyang (2003) who studied the publication patterns and productivity of academic scientists in Nigeria, with the results indicating that 76.2% of the respondents reportedly published in internationals journals. Okafor (2011) found that there is a significant difference between articles published by academic staff in Nigerian universities in local and international journals.

In Spain, Sanz, Aragon and Mendez (1995) similarly reported that publication of articles in international journals is often considered more significant by academic staff in Spanish universities than in national journals. A review by Sanz, Aragon and Mendez (1995) revealed the same patterns in India, Brazil and Croatia. The preference for publishing their research findings in international journals by scholars in developing (African) countries is essentially attributed to poor quality of local journals which resulted in inability of these papers to be cited

internationally and thus not being indexed by scholarly databases, such as the *Web of Science*, or *Scopus* – popularly used to evaluate researchers, research projects and programmes, and journals. According to Sanz, Aragon and Mendez (1995), local (national) journals especially from developing (African) countries are usually not cited internationally because most of their publications are devoted to local problems which are of low interest to the international community.

In view of the low number of journal articles published in international journals, academics in African universities have been described as being less productive compared with their counterparts in developed nations. Observably, a number of factors have been identified to have effect on productivity of academic staff in African universities especially in global and international perspective. These have been discussed by scholars to include: nature of research - basic or applied research (Al-Shanbari & Meadows, 1995; Gupta, Kumar & Aggarwal, 1999; Sanz, Aragon & Mendez 1995)**,** inadequate funding, lack of equipment/facilities, poor information infrastructure/communication network, working conditions, language, government policy, collaboration, journal's editor and referees, criteria for promotion of academic staff, number of information sources published in a country (Abrahams, Burke & Mouton, 2009/2010; Nworgu, 1991; Onyancha, 2008), and low accessibility and utilization of electronic resources (Foster *et al.*, 2008).

Research in African countries is said to be commonly applied in nature, and the finding is usually devoted to industrial application locally (Gupta, Kumar & Aggarwal, 1999; Sanz, Aragon & Mendez, 1995). While a few researchers that are involved in basic research, would readily seek to publish their research findings in international journals for recognition and visibility. However, accessibility and utilization of e-resources has been the factor of interest in the present study, since it is postulated that academic staff in African universities are not comparatively making the best use of modern e-resources, which may account to their low productive capacity internationally.

Productivity study can be descriptive, predictive or combination of both (Gupta, Kumar & Aggarwal, 1999). In descriptive study, productivity is measured in terms of number of published

papers by academic staff and its relationship with other variables such as discipline and gender. Thus, descriptive study deals with personal attributes or demographic variables of academic staff that influence his/her academic productivity. In predictive study, productivity measure is considered in terms of several variables such as funding, ICT infrastructure or e-resources that contribute to publication output of the academic staff. As earlier indicated, the focus of the present study is on accessibility and utilization of electronic resources as a predictive variable of productivity measure.

Holistically, as earlier highlighted, productivity measure involves not only individual academic staff, but disciplines, universities, countries and regions (Bottle *et al*., 1994; Dore *et al*., 1996; Kirlidog & Bayir, 2007; Lissoni, Mairesse, Montobio & Pezzoni, 2009; Pienta, 2004). Bottle *et al*., (1994) in a comparative study of academic productivity of senior academic chemists (Professors and Readers/Senior Lecturers) in the UK and their counterparts from American universities between the period 1980 and 1991 using *Chemic*al *Abstracts* have found no productivity difference between the respondents from the two countries. However, when the productivity of the UK chemists was compared with that of their Nigerian counterparts with equivalent ranks over the same period, it was found that, the productivity of the Nigerian chemists was significantly lower than those from the UK universities. The result of the study thus confirmed the widely reported low level of academic productivity in African universities. But, a similar study by Al-Shanbari and Meadows (1995) revealed that, there was no significance difference between the level of academic productivity of scientists and engineers in Saudi universities and those in the UK.

Dore *et al*., (1996) in their study, using the *Web of Science*, examined and analysed the productivity of 48 countries based on their publications of journal's articles in 18 disciplines over a 12 year period (1981-1992), and found that the U.S. was the most productive country with 2.3 millions articles and clinical medicine as the most productive discipline in the world. A study by Markusova, Jansz, Libkind and Varshavsky (2007) also confirmed clinical medicine as the most productive scientific discipline in USA in 1988 and 2001. In a study of academic productivity by Kirlidog and Bayir (2007) in 2001 and 2003, no African country was listed among 30 most productive countries in the world in 2001 and 2003 respectively. Both in 2001 and 2003 USA

was listed as the most productive country with total publication outputs of 388, 325 and 391, 613; and was trailed second by the UK with total publication outputs of 103, 975 and 102, 277 in 2001 and 2003 respectively.

A recent study by Aguillo (2011) affirmed the U.S. as world most prolific country with overall 3,711,305 published items from its universities; while Harvard University in the U.S. was reported as the most productive university in the world with a total of 1,170,000 published items on its website. A citation analysis by Tsay (2011) has also put the U.S. as the most productive country in the world accounting for 31% cited authors and trailed by England (10%) and German (5%) respectively; with Harvard University being the most productive university accounting for 2% of cited authors in the sample. This may explain why the U.S. universities are on top of the world best universities based on recent ranking of world universities (4International Colleges & Universities. 2012; Cybermetrics Lab CSIC. 2012; *Times Higher Education*. 2012).

In Africa, South Africa was ranked 25th in world productivity by Dore *et al.*, (1996) ahead of Egypt (33[rd)]) and Nigeria (39[th)]) respectively. This productivity trend in Africa was confirmed by Adams, King and Hook (2010) who also found that South Africa, Egypt and Nigeria are leading the rest of African countries in scientific publication using data obtained from 1999-2008 from the *Web of Science* database. But a study by Pouris and Pouris (2007) ranked South Africa (30.1%) and Egypt (20.2%) as the two leading countries in scientific research and publication in Africa followed by Morocco (7.9%) and Nigeria (5.9%) respectively. Onyancha (2008) reported on a study that investigated the growth, productivity, and scientific impact of HIV/AIDs – information sources in Africa between 1980 and 2005 with the results indicating South Africa (9, 0.186%), Nigeria (5, 0.103%) and Egypt (4, 0.083%) as leading in HIV/AIDs publications in Africa. Further analysis of the findings of the study revealed low productivity of HIV/AIDs literature when compared with that of the developed countries especially the U.S. (299) and the UK (223). A study of academic productivity of Nigerian universities by Ani and Onyancha (2011) from 2000-2010 using *Web of Science* showed the University of Ibadan as the most productive university in Nigeria with biology and applied microbiology as the most productive disciplines/subject areas respectively.

The empirical findings by scholars as highlighted above (Adams, King & Hook, 2010; Dore *et al*., 1996; Kirlidog & Bayir, 2007; Onyancha, 2008) have significantly revealed that Africa is lagging behind developed countries in terms of publication output; and by implication, individual academic staff in advanced countries are seemingly productive than their counterparts in African countries. Interestingly, Foster *et al.*, (2008) have linked the high productivity in developed countries to their increasing level of access and use of ICTs and electronic resources in research. Conversely, the report attributed the relatively low productivity in African countries to poor level of accessibility and utilization of electronic resources in research activities. From these theoretical analyses and perspectives, the pertinent question that the present study envisages to provide answer to is, would accessibility and utilization of electronic information resources increase productivity of academic staff in African universities (and Nigerian universities in particular)?

2.10   THE EFFECT OF ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES ON PRODUCTIVITY

Information is a resource for academic research. It is a resource for national or societal development, which to a larger extent is dependent upon the quality of available research system in a given country or region. The universities are the bedrocks for research, and they require efficient and quality access to information to support research activities of their academic staff. According to Dulle *et al*., (2002: 157):

> Access to information is one of the most important pre-requisites for an efficient, productive and relevant research system. Researchers must obtain timely and relevant information from various sources for effective research.

A recent study by Mahmood, Hartley and Rowley (2011) affirmed the importance of access to information to facilitate and support efficient and productive research. Grace, Kenny and Qiang (2004) explained that as the society is witnessing the digital age, information has become a vital resource for socio-economic development and research is a panacea for effective socio-economic development in the society. ICTs and electronic resources are sources of information in modern electronic information environment. Notably and relatively, ICTs and electronic resources provide quick access to information than the conventional print

resources. According to Grace, Kenny and Qiang (2004), academic staff (or universities) without access to information and communication technologies/electronic resources will find themselves unable to compete in the international research arena or for the journal space for their publications. They counseled by saying that there is need for meaningful investments on ICTs towards efficiency and improved quality of research in the society especially in African countries.

Besides, access to information, information use is postulated to be a correlate of academic productivity. In their study, King and Griffiths (1989) used "reading" as a measure of information use among academic staff. Reading is the ability to extract information from variety of information sources/resources particularly the books/journals to primarily accomplish a research activity by academic staff in the university. King and Griffiths (1989) found that readings of books/journals have had perceived positive effect on productivity of academic staff. They proposed that academics who read a great deal are likely to also have high academic productivity. Since reading is an indicator of information use, they upheld the proposition that information use is a correlate of productivity; that is high level of information use among academic staff is likely to have positive effect on productivity.

With the emergence of digital age, and the ICTs, information now exists in electronic format (referred to as electronic resource); access to information is thus relatively enhanced as information is efficiently make available to academic staff through computers, the Internet and related electronic networks and is readily used in research activity. Thus, in the electronic information environment, ICTs and electronic resources now provide the platforms for access and use of information in research process; and are perceived to have a positive effect on academic productivity. Hence scholars within the past two decades have been conducting users' studies to determine the relationship between accessibility and utilization of electronic information resources and academic productivity. Observably, most of these studies only dealt with perceived effect of ICTs/electronic resources on productivity, and only a few actually explored quantitatively relationship between access and use of electronic resources and productivity. Apparently, the present study is aimed at filling this knowledge gap in African

(Nigerian) setting, in both perspectives, especially with the apparent digital divide in the continent.

Ng Tye and Chau (1995) reported in their study that one of the benefits of access and use of information technology in an organization/institution (university) is that it increases productivity, as it helps to improve the efficiency and effectiveness in such organization/institution. Kaminer (1995) opined that the use of the Internet will enable scientists to be more productive. He attributed this to the fact that, with the Internet and other electronic networks, research is done much faster and in more efficient manner, and this will definitely leads to increase in productivity. For instance, a lot of information can be accessed within and outside the university efficiently with the Internet and digital networks, and if this information is properly harnessed, it will promote increase in productivity of the academic staff. He has reviewed literature that showed correlation between ICTs/electronic resources and productivity to support his postulation; and proposed further study on the use of the Internet and electronic networks in relation with productivity.

A review by Costa and Meadows (2000: 256) showed that there is "a positive association between the use of the Internet by scholars and their productivity". They carried out a survey to investigate the relationship between access and use of IT and productivity among the social scientists in Brazil. It was found that the "responses regarding the impact of IT on productivity confirmed the existence of a positive link" (Costa & Meadows, 2000:260). Furthermore, the study revealed that productivity of social scientists increases with access and use of IT, as respondents (economists and sociologists) in the survey agreed that there is a positive impact of IT use on productivity.

Dulle *et al*., (2002) corroborated the postulation that improved access and use of ICT infrastructures and electronic resources will enhance academic productivity. And the World Bank (2002) affirmed that high investment in IT enhances productivity, which implies that, African (Nigerian) university that invests in ICTs/electronic resources, and encourages their access and use by the academic staff will derive increase in academic productivity for its investment.

Heterick (2002) in a survey to explore the extent of access and use of electronic resources among academic staff in American universities; also sought to determine the perceived effect of electronic resources on academic productivity. The findings of the study revealed that there was high perception of the impact of electronic resources on productivity among the academic staff. In view of this, Heterick (2002) concluded that electronic resources have become an invaluable tool for research in the U.S. A survey of professors in University of Idaho (UI), Moscow, Russia by Jankowska (2004: 57) in Russia on the impact of the use of ICTs on research showed that "85 % of the respondents were of the view that the use of ICTs has increased their productivity in research and teaching". This is in line with a research survey by Ellis and Oldman (2005) who found that the use of the Internet resources is making positive impact on academic research in the universities around the world including the UK.

Mahajan (2006) explored the perception of researchers on the Internet use in research on productivity at the Panjab University, Chandigarh, India, across three academic disciplines: science, social science, and humanities. It was found that scientists (99%) agreed on the positive effect of the Internet on research than the social scientists (50%), while all responses from researchers in humanities were in negation. The paper there concluded that, the researchers in science based disciplines were making optimal use of the Internet with corresponding impact on their productivity than their counterparts in social sciences and humanities. Recently, Khan and Dominic (2012) did a survey to assess the perceived impact of access and use of the Internet on academic staff in Engineering Colleges of Moradabad, India. The results of the survey revealed that 50% of the respondents agreed on productive impact of the Internet on research.

In Africa, Mgobozi and Ocholla (2002) did a comparative study to investigate the relationship between the use of electronic journals by academic staff at the University of Natal and the University of Zululand in South Africa and their research publications. According to the study, when asked to respond if there is correlation between use of electronic journals and research publications, "some 29% indicated a correlation whereas 13% indicated no correlation" and others were undecided" (Mgobozi & Ocholla, 2002: 42). The authors however noted that, it was

difficult to measure the effect of access and use of electronic journals on publication outputs quantitatively, as the respondents were only asked to give their perceptions on the survey.

Badu and Markwei (2005) opined that the Internet is a worthwhile tool for scholarly research, and it is therefore expected to have a significant impact on research among academic staff in African universities. Their survey indicated that 64.2% of academics at the University of Ghana were in affirmation that Internet use has a positive effect on productivity. When asked to rank the usefulness of Internet in research, it was reported that 69.4% of the respondents said it was "useful". Ojedokun and Owolabi (2003) conducted a study to assess the effect of the use of the Internet in research by academic staff at the University of Botswana. The results showed that the respondents perceived that the Internet is a very useful in research and positively impacted on productivity.

In Nigeria, Fatoki (2004) observed that with the emergence of the digital age, Nigerian academic staff are relying on electronic resources to support their research in the universities. According to Fatoki (2004), the Internet was first connected in Nigeria in the 1990s, and since then many organizations and educational institutions have been connecting to the global network just to improve their corporate or academic productivity. In a study by Ani and Biao (2005), using academic scientists in four Nigerian universities as respondents, it was found that 30.4% of the respondents answered in affirmative that, increase in productivity is one of the effects of access and usage of modern ICT facilities and electronic resources on scientific research in Nigeria. Popoola (2008) in a survey of social scientists in 13 Nigerian universities similarly opined that access and use of electronic information sources by academic staff could lead to increase in productivity. In a survey of 1,061 researchers in Africa by Foster *et al*. (2008), a low level of access and use of electronic resources by the respondents was reported, the paper concluded and postulated that increase in access and use of electronic resources would have a positive effect on productivity of Africa in international journals.

A study by Nwezeh (2010) to assess the impact and usefulness of the Internet on research by academic staff in Obafemi Awolowo University, Nigeria, indicated that almost all the

respondents perceived that, the Internet is a useful tool for their research activities. A similar finding was obtained by Ajala *et al*., (2010) where most academics in Ladoke Akintola University of Technology in Nigeria perceived the Internet as impacting positively on their research work.

Tiamiyu (2000) did a survey to assess the perceptions of personnel of Nigerian federal public agencies of the impact of information technology (IT) use on their work including research. It was found that only 0.8% of the respondents in the survey agreed that there is a positive impact of IT use on their work. He attributed the low level of perception of the impact of IT use in Nigeria on productivity on low level of investment on IT which led to poor understanding of the potential of IT by the staff. Similar result was obtained by Jimba and Atinmo (2000), who had found in their study that there is no significant association between access and use of electronic information resources and publication output of researchers in Nigeria.

Ehikhamenor (2003b) investigated the use of Internet resources in Nigeria with the aim of determining if it has "any positive influence" on the productivity of academic scientists in ten Nigerian universities. His review of literature had shown that the use of electronic journals has been positively associated with scientific productivity. But the findings of the study revealed that:

> Very few of the scientists agreed that the use of the Internet had greatly facilitated their research work…or that the Internet facilitated higher productivity (Ehikhamenor, 2003b: 110-111).

In specific terms, 89.3% of the respondents strongly disagreed that the use of Internet resources facilitates higher productivity. The study concluded that the extent to which access and use of electronic resources on the Internet meets the research needs of scientists in Nigerian universities is minimal, and its contribution to increase in productivity is therefore not significant. Ehikhamenor's (2003a) survey findings also revealed that the use of electronic information resources contributed little in improving the research productivity of academic scientists in Nigerian universities.

Apparently, with possible positive effect of electronic information resources in the research process in developed countries (Brittain, 1990; Foster *et al*., 2010; Heterick, 2002; Jankowska, 2004; Mahmood, Hartley & Rowley, 2011; Meadows, 1989; Vakkari, 2008) and a few contradicting research findings in Nigeria – Africa (Ehikhamenor, 2003a, 2003b; Jimba & Atinmo, 2000; Tiamiyu, 2000); Duque *et al*., (2010: 4) raised a poser if the research process – that is "process of knowledge production is similar in the developed and developing worlds?" In other words, if it is substantiated that there is a positive effect due to accessibility and utilization of electronic information resources on research productivity in the developed countries, would the recent postulation by Foster *et al*., (2008) hold for African researchers/academic staff, and Nigeria in particular that access to electronic information resources will increase the level of their publications in international journals, and therefore increase their productivity? Hence, in the light of the research reports by Kirlidog and Bayir (2007) and Foster *et al.,* (2008) on the tendency for positive correlation of accessibility and utilization of electronic information resources by African researchers with productivity and in relation with other contradicting research reports in Nigeria (Ehikhamenor, 2003a, 2003b; Jimba & Atinmo, 2000; Tiamiyu, 2000), there is need for further investigation in this pulsating subject matter in the context of Information Science. And this will help in elucidating the enigma that characterizes diverse postulations/theories on the possible relationship between access and use of electronic information resources and research productivity in the field.

However, in view of the limited use of perception of the likely effect of electronic resources on productivity measure, Mgobozi and Ocholla (2002) suggested the need for researchers to embark on quantitative study of the effect of e-resources on productivity where direct data on the two variables (accessibility and utilization of e-resources and productivity) are captured and analyzed or correlated, in order to find out if quantitative relationship exists or not.

In his study of the use of chemical information systems by academic chemists in ten universities in the UK, Philip (1995) found that, chemistry departments with high rating in academic productivity were found to make extensive use of computerized chemical information systems. The study used the research rating of each department by Universities Funding Council in the UK and compared the extent of use of chemical information system (known as leading-edge

systems) or electronic resources in the department throughout the ten universities surveyed. The findings of the study indicated that "there appears to be a significant correlation between the research rating of each chemistry department and its use of leading-edge systems" (Philip, 1995: 195).

Al-Shanbari and Meadows (1995) studied computer usage by academic scientists and engineers in universities in Saudi Arabia that aimed to determine its impact on productivity. It was found that computers were often used in research in the Saudis and that there was correlation between publications and computer usage among the academic scientists in the survey. In other words, most productive scientists and engineers were more involved in the use of computers than the less productive ones. It was also reported that ease of access to information via electronic networks would accelerate research process of academic scientists and engineers in Saudi Arabia. From the results of the study, the authors argued that the use of ICTs – computing facilities, CD-ROMs, the Internet and electronic networks improves access to information which correspondingly increases academic productivity. Thus, productive academic scientists and engineers are reportedly more likely to use ICT facilities and electronic resources than the less productive ones.

A survey of the use of information technology by biological researchers in the UK by Rolinson, Meadows and Smith (1995) revealed that researchers who were more information-active (or made extensive use of ICT in research), were found to publish more journals articles, authored books, book review, edited works, reports among others than those who were less information-active (that is made less use of ICT in research). This was done by comparing the extent of use of information and communication technology with their publication outputs. In other words, the paper found that there was a correlation between the use of information and communication technology and productivity among the researchers in the survey.

A study by Kirlidog and Bayir (2007) linked academic productivity with access and use of electronic resources. They attributed the low level of scientific publications in developing countries in relation to that of developed and industrialized nations essentially to inadequate access to scientific literature as typified by modern electronic resources. According to their study of the productivity of Turkish universities between 1998 and 2003 using the *Web of*

Science, the results showed comparative annual increase in quantity of publications originating from all Turkish institutions, but the increase was remarkable after 2000. Kirlidog and Bayir (2007: 104) concluded that "the sharp increase after 2000 is clearly related to access to scientific journals through ANKOS", and argued that many academics in Turkish universities, are benefiting extensively from electronic databases provided by ANKOS (Anatolian University Libraries Consortium). ANKOS is responsible for massive provision of electronic databases to all universities in Turkey; its mission is to provide researchers and students in all Turkish universities with access to electronic resources and global network in a cost-effective manner. The observed correlation of academic productivity of academic staff with accessibility and utilization of electronic resources, according to Kirlidog and Bayir (2007) is responsible for the reason why all universities in Turkey are connected to the Internet with free access by Ulakbim (Turkish National Academic Network and Information Center). The aim is to promote increase in research productivity of the academic staff in the Turkish universities.

Tenopir *et al*., (2008) in a survey of access and use of electronic resources in three countries: Finland, the U.S. and Australia; found that productivity was correlated with the use of e-resources in Finland and the U.S., but no correlation between the use of e-resources and productivity was found in Australia. In a specific terms, "in Finland, the total number of scholarly items published was significantly associated with the number of electronic article readings" by the academic staff (Tenopir *et al.*, 2008: 7); and similar result was found in the U.S. The paper concluded that, it's appeared that, the correlation between use of electronic resources and academic productivity may vary from country to country. In view of this, the puzzle that concerns the present study is, will the situation in African (Nigerian) universities be similarly or different as reported in the review of literature above?

From the above, although, literatures on quantitative studies employed to determine the effect of access and use of electronic resources on productivity are sparse; and contribution in African (or Nigerian) setting on the subject matter seems to be relatively insignificant. Hence, the present study is aimed at filling this knowledge gap in African setting with special reference to Nigeria.

2.11   CHAPTER SUMMARY

Universities are centres for research in every society (Ani & Onyancha, 2011); through research, knowledge is generated and disseminated for societal development and betterment of humanity. Academics are involved in the conduct of research in the universities. The productivity of academic staff is essentially measured in terms of his/her publication output; and this according to the present study, is basically determined by the number of published journal's articles within a given period of time. However, academic staff in African universities are observed to lag behind their counterparts in developed countries in productivity measured at the international scene. Scholars have recently attributed this phenomenon to poor level of accessibility and utilization of electronic information resources by academic staff in African universities.

There has been increasing trend towards access and use of electronic resources by academic staff in African universities in research, especially in Nigeria, within the past one decade or so. The review has shown that access and use of ICTs and e-resources by academic staff in research is not gender neutral. Most studies are of the view that, males are dominating their female counterparts in access and use of ICTs and e-resources in research. The need for gender balance and equality in access and use of e-resources in the universities around the world particularly in Africa (Nigeria) has been proposed in the literature towards accelerated access and use of these resources in research.

Age is another factor that has been observed by scholars in the literature review to have significant effect on accessibility and utilization of ICTs and e-resources by academic staff in research. Most studies in the review have proposed that the extent of access and use of e-resources decreases with age. In other words, the younger academic staff potentially or preferentially access and use electronic resources more than the older ones. In terms, of academic disciplines, most studies in the review tend to indicate that access and use of ICTs/e-resources vary considerably with academic disciplines in the universities. According to these studies, academic scientists generally seem to access and use electronic resources more than their counterparts in other disciplines; while academics in the Humanities are apparently reported to make the least access and use of e-resources in their research activities.

Attempts have been made in the literature review to delineate between perceived and quantitative effect of electronic resources on productivity among the academic staff in the universities. The former (perceived effect) uses the opinion of individual academic staff to study the effect of e-resources on productivity; while the latter (quantitative effect) involves the use of quantitative data to determine the relationship between e-resources and productivity. Most studies in the review have shown that, there is a perceived positive impact of electronic resources on productivity, although a few studies especially in Nigeria contradicted this postulation. In terms of quantitative studies, the literature review literally shows consensus by scholars that there is correlation between e-resources and productivity, especially in developed countries where these studies were carried out (but with likely variation from one country to another); but the situation in Africa is bleak, as little or nothing has been found on the subject matter in respect of Africa (or Nigeria). This therefore, amplifies the need to unravel the postulation by Foster *et al*., (2008) that, there would be increase in publication output by academic staff in African (Nigerian) universities, if they join the global trend towards access and use of electronic resources in their research.

CHAPTER THREE: THEORETICAL FRAMEWORK

3.1   INTRODUCTION

The theoretical frameworks that were selected to guide the study are discussed this chapter. The theories/models include Maslow's Hierarchy of Needs Theory, McClelland's Achievement Theory, Herzberg's Motivation-Hygiene Theory, and the Hawthorne Studies. As earlier indicated, these are referred to as motivation theories/models. Others are: Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Information Technology (UTAUT) – otherwise known as user acceptance of information technology theories/models.

3.2   MOTIVATION THEORIES/MODELS

Motivation has been identified by scholars as a key factor that has a significant influence on human behaviour and action (Saade, Nebede & Mak, 2009). Motivation theories/models are used in the study to explain possible variation in extent of accessibility and utilization of electronic resources as well as productivity among academic staff in Nigerian universities. There are varieties of motivation theories, but those that guided the theoretical framework of the study include Maslow's Hierarchy of Needs Theory, McClelland's Achievement Theory, Herzberg's Motivation-Hygiene Theory, and The Hawthorne Studies.

3.2.1.   Maslow's Hierarchy of Needs Theory

Maslow has theorized that there is a hierarchy of human needs in ascending order which include physiological needs, security or safety needs, social needs, esteem needs, and need for self-actualization (Cole, 2004; Goldstein, 1994; Weihrich, Cannice & Koontz, 2008). Physiological needs are basic needs such as food and shelter, while need for self-actualization is regarded as the highest need in the hierarchy. It is also known as the need for self-fulfillment. It has been generally observed that a "group of needs" in Maslow's theory are satisfied in a progression

from the basic (physiological) needs before the higher needs in the hierarchy are satisfied (Weihrich, Cannice & Koontz, 2008).

Maslow's theory explains the observed differences in productivity of academic staff in the universities. According to Maslow's theory, some academic staff would readily satisfy their basic needs and move to need for self-actualization. The need for self- actualization or self-fulfillment encourages individual academic staff to work towards high productivity in order to be visible in his/her professional discipline/field of specialization. The need for self-fulfillment provides the drive for excellence in research which enhances career advancement of the academic staff. Whatever infrastructural facilities or resources such as ICTs/e-resources that will bring quality and excellence into his/her research, the need for self-actualization will push the academic staff to make use of such facilities or resources.

Every academic staff who is aspiring to be self-fulfilled by progressing to the top of his/her professional career or being internationally renowned will definitely extricate himself/herself from those things that will dwindle his/her productivity. He/she would acquire relevant information literacy to facilitate access and use of e-resources, if this will have a positive effect on his/her research.

3.2.2 McClelland's Achievement Theory

McClelland's theory states that in an organization/institution (university) different employees (academic staff) have different levels of need for achievement (or academic achievement in the university environment). He postulated that employees/academic staff with high needs for achievement will strive to increase their academic productivity in the universities (Coon, 2003). Passer and Smith (2001) explained that the need for academic achievement leads to the desire to initiate and accomplish quality research in order to attain academic excellence in one professional discipline, nationally and internationally. According to McClelland's theory, an employee/academic staff with high need for academic achievement in research and publication will possess the following characteristics: responsibility, risk, and feedback. Weihrich, Cannice and Koontz (2008) observed that such an employee/academic staff with a profound need for

achievement has intense desire for quality research. Hence, he/she will certainly get involve in active research in order to increase his/her productivity.

Thus, academic staff with high need for achievement in his/her professional career has a high tendency to access and use modern ICTs/electronic resources that may enhance his/her determination to increase his/her publication output in the university. Career advancement in the university system requires high level of commitment to research, which will eventually lead to increase in productivity. So McClelland's Achievement Theory is used in the study to explain why some academic staff are relatively productive - as they are guided by the need for academic achievement. This needs consequently drive them toward meeting their targets of not only attaining the highest professional rank, but becoming distinguished scholars in their respective disciplines/fields of specialization. Notably, this category of academic staff is essentially involved in reputable national and international research projects. Professional prizes'/awards' winners belong to this group of productive academic staff in the universities around the world.

3.2.3   Herzberg's Motivation-Hygiene Theory

Herzberg's Motivation-Hygiene Theory also known as the Two-Factor Theory of motivation postulates that there are two groups of needs in organization/institution (university) that have influence on job satisfaction (performance or productivity) of employees/workers/academic staff. One group causes job satisfaction, the other causes dissatisfaction. The first group consists of factors known as the motivators, and the second group is made up of the hygiene factors. The motivators (also known as satisfiers or job-content factors) if they exist in an organization/institution tend to lead employees to extreme job satisfaction. The motivators include achievement, recognition, responsibility, advancement, and growth in the job (Cole, 2004; Weihrich, Cannice & Koontz, 2008). The hygiene factors otherwise called the "dissatisfiers" or "job-context factors" include institutional policy, supervision, work condition, salary, interpersonal relations (relationship with supervisor or subordinates/colleagues), status, and job security. The theory presupposes that the existence of hygiene factors in an institution (university) does not give rise to motivation by providing satisfaction. However, lack of hygiene factors would result in dissatisfaction by the employees (Weihrich, Cannice & Koontz, 2008). In

other words, hygiene factors although do not motivate, they are necessary in an institution to avoid dissatisfaction among employees.

From Herzberg's theory, the degree of availability of the motivators and hygiene factors in African (Nigerian) universities will be a major determinant of the extent of accessibility and utilization of e-resources, and level of productivity among the academic staff. In most African universities, the hygiene factors are not readily available as expected, and these may bring dissatisfaction among the academic staff with corresponding effect on productivity. For instance, lack of relevant ICT policy in the university may discourage access and use of ICTs/electronic resources. This may have a profound effect on productivity of the academic staff in the universities.

3.2.4   The Hawthorne Studies

The Hawthorne Studies are series of research carried out between 1927 and 1932 at the Hawthorne plant of the Western Electric Company in the U.S. usually credited to Professor Elton Mayo (Cole, 2004). The research dealt with investigations into physical conditions, social factors and productivity of workers in the company. According to Cole (2004), the findings of Hawthorne Studies significantly showed that social relationships between workers and their physical working conditions have influence on their productivity. In other words social interactions as well as provision of enabling physical environments significantly influence employees' behaviours and productivity.

The lesson from the Hawthorne Studies is that, research productivity of academic staff could be enhanced with the provision of enabling electronic information environments in African universities. This implies that, appropriate electronic information environment will likely promote access and use of electronic resources by academic staff in their research. This may appropriately have a potential effect on productivity of the academic staff in line with global trend. Hence, the choice of Hawthorne Studies as theoretical framework is to guide the study in the area of provision of enabling electronic information environment as a prerequisite for accessibility and utilization of electronic resources in African universities.

3.3   USER ACCEPTANCE OF INFORMATION TECHNOLOGY THEORIES/MODELS

Dillon and Morris (1996) defined user acceptance of information technology as the willingness of a person or group of persons in an organization/institution to use information technology for the task it is designed to support. In the university system, this implies the acceptance of ICTs/electronic resources as tools to support research process. Hence, in the field of Information Science, researchers have shown concern in studying, investigating, predicting and explaining users' behaviours in respect of acceptance of ICTs/electronic resources as tools to enhance academic productivity in the universities. This is because a number of scholars perceive information and communication technology as having the capability to increase not only the productivity of individual academic staff but that of the university in its entirety (Davis, 1989, 1993; Davis, Bagozzi & Warsar, 1992; Saade, Nebebe & Mak, 2009; Venkatesh, Morris & Ackerman, 2000).

For example, in an organizational setting, Davis, Bagozzi, and Warsaw (1992) observed that individual employees in one department that were using computers were found to be more productive than their counterparts in another department that were not using computers. This explains why modern organizations/institutions (universities) are embarking on ICT adoption and use. This viewpoint is aptly captured by Venkatesh, Morris and Ackerman (2000: 34) thus:

> Organizational investments in information technologies (IT) have increased significantly in the past decade. These investments specifically aim to increase individual productivity and thus contribute to organizational productivity. While advances in technology continue at astronomical pace, the use of these emerging information technologies has fallen well below expectation…and has been identified as plausible explanations for productivity gains from IT investments being less than expected.

Following Venkatesh, Morris and Ackerman's (2000) argument and observation, that lack of use of ICT may lower productivity; researchers have been showing keen interest in exploring extent of use or non-use of information and communication technology by potential users (academic staff). The information technology acceptance theories/models are used to explain and predict use and non-use of ICT infrastructural facilities in organization/institution (university) (Anderson & Schwager, 2004; Dulle & Minishi-Majanja, 2011). User acceptance, according to Davis

(1993) is often the pivot that determines the success or failure of information and communication technology adoption in organization/institution. In other words, user acceptance would determine the degree of use and non-use of ICT facilities/electronic resources by academic staff in African universities in research activities. Thus, application of user acceptance of information technology theories/models is found by scholars to be vital in the study of ICT usage in the universities.

There are a number of user acceptance of information technology theories/models (Al-Shafi & Weerakkody, 2009; Hess, Wigand, Mann & von Walter, 2007; Saade, Nebede & Tan, 2007; Suhendra, Hemana & Sugiharto, 2009; Venkatesh, Morris, Davis & Davis, 2003), but only a few would be examined and used to guide the study. These include the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Information Technology (UTAUT).

3.3.1   The Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) is a well-established model from social psychology which is used in explaining and "interpreting the determinants of consciously intended behaviour" (Ghobahloo, Zulkiflu & Aziz, 2010: 10) such as ICT Usage (or access and use of e-resources). Basically, the aim of TRA is simply to explain the relationship between a person's behaviour and attitude. Dillon and Morris (1996) explained that attitude towards a behaviour is determined by the beliefs (or feelings) about the outcome of the behaviour. The TRA postulates that, the performance of behaviour by a person is influenced by his/her behavioural intention. Then the behavioural intention is determined by the person's attitude towards the behaviour, and subjective norm in respect of the behaviour (Fig. 3.1). In other words, attitude towards the behaviour and subjective norm are the two determinants that are used to predict behavioural intention to perform a given behaviour.
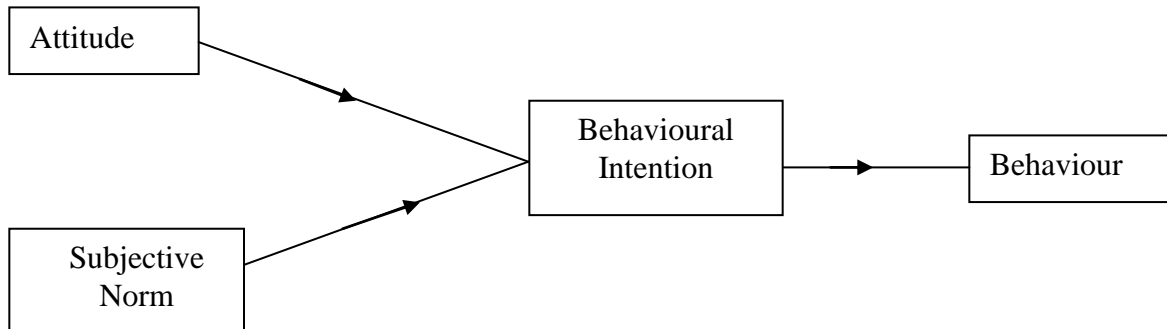
Fig. 3.1**: Theory of Reasoned Action (TRA)**

According to Ajzen (1991: 188), subjective norm "refers to the perceived social pressure to perform or not to perform the behaviour". Subjective norm is therefore defined as the degree of social influence on an individual towards the behavior. In other words, how an individual employee perceives that people who are socially or professionally close to him/her, think that he/she should perform or not perform the behaviour (Dillon & Morris, 1996). Summarily, TRA posits that attitude is influenced by belief which in turn determines behavioural intention to perform a behavior. It is said that behavioural intention is the strongest determinant of behaviour. Although, TRA is said to be general or broader in scope in terms of application areas, it is the basis for the formulation of most of the specific information technology acceptance theories/models (TAM and UTAUT) in Information Science.

3.3.2   The theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) is simply a modification of TRA. The TPB was developed due to observation that, behavioural intention cannot be the only factor that influences behaviour as obtained in TRA (Ajzen, 1991; Ghobahloo, Zulkiflu & Aziz, 2010). Hence, the Theory of Planned Behaviour postulates that, perceived behavioural control, and behavioural intention, can be used directly to predict behavior (Ajzen, 1991). Thus the TPB differs from the TRA by addition of another variable, perceived behavioural control, to attitude towards a behaviour, and subjective norm as determinants of behavioural intention (Fig. 3.2).
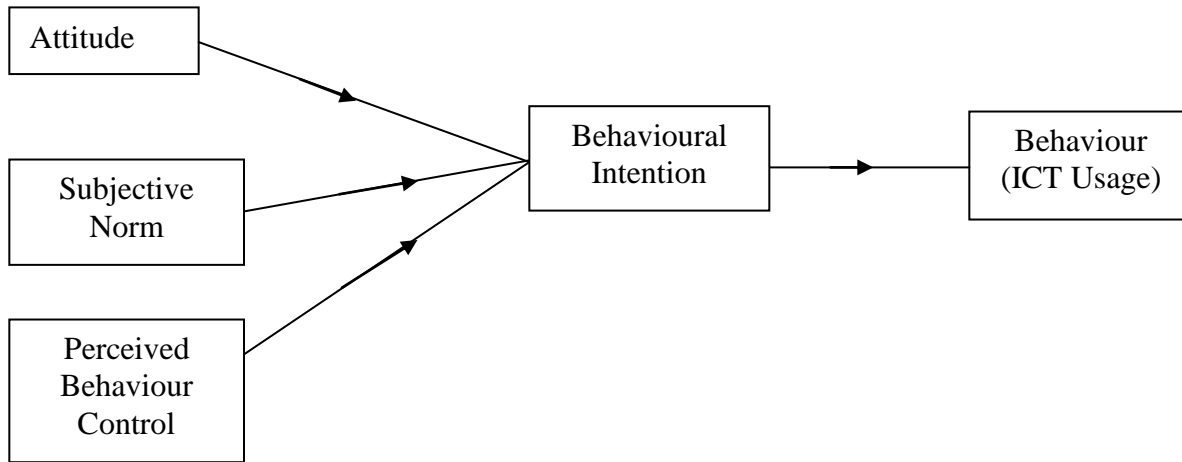
Fig. 3.2**: Theory of Planned Behaviour (TPB)**

Explicitly, the Theory of Planned Behaviour proposes that behavioural intention to perform behaviour (ICT usage or access and use of electronic resources) can be predicted by the three conceptually independent determinants/variables, attitude towards the behaviour, subjective norm, and perceived behavioural control (Ajzen, 1991). Perceived behavioural control "refers to people's perception of the ease or difficulty of performing the behaviour of interest" (Ajzen, 1991: 183). It is viewed as the degree of self-efficacy or confidence, a person feels he can perform the behavior (access and use of e-resources).

Unlike the TRA, the TPB has been widely applied in the study of information technology acceptance by researchers (Venkastesh, Morris & Ackerman, 2000). Venkastesh, Morris and Ackerman (2000) used the TPB to study gender differences in the adoption and use of ICT in decision making process. The findings of the study indicated that there exist significant gender differences in the use of information and communication technology. It was concluded that the TPB provides a relatively good measure in explaining behavioural intention and ICT usage for both women and men in decision making (Venkastesh, Morris & Ackerman, 2000). However, Mathieson (1991) observed that the Technology Acceptance Model (TAM) is empirically easy to apply, and good in predicting behavioural intention to use ICT than the TPB.

3.3.3 The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis in 1989 to explain and understand factors affecting the acceptance and use of computer technology or ICT infrastructure in general in organizations/institutions (Davis, 1989, 1993; Johnson, 2005; Lee, Kozar & Larsen, 2003; Ramayah, 2006). Basically, the Technology Acceptance Model (TAM) has been used by many researchers to explain and understand individual's acceptance and intention to use variety of information and communication technologies. The TAM postulates that behavioural intention determines the actual use of information and communication technology. However, behavioural intention is jointly determined by two variables: perceived usefulness and perceived ease of use (Saade, Nebede & Tan, 2007). Thus, the TAM presupposes that perceived usefulness and perceived ease of use influence attitude toward behavioural intention to use information and communication technology (Fig. 3.3). Davis (1989: 320) affirmed that the aim of the TAM is to "provide better measures for predicting and explaining use" of ICT in organization/institution (university).
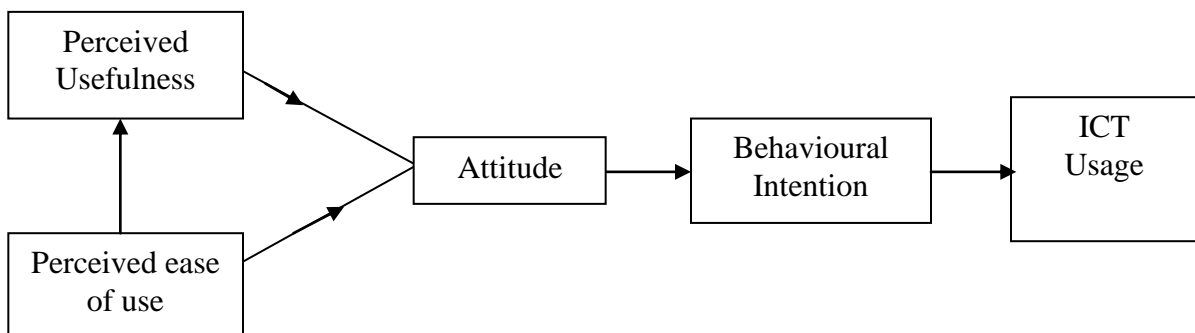
Fig. 3.3: **Technology Acceptance Model (TAM)**

Fundamentally, the TAM is an adaptation of the TRA (Dishaw, Strong & Brandy, 2002; Ghobahloo, Zulkiflu & Aziz, 2010). According to Ghobahloo, Zulkiflu and Aziz (2010: 10), the **"**TAM presumes that perceived usefulness and perceived ease of use are of main relevance regarding computer acceptance behaviours". The perceived usefulness and perceived ease of use are said to influence behavioural intention which is affected by attitude towards the behaviour as

embedded in the TRA. Put, differently, attitude towards behavioural intention to use information and communication technology is determined by perceived usefulness and perceived ease of use. Observably, the TAM is said to exclude the original variable subjective norm from the TRA. But, in general, these two theories (TRA, TAM) "state that a behaviour is determined by the intention to perform the behaviour…intention itself is determined by attitude towards the behaviour" (Dishaw, Strong & Brandy, 2002: 1022). Additionally, the TAM presupposes that the use of ICT in organization/institution (university) by employee/academic staff to be voluntary.

According to Davis (1993), attitude towards the behavior - use of information and communication technology, is a major factor that determines whether a potential user (academic staff) would actually use ICT (or access and use of electronic resources) or not. Hence, attitude towards ICT usage affects actual use of ICT, with perceived usefulness and perceived ease of use as the determinants of attitude (Koufaris, 2002). This is consistent with the postulation by Davis (1993: 476) that "attitude toward using is in turn a function of two beliefs: perceived usefulness and perceived ease of use". Thus, perceived usefulness and perceived ease of use have helped in application of the TAM to explain and predict acceptance of the use of information and communication technology by different people (academic staff) in organization/institution (university).

Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989: 320). Perceived usefulness is a concept that explains the expected overall effect of use of information and communication technology on job performance or productivity (Davis, 1993). Davis (1989: 320) therefore theorized that "a system high in perceived usefulness, in turn, is one for which the user believes in the existence of a positive use-performance relationship". In other words, if a system (ICT) has a high degree of usefulness (productivity), it would be used by the potential user (academic staff).

Thus, in line with the work of Saade, Nebebe and Mak (2009), perceived usefulness is defined in the present study as the degree to which an academic staff believes that accessibility and utilization of electronic information resources will enhance or increase his/her productivity.

Consequently, from the concept of perceived usefulness, it is therefore postulated that academic staff would readily access and use variety of electronic information resources in his/her research, if he/she believes that, this would definitely increase his/her productivity. This leads to the hypothesis that, electronic information resources are research tools for productive academic staff in African universities. In other words, accessibility and utilization of e-resources would have a positive effect on productivity of academic staff in African universities.

Perceived ease of use is "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989: 320). So perceived ease of use deals with the situation in which little mental/physical effort is required in ICT usage in organization/institution (university) by potential users (academic staff). Hence, in the present study, perceived ease of use is defined as the degree to which academic staff believes that accessibility and utilization of electronic information resources will be free from effort. However, researchers have observed that perceived usefulness has a more significant influence on use of ICT than perceived ease of use (Tibendera & Ogao, 2009).   Specifically, Tibendera and Ogao (2009: 394) observed that "usefulness was more significantly affected by usage than ease of use" and that "perceived usefulness had a stronger correlation with user acceptance of technology". Thus, to guide the study, using TAM, it is proposed that academic staff who access and use electronic information resources frequently are expected to be more productive than those who do not.

Davis, Bagozzi and Warsaw (1992: 1124) used the TAM to show that "people's intentions to use computers are influenced mainly by their perceptions of how useful the computers are for improving their job performance". Application of the TAM by Koufaris (2002: 217) on online consumer behaviour has also confirmed that "perceived usefulness (*or increase in productivity*) was more an important predictor of intended system usage".   Klopping and McKinney (2004) affirmed that the TAM is one of the most effective tools to study user acceptance and use of information and communication technology among other competitive theories/models. They used the TAM, to predict and explain the impact of the Internet on e-commerce. A review by Johnson (2005) has also revealed extensive application of the TAM to study users' acceptance of microcomputers, World Wide Web, Software, and decision support system in different organizations/institutions across diverse cultures.

In their study, Saade, Nebede and Tan (2007) used TAM to test students' behaviour in a multimedia learning environment, specifically, the use of internet-based technologies by the students. The TAM was found to be a solid theoretical model that "provides better understanding of user behaviour on the system and a multimedia acceptance model" (Saade, Nebede & Tan, 2007: 174). In another study, Saade, Nebebe and Mak (2009) applied the TAM to investigate cultural variation of the use of Web-based Learning System between the Chinese and Canadian students, with the finding that the use of ICT differs across cultural background. Recently, Sheikhshoaei and Oloumi (2011) applied TAM to establish its validity on librarians in engineering faculties of public universities in Iran. The findings confirmed that perceived usefulness have considerable influence on use of ICT by the librarians and therefore validated the model. Thus, the present study would apply the TAM as a guide to explore and explain if there is any possible correlation between accessibility and utilization of electronic information resources and productivity by academic staff in Nigerian universities.

Although, the TAM has been reported as the most widely used and robust theoretical model in Information Science in the study of acceptance and use of information and communication technology, observably it has some limitations (Al-Shafi & Weerakkody, 2009; Koufaris, 2002; Lee, Kozar & Larsen, 2003, Sheikhshoaei & Oloumi, 2011). According to Al-Shafi and Weerakkody (2009), the basic strength of TAM is derived from its power and capability to predict the use of information and communication technology in variety of organizations/institutions globally. Additionally, the TAM is said to provide "factors which lead to IS acceptance, provides room for extensions and elaborations better than other competing models", while its weaknesses "are its failure to determine barriers that hinder technology adoption" and use (Tibenderana & Ogao, 2009: 394-395). However, in spite of its numerous applications, validations and robustness, and high prediction capability on the use of ICTs,

> on the other hand TAM has been found to excludes some important sources of variance and does not consider challenges such as time or money constraints as factors that would prevent an individual from using an IS (Al-Shafi & Weerakkody, 2009: 5).

Hence, the Unified Theory of Acceptance and Use of Information Technology (UTAUT) was developed to address the limitations/weaknesses of the TAM (Al-Shafi & Weerakkody, 2009).

3.3.4   The Unified Theory of Acceptance and Use of Information Technology (UTAUT)

In view of the observed weaknesses of individual theories/models in the study of information technology acceptance, Venkatesh *et al*., (2003) reportedly examined eight prominent models, empirically compared them, and then formulated a new model or "unified model". The unified model is referred to as the Unified Theory of Acceptance and Use of Information Technology (UTAUT). The UTAUT integrates salient elements from eight theories/models: the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), the Motivational Model (MM), a model combining the TAM and the TPB (C-TAM-TPB), the model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT) (Ghobakloo, Zulkifli & Aziz, 2010; Venkatesh *et al*., 2003; Wu, Tao & Yang, 2007).

According to the UTAUT, the four main determinants of behavioural intention and actual ICT usage are performance expectancy, effort expectancy, social influence, and facilitating condition (Fig. 3.4). These variables are said to be moderated by age, gender, experience, and voluntariness of use (Al-Shafi & Weerakkody, 2009; Ghobakloo, Zulkifli & Aziz, 2010; Suhendra, Hemana & Sugiharto, 2009; Wu, Tao & Yang, 2007). The empirical testing and validation of the UTAUT proved that, the UTAUT model outperformed the eight individual theories/models (Ghobakloo, Zulkifli & Aziz, 2010; Venkatesh *et al*., 2003). This is confirmed by Wu, Tao and Yang (2007: 2) that the explanation or predicting strength offers by the UTAUT model "for technology acceptance behaviour is up to 70%, which is more effective than any of the known models from the past".
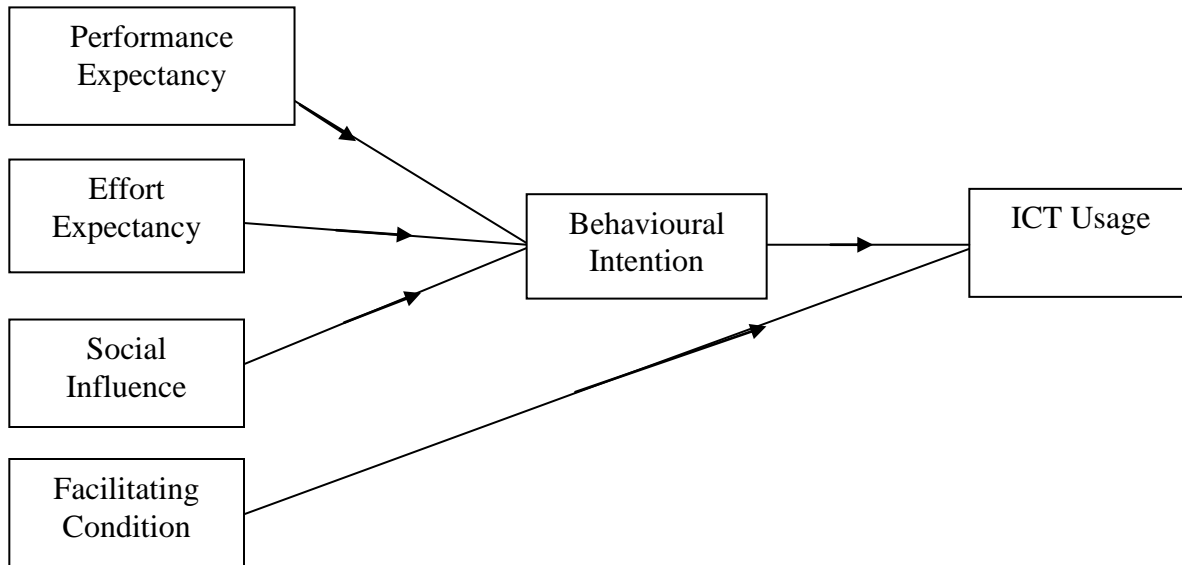
Fig. 3.4: **Unified Theory of Acceptance and Use of Information Technology (UTAUT)**

Performance expectancy: the degree to which an academic staff believes that access and use of information technology/electronic information resource will help him/her to enhance his research performance (publication output or productivity). Performance expectancy now replaces perceived usefulness in the TAM as a major measure that motivates academic staff to access and use electronic resources in research and publication.

Effort expectancy: the degree of ease of access and use of information and communication technology/electronic information resource.

Social Influence: the degree to which academic staff perceives that his/her social/professional peers believe he/she should access and use information and communication technology/electronic information resource in research.

Facilitating condition: the degree to which an academic staff believes that, institutional ICT infrastructural facilities are available to support access and use of electronic information resources. Put different, the degree in which an academic staff believes that his/her university has an enabling electronic information environment that will facilitate him/her to access and use electronic resources in research.

So, the performance expectancy and facilitating conditions are the two UTAUT variables that are used to guide the present study if an academic staff believes that access and use of electronic resources in research may have a positive effect on his productivity. From UTAUT, the extent of access and use of electronic resources depends on facilitating condition (electronic information environment).

The UTAUT has been a widely used model in information technology acceptance study. Wu, Tao and Yang (2007) used the UTAUT to explore the behaviour of 3G mobile communication users in Taiwan. It was found that performance expectancy and facilitating conditions have had significance influence on behavioural intention of people to use 3G mobile communications in Taiwan. Tibenderana and Ogao (2009) applied the UTAUT model to study the use of hybrid library services in Ugandan universities; the findings validated the model as an efficient and robust tool for technology acceptance studies. Dulle and Minishi-Majanja (2011) used the UTAUT model to study the acceptance and usage of open access in Tanzanian universities; the results showed performance expectancy as a major factor affecting the researchers' behavioural intention to use the open access. A study by Al-Shafi and Weerakkody (2009) focused on application of UTAUT model to investigate the adoption and diffusion of e-government services in Qatar. Hence, Ghobakloo, Zulkifli and Aziz (2010: 11) reported that the UTAUT model is "robust across cultures through increasing understanding of cultural impacts of IT acceptance".

3.4   CHAPTER SUMMARY

The chapter highlighted and discussed a number of theories/models from motivation theories/models and user acceptance of information technology as theoretical frameworks to guide the study. The motivation theories/models are Maslow's Hierarchy of Needs Theory, McClelland's Achievement Theory, Herzberg's Motivation-Hygiene Theory, and The Hawthorne Studies. The choice of Maslow's Hierarchy of Needs Theory to guide the study is due to the concept of self-actualization or self-fulfillment which explains why certain groups of academic staff are productive in their research while others are less productive. The need for self-actualization drives productive academic staff to involve in excellence and quality research.

The implication is that, the productive academic staff have the tendency to access and use electronic resources as tools to enhance their research in order to attain self-fulfillment.

 McClelland's achievement theory was chosen as a theoretical framework to guide the study in view of the fact that an academic staff with high need for academic achievement in research and publication will work hard to increase his/her productivity for successful career advancement. Such academic staff will be involved in active research in order to achieve high publication output. Since information is vital in research in the digital age, the academic staff with high needs for achievement will be willing to access and use electronic resources in his/her day-to-day research process.

The choice of Herzberg's theory as theoretical framework to guide the research is justified by the fact that, availability of the motivators and hygiene factors in African (Nigerian) universities will likely lead to increase access and use of e-resources and lead to high productivity by academic staff. For instance, lack of relevant ICT policy (hygiene factor) in the university may discourage access and use of ICTs/electronic resources. This may have a profound effect on productivity of the academic staff in the universities.

Another motivation theory/model that is chosen to guide the study is the Hawthorne Studies. The Hawthorne studies presuppose that the provision of enabling physical environments will significantly influence the productivity of academic staff. This implies that, the provision of enabling electronic information environment may promote access and use of electronic resources and this may likely have a positive effect on productivity of academic staff in African (Nigerian) universities.

Under user acceptance of information technology, the TRA and the TPB were discussed as the theoretical models that form the foundation for the formulation of the TAM and the UTAUT, the two theories/models of acceptance of information technology that are chosen to guide the study. The TAM postulates that perceived usefulness and perceived ease of use are two determinants of ICT usage. Specifically, perceived usefulness proposes that academic staff would access and use electronic information resources in his/her research, if he/she believes that, it would lead to

increase in productivity. In line with the aim of the present study, the TAM would provide a guide in exploring the effect of accessibility and utilization of e-resources on productivity of academic staff in African (Nigerian) universities.

Finally, the UTAUT is also chosen as a theoretical model to guide the study. This is due to the relevance of two of its variables, the performance expectancy and facilitating condition on the objectives of the study. The performance expectancy presumes that accessibility and utilization of electronic resources increases the productivity of academic staff. Put differently, individual academic staff would willingly access and use electronic resources; if he/she believe that it enhances his/her productivity. Facilitating condition proposes that there will be extensive access and use of electronic resources by academic staff if there is enabling electronic information environments in African (Nigerian) universities. Thus the two variables, performance expectancy and facilitating condition would provide proper guide in investigating the effect of accessibility and utilization of electronic resources on productivity of academic staff in African (Nigerian) universities

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The research methodology is described as approaches/methods/techniques that guide a study; "it considers and explain the logic behind research methods and techniques" (Welman, Kruger & Mitchell, 2005:2). Similarly, Babbie *et al*., (2001) explain that research methodology consists of different methods, techniques or procedures that are used in conducting research. The Chapter focuses on the research paradigm, research method, target population, sampling technique, study area, data collection, pilot study, and data analyses and interpretation.

4.2 RESEARCH PARADIGM

Research paradigm describes theoretical/methodological framework or approach to conduct social science research, and "there are two main approaches to research", the positivist approach also known as quantitative approach, and anti-positivist approach otherwise known as qualitative approach (6 & Bellamy, 2012:6). However, a discourse of research paradigm in terms of positivist and anti-positivist approaches deals with the philosophical views of scholars on how social science research should be conducted. This theoretically, is concerned with the formulation of laws that guide the conduct of social science research. On the other hand, a discourse of research paradigm in terms of quantitative and qualitative approaches emphasizes methodological approaches to social science research. In methodological approach, social scientists (researchers) deal "with how well we argue from analyses of our data to draw and defend conclusions" (6 & Bellamy, 2012: 11). In other words, what approach does a researcher use to gather and analyze his/her data that would allow for sound interpretation of the data and thus lead to valid research outcome or conclusion? The two main methodological approaches in social science research, quantitative and qualitative approaches are well discussed by scholars (6 & Bellamy, 2012; Bryman, 2008; Neuman, 2011; Taylor, 2000a; Trumbull, 2000; Welman, Kruger & Mitchell, 2005).

Quantitative research approach deals with objective measurement of observation (behaviour) and also explains what causes the observation (or observed behaviour). Welman, Kruger and Mitchell (2005: 6) explain the term objectivity to "implies that people other than the researcher should agree on what is being observed, such as the score that the observation should register on a measuring instrument". This presupposes that, other researchers should be able to repeat the research or carry out the measurement of the observation as done by the researcher. This implies that quantitative researches are replicable. While in qualitative research "research procedures are particular and replication is rare" (Neuman, 2011: 174). In other words unlike quantitative approach, qualitative research is devoid of standard procedures that will allow the replication of a research as the qualitative researcher is subjectively involved in the research process. Rather than talking about objectivity, a qualitative research is concerned with confirmability – "the degree to which the findings are the products of the focus of the inquiry and not of the biases of the researcher" (Babbie *et al*., 2001: 274). This is because the "qualitative researchers attempt to study human action from insiders' perspective" (Babbie *et al*., 2001: 53). This is based on the assumption that "human experience, which is the object of behavioural research, cannot be separated from the person who is experiencing it" (Welman, Kruger & Mitchell, 2005:6). Put differently, behavioural researchers or social scientists cannot strictly distance or separate themselves from the phenomena (social behaviours) they are studying as obtained in natural sciences. So the contest for the issue of objectivity in the process of measurement of observation is concerned with the degree of existence of personal idiosyncrasy, feeling or bias of the researcher in the research process (Welman, Kruger & Mitchell, 2005). Unlike in quantitative approach, a qualitative researcher is subjectively involved in the study of social behaviour in order to gain insight and understand the observed social behaviour (Babbie *et al.*, 2001; Maykut & Morehouse, 1994). Thus, quantitative approach is deemed to be relatively free from bias/prejudice in presenting research findings, as "the researcher attempts to achieve objectivity by not letting his personal biases influence the analysis and interpretation of the data" (Taylor, 2000b: 69). Again the critics of the quantitative research are of the "view that truly objective research, social science or otherwise, may be impossible to achieve under any circumstance" (Yin, 2001: 281).

The goal of quantitative approach is to postulate general laws that govern relationships in social science research, while qualitative approach aims at how to understand social behaviour from the perspectives of those that are being studied. Instead of focusing on the generalization of research outcomes, qualitative researcher is concerned with the problem of transferability (Babbie *et al*., 2001; Stavros & Westberg, 2009). Transferability is defined by Babbie *et al*. (2001) as the extent to which the research outcome in qualitative approach can be applied in other contexts or with other respondents. Thus:

> The qualitative researcher is not primarily interested in (statistical) generalizations. All observations are defined by the specific contexts in which they occur. The qualitative researcher, therefore, does not maintain, or claim, that knowledge gained from one context will necessarily have relevance for other contexts or for the same contexts in another time frame (Babbie *et al*., 2001: 277).

In view of the need for generalization of the research outcome, quantitative approach usually deals with larger numbers of people (population) unlike qualitative approach that "involves small samples of people" (Welman, Kruger & Mitchell, 2005:9). On the order hand qualitative research focuses "on process rather than outcome" as its main concern is to provide understanding of social action contextually rather than attempting to generalize the outcome of the study to a larger population (Babbie *et al*., 2001: 270).

Quantitative research is concerned with the use of numbers or statistics, which is alien to qualitative researcher (Silverman, 2001). Trumbull (2000:79) affirmed that "qualitative research is not represented by numbers; rather it is focused on meaning and involvement of the researcher in the research process". Advocates of qualitative research are in contention that "quantitative research turns human beings into numbers" (Seidman, 2006: 11). So, the two research paradigms are distinctively different based on the nature of their data, as quantitative research is reputed with the use of hard data (numbers), while qualitative research is involved with the use of soft data (words, sentences, photos, symbols) (Neuman, 2011).

The use of numbers and statistics allows the quantitative research to be used for testing of hypotheses in order to explain social behaviour and to proffer solution to the research problem (Silverman, 2001). Neuman (2011: 180) defined hypothesis as "a proposition to be tested or a tentative statement of a relationship between two variables". On the other hand, qualitative

research deals with the gathering of data to formulate "hypotheses and note important themes" throughout the research process (Frankfort-Nachmias & Nachmias, 1996: 292).

In summary, according to Welman, Kruger and Mitchell (2005: 9):

> The purpose of both quantitative and qualitative research is to try to understand the subject's point of view. Quantitative researchers do it by means of controlling the situation and using remote, empirical, and inferential methods. Qualitative researchers, on the other hand, use unstructured interviewing and detailed observation processes to gain better information about the subject.

However, and in spite of its perceived advantages by its proponents, it has been observed that "that quantitative research cannot successfully evaluate the full range of human behaviour" (Taylor, 2000b:68). Notably qualitative research is usually used to play "a preparatory role for the conduct of quantitative social research" (Bryman, 2008: 16).

In view of the fact that neither quantitative nor qualitative approach can proffer solution to every social behaviour, the mixed methods research has emerged and has been used to address the inherent weaknesses of the two research approaches (Bryman, 2008; Yin, 2011). A mixed methods research is used when quantitative and qualitative approaches are combined in a given study. According to Yin (2011: 289) "mixed methods research offers an option that actually tries to take advantage of the similarities and differences in qualitative methods**.** However, Bryman (2008: 15) has cautioned against the use of mixed methods as "a new research approach" in social science research.

In view of the above discourse, quantitative approach was used in the current study due to the large number of the target population, and the need to generalize the research outcome to the target population. Quantitative research was considered cost effective in terms of time and money, as a sample of the population was used; and the results generalized. Again, the use of quantitative research primarily allowed the researcher to test hypothesis that was aimed at proffering solution to the research problem: the effect of accessibility and utilization of e-resources on research productivity of academic staff in Nigerian universities. The use of quantitative approach in the study was to allow the researcher to effectively determine the existing relationship between the accessibility and utilization of e-resources and research

productivity of academic staff in Nigerian universities. This was achieved through hypothesis testing with numerical data than would be obtain with qualitative approach. The need for objectivity of the study also informed the choice of quantitative approach as the researcher did not want personal involvement and interaction with the subjects (academic staff) to influence the outcome of the study.

4.3   RESEARCH DESIGN AND METHOD

A research design is a plan or blueprint, which indicates how a research would be conducted or guided (Babbie *et al*., 2001; Frankfort-Nachmias & Nachmias, 1996; Trumbull, 2000; Welman, Kruger & Mitchell, 2005). According to Trumbull (2000: 80), research design is a blueprint that helps the researcher "to seek, explore, and discover answers to research questions". Similarly, Welman, Kruger and Mitchell (2005: 2) describe a research design as "the plan according to which we obtain research participants (subjects) and collect information from them…with a view to reaching conclusions about the research problem". 6 and Bellamy (2012:20) look at research design as a plan that specifies "the way in which data will be created, collected, constructed, coded, analyzed and interpreted". Hence, a research design is a master plan that guides a researcher on how to choose his/her research paradigm, research method, sampling technique and statistical procedure for data analysis and interpretation of the research findings. Thus, Trumbull (2000b: 80) explains that research design helps:

> researchers in determining the types of observations to make, how to make them, and the type of research to employ (qualitative and quantitative). Specific procedures are outlined to guide the researcher in manipulating and categorizing the variables. Research designs should also indicate appropriate types of statistical and narrative analysis to use as well as anticipate or project conclusions to be drawn from analysis.

Research design is therefore wider in scope than the research method, as we may have quantitative or qualitative research design, survey research design or experimental research design, even cross sectional research design or longitudinal research design (although the two, research design and research method are at times narrowly used as synonyms or interchangeably).

Neuman (2011: vii) defined 'methods' as "the techniques of research design, measurement, data collection, and data analysis". Similarly, 6 and Bellamy (2012: 9) described 'method' "as the set of techniques recognized by most social scientists as being appropriate for the creation, collection, coding, organization and analysis of data". And "finally, 'methods' are specific research techniques" (Silverman, 2001: 4). So, a research method is the technique "used to produce the raw material of research, namely well-structured data – or sets of information – that can be used to perform further investigations" (6 & Bellamy, 2012: 9). Hence, research methods are techniques used to create or produce new data in social science research.

There are varieties of research methods in social science and these include survey, experiment, observation, case study, content analysis (analysis of records/documents – such as bibliometrics) among others (Antonius, 2003; Babbie *et al.*, 2001; 6 & Bellamy, 2012; Welman, Kruger & Mitchell, 2005; Seidman, 2006; Zikmund, 1994). The aim or purpose of a research is said to determine the choice of appropriate research method for a given study (6 & Bellamy, 2012; Seidman, 2006; Silverman, 2001; Welman, Kruger & Mitchell, 2000). Seidman (2006: 11) confirms that "the adequacy of a research method depends on the purpose of the research and the questions being asked". Since the present study is based on quantitative research, it is essential that research methods that produce quantitative data are used in the study. According to Antonius (2003: 108), there are three principal types of research methods "that produce quantitative data: survey research, experimental research, and secondary data analysis…other types may involve quantitative data, but their focus is rather qualitative". Yin (2011: 282) confirms surveys and experiments to be dominant research methods in quantitative approach. Neuman (2011: 17) observes that the choice of research method in social science varies "according to whether we follow a quantitative or qualitative approach" in a study. So, the quantitative based research methods were chosen and used for the study.

Survey method is a research method that is used to gather primary or empirical data in social science research mostly through questionnaire and interview (structured interview) in quantitative research. The survey method was used for the study since it allows data to be collected from a large sample due to its relative cost effectiveness (time and money) (Aina, 2012; Emojorho & Adomi, 2006; Hasim & Salman, 2010; Jankowska, 2004; Nwagwu, Adekannbi &

Bello, 2009) compared to experimental method that uses small sample. This is affirmed by Babbie *et al*., (2001: 265) that "survey research is especially appropriate for making descriptive studies of large populations". Experimental research involves the manipulation of variables particularly the independent variables (such as accessibility and utilization of e-resources) to see their effect on dependent variables (research productivity) to allow the researcher to control research situation. In order words, unlike survey research, experimental research requires intervention of the researcher to obtain data from the subjects (academic staff) in the study.

Furthermore, "the central principle of experimental research is that control is exercised over all the factors that might exert causal influence upon the outcomes in which we are interested" (6 & Bellamy, 2012: 69). However, in spite of its strength in terms of the degree of control over the research situation or production of inferences with high degree of generalization; experimental research is limitedly used in social science research due to inherent nature of human beings (such as the academic staff) who cannot easily be manipulated. It would have been of a great interest to divide the academic staff in the study into two groups: one group to access and use electronic resources (experimental group) with the other group as a control group (without access and use of e-resources), and subsequently measure the research productivity of the two groups. But this was apparently not practically feasible.

Secondary data analysis involves the use of documents/records/literatures to obtain data for research, and bibliometrics is a research method that falls under secondary data analysis. Moed (1989: 4) looks at bibliometrics as a term that "indicates the collection, handling and analysis of quantitative bibliographic data". According to Okafor and Dike (2010: 42), "bibliometrics is the study of attributes and trends in publications" by individual authours, universities or countries/regions. Bibliometric method was adopted in the study to allow for analysis of research output of the academic staff using an international database (record/document) – Thomson Reuter online database known as *ISI Web of Science*. Since, the study has research productivity as a major variable; bibliometric method was used in the study to give comparative insight into the degree of involvement of the two surveyed universities (University of Ibadan and University of Calabar) in international research (Nwagwu & Egbon, 2011). This is affirmed by Okafor and Dike (2010) who disclose that bibliometrics is beneficial in comparing research

productivity between individual academic staff, universities or countries/regions. Bibliometrics has been a popular research method used by scholars to study research productivity in Nigerian universities (Ani & Onyancha, 2011; Nwagwu & Egbon, 2011; Okafor & Dike, 2010) and globally (Lissoni, *et al*., 2009; Onyancha, 2007; Pienta, 2004).

4.4   STUDY AREA

The geographical area for the study was Nigeria a nation in the continent of Africa, with a relatively low literacy level compared with the developed nations, but high in relation to developing countries especially those in Africa. The World Bank (2006) indicated Nigeria as having 64% for educational enrolment (primary, secondary and tertiary) compares with that of Senegal 39, Ghana 48%, Algeria 74%, Egypt 74%, Tunisia 74%, and South Africa 78%. In spite of a long history of university education that spans over five decades: Nigerian universities are not ranked among the best universities in the world. Even in Africa, no Nigerian university is ranked among the top 20 universities in the region as shown in Table 3.1 (4International Colleges & Universities, 2012; Cybermetrics Lab CSIC. 2012). The university education in Nigeria began 1948 with the University of Ibadan as the first Nigerian university.

Two federal universities: University of Ibadan - a first generation university, and University of Calabar - a second generation university, were selected for the study. These universities were selected based on relative variance in their rating in productivity measure (Ani & Onyancha, 2011) and ranking in the recent global ranking of universities (4International Colleges & Universities, 2012; Cybermetrics Lab CSIC. 2012) respectively. The University of Ibadan was selected due to its high rating/ranking in productivity measure and global ranking of universities; while the University of Calabar was selected based on its comparative low rating/ranking in productivity measure as well as global ranking of universities.

The University of Ibadan is located in the city of Ibadan, Oyo State in the South West Geopolitical Zone of Nigeria. It was originally established as a College of University of London in 1948 and became autonomous in 1962. The University of Calabar is located in Calabar

Metropolis, Cross River State in the South-South Geo-political Zone of Nigeria. The surveyed universities, University of Ibadan and University of Calabar are mono-campus universities.

4.5   POPULATION OF THE STUDY

Babbie *et al*., (2001: 100) defined population as a "group (usually of people) about whom we want to draw conclusions". This definition is extended by Welman, Kruger and Mitchell (2005) who defined population as the study object which consists of people or group of people, organizations/institutions, products and social events. The choice of population in a research is based on the specific unit of analysis (individuals or institution) in which a researcher wishes to draw his/her specific conclusions. Thus, a population of the study consists of the full set of cases or units of analysis in which a sample is drawn for the study (Welman, Kruger & Mitchell, 2005). In this study the academic staff are the units of analysis. Hence, the population of the study consisted of all academic staff in the University of Ibadan and University of Calabar. An academic staff is a person in the employment of a university with a responsibility to teach and conduct research. The study was focused on the research component of the dual functions of the academic staff. The population of academic staff at the time of the study in the University of Ibadan was 1200 and 835 in the University of Calabar. Thus, the total population for the study was 2035 academic staff.

4.6   SAMPLING PROCEDURES AND METHODS

In a survey research with a large number of population "it is impractical and uneconomical to involve all the members of the population in a research" (Welman, Kruger & Mitchell, 2005: 55). In a large population so much time and funds would be needed to study all the members of the population, which in a practical point of view is rather impossible. A way out of this problem, according to scholars (Babbie *et al*., 2001; Welman, Kruger & Mitchell, 2005) is to obtain or select a sample (or small number of members) of the population for the study. Babbie *et al*., (2001: 164) define sampling as "the process of selecting observations" or members of the population in social science research. The selection of the sample for the study should be done in a way that allows for the generalization of the results of the study. This therefore requires that the

sample for the study must be representative of the population from which it is drawn. A representative sample has the same or similar characteristics as the population, and is proportional to the population. The procedure of selecting a sample is referred to as sampling method or technique. So, this section presents sampling techniques, sample frame and sample size that were relevant in the selection of appropriate sample for the study.

4.6.1 Sampling techniques

There are quite a number of sampling techniques that are used in social science research and these are broadly classified into probability sampling and non-probability sampling (Babbie *et al*., 2001; Frankfort-Nachmias & Nachmias, 1996; Welman, Kruger, & Mitchell, 2005). In a probability sampling the probability of any member of the population to be selected and included in the sample can be determined (Welman, Kruger, & Mitchell, 2005). Examples of probability sampling techniques are simple random sampling, stratified random sampling, systematic sampling, cluster sampling. In non-probability sampling, the probability for the selection of any member of the population for possible inclusion in the sample cannot be predicted or determined. Non-probability sampling techniques include quota sampling, purposive sampling, and convenience sampling.

The most popularly used sampling technique is the random sampling. Dane (2011: 86) defined random sampling as "a process by which every member of the population had an equal opportunity to be included in the sample". So, a random sampling technique ensures that each unit of analysis (academic staff) in the population is given equal chance or opportunity to be selected and included in the sample and used in the study. A stratified random sampling is a condition that selection of members of the population for the sample must be done based on available strata of the population. So, if the purpose of the research is that each stratum of the population should be included in the sample for effective representation of the population, then the choice of stratified random sampling is relatively most appropriate.

As earlier indicated, two federal universities that belong to the first and second generations' universities were used for the study due to their relatively long history of academic and infrastructural development. A stratified random sampling technique was used to select University of Ibadan from the first generation and University of Calabar from the second

generation respectively for the study (Table 4.2). Thus, the use of stratified random sampling was to ensure that one university is selected from each of the two strata (first generation and second generations' universities) in the study (Okafor & Dike, 2010)

Furthermore, supplementary criterion in terms of global ranking of Nigerian universities was used in the selection of the two universities. Table 4.1 shows the list of first and second generations' universities in Nigeria that are ranked among the top 100 universities in Africa in recent ranking of world universities (4International Colleges & Universities, 2012). A stratified random sampling was used to select University of Ibadan from Table 4.1 (as one of the best ranked first generation universities), while University of Calabar was selected from Table 4.2 as one of the non-ranked second generation universities among the top 100 universities in Africa.

Table 4.1 **List of Nigerian universities among top 100 universities in Africa in 2012** (4International Colleges & Universities, 2012)

Name of Nigerian University	Generation	Position in Africa
University of Ibadan	1st	30
University of Benin	1st	32
University of Lagos	1st	38
University of Ilorin	2nd	40
Obafemi Awolowo University	1st	43
Ahmadu Bello University	1st	46
University of Jos	2nd	59
University of Port Harcourt	2nd	78

Table 4.2 **List of first and second generation universities in Nigeria** (adapted from Ani & Edem, 2012)

First Generation University	Second Generation University
University of Ibadan, Ibadan	University of Port Harcourt, Port Harcourt
University of Lagos, Lagos	University of Calabar, Calabar
Obafemi Awolowo University, Ife	University of Ilorin, Ilorin
Ahmadu Bello University, Zaria	Universality of Maiduguri, Maiduguri
University of Nigeria, Nsukka	University of Jos, Jos
University of Benin, Benin	Usman Danfodiyo University, Sokoto
	Bayero University Kano, Kano
	University of Uyo
	University of Abuja

Purposive sampling technique was used in the selection of faculties from the surveyed universities (University of Ibadan and University of Calabar) for the study as shown in Table 4.3. Purposive sampling technique allows a researcher to use his/her research experience, discretion or judgment to select the sample he/she considers would be a representation of the population (Frankfort-Nachmias & Nachmias, 1996; Welman, Kruger & Mitchell, 2005; Zikmund, 1994). Purposive sampling is also referred to as judgment sampling. In order to have adequate data for the study, the five broad faculties that are common in the two universities (University of Ibadan and University of Calabar) were purposively selected for the study. The selected faculties were Agriculture, Arts, Education, Social Science and Science. This was in line with a recent study by Adetimirin (2012) that explores ICT literacy among undergraduates in seven Nigerian universities. Adetimirin (2012: 385) purposively selects four faculties "on the basis of being available in all selected universities….The faculties were Arts, Education, Science and Social Sciences". Popoola (2008: 2) adopts similar method to select nine universities in Nigeria "which offer at least three of the core disciplines in social science" to study the effect of use of information sources on research output of social scientists in Nigerian universities. Badu and Markwei (2005) similarly select three faculties: Faculties of Arts, Social Science, and Science to investigate the use of the Internet by academic staff and postgraduate students in the University of Ghana.

Table 4.3 **List of faculties in the surveyed universities**

Sn	Ibadan	Calabar
1	*Agriculture*	*Agriculture*
2	*Arts*	*Arts*
3	*Education*	*Education*
4	*Social Science*	*Social Science*
5	*Science*	*Science*
6	Law	Law
7	College of Medicine	Basic Medical Sciences
8	Pharmacy	Clinical Sciences
9	Technology	Laboratory and Allied Science
10	Veterinary Medicine	Management Science

Note: Selected faculties for the study are italicized.

A simple random sampling technique was then employed to select the academic staff from the selected faculties in the two universities as respondents in the survey for both the questionnaire and the structured interview (Emojorho & Adomi, 2006; Nwagwu, Adekannbi & Bello, 2009; Popoola, 2006). The choice of a random sampling technique was to give equal opportunity to each academic staff in the selected faculties in the surveyed universities to be included in the sample and used for the study.

4.6.2   Sampling frame

A sampling frame is a complete list of the units of analysis or elements, "which ideally is the same as the population, but which often differs due to practical problems relating to availability of information" (Welman, Kruger & Mitchell, 2005: 57). Thus, the sampling frame is otherwise referred to as "the working population" (Zikmund, 1994: 361). Ideally, the sampling frame provides a guide for the drawing of the sample from the population. The sampling frames for the study were the faculty lists of academic staff members of the faculties used in the survey at the University of Ibadan and the University of Calabar. So, the researcher sought and obtained permission from the Deans of the surveyed faculties at the two universities to use their academic staff lists as sample frames to guide the study. Hence, the population and sample size used for this study were based on the obtained faculty lists of academic staff at the surveyed universities.

4.6.3   Sample size

It has been agreed by scholars in Social Science that for a sample to be representative in a study it must be a good proportion of the population (de Vaus, 1993; Welman, Kruger, & Mitchell, 2005; Zikmund, 1994). A sample size is simply the actual number of members of the population that are in the sample. A sample size helps significantly to determine the accuracy of the results. It has been postulated by scholars that the larger the sample size the better the accuracy or precision of the results of the study, however sample size tends to decrease with relatively large population (Welman, Kruger & Mitchell, 2005). But, Welman, Kruger and Mitchell (2005: 71) counsel that: "if a random sampling is done, it is not necessary to use a sample size larger than 500 units of analysis, no matter the size of the population". This is affirmed by Babbie *et al*.,

(2001: 164) that a random sampling technique allows "a researcher to make relatively few observations and generalize from those observations to a much wider population".

It has also been reported that it is not only the size of the population that should be considered in the determination of the sample size but also the variance (or heterogeneity) of the population (Welman, Kruger, & Mitchell, 2005; Zikmund, 1994). For a homogeneous population, a small sample is required for a study unlike heterogeneous population that requires a large sample. It is further recommended that, in view of the fact that not all potential respondents may be available or willing to complete the questionnaire or respond to the interview for one reason or the other, "it is usually advisable to draw a larger sample than the one for which complete data is desired in the end" (Welman, Kruger & Mitchell, 2005: 72).

Based on the fact that random sampling technique was used to select the respondents (the sample), the population of study is relatively homogeneous, and not all the potential respondents would be available or if available would be willing to complete the questionnaire, a sample size of 586 academic staff from the study population was used in the study. The 586 academic staff used as the sample size represents 40% of the "study population" (Adetimirin, 2012) or 29% of the total population. Adetimirin (2012) used a sampling percentage of 20% to determine his sample size. This is in line with the principle outlined by Frankfort-Nachmias & Nachmias (1996: 192) that a researcher should "determine the strata; from each stratum, select a random sample proportionate to the size of the stratum in the population". So the faculties were used as the strata to determine the sample size for the study (Table 4.4).

Asemi and Riyahiniya (2007) used a sample size of 250 to study the use of digital resources among students in the Isfahan University in Iran. Ekwelem, Okafor and Ukwoma (2009) adopt a sample size of 600 to investigate the use of e-resources among students in the University of Nigeria, Nsukka; while Kindilchie and Samarraie (2008) use a sample of 598 in exploring the impact of e-resources on academic staff in Qatar University. Popoola (2008) uses the sample size of 315 to study the use and effect of information resources on research output of social scientists in nine universities in Nigeria. In a related study, Popoola (2006) uses a sample size of

550 managers to investigate information accessibility and utilization as factors influencing decision-making of managers in commercial banks in Nigeria.

Table 4.4 **Study population (SP) and sample size (SS)**

Sn	Ibadan	SP	SS	Calabar	SP	SS	**SS
1	Agriculture	138	55	Agriculture	164	66	
2	Arts	132	53	Arts	138	55	
3	Education	142	57	Education	139	56	
4	Social Science	125	50	Social Science	108	43	
5	Science	160	64	Science	144	*87	
	Total	697	279		693	307	586

*Note: Since academic staff in Faculty of Science (University of Calabar) were mostly willing to complete the questionnaire, and in order to increase the overall response rate in the survey, 30 academic staff were added to the original sample size of 57 (Welman, Kruger & Mitchell, 2005). **SS (586) represents the sample size used in the study.

Unlike the questionnaire method, the structured interview requires a very small sample size. Silverman (2001) recommends the use of random sampling method for structured interview in survey research unlike purposive sampling technique that is mostly employed in in-depth/unstructured interview. Hence, random sampling technique was used to select a sample size of 40 academic staff from the selected faculties in the two surveyed universities for the structured interview. This resulted in a sample size of 20 academic staff in each of the two surveyed universities with four academic staff (respondents) per faculty.

4.7 DATA COLLECTION PROCEDURES AND METHODS

This section discusses different methods/techniques that were used to guide the data collection process in the study. These are data collection procedures, methods of data collection, instrument of data collection, validity and reliability of instruments, and pilot study.

4.7.1 Data collection procedures

Data collection procedure is concerned with the administration of research instruments or tools of data collection on the respondents (Bhandarkar & Wilkinson, 2010). Two research assistants were employed to facilitate in the survey (administration of the questionnaire) at the University

of Ibadan (Popoola, 2006). The researcher discussed the study with the Deans and Heads of Departments (HODs) and obtained their permissions to administer the questionnaire to academic staff in their faculties/departments. The researcher/research assistants thereafter distributed the questionnaire to the academic staff directly seeking their consents to participate in the survey or through Secretaries to HODs, as some HODs directed their Secretaries to help in the distribution of copies of the questionnaire to available academic staff in the departments and subsequent retrieval of the completed ones for onward collection by the researcher/research assistants.

In terms of direct contact with individual respondents, willing respondents collected copies of the questionnaire and completed them at their own free time, requesting the researcher/research assistants to come back for the completed questionnaires. Thereafter, the researcher/research assistants then routinely visited the Departmental Secretaries or individual respondents in their offices until the completed copies of the questionnaires were retrieved.

At the University of Calabar, where the researcher is an academic staff, the researcher did self introduction, explained the purpose of the study and then sought for and obtained the permission of Heads of Department to administer the questionnaires in their departments through the help of their Secretaries or approach individual respondents and sought for their consents to participate in the completion of the questionnaires. Routine visits were made to the offices of the Departmental Secretaries or individual respondents until the completed copies of the questionnaire were retrieved.

In terms of the structured interview, the researcher went to offices of the respondents and introduced himself and the purpose of the research to them. The respondents were then requested to willingly participate in a brief interview to enable the researcher to collect data for his doctoral research. The interviews were therefore conducted with the willing respondents.

In bibliometrics, the procedures for data collection involved logging on to the home page of *The Web of Science* on the Internet. Advanced search was conducted with the field tag CU=Nigeria, the timespan (period) for the study 2005 to 2012 (specifically 2005-01-01 to 2012-08-31) was selected, and three citation databases: Science Citation Index (SCI), Social Science Citation

Index (SSCI) and Arts and Humanities (A&HCI) were used for the study. The search was limited to "articles" as document types, with the selection of "all languages" for language of publication. After the search, the result of the search for Nigeria was analyzed by organization in which the two surveyed universities (University of Ibadan and University of Calabar) were selected and further analysis carried out. Thereafter, the publication counts or "record counts" were analyzed by universities, and then by authors and publication year.

4.7.2   Methods of data collection

According to Neuman (2011: 9) "data are the forms of empirical evidence or information carefully collected according to the rules or procedures of science". Careful and procedural collection of data in social science research is necessary because "data serve as the foundation for a research study" (Yin, 2011). 6 and Bellamy (2012) define methods of data collection as procedures for obtaining relevant/required data (or information) that will aid in answering the research question. These procedures "may involve scanning text for particular themes, codes or content or undertaking counts or more advanced quantitative procedures" (6 & Bellamy, 2012: 10). The choice of method of data collection is dependent upon the research method adopted for the study. According to de Leeuw (2008) the two main methods of data collection in a survey research are the questionnaire and standardized/structured interview. Again de Leeuw (2008: 323) explains that:

> Deciding which data collection is best in a certain situation is often complex and depends on many factors, such as population under investigation, types of questions to be asked, available time, and funds. This presents researchers with a difficult choice indeed. It is no wonder that recently multiple modes of data collection or mixed modes have been become popular.

In view of the large population, limited time and funds, the questionnaire method was the major data collection method in the survey. Questionnaire method has been widely used by scholars in the study of accessibility and utilization in universities in Nigeria (Ehikhamenor, 2003a; Ekwelem, Okafor & Ukwoma, 2009; Nwagwu, Adekannbi & Bello, 2009; Nwezeh, 2010), Africa (Badu & Markwei, 2005; Chifwepa, 2005) and around the world (Al-Ansari, 2006; Asemi & Riyahiniya, 2007; Renwick, 2005; Selwyn, 2008; Tahir, Mahmood & Shafique, 2010; Vibert, Rouet, Ros, Ramond & Deshoullieres, 2007). Questionnaire method has equally been used in the

study of research productivity among academic staff in Nigeria (Okafor & Dike, 2010), accessibility and utilization of e-resources and research productivity (Ehikhamenor, 2003b; Popoola, 2008; Kindilchie & Samarraie, 2008).

Additionally, standardized/structured interview was used to complement the questionnaire method in the survey to enable the researcher to gather further data from the respondents, which may not readily be obtained, by the questionnaire method. This was based on Seidman (2006: 11) argument for the need to use "multiple methods" for data collection if need be, in order to obtain appropriate data to meet all "research interests" in the study. Bhandarkar and Wilkinson (2010) describe structured interview as the use of formal lists of questions by the researcher to ask every respondent in the same way; apparently these questions are usually prepared in a questionnaire. So, structured interview involves the use of preset, predetermined or standardized questions by the researcher to obtain research data from the respondents (Bhandarkar & Wilkinson, 2010; Seidman, 2006). Emojorho and Adomi (2006) used questionnaire and structured interview in their study of "assessment of the use of information technology facilities for academic pursuit" in Delta State University, Abraka, Nigeria.

In terms of bibliometrics, publication count was used as method of data collection on research productivity from the two surveyed universities. According to Nwagwu and Egbon (2011: 440) "the number of publications by a scholar (*university*) or a country is an indicator of their level of production of new knowledge (*or productivity*). Publication count refers to counting the number of publications (in this study journal articles) published by individual academic staff or university within the period of time (in this study 2005-2012). Okafor and Dike (2010: 42), similarly, opined that publication count involves "counting the number of books published, or journal articles produced over a period".

4.7.3   Instruments of data collection

Instrument for data collection is a tool that is used by researcher for collection of data in social science research (Bhandarkar & Wilkinson, 2010). Questionnaire was the first instrument used for data collection with the survey method in the study (Jankowska, 2004; Popoola, 2006). Deng (2010: 89) described a questionnaire as "a structured instrument for gathering data from a

potentially large number of respondents". The questionnaire was designed to capture questions on bio-data of the respondents as well as the four variables in the study: electronic information environment, accessibility and utilization of electronic resources, ICT policy/strategy, and research productivity of the academic staff between 2005 and 2012. Thus, the questionnaire was structured into five sections: section I - bio-data of the respondents, section II – Electronic Information Environment, section III – Accessibility and Utilization of Electronic Resources, section IV – ICT Policies/Strategies toward Effective Accessibility and Utilization of Electronic Resources, and section V – Productivity. Okafor and Dike (2010: 44) similarly used questionnaire to collect data from individual academic staff "on the number of their journal articles published during the period 1997-2006" in their study of research output of academics in seven Nigerian universities. The questionnaires were administered to 586 academic staff at the surveyed universities as respondents.

The choice of the period, 2005-2012 for the study, was primarily to coincide with the period that ICTs and electronic resources were pervasively integrated into research process in Nigerian universities, since the widespread adoption of these research tools in Africa and Nigeria in particular was of recent history (Ajala *et al*., 2010; Ani & Esin, 2003; Ani, Edem & Ottong, 2010; Ehikhamenor, 2003a, 2003b; Jagboro, 2003; Nwezeh, 2010; Rosenberg, 2005).

The interview schedule was used to complement the questionnaire as instrument for data collection with the survey method in the study (de Leeuw, 2008; Maykut & Morehouse, 1994; Silverman, 2001; Yin, 2011). Maykut and Morehouse (1994: 83) define interview schedule as "an interview format consisting of detailed set of questions and probes". This is why Yin (2011) described interview schedule as instrument for data collection in a survey as "fixed questionnaire". Hence, the interview schedule or fixed questionnaire contains list of questions that the researcher asked the respondents during the study. Emojorho and Adomi (2006) used the questionnaire and interview schedule in their study. A total of 20 academic staff were interviewed at the surveyed universities.

In the case of bibliometrics, *The Web of Science* otherwise known as *ISI Web of Knowledge* was used as the instrument for data collection in the study. *The Web of Science* is a global online

database that indexes publications across all disciplines. The *Science Citation Index (SCI), Social Science Citation Index (SSCI)* and *Arts and Humanities Citation Index (A&HCI)* of *The Web of Science* were used as specific databases for data collection in the study.

4.7.4 Triangulation

In order to enhance the validity in social science research, Babbie *et al*., (2001: 275) suggested the need "to collect information about different events and relationships from different points of view. This means asking different questions, seeking different sources, and using different methods". This process of using multiple methods or techniques in conducting social science research is referred to as triangulation. Jack and Raturi (2006: 345) explained that "triangulation combines several research methodologies to study the same phenomena". According to Neuman (2011: 165) triangulation "requires using multiple theoretical perspectives to plan a study or interpret the data"; and that triangulation of method in research makes a study to be more comprehensive. The underlying reason of using triangulation in research is to ensure that the weakness of one method is complemented by other methods (Babbie *et al*., 2001; Jack & Raturi, 2006; Neuman, 2011). In the words of Jack and Raturi (2006: 345), triangulation will ensure that "weaknesses inherent in one approach will be counterbalanced via strengths in another"; and therefore advocate the need for scholars to practice the use of triangulation in research in order to strengthen the research outcomes.

In view of the relative benefits of triangulation, it has been widely used by scholars in research (Adetimirin, 2012; Collins, More, Hanlon, Wall, McKenzie & Duggan, 2012; Stavros & Westberg 2009; Vibert *et al*., 2007; Voorbij, 1999). Adetimirin (2012: 385) used "the questionnaire, interview and observation" as data collection instruments in her study. Collins *et al*. (2012) used semi-structured interviews, focus group and facilitated workshop to investigate improvements to equine welfare in Ireland; Stavros and Westberg (2009: 307) used semi-structured interviews, historical data sources and participant observation to study "the contribution of qualitative methods and techniques in extending the understanding of relationship marketing theory"; Vibert *et al*. (2007) used questionnaire and interviews to study the use of online electronic information resources in scientific research; while Voorbij (1999) uses

questionnaire and focus group interviews to study perceived importance of the use of the Internet by academics and students in the Netherlands;

In view of the wide application of triangulation to increase the validity of research, the researcher considered it necessary to use variety of methods/instruments to collect data in this study. Thus the survey and bibliometrics were used as research methods in the study; questionnaire, structured interview and publication count as methods of data collection; and questionnaire, interview schedule and *The Web of Science* as instruments for data collection.

4.8   PILOT STUDY

The pilot study involves the preliminary investigation of a research with relatively small sample before the main study. This is usually done to pre-test the research instrument and correct all observed anomalies before the main study (Alasuutari, Bickman & Brannen, 2008; Welman, Kruger & Mitchell, 2005). Alasuutari, Bickman and Brannen, (2008: 266) explain that:

> It seems obvious that the answer to the question needs to reflect what we wanted to know. However, respondents may not understand the question in the way the person who wrote it expects….writing good questions requires pre-testing.

Welman, Kruger and Mitchell (2005: 148) affirmed that it is necessary and useful to pre-test the instrument for data collection "before administering it to the actual sample". So, in order to write good questions for the survey research (with questionnaire or structured interview), the two instruments for data collection: the questionnaire and the interview schedule were pre-tested in the study through a pilot study. Deng (2010) gave the need to ensure content validity of the questionnaire as a basic reason for a pilot study. So, a pilot study helps a researcher to modify questions in the survey with both questionnaire and interview as well as the mode of presentation of these questions by the researcher (6 & Bellamy, 2012; Maykut & Morehouse, 1994; Silverman, 2001).

A pilot study with the survey method was conducted at the University of Calabar. A random sampling technique was used to select 35 academic staff as respondents in the pilot study. The designed questionnaires were administered face-to-face to the respondents and the feedback from

the retrieved and completed questionnaires was helpful in modification and revision of the questions on the designed questionnaire for the main study. Similarly, a random sampling technique was used to select 5 academic staff for pilot study using interview schedule as instrument for data collection. The pilot survey was vital for the revision of questions on the interview schedule before the main study. This was absolutely useful in re-defining or streamlining questions for the final interview of the academic staff in the study. A pilot study was also conducted with bibliometric method with *The Web of Science* as instrument for data collection. A bibliometric analysis with publication count of research productivity of academic staff was conducted with the University of Calabar as organization. The pilot study was helpful in enhancing the skills of bibliometric analysis in the main study by the researcher. Thus, the pilot study was vital in getting the researcher to gain familiarity with bibliometric method before the final study was conducted at the two surveyed universities.

4.8.1 Validity and reliability of instruments

Validity is the ability of a research instrument or instrument for data collection to measure a research variable effectively or the degree in which a variable is measured well by the research instrument (Antonius, 2003; Frankfort-Nachmias & Nachmias, 1996; 6 & Bellamy, 2012). Simply put validity "refers to the extent to which measures actually measure what they claim to measure" (6 & Bellamy, 2012: 92). Validity helps a researcher to draw a sound inference or conclusion from his/her data. Expert's view on the research instrument is a common measure of its validity in social science research (Frankfort-Nachmias & Nachmias, 1996). Thus, the designed questionnaire and interview schedule were validated by experts in Information Science, precisely, the two supervisors of the researcher as veritable tools for data collection in the survey. Similarly, in bibliometric method, the use of *The Web of Science* as instrument for data collection was validated by the two supervisors as capable of measuring effectively the research productivity of the academic staff in the surveyed universities.

Reliability is a process of ensuring consistency in measuring a research variable by the research instrument (6 & Bellamy, 2006; Field, 2005). According to Field (2005: 666), "reliability just means that a scale should consistently reflect the construct it is measuring". 6 & Bellamy (2012: 21) explain that "a reliable system of measurement or coding is consistent in that, each time it

used on the same data, it yields the same measure or code". SPSS software was used to determine the reliability of the questionnaire as instrument for data collection in the survey. The reliability estimates obtained are shown in Table 4.5. The values of the reliability estimates range from 0.784 to 0.922 and these indicate that the questionnaire instrument was reliable to use for data collection in the study.

Table 4.5   **Reliability estimates of questionnaire instrument**

Variable	Cronbach's alpha
Electronic information environment	0.847
Accessibility and utilization of e-resources	0.784
ICT policy/strategy	0.922
Perception of effect of e-resources on productivity	0.887

Reliability measure is difficult to assess with interview schedule as instrument for data collection (6 & Bellamy, 2012; Silverman, 2001). This is aptly captured by Silverman (2001: 13) that "A central methodological issue for quantitative researchers is the reliability of the interview schedule". However, and in order to maximize reliability of the interview schedule, these scholars proffered solutions which were adopted in this study (6 & Bellamy, 2012; Silverman, 2001). Silverman (2001: 229) suggested that the researcher should ensure "that each respondent understands the questions in the same way and that the answers can be coded without the possibility of uncertainty". In addition, 6 and Bellamy (2012: 94) argued that reliability is dependent "upon methodical attention to detail" by the researcher. Thus, the following measures were used to increase or maximize reliability of the interview schedule in the study. One, attentions were given to the concepts used to frame the questions in the interview schedule in order to aid each respondent to have the same understanding of these concepts. Ambiguous questions were avoided. Secondly, pilot study was conducted to pre-test interview schedule, and thereafter necessary modifications were made. Finally, attention was given by the researcher in recording the responses of the respondents with clarity and consistency as guided by the interview schedule.

In terms of bibliometrics, the reliability of *The Web of Science* as the instrument for data collection was affirmed by the two supervisors and relevant literature. Nwagwu and Egbon (2011: 439) referred to *The Web of Science* as a:

> very popular index and its *Journal Citation Reports* might be reflecting merely the global perception and assessment of science performance, but they also probably give some insight about the condition of science in Africa.

The reliability of *The Web of Science* as instrument for data collection in bibliometric studies is affirmed by Okafor and Dike (2010) who state that the database "provides objective and accurate data pertaining to journals, years and countries wherein the academics publish and even such details as number of authors for each publication". So, *The Web of Science* was considered as a reliable instrument to capture data on publication counts for the two surveyed universities (in view of non-availability of relevant or similar database in Nigeria and Africa in general) (Ani & Onyancha, 2011; Nwagwu & Egbon, 2011; Okafor & Dike, 2010). In terms of measuring and getting consistent results, the researcher pre-tested the instrument with his name as an authour and that of five notable authours to assess their research productivity within a given period of time (2005-2012 used in the study). A repeated measure by the researcher indicated that the results obtained were consistent for each of the authours. Thus, the reliability of *The Web of Science* as instrument for data collection in the study was not in doubt, but observed by the researcher to be trustworthy in line with literature and experts' views.

4.9   DATA ANALYSIS AND INTERPRETATION

Data analysis generally involves "entering the data in an electronic file by using some statistical software package" and performing of appropriate statistical analysis (Antonius, 2003: 29). 6 and Bellamy (2012: 10) explain that analysis methods "are procedures for manipulating data so that the research questions can be answered, usually by identifying important patterns". In quantitative research which is used in this study, data analysis basically involves the use of statistical procedures (Antonius, 2003; 6 & Bellamy, 2012); unlike thematic analysis usually use in qualitative research (Collins *et al*., 2012). Collins *et al*., (2012) explain that, the themes involves identification of concepts which can be converted into text and can then be analyzed by relevant qualitative software such as ATLAS ti 5.5.9.

The data from the questionnaire survey were entered into Excel package and exported into SPSS software for analysis. Out of the 586 copies of questionnaire administered in the surveyed universities, 324 copies of questionnaire were retrieved and used for data analysis representing 55.29% response rate. The research questions were analyzed based on the descriptive statistics and tables, while the lone hypothesis was analyzed with inferential statistics – Pearson correlation. The data from the structured interview and bibliometrics were analyzed using simple frequencies and percentages. Coding schedules for the data in the study were done as shown in Table 4.6 below. The academic disciplines of the respondents were analyzed by faculty system: Agriculture, Arts, Education, Social Science and Science.

Table 4.6   **Coding schedules for data analysis**

Sn	Variable	Code
1	Serial number	001-400
2	Name of university	1 University of Calabar 2 University of Ibadan
3	Faculty (discipline)	1 Agriculture 2 Arts 3 Education 4 Social science 5 Science
4	Gender/sex	1 Male 2 Female
5	Age (yr)	1 Below 40 2 40-49 3 50-59 4 60 and above
6	Highest educational qualification	1 BA/Bed/MSc. 2 MA/Med/MSc. 3 PhD
7	Professional rank	1 Professor 2 Associate Professor 3 Senior Lecturer 4 Lecturer 5 Assistant Lecturer
8	Electronic information environment (EIE)	Score all 17 items in section II in Questionnaire (appendix 1)
9	Accessibility and utilization (AU)	Add scores of all 10 items in section III in Questionnaire (appendix 1)
10	ICT Policy/strategy (PS)	Add scores of all 10 items in section IV in Questionnaire (appendix 1)
11	Perception of effect of AU on productivity (PP)	Add scores of all three items in section V in Questionnaire (appendix 1)
12	Productivity NP – National productivity IP - International productivity TP - Total productivity BP – Productivity output from bibilometrics	1 NP Score in section V2 in questionnaire (appendix 1) 2 IP Score in section V2 in Questionnaire (appendix 1) 3TP Score in section V1 in Questionnaire (appendix 1) 4 BP

4.10 ETHICAL CONSIDERATIONS

In social science research, human beings commonly referred to as participants are usually subjects of study. This raises a fundamental ethical issue on how a researcher can go about the conduct of his/her research without causing any harm to the participants. Frankfort-Nachmias and Nachmias (1996) and Preece (1994) made a discourse on the desirability of considering the rights and privileges of participants by the researcher without jeopardizing his/her research obligation. In specific terms, Frankfort-Nachmias and Nachmias (1996: 81) adduced that "research involving human participants should be performed with the informed consent of the participants" and argued that participants (respondents) should always be made to know that their involvement or participation in a research is voluntary. This is affirmed by Taylor (2000a: 7) that, "subjects (*respondents*) must be given a choice to determine whether to participate in the study" or not. Thus, the academic staff used as respondents, were informed that their participation in the survey was voluntary (UNISA, 2007). This was spelt out in the questionnaire that the respondent has the option of completing or not completing the questionnaire; that is, his/her completion of the questionnaire was voluntary.

Another related ethical issue in relation to the participant (respondent) was protection of his/her privacy in responding to the questionnaire, this is otherwise referred to as confidentiality in research report (Welman, Kruger & Mitchell, 2005). In this regards each respondent was informed in the questionnaire that the data collected would be kept in confidence, and would be used for the research purpose only. For confidentiality of the respondent, ideally, the questionnaire should be coded by removal of identifying information about the respondent. In compliance with these requirements, the questionnaire for the study had no provision for the name of the respondent.

This leads to the issue of honesty in reporting the findings of the study; and the researcher ensured that only the findings emanated from the study were reported, and no manipulations were done to the collected data in order to achieve predetermined results. Plagiarism is obviously a serious ethical issue that the researcher gave serious attention. All works used in the study were dully acknowledged as spelt out by UNISA ethical guidelines/policies on research (UNISA, 2007).

4.11   CHAPTER SUMMARY

The chapter discussed different approaches/methods/techniques that were used to guide the study. The quantitative approach was used to guide the study, with survey and bibliometrics as research methods. The questionnaire method, structured interview and publication count were the three methods for data collection used in the study. The instruments used for data collection in the study were the questionnaire, interview schedule and *The Web of Science*. The stratified random sampling was used to select two universities and five faculties for the study. Thereafter, simple random sampling was used in the selection of academic staff as respondents included in the sample for both the questionnaire survey and the structured interview. The sample size used in the study was 586 academic staff. The questionnaires were administered face-to-face to the respondents in their offices by the researcher/two researcher assistants. The items on the questionnaire and interview schedules were validated by the experts – specifically the two Supervisors of the researcher.   Pilot survey was conducted at the University of Calabar; the feedback was used to revise items on the questionnaire and interview schedule before embarking on the main survey. Pilot study was also conducted with bibliometric method using University of Calabar as organization before the main study. The data for the study were coded and entered into Excel package before it was exported into SPSS software for analysis.

CHAPTER FIVE: PRESENTATION OF RESULTS

5.1   INTRODUCTION

The results of the study are presented in this chapter. The order of presentation is as follows: results from the questionnaire survey are presented first followed by that of the structured interview and bibliometric analysis.

5.2   RESULTS OF QUESTIONNAIRE SURVEY

The results of the questionnaire survey are presented under the following subheadings: demographics, electronic information environment, accessibility and utilization of electronic resources and demographic variables, extent of accessibility and utilization of electronic resources, ICT policy/strategy, level of productivity, perception of effect of accessibility and utilization of e-resources on productivity, and effect of accessibility and utilization of e-resources on productivity

5.2.1   Demographics of respondents

The demographics of the respondents in the study include faculty, gender, age, education and professional rank. The results in Table 5.1 depict the discipline/faculty of the respondents in the study. The majority of respondents (48.3%) were from the Faculty of Science; this was followed by the respondents from Faculties of Education (24.4%), Agriculture (10.8%), Arts (10.2%) and Social Science (9.9%) respectively.

Table 5.1   **Distribution of respondents by discipline/faculty**

Faculty	Calabar (N=173)		Ibadan (N=151)		Total (*N=324)	
	Frequency	%	Frequency	%	Frequency	%
Agriculture	16	9.2	19	12.6	35	10.8
Arts	17	9.8	16	10.6	33	10.2
Education	45	26.0	34	22.5	79	24.4
Social Science	23	13.3	9	6.0	32	9.9
Science	72	41.6	73	48.3	145	44.8
Total	173	100.0	151	100.0	324	100.0

*Note: N=324 is the total number of respondents that completed the questionnaires from the two surveyed universities out of 586 copies of questionnaire administered.

The results of the study on gender are shown in Table 5.2. Analysis of the results indicates that, out of the 324 respondents in the survey, 70.7% were male and 29.3% were female. This shows the dominance of males as academic staff over females in the surveyed universities.

Table 5.2   **Distribution of respondents by gender**

Gender	Calabar (N=173)		Ibadan (N=151)		Total (N=324)	
	Frequency	%	Frequency	%	Frequency	%
Male	137	79.2	92	60.9	229	70.7
Female	36	20.8	59	39.1	95	29.3
Total	173	100.0	151	100.0	324	100.0

The respondents were asked to indicate their age range in the questionnaire; the results are shown in Table 5.3. The majority of the respondents (52.2%) were in the age range of 40-49 years, and those in the category of 60 years and above received the least responses.

Table 5.3   **Distribution of respondents by age**

Age range (years)	Calabar (N=173)		Ibadan (N=151)		Total (N=324)	
	Frequency	%	Frequency	%	Frequency	%
Below 40	25	14.5	30	19.9	55	17.0
40-49	92	53.2	77	51.0	169	52.2
50-59	44	25.4	36	23.8	80	24.7
60 and above	12	6.9	8	5.3	20	6.2
Total	173	100.0	151	100.0	324	100.0

Analysis of the results in respect of level of education of the respondents is presented in Table 5.4**.** The results in Table 5.4 show that majority (71.3%) of the respondents indicated that they have PhD as their highest educational qualification; those with MA/Med/MSc were 26.9% and only very few (1.9%) of the respondents claimed to have BA/Bed/BSc as their highest educational qualification. The academics with first (BA/Bed/BSc) and masters degrees (MA/Med/MSc) are expected to obtain their PhD before they are fully integrated into the university system in Nigeria. This explains the reason why Nigerian academics must obtain PhD before they can be promoted to the senior academic positions especially the professorial cadre. However, academics with BA/Bed/BSc are generally expected to complete their MA/Med/MSc

degrees within a stipulated period before their appointments are confirmed or lose their jobs in the universities.

Table 5.4   **Distribution of respondents by level of education**

Education	Calabar (N=173)		Ibadan (N=151)		Total (N=324)	
	Frequency	%	Frequency	%	Frequency	%
BA/Bed/BSc	5	2.9	1	0.7	6	1.9
MA/Med/MSc	47	27.2	40	26.5	87	26.9
PhD	121	69.9	110	72.8	231	71.3
Total	173	100.0	151	100.0	324	100.0

The study sought to know the status of respondents by their professional ranks, and this is presented in Table 5.5. From the results, the highest responses of 37.3% and 30.9% came from the ranks of senior lecturer and lecturer respectively. Expectedly, respondents from the professorial cadre, reader (assistant professor) and professor received the least responses of 8.6% and 9.0% respectively; this is because academic staff in these categories are relatively few and in addition to their busy time schedules.

Table 5.5   **Distribution of respondents by professional rank**

Rank	Calabar (N=173)		Ibadan (N=151)		Total (N=324)	
	Frequency	%	Frequency	%	Frequency	%
Professor	21	12.1	8	5.3	29	9.0
Reader/Assistant Professor	14	8.1	14	9.3	28	8.6
Senior Lecturer	75	43.4	46	30.5	121	37.3
Lecturer	44	25.4	56	37.1	100	30.9
Assistant Lecturer	19	11.0	27	17.9	46	14.2
Total	173	100.0	151	100.0	324	100.0

5.2.2 Level of ICT infrastructure

The electronic information environment in the study was measured in terms of the level of ICT infrastructures that are available in the surveyed universities as shown in Table 5.6. Accessibility and utilization of electronic resources in research by academic staff is possible only if appropriate ICT facilities are available. In order words, access and use of e-resources by academic staff in research is apparently or relatively dependent on the nature of electronic information environment in the universities. Thus, the respondents were asked to indicate (make multiple responses as applicable) availability of the listed ICT facilities in Table 5.6 in their universities.

Analysis of the results indicates that availability of personal (laptop) computers (90.7%), personal printer (75.0%), official computer in the department (73.8%) and official printer in the department (69.4%) received the highest ranking among the respondents. Analysis of the results by university reveals that the degree of availability and accessibility of each of the ICT facility varies between the two universities in the study. For example, 80.8% of the respondents from University of Ibadan reported that they have access to official computers in their departments compared with 67.6% by respondents from the University of Calabar; 70.9% of the respondents from the University of Ibadan indicated availability and accessibility of official computers in their personal offices, which is almost three times the responses (26.6%) from the University of Calabar.

In terms of Internet connectivity, 67.9% of the respondents indicated that they have Internet access at their homes of residence, Internet access in university library 60.8%, Internet access in faculty/department 60.2%, and Internet access in personal office 63.9%. Availability and accessibility of CD-ROM in the university library as a mean of accessing e-resources was relatively low (42.6%).

Analysis of the results of the study to explore access to computer networks (campus network/Intranet/LAN) reveals low responses compared with that of computers and the Internet. From the results in Table 5.6, 51.9% of the respondents reportedly have access to campus network/Intranet in faculty/department, while those that have access to LAN in personal office

are 31.5%. The least responses in terms of different categories of ICT facility were obtained in respect to virtual/digital library: as only 41.7% of the respondents indicate that they access virtual/digital library in university library while only 31.2% have access to virtual/digital library in personal office.

Apparently, from the results of the study University of Ibadan has comparatively a better electronic information environment than the University of Calabar, as its received higher percentage responses on availability and accessibility of all the ICT facilities surveyed in the study.

Table 5.6   **Level of ICT infrastructure**

ICT facility	Calabar (N=173)		Ibadan (N=151)		Total (N=324)	
	Frequency	%	Frequency	%	Frequency	%
Official computer in the department	117	67.6	122	80.8	239	73.8
Official computer in personal office	46	26.6	107	70.9	153	47.2
Personal (laptop) computer	155	89.6	139	92.1	294	90.7
Official printer in the department	108	62.4	117	77.5	225	69.4
Official printer in personal office	31	17.9	89	58.9	120	37.0
Personal printer	121	69.9	122	80.8	243	75.0
Internet access in university library	102	59.0	95	62.9	197	60.8
Internet access in faculty/department	82	47.4	113	74.8	195	60.2
Internet access in personal office	89	51.4	118	78.1	207	63.9
Internet access at home of residence	102	59.0	118	78.1	220	67.9
CD-ROM access in university library	53	30.6	85	56.3	138	42.6
Access to campus network/intranet in faculty/department	73	42.2	95	62.9	168	51.9
Access to campus network/intranet in personal office	67	38.7	94	62.3	161	49.7
Access to LAN in faculty/department	39	22.5	86	57.0	125	38.6
Access to LAN in personal office	24	13.9	78	51.7	102	31.5
Access to virtual/digital library in university library	51	29.5	84	55.6	135	41.7
Access to virtual/digital library in personal office	21	12.1	80	53.0	101	31.2

5.2.3   Influence of demographic variables on accessibility and utilization of electronic resources

Literature on user studies reveals a degree of variation of accessibility and utilization of e-resources with demographic variables (Adams & Bonk, 1995; Elam, 2007; Heterick, 2002; Kaur & Verma, 2009; Park, 2010; Selwyn, 2008; Tahir, Mahmood & Shafique, 2010). It was therefore

considered pertinent by the researcher to determine if accessibility and utilization of e-resources in research by academic staff in Nigerian universities is dependent on demographic variables (discipline, gender, age, education and professional rank).

5.2.3.1 Discipline

The influence of discipline on accessibility and utilization of electronic resources is widely reported in literature (Adams & Bonk, 1995; Elam, 2007; Heterick, 2002; Ehiklamenor, 2003a; Jankowska, 2004; Philip, 1995; Rolinson, Meadows & Smith, 1995; Selwyn, 2008; Tahir, Mahmood & Shafique, 2010). One-way ANOVA was run to determine possible influence of discipline/faculty on accessibility and utilization of e-resources by respondents in the survey (Tahir, Mahmood & Shafique, 2010). The results of the analysis are presented in Table 5.7a. From the results (F =0.721, p= 0.578), there is no significance influence of discipline on accessibility and utilization of e-resources by respondents in the survey.

Table 5.7a   **Summary of data and one-way ANOVA of influence of discipline/faculty on accessibility and utilization of e-resources**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	77.640	4	19.410	.721	.578
Within groups	8582.162	319	26.903		
Total	8659.802	323			

*Not significant at 0.05 level; df = 4; 319

The results of the study were also analysed by university as shown in Tables 5.7b and Table 5.7c. The results in Table 5.7b similarly show that there is no significant influence of discipline on accessibility and utilization of e-resources at the University of Calabar (F=1.475, p=0.212); while results in Table 5.7c indicate that there is significant influence of discipline on accessibility and utilization of e-resources by respondents at the University of Ibadan (F=4.372; p=0.002).

Table 5.7b **Summary of data and one-way ANOVA of influence of faculty on accessibility and utilization of e-resources at the University of Calabar**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	134.248	4	33.562	1.475	.212
Within groups	3822.502	168	22.75		
Total	3956.751	172			

*Not significant at 0.05 level, df=4; 168

Table 5.7c **Summary of data and one-way ANOVA of influence of faculty on accessibility and utilization of e-resources at the University of Ibadan**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	481.134	4	120.282	4.372	.002
Within groups	4016.389	146	27.510		
Total	4497.523	150			

*Significant at 0.05 level, df=4; 146

In view of the observed significant influence of discipline on accessibility by respondents at the University of Ibadan, further analysis indicates influence of discipline/faculty on accessibility and utilization of e-resources was higher in Faculty of Education than others (Agriculture: F=5.28019, p=0.001; Arts: F=4.84926, p=0.003; Science: F= -3.55560, p=0.001).

5.2.3.2 Gender

The study investigated the influence of gender on accessibility and utilization of electronic resources in research by the respondents. The results of independent t-Test reveal that there is no significant difference on accessibility and utilization of electronic resources based on gender. The Mean for male is 28.20 compared with that of female ($\sum$= 27.44) (t=1.195; p=0.233, which is not significant at 0.05 level). However, analysis by university indicates that there is significant difference in accessibility and utilization of electronic resources by gender at the University of Calabar. The Mean for male is 27.60 and that of female is 25.83 (p= 0.049) indicating that male respondents access and use e-resources more than their female counterparts in conducting research at the University of Calabar; while at the University of Ibadan there is no significant difference in accessibility and utilization of e-resources by gender.

5.2.3.3 Age

The possible influence of age of respondents on accessibility and utilization of e-resources was examined in the study as shown in Table 5.8a and then by university (Tables 5.8b and Table 4.8c). From the results in Table 5.8a there is no significant influence of age of the respondents on accessibility and utilization of electronic resources in the survey (F=2.475; p=0.061).

Table 5.8a   **Summary of data and one-way ANOVA of influence of age on accessibility and utilization of e-resources**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	196.380	3	65.460	2.475	.061
Within groups	8463.422	320	26.448		
Total	8659.802	323			

*Not significant at 0.05 level; df=3; 320

However, the analysis of the results by university indicates a significance influence of age on accessibility and utilization of e-resources at the University of Calabar (F=3.069, p=0.029). Further analysis reveals that respondents below 40 years of age significantly access and use e-resources more than those that are 60 years and above (F=4.8400; p=0.004); similar results were obtained between respondents within the age range of 40-59 years and those that are 60 years and above (F=3.44565; p=0.018). At the University of Ibadan, analysis of the results in Table 5.8c indicates that there is no significant influence of age on accessibility and utilization of e-resources by respondents.

Table 5.8b   **Summary of data and one-way ANOVA of influence of age on accessibility and utilization of e-resources at the University of Calabar**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	204.41	3	68.138	3.069	0.029
Within groups	3752.382	169	22.203		
Total	3956.751	172			

*Significant at 0.05; df=4; 169

Table 5.8c   **Summary of data and one-way ANOVA of influence of age on accessibility and utilization of e-resources at the University of Ibadan**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	16.388	3	5.463	0.179	0.910
Within groups	4481.135	147	30.484		
Total	4497.523	150			

*Not significant at 0.05; df=3; 147

5.2.3.4 Education

Analysis of the results of the survey to investigate the influence of level of education of the respondents on accessibility and utilization of e-resources is shown in Table 5.9a. The results reveal that there is no significant influence of education on accessibility and utilization of e-resources among the respondents in the survey. Similar results were obtained by university as shown in Tables 5.9b and 5.9c.

Table 5.9a   **Summary of data and one-way ANOVA of influence of education on accessibility and utilization of e-resources**

Source of variance	Sum of square	Df	Mean square	F	Sig. of F
Between groups	.610	2	.305	.011	.989
Within groups	8659.193	321	26.976		
Total	8659.802	323			

*Not significant at 0.05 level; df=2; 321

Table 5.9b   **Summary of data and one-way ANOVA of influence of education on accessibility and utilization of e-resources at the University of Calabar**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	120.183	2	60.92	2.663	0.073
Within groups	3836.568	170	22.568		
Total	3959.75	172			

*Significant at 0.05 level; df=2; 170

Table 5.9c   **Summary of data and one-way ANOVA of influence of education on accessibility and utilization of e-resources at the University of Ibadan**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	117.069	2	58.534	1.978	0.142
Within groups	4380.455	148	29.58		
Total	4497.523	150			

*Not significant 0.05; df=2; 148

5.2.3.5 Professional rank

The study explored possible influence of professional ranks of the respondents on accessibility and utilization of e-resources. The results of the study at the overall level (Table 5.10a) and at the university level (Tables 5.10b and 5.10c) show that there is no significant influence due to professional rank of respondents on accessibility and utilization of e-resources in the survey.

Table 5.10a   **Summary of data and one-way ANOVA of influence of professional rank on accessibility and utilization of e-resources**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	81.142	4	20.285	.754	.556
Within groups	8578.661	319	26.892		
Total	8659.802	323			

*Not significant at 0.05 level; df=4; 319

Table 5.10b   **Summary of data and one-way ANOVA of influence of professional rank on accessibility and utilization of e-resources at the University of Calabar**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	70.190	4	17.547	0.759	0.554
Within groups	388.562	168	23.134		
Total	3955.751	172			

*Not significant at 0.05 level; df=4; 168

Table 5.10c   **Summary of data and one-way ANOVA of influence of professional rank on accessibility and utilization of e-resources at the University of Ibadan**

Source of variance	Sum of square	Df	Mean square	F	Sig.
Between groups	224.755	4	56.189	1.920	0.110
Within groups	4272.768	146	29.266		
Total	4497.523	150			

*Not significant at 0.05 level; df=4; 146

5.2.4   Extent of accessibility and utilization of electronic resources

The independent t-Test was used to determine the extent of accessibility and utilization of electronic resources between the two surveyed universities (Tahir, Mahmood & Shafique, 2010). The findings of the study indicate significant difference in terms of accessibility and utilization of electronic resources by respondents in the two universities. Analysis of the results in Table 5.11 shows that respondents at the University of Ibadan ($\sum$= 28.8278) access and use electronic

resources more than their counterparts at the University of Calabar ($\sum$= 27.2312) (t = – 2.798 p= 0.005).

Table 5.11   **Extent of accessibility and utilization of electronic resources between the surveyed universities**

University		N	Mean	T	Sig.
Access and use Calabar		173	27.2312	-2.798	0.005
	Ibadan	151	28.8278		

*Significant at 0.05

5.2.5   ICT policy/strategy

The study sought to establish institutional ICT policies/strategies that are put in place to promote accessibility and utilization of e-resources between the surveyed universities. The results of the independent t-Test show that there is significant difference in institutional ICT policies/strategies between the University of Calabar and University of Ibadan. Analysis of the results in Table 5.12 indicates that the state of institutional ICT policies/strategies at the University of Ibadan ($\sum$=29.9404) is greater than that of the University of Calabar ($\sum$= 27.4971) (t = – 2.907, p= 0.004).

Table 5.12   **Extent of ICT policy/strategy between the surveyed universities**

University		N	Mean	T	Sig.
ICT policy Calabar		173	27.4971	-2.907	0.004
	Ibadan	151	29.9404		

5.2.6   Level of productivity

In their study of research output of academics in the science and engineering faculties of federal universities in Southern Nigeria, Okafor and Dike (2010: 41) explored the level of research productivity or "research output during 1997-2006 in terms of the publication of journal articles". The data for the study "were collected not from a database, but through a questionnaire administered on academics sampled from selected universities" (Okafor & Dike, 2010: 44). The present study adopted a similar method to explore the level of research productivity of respondents covering the period 2005 and 2012 between the two surveyed universities. In a related study, Vakkari (2008) similarly used a self-reported questionnaire to obtain data on publication output of scholars in Finland.

The independent t-Test was used to analyse the data obtained in the survey. Analysis of the results in Table 5.13 indicates that there is significant difference in the level of research productivity between the University of Calabar and University of Ibadan. From the results, the level of research productivity is greater at the University of Calabar ($\sum$= 12.9595) than University of Ibadan ($\sum$= 9.5298) (t = 3.885; p = 0.000).

Table 5.13   **Level of productivity of productivity of respondents**

University		N	Mean	t	Sig.
Productivity	Calabar	173	12.9595	3.885	0.000
	Ibadan	151	9.5298		
International publication	Calabar	173	6.35	1.244	0.215
	Ibadan	151	5.56		

However, there is no significant difference in the level of international publication between the two universities, University of Calabar ($\sum$=6.35) and University of Ibadan ($\sum$=5.56) (t =1.244; p=0.215).

5.2.7   The effect of accessibility and utilization of e-resources on productivity

Recently, researchers have shown keen interest on perceived effect of e-resources on research productivity (Costa & Meadows, 2000; Heterick, 2002; Mahmood, Hartley & Rowley, 2011; Vakkari, 2008) besides the real or actual effect of e-resources. In order to examine this issue, Vakkari (2008: 602) posed a question: "In scholars' opinions, does access to electronic literature have a positive influence on their work?" This line of thought was adopted in the study, in which the respondents were asked to express their opinions on perceived effect of accessibility and utilization of electronic resources on research productivity as shown in Table 5.14 (SA = strongly agree, A=agree, D=disagree, SD=strongly disagree). Overwhelmingly, majority of respondents were of the opinion that accessibility and utilization of electronic resources in research has a positive effect on research productivity (Table 5.14). Therefore, increase in access and use of e-resources will perceivably lead to increase in research productivity in the surveyed universities.

Table 5.14 **The effect of accessibility and utilization of e-resources on productivity by respondents**

Productivity measure	SA (freq/%)	A (freq/%)	D (freq/%)	SD (freq/%)
Access and use of electronic resources in research increase my research productivity	193 (59.6)	119 (36.0)	5 (1.5)	7 (2.2)
Access and use of electronic resources improve the quality of my research	184 (56.8)	123 (38.0)	10 (3.1)	7 (2.1)
Access and use of electronic resources promote efficiency and effectiveness in my research	183 (56.5)	124 (38.3)	11 (3.4)	6 (1.9)

In terms of university, analysis of the results of the independent t-Test in Table 5.15 indicates that there is higher perception of the effect of accessibility and utilization of e-resources on research at the University of Calabar ($\sum$=10.7399) than the University of Ibadan ($\sum$=10.3179) (t=2.094; p=0.037).

Table 5.15 **The effect of accessibility and utilization of e-resources on productivity between the surveyed universities**

University		N	Mean	T	Sig.
Perception	Calabar	173	10.7399	2.094	0.037
	Ibadan	151	10.3179		

The basic aim of this study was to determine the possible relationship or correlation between accessibility and utilization of electronic resources and research productivity of academic staff in Nigerian universities. In other words, the study explored if there was a positive effect of accessibility and utilization of e-resources on research productivity in Nigerian universities especially at international scene as proposed by Foster *et al*. (2008). Thus, the following hypothesis was formulated to guide the study:

There is no significant correlation between accessibility and utilization of electronic information resources and research productivity of academic staff in Nigerian universities.

The hypothesis was further tested at international level of research productivity.

Table 5.16a   **Correlation analysis between accessibility and utilization of e-resources and productivity**

	Accessibility	Productivity	International publication
Accessibility Pearson correlation	1	0.135	0.158
Sig. (2 tailed)		0.015	0.004
N	324	324	324

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

Correlation analysis as shown in Table 5.16a indicates that there is significant positive correlation (or relationship) between accessibility and utilization of electronic resources and productivity of academic staff in the surveyed universities (r=0.135; p=0.015). This implies that increase in access and use of e-resources will lead to increase in productivity among the respondents in their research. Similar result was obtained when the hypothesis was tested at international level (Table 5.16a) with r=0.158 and p=0.004. In other words, respondents that access and use electronic resources in research frequently publish more articles in international journals than those who do not or are accessing and using e-resources less frequently. Put differently, respondents who access and use e-resources in research in the surveyed universities are internationally more productive than those who do not.

However, analysis of the results by university indicates that there is no significant correlation between accessibility and utilization of e-resources and research productivity of respondents at the University of Calabar (r=0.074; p=0.330) as shown in Table 5.16b; but results in Table 5.16c indicate that there is significant correlation between accessibility and utilization of e-resources and research productivity of respondents at the University of Ibadan (r=0.282; p=0.000).

Table 5.16b   **Correlation analysis between accessibility and utilization of e-resources and productivity at the University of Calabar**

	Accessibility	Productivity	International publication
Accessibility Pearson correlation	1	0.074	0.103
Sig. (2 tailed)		0.330	0.177
N	324	173	173

*Correlation is significant at the 0.01 level (2-tailed)

Table 5.16c   **Correlation analysis between accessibility and utilization of e-resources and productivity at the University of Ibadan**

	Accessibility	Productivity	International publication
Accessibility Pearson correlation	1	0.282	0.231
Sig. (2 tailed)		0.000	0.004
N	151	151	151

*Correlation is significant at the 0.01 level (2-tailed)

Similar results were obtained in terms of international publications, as the results indicate that there is no significant correlation between accessibility and utilization of e-resources and international publication of respondents at the University of Calabar (Table 5.16b); while there is significant correlation between accessibility and utilization of e-resources and international publication of respondents at the University of Ibadan (Table 5.16c).

5.3   RESULTS OF STRUCTURED INTERVIEW

The results of structured interview are presented in this section in the following order: electronic information environment, extent of accessibility and utilization of electronic resources, ICT policy/strategy, and perception of effect of accessibility and utilization of electronic resources on productivity.

5.3.1   Electronic information environment

In order to determine the nature of electronic information environment in the surveyed universities, the respondents were asked to mention different ICT facilities that are available and accessible to them in the faculty/department and official office.

5.3.1.1 Computers

The respondents were asked during the interview if they have access to computers to support their research; most respondents affirmed that they have access to official computers in the departments and their own personal laptop computers. And about half of the respondents said that they have access to official computers in their personal offices. However, access to official computers in personal offices was greater at the University of Ibadan than University of Calabar.

One respondent at the University of Calabar said that he has no computer in his official office or laptop computer, but has a desktop computer at home.

5.3.1.2 Internet access

In view of the importance of the Internet as a vital tool to access e-resources, the respondents were asked to express views generally on the state of Internet access in their universities. The findings of the study indicate that the two surveyed universities are connected to the Internet through wireless networks. It was revealed that the two universities provide Internet access to the respondents at their faculties/departments/ or personal offices, but that access to the Internet is through monthly subscription by individual respondents. At the University of Calabar, monthly subscription at the time of the study was N2000.00 (about $12) and that of University of Ibadan was N1000.00 (about $6). The cost of accessing the Internet is doubly high at the University of Calabar compared with the University of Ibadan. This financial constraint limits the number of respondents that are connected to the Internet in their official offices (mostly with their personal laptop computers) at the University of Calabar. Thus, (by reason of economic factor), most respondents were connected at the University of Ibadan than obtained at the University of Calabar. However, majority of the respondents at the University of Calabar preferably were connected to commercial wireless Internet services where they could also use at their homes or outside the campus (even though the commercial connectivity was more expensive). In terms of Internet access in the university library, it was found that majority of the respondents did not patronise or make use of Internet access at the University library for the same financial reason since access was not free in addition to lack of time to visit the library. One respondent from the University of Calabar responded that he uses commercial Internet café to access the Internet.

5.3.1.3 Campus network/Intranet/LAN

The respondents were asked if they have access to campus network/Intranet/LAN, it was found that networking was not popular in the surveyed universities. Hence most respondents do not have access to campus network/Intranet/LAN. Further analysis indicated that more respondents at the University of Ibadan have access to campus network/Intranet/LAN than the University of Calabar. The results also reveal that most faculties in University of Ibadan have their own computer networks (campus network/Intranet/LAN).

5.3.2   Extent of accessibility and utilization of electronic resources

Extent of accessibility and utilization of electronic resources in the study was determined during the interview by asking from respondents the frequency in which they access and use relevant e-resources in their research. Most respondents affirmed that they access and use e-resources on the Internet frequently (in a daily basis) to conduct their research. However, two respondents at the University of Calabar responded that they access electronic resources on the Internet in a monthly basis.

5.3.3   ICT policy/strategy

Formulation of relevant ICT policy/strategy is imperative on effective accessibility and utilization of e-resources in universities around the world. The respondents were therefore asked during the interview to highlight different ICT policies/strategies that are put in place by their universities to support and promote accessibility and utilization of electronic information resources; responses greatly differed between the two universities in the survey. Most respondents at the University of Calabar were non-affirmative in their responses; they rather preferred to list a number of ICT policies/strategies that the university management should put in place towards enhanced accessibility and utilization of electronic resources by academic staff in university in their research. One respondent was of the view that there is "no policy that encourages access to e-resources since Internet access is for a fee". Mention was made of erratic power (electricity) supply in university which does not allow effective use of ICTs (computer and the Internet) since access and use of e-resources depends on these ICT facilities.

It was the desire of most respondents at the University of Calabar that management should formulate policy/strategy to improve power supply in the university, as this would facilitate effective accessibility and utilization of e-resources by respondents in their research. At this point it is necessary to let the reader know generally that erratic power supply (or frequent power outage) is a common problem in Nigeria as public power supply could be cut off for days, weeks or even months in a particular part(s) of the country (including university). Hence, the use of alternative power supply (generating plants) by university/faculty/department is common towards access and use of ICTs/electronic resources. So, the despondency of respondents at the University of Calabar in respect of ICT policy/strategy that is devoid of power policy is understood.

However, another respondent at the University of Calabar enumerated some ICT policies/strategies put in place at the university by management towards effective, efficient and sustainable access and use of e-resources at the university. These include provision of computers to some departments/units in the university, expansion of the bandwidth from 8 megabit to 16 megabit, 2 Internet servers for efficiency, and 200 computer systems with Internet connectivity in the university library. The respondent (ICT Director) affirmed that there is presently no ICT policy by the university to provide each/every academic staff with free computers in their offices.

At the University of Ibadan, most respondents were affirmative that the university has effective ICT policies/strategies geared towards promotion of access and use of e-resources in the university by respondents in their research. One respondent affirmed that the university has official ICT policy document and referred the researcher to check with the university library (librarian) for a copy. Unlike the University of Calabar, it was found that the University of Ibadan had a policy of providing each academic staff with a computer; this is however done at the faculty/departmental level. So, academic staff are encouraged to have access to computers in the university. It was also found that there is a reliable and wider coverage of the Internet connectivity in the university than at the University of Calabar.

5.3.4   The effect of accessibility and utilization of electronic resources on productivity

In view of the possible positive effect of accessibility and utilization of electronic resources with research productivity as contained in literature review, respondents were asked to freely express their opinions on the issue. Overwhelmingly, all the respondents in the survey opined that accessibility and utilization of electronic resources do have a positive effect or impact on their research productivity. A number of reasons were given by the respondents. According to a respondent at the University of Calabar, "there is a positive impact of access to e-resources on research productivity since it adds to body of literature which is essential in research, then contribute to quality". At the University of Ibadan, a respondent opined that electronic resources "enhance the quality and efficiency of research work".

5.4   RESULTS OF BIBLIOMETRIC ANALYSIS

Research productivity of scholars is mostly and reliably measured by bibliometric study as self-reporting using questionnaire as instrument of measuring research productivity according to scholars is prone with biases/prejudices (Kirlidog & Bayir, 2007; Okafor, 2010). Bibliometric study involves the use of standardized databases to measure research productivity of individual academic staff, universities, countries or regions. Bibliometric method is often used in verification of publications or research productivity of academic staff (Okafor, 2010). Hence, *The Web of Science* was used in the study to determine the research productivity of the two surveyed universities. This was to complement the questionnaire survey and to check inherent response bias in questionnaire survey. Results from bibliometric analysis indicate that the University of Ibadan with record count (number of published journal articles) of 2,206 is about six times more productive than the University of Calabar with record count of 362. The breakdown of results of the bibliometric analysis (for the first 500 cases) is presented in Table 5.17 comparatively with that of the questionnaire survey. The publication trend as shown in Table 5.17 revealed that the University of Ibadan is more productive than the University of Calabar in each of the categories (number of journal articles) in bibliometric analysis while the reverse is the case with questionnaire data (which indicated the University of Calabar as being more productive than the University of Ibadan). For example, in bibliometric analysis, at the University of Ibadan 301 academic staff published below 5 journal articles and 134 academic staff published 5-9 journal articles compared with 225 and 36 journal articles respectively for University of Calabar. Interestingly, the trend is reversed in terms of questionnaire results (Table 5.17) in favour of University of Calabar as being more productive than University of Ibadan.

Table 5.17   **Number of journal articles published by respondents (2005-2012)**

No. of journal article (international)	Calabar		Ibadan	
	Bibliometric	Questionnaire	Bibliometric	Questionnaire
Below 5	225	70	301	86
5-9	36	68	134	39
10-14	5	25	23	15
15-19	1	4	6	2
20-24	2	2	2	2
25-29	0	1	4	2
30-34	0	1	3	2
35-39	0	1	0	2
40 and above	0	1	5	1

In Table 5.18, the results of the ten most productive academic staff in bibliometric analysis for the two universities indicate that, the ten most productive academic staff at the University of Ibadan published comparatively more journal articles than their counterparts at the University of Calabar. The highest number of journal articles (56) published within the period 2005-2012 by individual academic staff, Gure, O. came from the University of Ibadan which is more than twice that of Ebenso, EE (24) from the University of Calabar.

Table 5.18   **Bibliometric analysis of ten most productive academic staff in surveyed universities**

Calabar		Ibadan	
Ten most productive academic staff	No. of journal article	Ten most productive academic staff	No. of journal article
Ebenso, EE	24	Gure, O	56
Okafor, PC	22	Sowunmi, A	53
Eneji, AE	18	Gbotosho, GO	52
Ekpe, UJ	12	Happi, CT	44
Ita, BI	12	Adebowale, KO	42
Asuquo, ME	11	Farombi, EE	42
Islam, MR	11	Olu-owolabi, BI	31
Umoren, SA	10	Obi-egbedi, NO	30
Ebong, PE	9	Ogunwande, IA	30
Eddy, NO	9	Odeku, OA	28

Analysis of the results in terms of year of publication similarly reveals higher level of research productivity at the University of Ibadan than obtained at the University of Calabar. Results of the

bibliometric analysis in Table 5.19 indicate that University of Ibadan published more papers (journal articles) than University of Calabar in each of the year under study. For example, in 2005, University of Ibadan published 174 papers which are about five times that of University of Calabar with 34 papers (journal articles).

Table 5.19   **Bibliometric analysis by year of publication**

Year	No. of article	
	Calabar	**Ibadan**
2005	34	174
2006	26	188
2007	39	269
2008	48	358
2009	49	334
2010	66	378
2011	64	345
2012	36	152

5.5   CHAPTER SUMMARY

The results of the study were presented in the chapter in order of questionnaire survey, structured interview and bibliometric analysis. Analysis of the results of questionnaire survey was done at two levels: general (overall) level where the two surveyed universities were taken as a unit and by university (where analysis was done with individual university as a unit). According to the results, most respondents in the study were from Faculty of Science, males, within the age range of 40-49 years, and senior lecturers.

Analysis of the results in terms of electronic information environment indicates that availability and accessibility of personal (laptop) computer (90.7%), personal printer (75.0%), official computer in the department (73.8%) and official printer in the department (69.4%) received the highest ranking among the respondents. Further analysis of the results by university reveals that the degree of availability and accessibility of each of the ICT facility varies between the two universities in the study. A breakdown shows that availability and accessibility of computers, computer networks (campus network/Intranet/LAN), Internet, and virtual/digital library was

greater at the University of Ibadan than the University of Calabar. Hence, from the results, the University of Ibadan comparatively has a better electronic information environment than the University of Calabar.

One-way ANOVA and Independent t-Test were used as statistical tools to analyse the influence of demographic variables on accessibility and utilization of e-resources. Analysis of results of One-way ANOVA reveals that there is no significant influence of discipline/faculty on accessibility and utilization of e-resources in the study. However, when analysis was done by university, the results indicate that there is a significant influence of discipline/faculty on accessibility and utilization of e-resources at the University of Ibadan; but no significant influence due to discipline on accessibility and utilization of e-resources was observed at the University of Calabar. Further analysis of the findings at the University of Ibadan reveals that respondents in Faculty of Education are significantly accessing and using e-resources more than other respondents.

The results of the study indicate that there is no significant influence of gender on accessibility and utilization of e-resources; but analysis by university shows that there is significant influence of gender on accessibility and utilization of e-resources at the University of Calabar; male respondents significantly access and use e-resources than their female counterparts. However, no significant influence of gender on accessibility and utilization of e-resources were observed at the University of Ibadan.

The results of the survey reveal that there is no significant influence of age of respondents on accessibility and utilization of e-resources. When the results were analysed by university it was found that there is significant influence of age on accessibility and utilization of e-resources at the University of Calabar; but no significant influence due to age was observed at the University of Ibadan. Further analysis at the University of Calabar reveals that respondents below 50 years of age are significantly accessing and using e-resources more than those at 60 years and above.

Analysis of the results indicates that there is no significant influence due to education and professional rank of respondents on accessibility and utilization of e-resources. Analysis by university gave similar results in terms of education and professional rank.

A comparative analysis of the results of the survey using Independent t-Test reveals that there is significant difference in extent of accessibility and utilization of e-resources between the University of Calabar and University of Ibadan. It was observed that the University of Ibadan has a greater accessibility and utilization of e-resources than the University of Calabar. Similar results were obtained in terms of ICT policy/strategy.

Majority of the respondents were of the opinions that accessibility and utilization of e-resources positively affects research productivity. Analysis of the results of the independent t-Test indicates that there was higher perception of the effect of accessibility and utilization of e-resources on research at the University of Calabar than the University of Ibadan.

Primarily, the aim of the study was to explore if there is correlation between accessibility and utilization of e-resources on research productivity. The results of the study revealed that there is significant correlation between accessibility and utilization of e-resources by academic staff in research and productivity. However, analysis of the results by university indicates that there is no significant correlation between accessibility and utilization of e-resources and research productivity of respondents at the University of Calabar; while there is significant correlation of accessibility and utilization of e-resources and research productivity of respondents at the University of Ibadan.

The results of the structured interview were generally consistent with that of the questionnaire survey. However, the results of bibliometric analysis and questionnaire survey were in sharp contrast to one another, as bibliometric analysis reveals that the University of Ibadan was more productive than the University of Calabar; and conversely the University of Calabar was more productive than the University of Ibadan with the questionnaire survey.

CHAPTER SIX: DISCUSSION OF THE FINDINGS

6.1   INTRODUCTION

The chapter presents discussion of the results of the study. According to 6 and Bellamy (2012: 11), discussion of the results of the study allow for the determination of "whether the data analysis supports the general conclusions drawn from the research, to answer research question". Hence, this chapter provides meanings to the data obtained from the study in line with previous studies in the field. The chapter is presented under the following sub-headings: demographics, electronic information environment, accessibility and utilization of e-resources and demographic variables, extent of accessibility and utilization of e-resources, ICT policy/strategy, level of productivity, perception of effect of accessibility and utilization of e-resources on productivity, and effect of accessibility and utilization of e-resources on productivity.

6.2   DEMOGRAPHICS

The results of the study showed that, most respondents were from the Faculty of Science (44.8%), while the least responses came from the Faculties of Agriculture (10.8%), Arts (10.2%) and Social Science (9.9%). This may indicate relative higher availability and willingness of respondents from Faculty of Science to participate in the study than their counterparts in other faculties (see comment in Table 4.4). However, the results of this study are in line with a similar study by Ani, Edem and Ottong (2010) who reported a higher number of respondents (65.22%) from "science-based disciplines" compared with that of "non-science-based disciplines" (34.78%).

The results of 70.7% of the respondents being males compared with 29.3% females affirmed the dominance of males in the surveyed universities as academic staff as widely reported in literature (Al-Ansari, 2006; Ani, Edem & Ottong, 2010; Renwick, 2005; Tahir, Mahmood & Shafique, 2010). A similar study by Renwick (2005) at the University of the West Indies revealed a ratio of 3 males to 1 female as their respondents. At Kuwait University, a survey by Al-Ansari (2006:

795) showed that "Out of the 143 respondents, 31 (21.7percent) were females and 112 (78.3 percent) were males". According to Ani, Edem and Ottong (2010), most respondents in their survey were males (82.61%), while 17.39% were females. A survey by Tahir, Mahmood & Shafique (2010) at the University of the Punjab similarly showed that 73.0% of their respondents were males compared with 27.0% females.

The results of the study revealed that most respondents were within the age range of 40-49 years (52.2%), followed by those within 50-59 years (24.7%); and the least number of respondents were 60 years and above (6.2%). From these results, majority of the respondents were generally within the age range of 40-59 years.

Al-Shanbari and Meadows (1995) reported that most (80.0%) respondents in their survey of productivity of academic staff in Nigerian and British universities possessed PhD degrees. The study of the present study has similarly affirmed that, the basic educational qualification of academic staff in the surveyed universities was a PhD (71.3%) degree. However, the results revealed that 1.9% of the respondents were those with BA/Bed/BSc; this category of academic staff in Nigerian universities are those with "Second Class Upper Division" and "First Class" degrees usually employed as "Graduate Assistants"; and are expected to obtain their master's degrees within a stipulated period of time before their appointments as academic staff are confirmed (or failure to obtain their master's degrees as stipulated would lead to the termination of their appointments). And those respondents with master's degrees (26.9%) are employed in Nigerian universities as Assistant Lecturers, they are expected to obtain their PhD degrees before they are promoted to senior academic positions or professional ranks (for examples, at University of Calabar, one is expected to obtain a PhD degree before he/she is promoted to professorial cadre; while at the University of Ibadan, promotion to the rank of a Senior Lecturer requires a PhD degree).

The results of the study revealed that most respondents were from the professional rank of "Senior Lecturer" (37.3%) and then followed by those with the rank of "Lecturer" (30.9%). These results are different from those of earlier studies (Ani & Biao, 2005; Ani, Edem & Ottong, 2010) who reported the dominance of academic staff in the professional rank of "Lecturer" as

their respondents then followed by those in the rank of "Senior lecturer". Expectedly, respondents with the professional ranks of "Reader/Associate Professor" and "Professor" received the least responses of 8.6% and 9.0% respectively; as they are comparatively few in number, besides, their relative involvement in administrative tasks. These categories of academic staff are usually Heads of Departments, Deans or Directors; and their busy schedules may not allow them to participate in completion of questionnaires during survey compared with their counterparts in other professional ranks (junior colleagues).

6.3   LEVEL OF ICT INFRASTRUCTURE

Adams and Bonk (1995) observed that availability and accessibility of ICT facility (such as network connections) is imperative for effectiveness and efficiency in access and use of e-resources in universities. Thus, the present study investigated the state of electronic information environment in the surveyed universities.   Availability and accessibility of different ICT facilities was used as the indicator to measure electronic information environment. The results of the study indicate that the state of electronic information environment in the surveyed universities is low compared with previous studies (Adam & Bonk, 1995; Al-Ansari, 2006; Jankowska, 2004; Nwezeh, 2010; Renwick, 2005). Item by item analysis reveals the following state of availability and accessibility of ICT facilities: computers in departments (73.8%), official computers in personal offices (47.2%), personal computers (90.7%); Internet access in personal offices (63.9%) and home of residence (67.9%); access to campus network/Intranet in faculty/department (51.9%) and in personal offices (49.7%).

These results are low in relation to the findings of previous studies: Adams and Bonk (1995) found that 84.0% of their respondents (academic staff) have access to computers in offices and 66.5% access to 'connection to campus network' in offices; Al-Ansari (2006) in a study of computer use in Kuwait University reported that all academic staff at the university have access to computers in offices, and remote access from home; Jankowska (2004: 54) in a similar study found that all the 247 respondents (academic staff at the University of Idaho) in her survey "owned and used computers with Internet access at their offices"; Renwick (2005) reported 90.0% access to computers by faculty members at the University of West Indies; even in Nigeria,

Nwezeh (2010) found that at the Obafemi Awolowo University, 95.7% of their respondents (academic staff) have access to computers in their offices, while 69.6% have Internet access in office. Thus, by implication there is low level of adoption and integration of ICT facilities (computers, the Internet and campus/Intranet/LAN) in research in the two surveyed universities. In summary, the findings of the study reveal low state of electronic information environment in the surveyed universities. The findings of the study corroborate the existence of institutional variation of electronic information environment particularly between developed and developing countries (Heemskerk *et al*., 2005).

In view of the reported variation of electronic information environment between universities, a comparative analysis of electronic information environment between University of Calabar and University of Ibadan was conducted. From the results, the University of Ibadan was found to have a better electronic information environment than the University Calabar. This implies that the University of Ibadan has relatively invested much more resources on adoption and integration of ICT infrastructural facilities than the University of Calabar. However, it is obvious to observe that the two surveyed universities have begun to adopt basic ICT facilities to support research. This is in recognition that access to basic ICTs especially the Internet connectivity has changed the way research is conducted in universities around the world (Ekwelem, Okafor & Ukwoma, 2009).

Access to ICT facilities particularly the Internet – the global information infrastructure – will help academic staff in Nigerian universities towards effective integration into global research community. One of the basic needs of academic staff is to have access to relevant literature for his/her research; in electronic information environment, relevant literature is now accessed electronically through ICTs. Thus access to ICT infrastructures will provide access to literature otherwise known in digital world as electronic information resource (such as electronic journal/online database). In other words, enabling electronic information environment will correspondingly bring about enhanced access and use of e-resources. Hence, accessibility and utilization of e-resources in Nigerian universities is facilitated by a good electronic information environment which is characterized by availability of appropriate ICT infrastructures such as

computer, the Internet, campus network/Intranet/LAN or virtual/digital library (Riahinia & Zandian, 2008).

In view of the critical and vital nature of emerging electronic information environment in modern day research in universities; the need for effective access to ICT infrastructural facilities (computer, campus network/Intranet/LAN, the Internet, virtual/digital library) by academic staff in their offices/homes, faculty/department and university library towards improved accessibility and utilization of e-resources cannot be overemphasized (Adams & Bonk, 1995; Heterick, 2002; Vakkari, 2008). The connectivity of academic staff to the Internet and network environment (campus network/Intranet/LAN) in their offices will appreciably and significantly promote access and use of e-resources. In order words, the need for enhanced network environment is imperative in Nigerian universities, as this will accelerate accessibility and utilization of e-resources in research activities by academic staff. Heterick (2002) advocated the importance of access to computers in research; Vakkari (2008) affirmed that better electronic information environment has tremendous influence on accessibility and utilization of e-resources in universities. The conclusion in this section is that, ICTs are motivators or job-content factors according to Herzberg's Motivation-Hygiene Theory that need to be provided in the universities in order to bring job satisfaction to academic staff.

6.4   INFLUENCE OF DEMOGRAPHIC VARIABLES ON ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES

The section discusses the results of the study to determine the influence of demographic variables on accessibility and utilization of electronic resources under the following subsections: discipline, gender, age, education and professional rank of the respondents.

6.4.1   Discipline

Literature review has shown a high degree of variation of accessibility and utilization of e-resources or ICTs in general by discipline (Al-Shanbari & Meadows, 1995; Adams & Bonk, 1995; Banwell *et al*., 2004; Elam, 2007; Hartley, 2007; Heterick, 2002; Jankowska, 2004; Kaur & Verma, 2009; Park, 2010; Philip, 1995, Popoola, 2008; Rolinson, Meadows & Smith, 1995; Selwyn, 2008; Tahir, Mahmood & Shafique, 2010; Voorbij, 1999).

In a study by Adams and Bonk (1995: 119), it was reported that "there are inequities in access to electronic technologies among disciplines". A survey by Banwell *et al*., (2004: 611) revealed that "academic staff access to a networked computer varied between and within colleges", and this explains that there is influence of discipline on accessibility and utilization of e-resources, depending on the extent in which a given discipline is equipped as observed by Adams and Bonk (1995). Heterick (2002) affirmatively found that there is influence of discipline on accessibility and utilization of e-resources in the universities; that academic staff in humanities depend less on e-resources than other disciplines (science and social science).

A study by Jankowska (2004: 54) revealed that scientists "spent more time using computers as an indispensable tool in their activities than using the Internet"; and observed that academic staff in humanities were among the highest users of the Internet. The increasing trend in access and use of the Internet by humanities may explain the fact that the widely use of computer by scientists as reported in literature has to do with their specific work, which is different from the current use of the Internet to access e-resources generally by anyone (or every academic staff) across discipline. This is to say that, the usage gap on e-resources by discipline is fast diminishing, as the humanists are now becoming integral part of users of Internet resources (or e-resources) in their research. This viewpoint is affirmed by Tahir, Mahmood and Shafique (2010: 126) who concluded in their study that "increasingly humanities scholars are using digital resources as a means of accelerating their information searching habits". Hence the earlier existing gap on access and use of e-resources between humanists and researchers in sciences and social sciences is being bridged. And this is in tandem with the result of the present study that there is no significant difference due to discipline on accessibility and utilization of e-resources in research in the two surveyed universities.

Apparently, the result of the present study is at variance and incongruent with literature review, which affirms the variation of accessibility and utilization of e-resources with discipline. However, the result of the study is in line with the findings and predictions of scholars (Heterick, 2002; Voorbij, 1999). Heterick (2002: 11) observed and predicted that "electronic resources have become an invaluable tool for research, and faculty will become more dependent on them in

future". So, the finding of the present study is the fulfillment of the above prediction, as academics across the disciplines/faculties were now depending on access and use of e-resources in their research in the two surveyed Nigerian universities. This is so, as the decline in subscription of printed materials (journals) in Nigerian universities due to low budgetary allocation for university libraries has made e-resources especially those on the Internet as alternative information sources available to the academic staff across disciplines for research. Therefore the dearth of current printed resources (journals) is in a way promoting access and use of e-resources among academic staff in the surveyed universities across discipline, which now bridges the access gap by discipline. Additionally, due to the importance of e-resources in modern day research, the World Bank are now providing Nigerian universities access to their e-resources on the Internet and CD-ROMs instead of the printed ones. So academic staff across all academic disciplines must key into the new information seeking behaviour, and be integral part of the global research community in the digital age.

Increasing level of awareness and information literacy may also explain why there is no significant difference in accessibility and utilization of e-resources by discipline in the survey (Atakan *et al*., 2008). Within the past two decades, academics in various disciplines, especially the humanities have realized the benefits and indispensability of e-resources in research, and thus appreciate the need to access and use these resources for their research. E-resources are now vehicles for research just like cars, which every academic staff across discipline must drive, if he/she must take active part in modern day research. Furthermore, increasing information literacy on ICTs/e-resources among academic staff is a boost towards bridging inequities or access gap in terms of accessibility and utilization of e-resources as observed in the study

Again the finding of the present study is in corroboration with that of Voorbij (1999) who specifically found that there was no significant difference across disciplines in regard to access and use of e-journals among his respondents (academic staff); as the use of e-journals was reportedly not popular among his respondents (academic staff) in his survey. Voorbij (1999: 601), however, predicted that "electronic journals may be an important source in the future, but at this moment their use is rather low". Today, according to the result of this study, electronic journals (other e-resources) are significantly useful to academic staff across discipline. Voorbij

(1999: 601) also found that "respondents from humanities use the Campus Wide Information System (CWIS) more frequently than their colleagues in the social sciences and sciences". This has added credence to the finding of this study, which implies that with equitable access to ICT infrastructures (computers, campus network/Intranet/ LAN or the Internet) there may be no significant access difference or gap in the use of e-resources by disciplines.

According to Nwezeh (2010: 690) ICTs and electronic resources are "modernizing the process of teaching, learning and research in most Nigerian universities". So, academic staff across disciplines are fast embracing the paradigm shift in access and use of information sources from the traditional print to electronic form. This is because access to e-resources is relatively faster and cost effective. With a computer on his/her desk, academic staff can readily access e-resources anywhere in the world without leaving his/her office. Hence, it is therefore expected that academic staff in humanities who were earlier reported in literature as disadvantaged in access and use of e-resources or ICTs in general are now overwhelmingly embracing the new research tools – the e-resources (Tahir, Mahmood & Shafique, 2010). This why Vibert *et al*., (2007: 512) posited that "general personality traits had a greater influence than discipline" on modern information-seeking behaviour or accessibility and utilization of e-resources. Scholars/academic staff are now generally appreciating the use of personal (laptop) computers in research which seemingly takes (or gradually taken) away computer phobia among non-scientists especially the humanists. It is now a personal pride to own personal (laptop) computers by academic staff across discipline which use is now rife in national/international workshops/conferences.

6.4.2 Gender

Gillard, Howcroft, Mitev and Richardson (2008: 264) in their study explained that "sex reflects biological difference, gender – although often based on biological sex – is a social construct" and that every person when born is naturally "classified as female or male, and over time acquired a gendered identity, that is, what it means to be feminine or masculine". Gender concept as it is today and over time attempts to explain what female can do or cannot in relation to men. This leads to the issue of gender relations, which Gillard *et al*., (2008: 264) described as the "power dynamics embodied in our conceptualizations of differences and sameness, that is unequal variances or assumed equalities between women and men". Today, we have gender

issues in every aspect of human life (socio-economic, politics, education, religion) that have provoked wider interest for academic research in universities.

In user studies of information systems (in Information Science), scholars have widely reported gender differences (or inequalities) in the accessibility and utilization of ICT infrastructures/e-resources in favour of men against women (Al-Ansari, 2006; Alao & Folorunsho, 2008; Atakan *et al*., 2008; Costa & Meadows, 2000; EdQual, 2010; Heemskerk *et al*., 2005; Gamage & Halpin, 2007; Moghaddam, 2010; Nwagwu, Adekanbi & Bello, 2009; Kaminer, 1997; Park, 2010; Riahinia & Azimi, 2008; Selwyn, 2008). Gillard *et al*., (2008: 264) argued that discussion on gender and ICTs/e-resources:

> is not on women per se but the socially constructed relations between women and men. More important, it recognizes that women and men are positioned differently in society and that not all women or all men share the same experiences.

This assertion is ratified by Moghaddam (2010: 723) that "men and women are socially constructed for different tasks and this may influence the pattern of IT usage".

In contrast another group of scholars has found that females access and use e-resources more than males (Akporido, 2005; Deng, 2010; Fourie & Botham, 2006; Riahinia & Azimi, 2008). However, the third group of scholars (Tahir, Mahmood & Shafique, 2010) found that access and use of e-resources in research is gender neutral. Tahir, Mahmood and Shafique (2010: 131) asserted that "gender has no effect on the use of all online facilities" in their survey. The result of the present study reveals that there is no significant difference on accessibility and utilization of electronic resources based on gender. The result of the study has invalidated the widely reported proposition that access and use of electronic resources is not gender neutral, but corroborates the finding of Tahir, Mahmood and Shafique (2010) that there is no gender effect on accessibility and utilization of e-resources. The result is plausible in that, since there is no cognitive difference between male and female, and that gender is a social construct, if social barriers or factors are removed, males and females have equal opportunity to access and use e-resources in their research in universities. In other words if females are placed in the same electronic information environment with their male counterparts, and provided with the same degree of user education; then the much reported gender difference especially in favour of men in accessibility and

utilization of e-resources will be bridged. Scholars (EdQual, 2010; Elnaggar, 2008) decried that females are marginalized in access and use of ICTs/electronic resources directly or indirectly, in terms unequal access to training or policy advocacy.

EdQual (2010) reported that males are exposed early towards acquisition of ICT knowledge than females since childhood as male children (boys) are usually allowed the freedom of visiting Internet cybercafé, while the girls are at home attending to domestic works. In Asian countries, due to cultural and religious antics, women are discriminated against in learning of ICTs and using of commercial Internet cybercafé which apparently influence their degree of access and use of e-resources (Elnaggar, 2008). Generally, women are socio-economically marginalized and thus most women lack economic power to purchase and own computers or have Internet connectivity. Our society is claimed to be men world, and it is only recently that women are found in public service around the world; women were usually confined to the kitchen especially in developing countries (Elnaggar, 2008; Olatokun, 2008). Elnaggar (2008) said that the ICT sector is traditionally dominated by the males. It is hoped that as the social barriers against females in access and use of ICTs/e-resources are being tackled globally and they are given equal opportunity from childhood with their male counterparts to get actively involved in acquisition of relevant ICT knowledge and skills, gender neutrality as reported by the present study will be the hallmark of accessibility and utilization of e-resources in universities.

6.4.3   Age

Accessibility and utilization of e-resources is widely viewed by scholars to be dependent on age of the users (Al-Ansari, 2006; Al-Shanbari & Meadows, 1995; Alao & Folorunsho, 2008; Atakan *et al.*, 2008; Deng, 2010; Kaur & Verma, 2009; Selwyn, 2008; Tenopir *et al*., 2008; Vakkari, 2008). Again these scholars seem to be in consensus that younger ones are accessing and using e-resources more than the older ones in the university systems around the world. This proposition is summarized by Kaur and Verma (2009) that age is inversely related to access and use of e-resources among users (scholars/academic staff); Al-Ansari (2006) observed that people with lower age spent more time accessing and using the Internet resources. Selwyn (2008: 12) described the present generation of younger academics as being integral part "of 'digital natives' who grew up with the Internet" and are comfortable "using online sources to meet their information needs". Park (2010: 427) explained that the younger people "are technology-

friendly, learn new technology easily, and further enjoy such activities. Hence, it is not surprising that they are the most active user group".

A review by Atakan *et al*. (2008) revealed the use of e-resources by all age groups, even though most frequent users were reported to be less than 35 years. Similarly, Alao and Folorunsho (2008) found that younger people use Internet cyber cafés in Nigeria more than the older ones; people between 16-30 years were the most active user group. However, the finding of the present study indicates that there is no significant influence of age of the respondents on accessibility and utilization of electronic resources by respondents (academic staff) in the surveyed universities; thus contradicting the widely held view of effect of age on access and use of e-resources in favour of younger respondents (academic staff). The finding of the study tends to align with that of Park (2010: 419) who reported that "age is not a significant variable" in the use of Social Networking Site in his study among undergraduate students. The finding of the present study in conjunction with that of Park (2010) explains that within a certain user group like academic staff in universities (or undergraduate students) the influence of age on accessibility and utilization of e-resources may be insignificant. The influence of age on accessibility and utilization of e-resources is most significant as reported in literature (Alao & Folorunsho, 2008; Atakan *et al*., 2008; Park, 2010) among those below the age of 35 years; and since most respondents in the present study were within the age of 40-59 years, it helps to explain the results that, there was no significance influence of age of academic staff on access and use of e-resources in the survey universities.

6.4.4   Education

Some scholars (for examples, Al-Ansari, 2006; Deng, 2010) asserted that education has effect on accessibility and utilization of e-resources in universities. Specifically, Al-Ansari (2006) found among his respondents that those with higher degrees spent more time on the Internet accessing e-resources. However, the finding of the present study reveals that there is no significant influence of education on accessibility and utilization of e-resources among the respondents in the surveyed universities. This is explained by the fact that, the respondents were dominantly those with PhD (71.3%) and master's (26.9%) degrees. According to Tahir, Mahmood and Shafique (2010: 131), "Academic qualifications (*Master's and PhDs*) appear to have no effect on the use frequency of electronic facilities" in universities; since "scholars with PhD, MPhil and

Master's qualifications use these resources at statistically the same degree of frequency". In the present study majority of the respondents (about 98 percent as in Table 5.4) have Master's and PhD degrees, thus, the finding of the study that there is no significant difference in the access and use of e-resources due to education within a particular user group, such as academic staff is plausible and in tandem with what is reported by Tahir, Mahmood and Shafique (2010).

Academic staff in Nigerian universities rely on global literature for research, with the changing information seeking behaviour in the universities from the print in favour of electronic resources; every academic staff seems to appreciate the benefits of e-resources without being limited by their academic qualifications. Curiously, the finding of the study agrees with the proposition by Al-Ansari (2006) that academics with higher degrees access and use e-resources more, and the dominant users of e-resources in the surveyed universities have higher degrees of Master's and PhD degrees (Table 5: 4).

6.4.5 Professional rank

A review by Atakan *et al*. (2008) showed that academic staff in the professorial cadre were using e-resources more than other categories of staff. This finding was confirmed in their empirical survey, which revealed that:

> Associate Professors were at the first rank (93.3 per cent) in 2002 and they have regressed to the second rank in 2005. The assistant professors were at the second rank in 2002 with the use rate of 90% and they have reached to the first rank with the use rate of 97.4 percent in 2005 (Atakan *et al*., 2008:253).

But a study by Kaur and Verma (2009) indicated that professional rank is inversely related to access and use of ICTs/e-resources in universities. This implies that senior academic staff (senior lecturers, associate professors, professors) are likely to use e-resources less frequently than their junior colleagues (assistant lecturers, lecturers). This proposition was affirmed in the review by Tahir, Mahmood and Shafique (2010: 126) that "the graduate students and younger faculty members tend to utilize electronic information technology far more than older faculty members"; they noted that senior researchers/scholars adopted the new information technology at a slower pace than the younger ones who easily adopted the new technology. Empirically, Tahir, Mahmood and Shafique (2010) found that academic rank does have an effect on the use of e-resources (online databases).

The finding of the present study indicates that there is no significant influence due to professional rank of respondents on accessibility and utilization of e-resources in the surveyed universities. This explains that in view of the critical nature of e-resources in research, all the respondents across the professional ranks are deeply involved in access and use of e-resources in their research. This implies that any academic staff who is deeply involved in access and use of e-resources would correspondingly have a higher increase in research productivity irrespective of his/her professional rank.

6.5 EXTENT OF ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES

Increasing access and use of e-resources for research purposes in the universities has been reported by scholars within the past two decades around the world (Al-Ansari, 2006; Deng, 2010; Heterick, 2002; Jankowska, 2004; Kaminer, 1997; Tahir, Mahmood & Shafique, 2010; Renwick, 2005; Vibert *et al*., 2007) and especially in Nigeria (Ani & Esin, 2003; Ani, Edem & Ottong, 2010; Ehikhamenor, 2003a; Ekwelem, Okafor & Ukwoma, 2009). Researchers have observed with keen interest variations into the extent of accessibility and utilization of e-resources between countries and institutions (universities). The result of the present study reveals that there is a significant difference between University of Calabar and University of Ibadan in terms of extent of accessibility and utilization of e-resources by the respondents; specifically that respondents at the University of Ibadan access and use e-resources more in research than their counterparts at the University of Calabar. The finding of the study is plausible in that with a better electronic information environment, University of Ibadan is expected to have a higher degree of accessibility and utilization of e-resources among its respondents. The better electronic information environment at the University of Ibadan may be attributed to the fact that, University of Ibadan, as the first university in Nigeria, and a first generation university, is better funded than the University of Calabar (a second generation university). When ICT facility is available and accessible, there is a tendency that it would be accessed and used by people in that environment.

6.6   ICT POLICY/STRATEGY

Some scholars have suggested that formulation and adoption of ICT policy/strategy is imperative in accessibility and utilization of e-resources (Deng, 2010; Riahinia & Zandian, 2008). According to Deng (2010: 88) "with the rapid growth of the collection of electronic resources, organizations have developed various strategies and policies for encouraging and facilitating their effective use". So the basic aim of ICT policy/strategy is to improve the degree of access and use of e-resources in universities. Thus, Riahinia and Zandian (2008) advocated the imperative of formulating of relevant ICT policy towards promotion of effective and efficient access and use of e-resources in universities. Robust ICT policy is required for annual subscription of relevant e-resources in universities. This is why Iranian universities are reported to always involve in annual subscription of a number of e-resources (online databases) to support research among the academic staff (Riahinia & Zandian, 2008). Hence, universities have been advised to direct their resources towards the provision of access to ICTs and e-resources through supportive ICT policies (Minishi-Majanja, 2002).

From the forgone, the present study sought to investigate and compare the state of ICT policies/strategies between the two surveyed universities. It was found that there is significant difference in the state of ICT policies/strategies between the surveyed universities and that University of Ibadan has better ICT policies/strategies than University of Calabar. This explains why respondents at the University of Ibadan are significantly and extensively accessing and using e-resources more than their counterparts at the University of Calabar. It is obvious that the management of University of Ibadan has appreciated the imperative of ICT policies/strategies in modern day research and this should be emulated by University of Calabar (and other Nigerian universities).

6.7   LEVEL OF PRODUCTIVITY

In a comparative survey of productivity of academic staff in six federal universities in Nigeria, Okafor (2011) found that University of Ibadan was ranked fourth with the mean publication of 8.92 behind University of Benin (12.17), Nnamdi Azikiwe University (9.86), and University of Nigeria (9.21). A test of significance showed that University of Benin was more productive than University of Ibadan. In terms of international publication, University of Ibadan with a mean

publication of 3.49 was ranked second behind University of Agriculture, Abeokuta (4.83), while University of Nigeria, Nsukka (2.05) came third. This affirms that there is variation of research productivity between Nigerian universities. This trend is confirmed by finding of the questionnaire survey of the present study which reveals that University of Calabar was more productive than University of Ibadan. But, no significant different was observed in terms of international publications between the two universities.

However, when the results of the questionnaire survey were compared with that of bibliometric analysis it was found that University of Ibadan was more productive than University of Calabar particularly in terms of international publications as captured by *The Web of Science*. The importance of international publication as noted by Atakan *et al*., (2008) cannot be overemphasized as international publication is considered as the most important factor in assessment and evaluation of academic staff and universities around the world. The result of the bibliometric analysis is consistent with that of Ani and Onyancha (2011), who found that University of Ibadan was the most productive university in Nigeria while University of Calabar was placed at the 10th position.

From the results of the questionnaire survey, it is likely that academic staff at the University of Calabar are publishing more papers in the local/national journals (or journals) that are not indexed by *The Web of Science* as compared with publications from the University of Ibadan, which are in the international journals (or journals) that are indexed by *The Web of Science*. The increased level of publications of academic staff at the University of Ibadan in international journals is attributed to their relative high level of accessibility and utilization of e-resources in research than their counterparts at the University of Calabar (Foster *et al*., 2008).

6.8 THE EFFECT OF ACCESSIBILITY AND UTILIZATION OF ELECTRONIC RESOURCES ON PRODUCTIVITY

The result of perception of effect of accessibility and utilization of e-resources on research productivity reveals a strong positive relationship between the two variables. Respondents overwhelmingly agreed that there is a positive link between accessibility and utilization of e-

resources and research productivity. In other words, it is perceived that respondents who access and use e-resources frequently will likely be more productive than those who do not. The results corroborate previous findings (Ajala *et al.*, 2010; Ani & Biao, 2005; Badu & Markwei, 2005; Costa & Meadows, 2000; Khan & Dominic, 2012; Dulle *et al*., 2002; Heterick, 2002; Jankowska**,** 2004; King & Griffiths, 1989; Mahajan, 2006; Mahmood, Hartley & Rowley, 2011; Nwezeh, 2010; Ojedokun & Owolabi, 2003; Popoola, 2008; Vakkari, 2008). As reported in literature review, all these studies affirm that there is a significant perceived positive effect of accessibility and utilization of e-resources on research productivity. Specifically, a survey by Vakkari (2008: 602) revealed that "perceived improved access to literature was positively associated with international publications scholars produced". Thus, he result of the present study consistently agrees with the provisions of TAM and UTAUT that perceived usefulness or performance expectancy of ICTs/e-resources will lead their access and use with expected positive perceived effect on productivity.

Nwezeh (2010) asserted that access and use of ICT and e-resources has improved research productivity and creativity in universities. Thus, accessibility and utilization of electronic information resources in universities for research purposes is now a common norm around the world. In a study of usage of electronic databases in Turkey, Atakan *et al*., (2008: 250) asserted that "studies from other countries, however, have examined the use of online (*electronic*) resources in academic environment and provide a useful context for considering the Turkish situation". Similarly, this present study examines accessibility and utilization of e-resources in Nigerian universities and then compares the results with other countries, in order to place Nigerian situation in the context of globalization as proposed by Foster *et al*., (2008). Foster *et al.*, (2008) made a proposition that, academic staff in Nigerian universities will significantly increase their productivity (especially internationally) if they join their counterparts in developed countries to access and use e-resources in research. This proposition provides the framework and guide for this study. Hence, the basic aim of the study was to determine if there is correlation between accessibility and utilization of e-resources and productivity of academic staff in Nigerian universities in line with global trend (literature).

Interestingly, the result of the study reveals that there is a significant positive correlation between accessibility and utilization of e-resources and productivity in the surveyed universities in Nigeria. The implication of the results is that, increase in accessibility and utilization of e-resources will lead to increase in productivity of academic staff in the surveyed universities. Furthermore, the results specifically indicate that, increase in accessibility and utilization of e-resources will lead to increase in international publication by academic staff in the survey. Thus, the results are plausible and consistent with global literature (or previous studies) that there is positive correlation between accessibility and utilization of e-resources and research productivity (Atakan *et al*., 2008; Al-Shanbari & Meadows, 1995; Foster *et al*., 2008; Kirlidog & Bayir**,** 2007; Philip; 1995; Rolinson, Meadows & Smith, 1995; Tenopir *et al*., 2008). According to Atakan *et al.,* (2008: 252) "it has been proved that there is a strong connection between electronic journal usage and research activities" in universities. Vakkari (2008: 603) affirmed that "the use of e-resources and Internet-based tools seem to have a positive influence on scholars' publication productivity". Kirlidog & Bayir (2007) in their study linked recent increase in research productivity in Turkish universities to increased accessibility and utilization of e-resources (electronic databases) provided by ANKOS (Anatolian University Libraries Consortium). According to the study:

> Although some academic institutions had access to electronic databases before the establishment of ANKOS, the consortium enabled mass access mainly by providing bargaining power through bulk purchasing (Kirldog & Bayir, 2007: 102).

In Nigeria, NULIB (Nigerian University Libraries Consortium) is analogous to ANKOS, but has not been able to provide relevant and adequate e-resources to Nigerian universities in order to promote access and use of e-resources as exemplified by ANKOS. So far, NULIB has only been able to negotiate and provide access to only EBSCO HOST database to Nigerian universities. It is therefore hoped that with the globally acceptance of access and use of e-resources as a major tool towards increase in research productivity as affirmed by the present study, NULIB, Nigerian university librarians, university managements, National Universities Commission (NUC) and governments will re-strategize on how to provide adequate access to relevant e-resources (electronic/online databases or e-journals) across all academic disciplines in Nigerian universities. This will be in line with the proposition of Hawthorne Studies (theoretical framework) which significantly showed that the provision of physical working condition

(enabling electronic information environment) will have positive influence on productivity of academic staff in universities**.** Hence, stakeholders should make e-resources available and accessible to academic staff in Nigerian universities in order to increase their research productivity. The result of the present study is consistent with the provision of Unified Theory of Acceptance and Use of Technology (UTAUT), that availability of facilitating conditions (ICTs/e-resources) in the universities will lead to increase in research productivity of academic staff.

Additionally, as observed from the results of the structured interview, Internet access in the surveyed universities is not free as obtained in Turkish universities. According to Kirldog and Bayir (2007: 103), "In Turkey all university Internet connections are provided free of charge by Ulakim", and this has significantly impacted on accessibility and utilization of e-resources in research. In line with earlier suggestion, free Internet access should be provided in all Nigerian universities as obtained in Turkish universities to accelerate accessibility and utilization of e-resources in order to correspondingly increase productivity. The positive association or correlation of accessibility and utilization of e-resources with research productivity, has revealed that academic staff with high need of achievement in his/her career, desire to be internationally recognized in his/her profession as obtained in McClelland's Achievement Theory will extensively and frequently access and use e-resources towards increased productivity.

6.9   CHAPTER SUMMARY

The discussion on the various findings of the study was carried out in this chapter in relation to the literature. From the discussion, the primary finding of the study that there is a positive effect of accessibility and utilization of e-resources on research productivity of academic staff in the surveyed universities in Nigeria is consistent with literature. Essentially the study affirms that international publication of academic staff in Nigerian universities will increase with access and use of e-resources.

CHAPTER SEVEN: **SUMMARY OF THE FINDINGS, CONCLUSION, AND RECOMMENDANTIONS**

7.1   INTRODUCTION

The chapter presents the summary of the findings, conclusion, recommendations and suggestions for further studies.

7.2   SUMMARY OF FINDINGS

The section presents the summary of the findings in line with the objectives of the study as outlined in chapter one, namely:

1. to investigate the electronic information environment in Nigerian universities;

2. to determine if accessibility and utilization of electronic information resources depends on demographic variables of academic staff in Nigerian universities;

3. to assess the extent of accessibility and utilization of electronic information resources among academic staff in Nigerian universities;

4. to establish different institutional ICT policies/strategies that are put in place toward effective accessibility and utilization of electronic information resources among academic staff in Nigerian universities;

5. to investigate the level of research productivity of academic staff in Nigerian universities;

6. to determine the effect of accessibility and utilization of electronic information resources on productivity by academic staff in Nigerian universities; and

7. to recommend a framework towards effective accessibility and utilization of electronic information resources in Nigerian universities.

7.2.1   Questionnaire survey

The summary of the results of the questionnaire survey is presented in this section

7.2.1.1 Level of ICT infrastructure

The electronic information environment in the study was measured in terms of different ICT facilities that are available and accessible by academic staff in the surveyed universities. The electronic information environment in the two surveyed universities was found to be low in relation to global literature. However, it was found that the University of Ibadan has comparatively a better electronic information environment than the University of Calabar in terms of availability and accessibility of all ICT facilities that were surveyed in the study. The ICT facilities that constitute the electronic information environment in the survey (as shown in Table 4.7) are official computers in the department (73.8%), official computers in personal office (47.2%), personal (laptop) computers (90.7%), official printer in the department (69.4%), official printer in personal office (37.0%), personal printer (75.0%), Internet access in university library (60.8%), Internet access in faculty/department (60.2%), Internet access in personal office (63.9%), Internet access at home of residence (67.9%), CD-ROM access in university library (42.6%), access to campus network/intranet in faculty/department (51.9%), access to campus network/intranet in personal office (49.7%), access to LAN in faculty/department (38.6%), access to LAN in personal office (31.5%), access to virtual/digital library in university library (41.7%) and access to virtual/digital library in personal office (31.2%).

7.2.1.2 Influence of demographic variables on accessibility and utilization of e-resources

The findings of the study have shown that there is no significant influence of demographic variables (discipline, gender, age, education and professional rank) on accessibility and utilization of electronic resources in the surveyed Nigerian universities. Specifically, the results of One-Way ANOVA (F =0.721, p= 0.578) indicates that there is no significant influence of discipline on accessibility and utilization of e-resources by respondents in the survey. Analysis of the results of independent t-Test reveals that there is no significant difference on accessibility and utilization of electronic resources based on gender. It was also found that there is no significant influence of age of the respondents on accessibility and utilization of electronic resources in the survey (F=2.475; p=0.061).

The results of study reveal that there is no significant influence of education on accessibility and utilization of e-resources among the respondents in the survey (F=0.011, p=0.989). It was also found there is no significant influence due to professional rank of respondents on accessibility and utilization of e-resources in the survey (F=0.754, p=0.556).

7.2.1.3 Extent of accessibility and utilization of e-resources

The findings of the study indicate significant difference in terms of accessibility and utilization of electronic resources by respondents in the two universities. Analysis of the results shows that respondents at University of Ibadan ($\sum$= 28.82) extensively access and use electronic resources than their counterparts at University of Calabar ($\sum$= 27.23) (t = – 2.798, p= 0.005).

7.2.1.4 ICT policy/strategy

The results of the independent t-Test show that there is significant difference in institutional ICT policies/strategies between University of Calabar and University of Ibadan. Analysis of the results indicates that the state of institutional ICT policies/strategies at the University of Ibadan ($\sum$= 29.94) is greater than that of the University of Calabar ($\sum$= 27.50) (t = – 2.907, p= 0.004).

7.2.1.5 Level of productivity

Analysis of the results indicates that there is significant difference in the level of research productivity between University of Calabar and University of Ibadan. From the results, the level of research productivity is greater in University of Calabar ($\sum$ = 12.96) than University of Ibadan ($\sum$ = 9.53) (t = 3.885; p = 0.000). However, there is no significant difference in the level of international publication between the two universities, University of Calabar ($\sum$= 6.35) and University of Ibadan ($\sum$=5.56) (t =1.244; p=0.215). However, the results of the bibliometric analysis was at variance with that of the questionnaire survey, indicating that research productivity of the respondents was higher at the University of Ibadan than at the University of Calabar.

7.2.1.6 The effect of accessibility and utilization of e-resources on productivity

Analysis of the results of the independent t-Test indicates that there is higher perception of the effect of accessibility and utilization of e-resources on research in University of Calabar ($\sum$=10.7399) than University of Ibadan ($\sum$=10.3179) (t=2.094; p=0.037).

The results of correlation analysis indicate that there is significant positive correlation (or relationship) between accessibility and utilization of electronic resources and research productivity of academic staff in the surveyed universities (r=0.135; p=0.004). This implies that increase in access and use of e-resources will lead to increase in research productivity among the respondents. Similar result was obtained when the hypothesis was tested at international level (r=0.158; p=0.004). In other words, respondents that access and use e-resources in research frequently publish more articles in international journal than those who do not or are accessing and using e-resources less frequently in the surveyed universities.

7.3   INTERVIEW

The summary of the results of the structured interview is presented in this section.

7.3.1   Level of ICT infrastructure

The results of the study showed that most respondents have access to official computers in the department and their own personal computers. About half of the respondents have access to computers in their personal offices. The two universities in the survey are connected to the Internet through wireless networks. It was revealed that the surveyed universities provide Internet access to the respondents at their faculties/departments or personal offices, but, that access to the Internet is through monthly subscription by individual respondents. It was found that networking was not popular in the surveyed universities. Hence, most respondents do not have access to campus network/Intranet/LAN. However, the results of the study indicated that the University of Ibadan has a better electronic information environment than University of Calabar.

7.3.2 Extent of accessibility and utilization of electronic resources

The results of the study showed that, most respondents access and use electronic resources especially those on the Internet frequently (in a daily basis) to conduct their research.

7.3.3 ICT policy/strategy

The results of the study showed that, most respondents at the University of Ibadan affirmed that, the university has articulated ICT policies/strategies to support and promote accessibility and utilization of electronic resources in research. But, at the University of Calabar, most respondents were of the view that the university has no articulated ICT policies/strategies to support and promote accessibility and utilization of electronic resources in research.

7.3.4 The effect of accessibility and utilization of electronic resources on productivity

The results of the study indicated that, all the respondents in the survey opined that accessibility and utilization of electronic resources do have a positive effect or impact on their research productivity.

7.4 BIBLIOMETRICS

The results of the study showed that, the University of Ibadan with record count (number of published journal articles) of 2,206 is about six times productive than University of Calabar with a record count of 362 within the period under survey (2005-2012).

7.5 CONCLUSION

The study basically aimed at investigating the effect of accessibility and utilization of e-resources on research productivity by academic staff in Nigerian universities. The finding of the study indicates that there is significant correlation between accessibility and utilization of electronic resources and research productivity in the two surveyed Nigerian universities (r=0.135; p=0.004). It is therefore concluded that increase in accessibility and utilization of e-resources by academic staff in the two surveyed universities will lead to increase in research productivity. Thus, there is a positive effect due to accessibility and utilization of e-resources on research productivity in the surveyed universities in Nigeria which is in line with global

literature. It was specifically found there is significant correlation between accessibility and utilization of e-resources by academic staff and international publication in the two surveyed universities (r=0.158; p=0.004). In other words, academic staff that access and use e-resources in research frequently will publish more articles in international journals than those who do not (or are accessing and using e-resources less frequently). The finding of the study specifically affirms the proposition by Foster *et al*., (2008) that academic staff in Nigerian universities will publish more international papers (journal articles), if they relative access and use e-resources in research as obtained in developed countries. The observed correlation between accessibility and utilization of e-resources, readily affirms the general perception by the academic staff that accessibility and utilization of e-resources will have a positive effect on research productivity. The use of TAM supports this proposition that perceived usefulness of e-resources will promote their access and use by academic staff in research or performance expectancy of e-resources as obtained in UTAUT will increase the degree of accessibility and utilization of e-resources by academic staff in research in the surveyed Nigerian universities.

However, and in view of the positive effect of access and use of e-resources in research, the findings of the study indicate low electronic information environment in the two surveyed universities in relation to global practices. But, University of Ibadan was found to have a better electronic information environment than University of Calabar. The study concludes that there is low level adoption and diffusion of ICTs at the two surveyed universities; and that increase investment in ICT facilities by university managements will lead to better electronic information environments in the surveyed universities.

Curiously, the findings of the study reveal that there is no significant influence of demographic variables (discipline, gender, age, education and professional rank) on accessibility and utilization of e-resources in the two surveyed universities. Although the findings of the study are at variance with literature review, the study attributes the results to increasing and appreciable awareness on the vital role of e-resources on research and tremendous increase in information literacy among academic staff within the past two decades. Besides, the ease in which e-resources are accessed, their cost effectiveness and currency (due to the dearth of current print materials in the university libraries) are other reasons why there is a bridge in user gap among

different demographic variables. It is therefore concluded that with increasing awareness and information literacy among academic staff coupled with enabling electronic information environment, the widely reported influence of demographic variables with accessibility and utilization of e-resources will generally be minimized. Thus, the relative significant difference found in accessibility and utilization of e-resources in favour of University Ibadan than University of Calabar leads to the conclusion that, where relevant ICTs/e-resources are made available and accessible by universities, academic staff in these universities will likely access and use these e-resources in their research.

Additionally, the imperative of formulation of relevant ICT policies/strategies to promote access and use of e-resources has been affirmed in this study; as the University of Ibadan was found to have better ICT policies/strategies than University of Calabar, and comparatively leads University of Calabar in extent of accessibility and utilization of e-resources. It is therefore obvious and concluded that Nigerian universities with relevant ICT policies/strategies will certainly promote access and use of e-resources among their academic staff, and this will bring relative increase in research productivity.

The study found that University of Calabar was more productive in terms of questionnaire survey than University of Ibadan, but reverse result was obtained with bibliometric analysis, where University of Ibadan was found to be more productive than University of Calabar (especially at the international scene). The study therefore concludes that bibliometric study is the most suitable and reliable measure of research productivity than the questionnaire survey which is likely prone to inherent response bias.

7.6   RECOMMENDATIONS

In view of the findings of the study, the following recommendations are made:
1. The study observes that the enabling electronic information environment will lead to increased accessibility and utilization of e-resources by academic staff at the surveyed universities, and indeed other Nigerian universities. Thus, university managements at the surveyed universities should massively increase their investments in ICT infrastructural

facilities such as computers, the Internet, computer networks (campus network/Intranet/LAN), virtual/digital libraries in line with the emerging digital trend in universities around the world. University managements should partner with other stakeholders: the governments (federal/state ministries of education), National Universities Commission (NUC), multinational organizations, international organizations/agencies and private individuals/alumni towards the provision enabling electronic information environments for academic staff to support their research activities. Nigerian universities need robust, reliable and sustainable Internet connectivity in order to be integrated into global research community, and this needs heavy financial investment by the stakeholders.

2. The results of the study reveal that there is no significant difference on accessibility and utilization of e-resources due demographic variables (discipline, gender, age, education and professional rank). This implies that equitable access to ICT facilities will promote access and use of e-resources across all the demographic variables. For example, if computers are provided to all academic staff or there is access to computer network (campus network/Intranet/LAN)/Internet in all disciplines/faculties, this will encourage and promote access and use of e-resources by all categories of academic staff in surveyed Nigerian universities. Hence, equitable access to ICT infrastructural facilities should be provided to all academic staff not only in surveyed universities, but other Nigerian universities.

3. From the forgone, it is also recommended that equitable training/re-training on information literacy should be provided to academic staff in every disciplines in surveyed universities and other Nigerian universities. Specific training/re-training or user education of academic staff on acquisition of ICT skills, access and use of e-resources should be organized regularly by relevant units such as university libraries or ICT Centers in surveyed universities. Academic staff should be encouraged/supported by university managements to attend national/international workshops/conferences/seminars that will expose them to best practices on accessibility and utilization of ICTs/e-resources in modern day research.

4. The university libraries in surveyed universities should embark on drastic development of virtual/digital libraries in line will global trend in order to promote accessibility and utilization of e-resources by academic staff in research. Effective library computerization and digitization of local library resources/materials are imperative in the emerging electronic information environments at the surveyed Nigerian universities. The need for the development of institutional depositories by the university librarians as obtained in developed countries cannot be overemphasized.

5. The finding of the study has affirmed that formulation of relevant ICT policies/strategies will facilitate and promote accessibility and utilization of e-resources by academic staff in Nigerian universities. Hence, it is imperative that each faculty/department, university library or ICT Center should formulate appropriate ICT policies/strategies that will promote equitable and sustainable accessibility and utilization of e-resources by the academic staff in surveyed universities. This should essentially include annual budgetary allocations to acquisition of ICT infrastructural facilities, recruitment/training/re-training of ICT personnel/librarians, and training/re-training of academic staff on access and use of ICTs/e-resources, subscription of e-resources, maintenance of ICT infrastructural facilities among others.

6. Regular sponsorship librarians/library staff and other relevant staff that work with ICTs to attend national/international seminars/workshops/conferences on ICTs/e-resources should be the best practice in surveyed Nigerian universities.

7. Academic staff on their own should be active on access and use of e-resources in view of the paradigm shift in information seeking behaviour from the print to e-resources and its attendant positive effect on research productivity. This should involve continuous acquisition of relevant ICT and information literacy skills to enable them to access and use specific e-resources (online databases) in their various disciplines. They should strive to acquire relevant ICT and information literacy skills that will enable them to access and use e-resources in research.

7.7   SUGGESTIONS FOR FURTHER STUDIES

The present study was limited in scope to two federal universities in Nigeria, University of Calabar and University of Ibadan. It is suggested that the study should be extended to other universities in Nigeria. Furthermore, there is need to conduct the study using other research methods such as the mixed methods research using survey, bibliometrics and in-depth-interview research methods in order to give more insights on issues of access and use of e-resources with productivity measure of academic staff in Nigerian universities. Further studies should not be limited to only journal articles as a measure of publication output, but should include books, chapters in book and conference papers/conference papers. In specific terms further studies should be conducted to assess the electronic information in Nigerian universities in view of the advancing digital revolution; the effect of demographic variables on accessibility and utilization of electronic resources in Nigerian universities; and the effect of ICT policy/strategy on accessibility and utilization of electronic resources in Nigerian universities.

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APPENDIX I

QUESTIONNAIRE FOR ACCESSIBILITY AND UTILIZATION OF ELECTRONIC INFORMATION RESOURCES FOR RESEARCH AND ITS EFFECT ON PRODUCTIVITY OF ACADEMIC STAFF IN NIGERIAN UNIVERSITIES BETWEEN 2005 AND 2012

Dear respondent,

I am a PhD student in the Department of Information Science, University of South Africa (UNISA), South Africa. I am undertaking a doctoral research on *Accessibility and Utilization of Electronic Information Resources for Research and Its Effect on Productivity of Academic Staff in Nigerian Universities between 2005 and 2012*. As academic staff in one of the surveyed universities, you have been randomly selected to voluntarily participate in the study. Hence, I am pleased to request you to voluntarily complete this questionnaire as appropriate, and be assured that all responses would be treated in confidence and used only for the purpose of the research.

Thanking you for your cooperation.

Section I: Demographic Data
1   Name of university…………………………………………………………………
2   Faculty……………………………………………………………………………
3   Gender/Sex: a. Male [   ]   b. Female   [   ]
4   Age (year): a. below 40 [   ]   b. 40-49 [   ] c. 50-59 [   ]   d. 60 and above [   ]
5   Highest educational qualification: a. B.Sc./Bed/BA [ ] b. M.Sc./Med/MA [   ]
       c. PhD [ ]
6   Professional rank: a. Professor [ ] b. Associate Professor [ ] c. Senior Lecturer [ ]
       d. Lecturer [ ] e. Assistant Lecturer [ ]

Section II   Electronic Information Environment

Please tick as appropriate which of these information and communication technology (ICT) infrastructures is/are available and accessible by you in your university to support your research activities within the past 7 years (multiple responses is allowed).

Sn	ICT infrastructure	Response
1	Official computer in the department	
2	Official computer in personal office	
3	Personal computer (desktop/laptop)	
4	Official printer in the department	
5	Official printer in personal office	
6	Personal printer	
7	Internet access in university library	
8	Internet access in faculty/department	
9	Internet access in personal office	
10	Internet access at home of residence	
11	CD-ROM access in university library	
12	Access to campus network/intranet in faculty/department	
13	Access to campus network/intranet in personal office	
14	Access to Local Area Network (LAN) in faculty/department	
15	Access to Local Area Network (LAN) in personal office	
16	Access to virtual/digital library in university library	
17	Access to virtual/digital library in personal office	

Section III   Accessibility and Utilization of Electronic Resources

Please tick as applicable the extent of your accessibility and utilization of electronic resources (information obtained from computer/Internet/digital network) as shown in the table below within the past 7 years: strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD).

Sn	Accessibility and utilization	SA	A	D	SD
1	I access relevant electronic resources on the Internet daily				
2	I access and use electronic journals on the Internet frequently				
3	I access and use online databases in my research				
4	I access and use CD-ROM databases in my research				
5	I access and use electronic resources through campus network/intranet for my research				
6	I use LAN in my office to access electronic resources for my research				
7	I prefer to access and use electronic resources for my research than the print materials				
8	I usually spend 3 hours and above to access and use electronic resources for my research				
9	I have enough skills to access and use electronic resources				
10	I am aware of lot of relevant online databases in my fields				

Section IV   ICT Policies/Strategies toward Effective Accessibility and Utilization of Electronic Resources

Please tick the following ICT policies/strategies geared toward effective accessibility and utilization of electronic resources as applicable in your university.

Sn	ICT Policy/Strategy	SA	A	D	SD
1	Provision of official computers to all academic staff in the university				
2	Provision of capacity building on the use of computers/Internet by academic staff				
3	Provision of free access to Internet by academic staff in their offices				
4	Provision of Internet access in the university library				
5	Regular subscription of electronic resources (electronic journals, online databases etc.) in the university library				
6	Creation of awareness on access to Internet/electronic resources in the university library				
7	User education on access and use of electronic resources in the university library				
8	Regular alert to academic staff on availability of relevant electronic resources (electronic journals, online databases etc.) in university library				
9	Regular maintenance of ICT infrastructures in the university				
10	Relevant policy to guide use of ICTs/electronic resources in the university				

Section V   Productivity

Please rank these items on productivity measure and tick as applicable to you.
A.

Sn	Productivity	SA	A	D	SD
1	Access and use of electronic resources in research increase my research productivity				
2	Access and use of electronic resources improve the quality of my research				
3	Access and use of electronic resources promote efficiency and effectiveness in my research				

B.
1. Please state total number of your published journal articles between 2005 and 2012:…….

2. How many of these are in international journals:…………………………………..

APPENDIX II: RESEARCH OBJECTIVES, RESEARCH QUESTIONS AND POSSIBLE DATA SOURCES

Sn	Research Objectives	Research Questions	Questions addressing the objectives on the Questionnaire		
			Questionnaire	Interview	Bibliometrics
1	To determine the electronic information environment in Nigerian universities	What ICT infrastructural facilities are available to support effective accessibility and utilization of electronic information resources by academic staff in Nigerian universities?	Section II: items 1-19 in the table	Section II: 1-2,4,11,15,17,19	
2	To determine the extent of accessibility and utilization of electronic information resources among academic staff in Nigerian universities	What is the extent of accessibility and utilization of electronic information resources among academic staff in Nigerian universities?	Section III: items 1-10 in the table	Section: 1-3	
3	To determine if accessibility and utilization of electronic information resources depends on demographic variables of academic staff in Nigerian universities;	Does accessibility and utilization of electronic information resources depend on demographic variables of academic staff in Nigerian universities?	Section I: 1-8, Section III: items 1-10 in the table		
4	to determine different institutional ICT policies/strategies that are put in place toward effective accessibility and utilization of electronic information resources among academic staff in Nigerian universities;	What are the institutional ICT policies/strategies that are put in place towards effective accessibility and utilization of electronic information resources by academic staff in Nigerian universities?	Section IV: items 1-10 in the table	Section IV: 1-3	
5	to determine the perception of the effect of accessibility and utilization of electronic information resources on productivity by academic staff in Nigerian universities	What is the perception of the effect of accessibility and utilization of electronic information resources on productivity by academic staff in Nigerian universities?	Section V: items A (1-3) on the table	Section V: item A1	
6	to determine the effect of accessibility and utilization of electronic	What is the effect of accessibility and utilization of electronic	Section V: B1-B2		Section V: item B2

information resources on productivity of academic staff in Nigerian universities;	information resources on research productivity of academic staff in Nigerian universities?			

APPENDIX III: INTERVIEW SCHEDULE

Section A: Electronic information environment

Please give details of how the following ICT facilities are available and accessible by you

    i. *Computers*

        (official computers in the department/official computers in

        personal office/personal (laptop) computers in office/personal (laptop) computers at

        home

  ii. *Internet access* (faculty/department/personal office/university library/home)

 iii. *Campus network/Intranet/LAN* (faculty/department/personal office)

Section B: Accessibility and utilization of electronic resources

Please how often do you access and use electronic resources in your research?

Section C: ICT policy/strategy

Please give different ICT policies/strategies that are put in place to support and promote access and use of electronic resources in your university

Section D: Effect of accessibility and utilization of electronic resources on productivity

Please give your opinion on effect of accessibility and utilization of electronic resources on your research productivity