

LIBRARY AND INFORMATION SERVICES DELIVERY AND RESEARCHERS' SCHOLARLY COMMUNICATION OUTPUTS IN AGRICULTURAL RESEARCH INSTITUTES IN NORTH-CENTRAL, NIGERIA

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ABSTRACT: *The study is an attempt at understanding researchers' perception of the relationship between library and information services delivery and their scholarly communication outputs in four National Agricultural Research Institutes Libraries in North-Central Nigeria. Library and information services was proxied as Current Awareness Services (CAS), Selective Dissemination of Information (SDI), Internet Services (IS), Inter-Library Loan Services (ILLS), Reference Services (RS) and Circulation Services (CS). The study was guided by six hypotheses. The researchers employed a correlation survey design and questionnaires were used for data collection. 820 respondents from the respective agricultural research institutes were sampled out of a population of 1,642 for the study and Pearson Product-Moment Correlation Coefficient (PPMCC) was used to test the hypotheses. The study found that all the six library and information services delivery measured as CAS, SDI, IS, ILLS, RS and CS have positive significant relationship with researchers' scholarly communication outputs in Agricultural Research Institutes in North-Central Nigeria. It was recommended that Agricultural Research Institutes administrators should put in more financial, human and material resources to enhance the already existing services delivery to the researchers as the prominent aim of any library is to provide the right information, in the right medium and at the right time.*

KEY WORDS: library and information services, researchers' scholarly communication output, Agricultural Research Institutes

INTRODUCTION

Research is a conscious effort to collect, verify, analyze and communicate information to the academic community through scholarly communication outputs (Rashid, 2001). When independently developed thoughts and ideas are shared among research team members and scholars and combined understanding and initiative insights are developed, this facilitates the creation of new knowledge or information disseminated through researcher's scholarly communication (Uganneya, Ape & Ugbagir, 2010). Scholarly communication is therefore, the

output of research work normally appearing in the form of creative work, journal articles, conference papers, innovation, and research books including critical scholarly texts, new interpretation of historical events and new ideas or perspectives.

Scholarly communication output is one of the strong determinants of research productivity of researchers (Popoola, 2008) a measure also used as a determinant of research productivity of researchers in agricultural research institutes in Nigeria. The measurement of scholarly communication output for agricultural scientist may be in the form of number of publications produced in referred works in a given period of time and reportable external research income among others. To help improve their scholarly communication outputs, researchers including agricultural research scientist depend on agricultural research institute libraries which provide varied but relevant information services to support their research activities. The thrust of every library including agricultural research libraries is to deliver information services and resources that will enhance the study and research output of the user community (Rhima, 2014). Information services delivered by libraries generally include referral services (RS), Current Awareness Services (CAS), Selective Dissemination of Information (SDI), Internet Services (IS), Inter-Library Loan Services (ILLS), Reference Services (RS) and Circulation Services (CS) (Ebiwole, 2010). It is important to point out that these services provide access to information resources, which are stored in a library collection and can be accessible in an electronic environment.

Despite the avowed benefits of library and information services in contributing to researchers' scholarly communication output, empirical research to establish this purported relationship is lacking (Daudu & Shehu, 2014). In other words, the relationship between library and information service delivery and scholarly communication outputs of researchers' especially agricultural research scientist in research institutes in North Central Nigeria appears to be completely lacking. Furthermore, the decline in physical library utilization by agricultural researchers together with unclear evidence of information delivery access has left the agricultural research institute libraries without any hard data to justify their role in meeting the information needs of researchers. It is this gap that has informed the decision to embark on this research work. The study therefore intends to investigate and determine the relationship between the researcher's perception of library and information services such as Current Awareness Services (CAS), Inter-Library Loan Services (ILLS), Reference Services (RS), Selective Dissemination of Information (SDI), Internet Services (IS), Circulation Services (CS) and their scholarly communication outputs in agricultural research institutes in North-Central, Nigeria.

Conceptual Framework

Library and Information Service Delivery

The concept of library and information service delivery is fundamental to libraries. Essentially, library and information service delivery are library processes and activities that are deployed by libraries to deliver information services and resources to library users, with the aim of enhancing the activities and productivity of library users. Library and information services are divided into two basic areas by library administrations: technical services and readers/user services. Technical services are concerned with the acquisition, processing and cataloging of library material resources

while user services are concerned with the loan service delivery, SDI delivery, CAS delivery, etc. (Popoola & Haliso, 2011). Uganneya (2011) posits that library and information service delivery are a set of mechanisms whose interactions determine library and information service effectiveness. He further maintains that library and information services are a set of distinctive activities that jointly and individually contribute to the development and dissemination of information resources and which provide the framework within which management form and implement policies to influence the library service processes.

Library and Information service delivery therefore, can be said to include those activities that create, store, and disseminate knowledge, skills and artifacts that define new technologies such as the Internet, E-mail, etc. Uganneya (2011) stress that the service delivery performance and effectiveness of any library depends not only on how the individual service performs in isolation, but also on how they interact with each other as elements of a collective system of knowledge and information dissemination and use and their interplay with other information resource bases. This study considers library and information service delivery as a synergy of library activities whose interplay enhances effective and efficient library and information service delivery consequently enhancing the researcher's scholarly communication output and the productivity of library users. The study conceptualizes library and information services as Current Awareness Services (CAS), Inter-Library Loan Services (ILLS), Reference Services (RS), Selective Dissemination of Information (SDI), Internet Services (IS), and Circulation Services (CS)

Scholarly Communication Outputs

Communication of agricultural scientific and technical information is one of the most important aspects of agricultural research, for it is the process that leads to its widespread use and ultimate benefits (Adeyinka, 2014). Aina (2002) hinted that research is generally not regarded as complete until it is disseminated widely. The purpose is mainly to disseminate the findings so that the researcher's peers can adjudge the research as well as be aware of the contribution of the research to knowledge. There are varieties of ways of disseminating the findings. Some of the methods used include conferences, workshops, seminars, annual reports, technical reports, theses and dissertations, books or chapters in books and journal articles or even web publishing. According to Martin and Irvine (2001), the number of publications is considered to be an indication of the scientific output of an individual or a group, while the impact is assessed by using data regarding the number of times these publications are cited in subsequent years.

In measuring scholarly communication, Blackburn & Lawrence (2001) used three output variables: published work, presentations on a national and international level and conservations regarding research. Scholarly communication can therefore be defined as the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community and preserved for future use. To Creswell (2003), scholarly communication output is the extent to which lecturers/scientists engage in their own research and publish scientific articles in refereed journals, conference proceedings, writing a book or a chapter, gathering and analyzing original evidence, working with postgraduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses,

writing monographs, developing experimental designs, producing works of an artistic or creative nature, engaging in public debates and commentaries. Okafor (2011) also define scholarly communication output as the quantity of research in terms of publication outputs and supervision of students that an academic is able to carry out within a defined period. In other words, scholarly communication output is a quantitative and measurable means by which academics and researchers contribute new knowledge to the existing body of knowledge.

LIBRARY INFORMATION SERVICES AND SCHOLARLY COMMUNICATION OUTPUT

Perception of the relationship between CAS and scholarly communication outputs

In order to meet the information needs of library users or researchers as a means of enhancing their research productivity, libraries deploy different kinds of services. One of such services is current awareness service (CAS). Straus (2012) define CAS as the establishment of a system for reviewing publications immediately upon receipt, selecting information pertinent to the programme of the organization served, and recording individual items to be brought to the attention of those persons whose work they are related to. This process involves the selection of pertinent information from periodicals, books, pamphlets, patents and reports. Johnson (2009) maintains that today, CAS alert scholars, researchers, agricultural practitioners' etc to recently published literature in their fields of specialization. This service can be provided in many ways including by telephone, display, routine of periodicals, list of latest additions, list of latest periodical received, topical bibliographical on demand, content page service, news clipping service and electronic mail and bulletin board services. Libraries use display boards and shelves to draw attention of users to recent additions.

Aguolu and Aguolu (2002) reported that CAS is designed to alert users of new or current information services/resources that might satisfy their needs. Research on the relationship between CAS and research productivity has been carried out by scholars. Sirwardena (2005) investigated the present status of CAS in an agricultural research library and research productivity of agricultural scientists in Sri-Lanka and found that CAS contributes positively to research productivity of agricultural scientists. Relatedly, Singh (2011) study on the impact of CAS on agricultural productivity was positive and significant. The empirical evidence as reported by these studies indicate that CAS has significantly related to research productivity. This has influenced the proposition of the following hypothesis:

Hypothesis 1: There is a significant relationship between the extent of utilization of Current Awareness Services (CAS) and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria.

Perception of the relationship between SDI and scholarly communication outputs

In order to provide information services and resources to scientists in the quest for knowledge, agricultural research institute libraries also deploy Selective Dissemination of Information (SDI)

services. SDI is primarily concerned with keeping users up-to-date with information; matching a user profile as it arrives at an information provider. Defined by Luhn as cited in Uganneya (2011), SDI is seen as that service within an organization which concerns itself with channeling of new items of information, from whatever source to those points within the organization where the probability of usefulness in connection with current work or interest is high. SDI or simply called selectivity is the ability of a service to notify a client of materials that matches the interest of the client. A good selection is dependent on the ability of the individual or computerized system to keep up with the changing information needs of the client. Opara (2008) noted that SDI remains an effective and potential tool, which definitely boost research production and in the end, create a profound impact on policy makers, researchers and scientist in Africa including those in Nigeria. Empirical research carried by Uganneya and Agoh (2013) in a university of agriculture in Nigeria established the significant effect of SDI on agricultural productivity. A similar research conclusion was reported by Zainab (2001), who carried out a study on publication productivity of academic staff from the National University of Malaysia and University of Malaya. Based on the empirical findings and arguments above, we propose the following hypothesis:

Hypothesis 2: There is a significant relationship between the extent of utilization of Selective Dissemination of Information (SDI) and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria.

Perception of the relationship between IS and scholarly communication outputs

Another library and information service delivery in agricultural research institute libraries is the Internet Services (IS) frequently described as a network of computer networks. The Internet constitutes a new paradigm for storing, accessing and using information in agricultural research library system (Kotrlik & Williams 2012). A number of studies have been conducted in Africa looking at the role and utilization of Internet and ICTs in particular in the agricultural sector. For example Victor (2007) has indicated that the Internet has significantly impacted on developing countries educational and financial sector through ICT-enabled solutions for study and research production. Relatedly, Kusure, Mutanda and Mawere (2006) reported that the networks in Africa also aid in the sharing of research knowledge. According to him, the use of mobile phones by libraries and other information systems for information delivery help spread messages from the authentic source to those needing the information thereby contributing to research productivity. Similar research conducted by Kusure et al. (2005) and Gakuru (2009) indicates that the use of knowledge management web portals enhances research productivity in both Asia and Africa. In Nigeria, such research conclusions are also reported (Ehikhamenor 2003; Aker, 2008; Okon, Ngulube & Onyancha, 2013; Umehali & Nwankwo 2010; Ogunjobi & Fagbami, 2012). Following the evidence in the literature on the link between ICT and agricultural research productivity, we make the following hypothesis:

Hypothesis 3: There is a significant relationship between the extent of utilization of Internet Services (IS) and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria.

Perception of the relationship between ILLS and scholarly communication outputs

Inter-Library Loan Services (ILLS) is another form of library and information service delivery. Before the advent of technologies such as computers and networks, ILL was an established service of sharing among libraries. Vicha (2007) defines ILL as a process which the library request materials from another library. The author asserts that the aim of the service is to obtain, upon request by users, materials that are not available in the user's library. It supplement library's collection by obtaining materials needed for research, scholarship and private study that are not available at a users home institution library. Aguolu and Aguolu (2002) posits that ILLS is based on the premise that no single library can acquire and own all the materials its users need due to information explosion and the increasing cost of materials. They further maintain that through ILLS, libraries are able to deliver the best reading materials to the great number of users at the least cost; thereby, achieving the concept of 'joint consumption'. Several studies have examined the link between ILLS and research communication output. While studies by Naidu and Gunjah (2001), Beaubien (2007), Uganneya (2011) have established a positive relationship between ILLS and research communication output, Duy and Lariviere (2012) study found a negative correlation between ILLS and research communication output. On the basis of these findings, we state the following hypothesis:

Hypothesis 4: There is a significant relationship between the extent of researcher's utilization of Inter-Library Loan Services (ILLS) and their scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria.

Perception of the relationship between RS and scholarly communication outputs

Reference Services provide an avenue by which library and information service delivery can interface with a large body of knowledge to obtain the information users desire. Depending on the type of library or information centre, the service may range from the provision of the desired information to the training and educating of the user to identify and locate what he/she needs (Fisher & Kinch, 2011). Frank (2010) stated that for a successful agricultural Reference Services, there are at least three main attributes the reference librarian must possess. These include knowledge of agriculture, an understanding of agricultural information and librarianship (and its new technologies), and possession of the interpersonal skills to deal successfully with clients. Garfield (2009) therefore argued that in agricultural literature, one must be familiar with the larger body of scientific literature. The third attribute needed by the reference librarian; interpersonal skills, is the one that is often underrated (Hinckley, 1999).

To perform reference service well and increase the productivity of agricultural scientists, an agricultural librarian should be a good listener and a skilled, yet gentle inquisitor in order to perform the reference interview. Reference Services are therefore, the key to research productivity output of researchers. An effective reference service can dramatically improve a user's ability to use library resources and as a consequence, improve research productivity (Han & Goulding, 2003). There is strong empirical evidence that effective reference service delivery contributes to research productivity. Such positive relationship has been found in research studies conducted by Rao and Sarganarayana (2010), Broadbent (2011), Capanio (2007), Idachaba (2005) and Onuoh

and Omokoje (2013). Based on the theoretical and empirical findings, we propose the following hypothesis:

Hypothesis 5: There is a significant relationship between the extent of researcher's utilization of Reference Services (RS) and their scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria.

Perception of the relationship between CS and scholarly communication outputs

With the explosion of user's information needs, libraries and information centers are expected to share their information resources with their prospective users. Library resources are expected to be utilized by prospective users; these can be achieved through Circulation Services (Brown, 2008; McNiff, 2005; Uganneya, Ape & Ugbagir, 2012). According to Daudu and Shehu (2014), library circulation or library lending comprise activities around the lending of books and other materials to users of a library. Library circulation provides lending services, facilitates the return of loaned books, renewal of materials and payment of fines. The beauty of library and information service delivery is not only in the ability to provide needed and useful materials containing information for the community but also to be able to make them accessible to the clientele as and when needed, which is what circulation is all about (Adebowale, Okiki & Yakubu, 2013). According to Anunobi and Moneke (2008), when the needed resources are delivered, it contributes to improving research productivity significantly. This is confirmed by empirical findings reported by (Popoola, 2008; Udoudoh, 2009; Okiki, 2011; Ezeala & Nwalo, 2011; Uganneya, Ape & Ugbagir, 2012; Adebowale, Okiki & Yakubu, 2013) who found that Circulation Services contributes to research productivity. Based on the reported empirical relationship, we make the following proposition:

Hypothesis: There is a significant relationship between the extents of utilization of Circulation Services (CS) on researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria

Theoretical Framework

One of the frameworks to measure quality is SERVQUAL. This theory propounded by Parasuraman, Zeithaml and Berry in 1985 states that the higher the perceived quality of library services, the greater the level of user satisfaction and productivity. In service industries, SERVQUAL theory has been used to measure service quality from customers' perspective and in library setting it provides a convincing framework to measure library service quality. This theory stipulates that the higher the perceived quality of the library services, the greater the level of satisfaction of users. The SERVQUAL literature identifies five important elements of service quality including tangibility (physical facilities, equipment and appearance of personnel), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customers or library users and provide prompt service), assurance (knowledge and courtesy of staff and their ability to inspire trust and confidence) and empathy (caring or individual based attention in the firm - library provides to its users).

At the library, users expect that physical facilities in terms of reading table/chairs, air conditioners, quality lighting etc. would be available. They also expect that the services provided should be reliable and sustainable; therefore a presence of gap between expectation and actual service delivery will raise a concern. The users will also expect the library staff to be responsive. Responsiveness is defined as the willingness of the staff to help and provide services promptly. Another expectation of library users is assurance in the context of agricultural research libraries. Users want the staff to be knowledgeable, competent and possess the ability to trust, inspire and exhibit confidence. When the users know that the library staffs are knowledgeable and competent, they will be assured that their information needs and problems will certainly be solved leading to greater satisfaction and loyalty (Manjunath & Shivalingatah, 2004).

Library quality (LIBQUAL) was introduced into library and information service as an expansion of SERVQUAL. The concept of quality and customer service is not a new phenomenon for library and information science professional as it is rooted in library philosophy and principles. For example, Ranganathan's Law of Library Science, particularly the fourth law "SAVE THE TIME OF THE READER" implicitly focus on quality of library products/services from customers (library users) perspective (Manjunatha & Shivalingatah, 2004). This law views quality as efficient catalogues, self-instructive signal guides, knowledgeable staff, proper shelving, error free records, good documentation service and adequate finance. Though the quality concept is in library principles, the study of service quality as a management philosophy is of recent development to library and information science profession. The applications of SERVQUAL have been traced to the LIS discipline from the 1990s. The studies have varied from testing one service (inter-library loan) to testing the whole range of library services. The instrument has been used in academic, public and special libraries.

The SERVQUAL measures of service quality are measured in terms of difference between customers (users), perception (P) and expectation (E). The magnitude of difference between them measures how well the facilities; resources and services provided in the library matches the user's expectations. The negative score of 'minus E' ($P - E$) indicates shortfall in the perception of service quality. The more negative the SERVQUAL score, the more the service quality shortfall is in the eyes of users. The $P - E$ score is also termed as "gap". The SERVQUAL and LIBQUAL form the foundation of this study as it accesses the service quality and library settings. Hence, if the researcher's expectations of library and information service delivery are satisfactory, their research activities would be increased, thereby improving scholarly communication outputs as a result their productivity will be enhanced in Agricultural Research Institutes in North Central Nigeria.

RESEARCH METHOD

The research design adopted for this study is the correlational survey research design with a focus on North-Central, Nigeria. Specifically, the study centers on the four (4) National Agricultural Research Institutes Libraries located in North-Central, Nigeria. They include: National Cereal Research Institute (NCRI), Bida, Niger State; Nigerian Store Product Research Institute (NSPRI), Ilorin, Kwara State; National Veterinary Research Institute (NVRI), Vom, Plateau State and

National Institute for Freshwater Fisheries (NIFF), New Bussa, Niger State. The population of the study is 1,642 registered library agricultural research scientists/researchers in the four National Agricultural Research Libraries in North-Central, Nigeria (RIU, Nigeria, 2010). However, only 820 researchers were selected and included in the sample, arrived at by selecting in the first instance the first name on the list with subsequent selection done by selecting the next name after the second name on the list. Out of the 820 questionnaires distributed, 621 were returned, giving a response rate of 76%.

A questionnaire was designed, tested and validated before administering to the respondents. A Cronbach's Alpha coefficient for the measurement instruments was calculated as: Current Awareness Services = 0.771; selective dissemination services = 0.728; Internet Services = 0.742; Inter-Library Loan Services = 0.727; Reference Services = 0.733; Circulation Services = 0.887; and researchers' scholarly communication outputs = 0.782. For tests of hypotheses, Pearson Product Moment Correlation Coefficient (PPMCC) was used to establish the direction and degree of relationship between the variables as defined in the study.

RESULTS

Test of Hypotheses

This section presents the result of the test of hypotheses (as Table 1 indicates). Hypothesis one was stated that there is a significant relationship between the extent of utilization of Current Awareness Services and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria. Based on the reported p-value, Current Awareness Services has a significant positive correlation with researchers' scholarly communication outputs ($R = 0.714$, $p < 0.001$), implying that hypothesis one is accepted.

Hypothesis two was stated that there is a significant relationship between the extent of perceived utilization of Selective Dissemination of Information and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria. The hypothesis was accepted based on the significant p-value of 0.000 at 95% level of confidence with $R = 0.730$ leading to the conclusion that there is a significant relationship between researchers utilization of Selective Dissemination of Information and their scholarly communication outputs.

For hypothesis three, the study proposed that there is a significant relationship between the extent of utilization of Internet Services and researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria. This third hypothesis was also accepted based on the significant $p < 0.000$ at the 0.05 significance level with a reported $R = 0.722$ leading to the conclusion that the researchers utilization of Internet Services relates significantly with researchers' scholarly communication outputs in agricultural research institutes in North Central Nigeria.

Hypothesis four was stated that there is a significant relationship between the extent of researcher's perceived utilization of Inter-Library Loan Services and their scholarly communication outputs in

Agricultural Research Institutes in North Central Nigeria. The hypothesis as stated is also accepted ($R = 0.712$, $p < 0.001$) leading to the conclusion that there is a significant positive relationship between the researchers utilization of Inter-Library Loan Services and their scholarly communication outputs.

For hypothesis five, the study proposed that there is a significant relationship between the extent of researcher's utilization of Reference Services and their scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria. Based on the reported p-value of 0.000, this hypothesis is also accepted given ($R = 0.722$, $p < 0.001$) indicating that Reference Services positively relates significantly with researchers' scholarly communication outputs.

Lastly, hypothesis six was stated there is a significant relationship between the extent of perceived utilization of Circulation Services (CS) on researcher's scholarly communication outputs in Agricultural Research Institutes in North Central Nigeria. Based on the results of the correlation analysis, the hypothesis was accepted based, ($R = 0.730$, $p < 0.001$) leading to the conclusion that there is a significant relationship between researchers utilization of Circulation Services and their scholarly communication outputs.

The implication of the reported R- and p-values means that library and information service delivery measured as CAS, SDI, IS, ILLS, RS and CS all have positive significant relationship with researchers' scholarly communication outputs. It means that the delivery of CAS, SDI, IS, ILLS, RS and CS by the institute libraries will lead to an increase in researcher's scholarly communication outputs in agricultural research institutes in North Central Nigeria. The result also indicates that the delivery of SDI will have the greatest influence on RSCO followed by IS, RS, CS, CAS and lastly ILLS.

Table 1: Correlation Analysis of CAS, SDI, IS, ILLS, RS and CS and RSCO

	Variable	R	p-value	Decision
H₁	Current Awareness Services (CAS) and Researchers' Scholarly Communication Output (RSCO)	0.714	0.000	Accepted
H₂	Selective Dissemination of Information (SDI) and Researchers' Scholarly Communication Output (RSCO)	0.730	0.000	Accepted
H₃	Internet Services (IS) and Researchers' Scholarly Communication Output (RSCO)	0.722	0.000	Accepted
H₄	Inter-Library Loan Services (ILLs) and Researchers' Scholarly Communication Output (RSCO)	0.712	0.000	Accepted
H₅	Reference Services (RS) and Researchers' Scholarly Communication Output (RSCO)	0.722	0.000	Accepted
H₆	Circulation Services (CS) and Researchers' Scholarly Communication Output (RSCO)	0.719	0.000	Accepted

Source: Author Computation (2016)

DISCUSSION OF FINDINGS

The findings of this study are discussed in line with the stated hypotheses. Hypothesis one attempted to assess the extent of the relationship between utilization of CAS and scholarly communication outputs of researchers' in Agricultural Research Institute in North Central Nigeria which was found to be strong and positively correlated. Increasing CAS will therefore, lead to a positive increase in RSCO in agricultural research institutes in North Central Nigeria. This finding agrees with Singh (2011), Sirwardena (2005) and Oyedum (2006) who also reported a positive correlation between the status of CAS and agricultural scientist's research productivity.

For hypothesis two, the study explored the relationship between utilization of SDI and RSCO in agricultural research institutes in North Central Nigeria. A strong positive relationship was found between SDI and RSCO implying that an increase in SDI utilization therefore, contributes to an increase in RSCO. This finding is in line with the research conclusions by Dauda and Shehu (2014) that, there is a significant correlation between information service utilization and research development of agricultural scientists and its effects on their research. These findings are supported by the studies of Zainab (2001) and Uganneya et al (2014) that SDI utilization can make scholars research productive. Also, Roy (2010) concluded that an effective and efficient SDI system facilitates scientists/researcher's critical role in decision making towards improved researchers' communication outputs.

Hypothesis three explored the extent of the relationship between the utilization of IS and scholarly communication outputs of researchers' in Agricultural Research Institutes in North Central Nigeria. The study found a strong positive correlation between IS and RSCO implying that an increase in the utilization of Internet Services by the research institutes will lead to a positive increase in the number of researchers scholarly communication outputs. This finding agrees with Kasure (2006) that ICT plays a significant role in enhancing research productivity.

Also, similar research conclusions were reached by Ehikhamenor (2003), Victor (2007), Kusure et al (2005), Aker (2008), Okon et al. (2013) and Ogunjobi & Fagbami (2012) all reported a significant relationship between utilization of information service and research outputs of academic staff. A contrary research finding was reached by Oyedum (2006) who reported that because of the high cost of the Internet and low bandwidth, the low utilization of the Internet by researchers in Nigeria does not relate significantly with scholarly communication outputs of researchers.

For hypothesis four, emphasis was on exploring the relationship between researcher's utilization of ILLS and RSCO in agricultural research institutes in North Central Nigeria. The result showed a strong positive relationship indicating that when researchers in agricultural research institutes in North Central Nigeria increase their utilization of ILLS, their scholarly communication outputs is bound to also increase positively. This finding is in agreement with the study by Naidu and Gunjah (2001), Beaubien (2007), Uganneya (2011) which reports a strong positive correlation between ILL borrowing transactions and total research findings and total publications. However, Duy and Lariviere (2013) reported that the relationship is significant and negative.

Hypothesis five was proposed to assess the extent of the researcher's relationship between utilization of RS and scholarly communication outputs in Agricultural Research Institute in North Central Nigeria. The correlation coefficient between RS and RSCO is high and positive indicating that an increase in the utilization of Reference Services in agricultural research institutes leads to a positive increase in scholarly communication outputs of researchers' in Nigeria. As usual, this finding compares favorably with the studies conducted by Broadbet (2011), Capanio (2007), Rao and Sarganarayan (2010), Idachaba (2005) and Onuoh and Omokoje (2013) which all reported that RS has contributed significantly to scholarly communication outputs of researchers. The implication of this finding is that RS has a strong positive correlation with researchers' productivity.

Lastly, hypothesis six explored the extent of the relationship between researcher's utilization of CS and RSCO in agricultural research institutes in North Central Nigeria also shows a positive strong perceived relationship. The result of the findings indicates that an increase in the utilization of circulation service by the researchers in agricultural research institutes in North Central Nigeria will lead to an increase in the outputs of their scholarly communication outputs. Interestingly, this finding is closely related to the findings by Popoola (2008), Udoudoh (2009), Okiki (2011), Ezeala and Nwalo (2011), Uganneya et al (2012), Adebowale, Okiki and Yakubu (2013) who all reported that circulation activities have a close link (relationship) with scholarly communication outputs of researchers in Nigeria. Okiki (2011) on his part reported that adequate provision and utilization of CS in libraries studied have positively boosted research communication outputs and have created a profound impact on both scholarly communication outputs of researchers and agricultural productivity generally in Nigeria.

Implications and Recommendations

The findings of this study have some important educational implications as they relate to the delivery of library and information services to researchers in Agricultural Research Institutes in North Central Nigeria. The educational implication of this is that scholarly communication outputs of researchers in Agricultural Research Institutes in North Central Nigeria is tied to their utilization of CAS, SDI, IS, ILLS, RS and CS. If the respondents greatly utilize the services provided and if there is a strong positive and significant relationship between the utilization of all the service delivery and scholarly communication outputs, then it is expected that research interest of the researchers will increase invariably therefore increasing researchers' scholarly communication outputs, their individual visibility and that of their research institutes.

The study also established that agricultural research institutes libraries in North Central Nigeria should intensify their efforts towards adequate provision of Reference Services (RS). The Institute library administrators should put in more financial, human and material resources to enhance already existing service delivery to the researchers as the main objective of any library is to provide the right information in the right medium and at the right time. Also, a viable Inter-Library Loan Services (ILLS) is necessary. Based on the findings of this study, because ILLS has the least capacity of improving researcher's scholarly communication outputs, a viable and workable ILLS in the institute libraries would contribute to scholarly communication output. Finally, agricultural

research institute libraries in North Central Nigeria should organize workshops, seminars and other training sessions in order to enlighten and expose researchers and agricultural scientist to various library and information service delivery systems and the need to utilize them. Focus should be placed especially on Current Awareness Services and Inter-Library Loan Services in order to expose the services and their value to the researchers for their effective utilization towards increasing scholarly communication outputs. The library administration in corroboration with the Agricultural Research Institutes authorities should embark on occasional training sessions for academic staff especially agricultural researchers on information search techniques skills in order to enable the researchers have unlimited knowledge of search techniques to overcome their problems of not being able to access appropriate information materials in the library.

Limitations and Suggestions for Further Study

Due to the constraints of time, other possible forms of library and information service delivery such as statistical data analysis, document delivery, referral services, CD-Rom database searching, indexing and abstracting services, photocopying services, etc., were not covered in this study. More so, like any other study where questionnaire is used in data collection, the objectivity of the respondents was always not guaranteed. Also, some of the agricultural scientists/researchers were said to be on different types of leaves (study leave, maternity leave, sick leave or sabbatical leave) and were not accessible to complete the questionnaire, therefore not included in this study. Further research could be explored in assessing the relationship between reference service awareness and use by academic staff for research productivity in Agricultural Research Institutes in Nigeria. Comparative studies could also be done on universities and research institutes to assess their level and quality of scholarly communication output.

References

- Adebowale, T. O., Okiki, O. C. and Yakubu, E. D. (2013). Circulation activities in tertiary institutions in Nigeria: a discourse on circulation transactions of Yaba College of Technology Library *Information and Knowledge Management*, 3(4), 24 – 31.
- Adeyinka, F. M. (2014). Information services and scientists' research productivity in Nigeria: Evidence from Research and development Institutions. *Information and Knowledge Management*, 4(11), 54 – 62.
- Aguolu, C. C. and Aguolu, I. E. (2002). *Libraries and Information Management in Nigeria: Seminars Essays, Themes and problems*. Maiduguri: ED-Inform Services. 215p.
- Aina, L. O. (2006). Agricultural information provision in Nigeria. *Information development*, 2(4), 242 – 244.
- Aker, P. (2008). Networking among agricultural libraries in Benue State. *International library movement*, 29(1), 25 – 36.
- Anunobi, C and Moneke, P. O. (2008). User assessment of University Library Facilities and Services. *The Research Librarian Journal of the Nigerian Library Association*, 3(67), 122-135.
- Beaubien, A. K. (2007): ARL white paper on inter-library loan. *Association of research libraries*, 6(7), 8 – 20.

-
- Blackburn, R. T. and Lawrence, J. H. (2001). *Faculty at work, motivation, expectation and satisfaction*. Baltimore: The Johns Hopkins University Press.
- Broadbent, K. P. (2011). Mobilizing local capabilities for more effective exchange of information in developing countries: Agriculture as an example. *IAALD Quarterly Bulletin*, 42(2), 39 – 45.
- Brown, C. H. (2008). Circulation work in college and university libraries. Chicago, American Library Association. Retrieved from <http://www.deals.illinois.edu/hitstream/handle/2124/5736/librarytrendsv6i/dopt.pdf%3Fseq> on April 11, 2005.
- Capanio, J. F. (2007). The aquatic science and fisheries information system and international exchange. *Agricultural Library Information Notes*, 3(4), 1-12.
- Chavula, H. K. (2014). The role of ICTs in agricultural production in Africa. *Journal of Development and Agricultural Economics*, 6(7), 279 – 289.
- Creswell, J. W. (2003). *Measuring faculty research performance*. San Francisco: Jossey-Bass.
- Daudu, H. M. and Shehu, N. (2014). The role of Agricultural Research Institute Libraries in Consolidating Research and Development of Agriculturalists in Kaduna State, Nigeria. *American International Journal of Research in Humanities, Arts and Social Sciences*. Retrieved from <http://www.iasir.net> on 15/11/2015.
- Duy, J. and Lariviere, V. (2013). Relationship between interlibrary loan and research activities in Canada. *College and Research Libraries*, 75(1), 5-19.
- Ebiwole, P. M. (2010). Nigerian Public Library Service to Rural Areas: Libraries in Niger Delta State. *Library philosophy and practice*, 2(2), 12 – 24.
- Ehikhamenor, F. A. (2003). Internet resources and productivity in scientific research in Nigerian Universities. *Journal of Information Sciences*, 29(2), 107-116.
- Ezeala, L. O. and Nwalo, K. I. (2011). Correlation between productivity and the use of the library by Nigerian Agricultural Research Institute Research Officers. *Library Philosophy and Practice (e-journal)*. Retrieved from <http://digitalcommons.unl.edu/libphilprac/475> on 15/11/2015.
- Fisher, R. C. and Kinch, M. P. (2011). Agricultural Reference Services. *Library trends*, 38(3), 397 – 414.
- Frank, R. C. (2010). NAL's information service encounters approach. *Agricultural Libraries information notes*, 14(1/2), 1–6.
- Gakuru, M. K. (2009). Inventory of innovative farmer advisory services using ICTs. *The forum for agricultural research in Africa (FARA)*.
- Garfield, E. (2009). In truth, the flood of scientific literature is only a myth. *The Scientist*, (11), 25.
- Han, L. and Goulding, H. (2003). Information and Reference Services in the digital library. *Information Services and Use*, 23, 251-262.
- Idachaba, F. S. (2000). Instability of national agricultural research systems in sub-Saharan Africa: Lessons from Nigeria. The international service for national agricultural research (ISNAR), *Research report 13*.
- Johnson, C. (2009). The delivery and support of information services for academic research. *Journal of Documentation*, 29(19), 85-102.
- Kotrlik, J. W. and Williams, H. A. (2012). Factors associated with research productivity of agricultural education faculty. *Journal of Agricultural Education*, 43(3), 1-10.

-
- Kusure L. P., Mutanda, L. and Mawere, D. (2006). Factors influencing research productivity among lecturers in Teachers' Colleges in Zimbabwe, Southern Africa. *Journal of Educational Science and Technology*, 1(2), 118-124.
- Martin, B. R. and Irvine, J. (2001). Study of scientometric indicators and the evaluation of research. Retrieved from <http://www.docs/goggle.com/gview> on June 06, 2015
- Mcniff, P. J. (2005). Administration of Circulation Services. Retrieved from <http://www.deals.illinois.edu/bitstream/handle/2124/5736/librarytrendsv6i/dopt.pdf.%3fs%3feq> on April 11, 2015.
- Motiangu, I. P., Wallis, M. and Karodia, A.M. (2014). An evaluation of user satisfaction with library services at the University of Limpopo, Medunsa Campus (Medical University of Southern Africa). *Arabian Journal of Business and Management Review*, 3(11), 41-58.
- Naidu, G. H. S. and Gunjah, S. R. (2001). Inter-Library Loan Services in agricultural libraries in India. *Annals of Library science and documentation*, 39(4), 134 – 138.
- Parasuraman, A. and Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of marketing*, 49, 41-50
- Parkhi, G. R. (2008). Use of external CAS at Southampton University. *Aslib Production*, 25(1), 10-11.
- Popoola, S. O. (2008). The use of information sources and services and its effects on research output of social scientists in Nigerian Universities. *Library Philosophy and Practice*. Available at <http://libr.unl.edu/lpp/popoola.html>. Retrieved 15/11/2015.
- Rashid, M. (2001). *Educational research*. Islamabad, Pakistan: National Book Foundation
- Rhima, T. C. (2014). Library awareness and use of online social media in university libraries in South, Southern Nigeria. *Benue Journal of Library Management and Information Science*, 4(2), 25 – 34.
- Roy, M. (2010). *Current Awareness Services and Selective Dissemination of Information services in Agricultural University Libraries*. In Deshmukh Agricultural Sciences and Technology Metropolitan Books Company. New Delhi. 121.
- Singh, S. (2011). Information services in university libraries in India. *International Library Movement*, 2(1), 1–15.
- Straus, S. K. (2012). Research and information retrieval among academic researchers: implications for library instruction. *Library Trends*, 39, 238-285.
- Udoudoh, S. J. (2009). Academic library services and the development of education in Niger State of Nigeria in the 21st century. *A paper presented at the Nigerian library Association, Niger State Chapter 1st Annual Conference 26th March, 2009, p.3.*
- Uganneya, S. A. (2011). *Information service provision and user satisfaction in Agriculture Research Libraries in Nigeria*. Unpublished Ph.D. Thesis, University of Nigeria Nsukka. P. 225.
- Uganneya, S. and Agoh, J. A. (2013). *Librarianship for higher education students*. Makurdi: Glory Ikani Printers, 120p.
- Uganneya, S., Ape, R. and Ugbagir, N. (2010). Current awareness service and access to agricultural research information in Nigeria. *Journal of Applied Information Science and Technology*, 4, 25 – 30.

- Umehali, C. O. and Nwankwo, J. (2010). The integration of information and communication technology in library operations for effective library services. *Journal of Educational Media and Technology*, 14(1), 228-243
- Vicha, D. (2007). Inter-Library Loan Services for State Employees. Retrieved November 2, 2014 from <http://www.a;a.org/ala/rusarusaprotools/referenceguide/inter-library.htm>.
- Victor, N. N. (2007). Application of Information and communication technologies (ICTS) to library services: An essential resource for educational research. *Journal of Library and Information Science*, 5(2), 31-42.
- Wadesango, Newman (2014). Publish or Perish: Impediments to Research Output and Publication. *International Journal of Educational Science*, 6(1), 57 – 63.
- Zainab, A. N. (2001). Library resources and services and publication productivity. *Malaysia Journal of Library and information sciences*, 6(1): 71-91.