



TRENDS AND RESEARCH COLLABORATIONS IN LIS PUBLICATIONS OUTPUTS IN NIGERIA IN WEB OF SCIENCE 2000-2016

Innocent Iwezor Ordu, Ph.D

Department of Library and Information Science,
Rivers State University Nkpolu-Oroworukwo, Port Harcourt
Email: innocent.ordu@ust.edu.ng, innocent.iwezor@gmail.com

Okon, Edet Ani Ph.D

Department of Library and Information Science,
University of Calabar, Calabar.
anioedet@yahoo.com

&

Victor Wagwu Ph.D

Dame Patience Good-Luck Jonathan Automated Library
Ignatius Ajuru University of Education Rumu-orlumeni
Port-Harcourt, Rivers State, Nigeria.
vwagwu@gmail.com

Abstract

This study investigated trends and research collaboration in library and information science (LIS) publications outputs in Nigeria from 2000-2016 in the Web of Science (WOS) database. In accomplishing the research purpose, four research objectives and four research questions were formulated to guide the study. A descriptive research survey design was adopted. 270 articles formed the population of the study and also used as the sample size, mean while a census sampling technique was used with a checklist as instrument for data collection. The study was limited to the use of Social Science Citation Index (SSCI), Arts and Humanities Citation Index (AHCI) all in WOS to ascertain the trends of publication outputs in LIS for Nigeria while publication counts and analysis were used to analyze data based on the research questions. Results of the study showed among others that, there was an increasing and fluctuating trend in the annual publication outputs in LIS in Nigeria, also multiple authors dominated the published articles and researchers in Nigeria prefer to collaborate more with their colleagues within the same institution, whereas, there was a limited collaboration with foreign authors. Based on the above results, it was recommended that; researchers should endeavor to publish in journals with high impact factors, especially journals indexed in WOS, Scopus or Google Scholar; collaborations with foreign researchers should be encouraged to help in knowledge transfer and resource sharing; also, publishing with experienced colleagues can enhance research expertise and skills transfer among other recommendations.

Keywords: Trends, Research Collaborations, LIS Publications Outputs, Web Of Science.

Introduction

There is a growing concern about library and information science (LIS) researches among scholars in Nigeria and Africa in general in relation to growth, development and relevance of the discipline. LIS is being seen as a disciplinary that is characterized by more than one field

of study that puts into service the practice and principles of education information technology in the operations and services of the library.

Publications have become the business of academic institutions which explains the academic operations and activities that take place in the academic environment. For any discipline to gain credence and recognition like the LIS, it must be up to the task in the number, and quality of publication outputs in its area to match with other similar institutions when compared. It is important to note that publication outputs in a given discipline are an indicator of its growth and progress. It also indicates the image and capacity of individuals, discipline and institution. In addition, publication outputs act as indices for global rankings when compared with others similar disciplines, and subsequently a measure of assessment and evaluation of literature to ascertain the extent of growth and progress in the profession.

Meanwhile, a lot of challenges have been observed to advance the course of limiting the supposed gross increase and quality of publication outputs in a given discipline, such as funding of research, research collaborations, platforms for publications (source journals), research skills and expertise. These factors can limit the progress of and contribution of literature in the field of study. Although a lot of efforts have been made by individual authors to contribute in no small measures to the literature of their discipline in order to gain promotions as academic staff and advance in their field and as sole sponsors of their research and seminar, workshop and conference attendance. This ought not to be because; the motivation to achieve more publication outputs may be minimal and un-encouraging. Moreover, decreasing publication outputs in a given field does not give a good account of the discipline and does not promote recognition or visibility of individuals, discipline and institutions when ranked with other institutions. It goes contrary to the mandate of the parent institution (University) as a research hub of the society. Siddiqui, Ashiq and Shah (1997) have noted that, the usefulness of a field of study is measured by the amount and quality of research completed in the area, most importantly, bibliometric studies and methods have been used as tools to measure the scientific performance of individual authors, institutions and countries.

The purpose of any research is to bring novelty in the field towards national development. Thus, publications are always expected to be of high quality in order to produce knowledge that is applicable outside the research environment.

Although LIS studies provide solution related to the discipline, hence the need to ascertain the level of growth and impact made so far in LIS discipline through bibliometric studies and analysis becomes imperative. Therefore, based on these facts that there is a limited study of publication outputs in LIS in Nigeria, this study is being carried out to ascertain the bibliometric study of publication outputs in library and information science (LIS) in Nigeria – 2000 to 2016 using the Web of Science Database as source platform.

Statement of the Problem

Library and information science is a field that has come of age in most developed countries of the world but for Africa, it is still evolving. As a discipline, it is saddled with various developmental challenges, such as expansion of the scope of the profession, research issues (publications outputs) and ethical issues to measure with other recognized disciplines. No discipline can develop in isolation, hence the growing concern among scholars or researchers of LIS on its trends of publication outputs, collaborative efforts, patterns of authorship and how LIS publications are cited and journals where they are published have come to the front burner in this discourse. These concerns among researchers provide platforms to fashion out ways of improving the fortunes of the profession, especially in areas of quality publications. It has been observed, that there seems to be neglect, lack of commitment and support for research by government, private sectors and even university institutions who are supposed to sponsor and encourage research efforts of individuals for national development. This neglect has made individuals to become major sponsors of research in various institutions in Nigeria. Consequently, there is a growing concern for lack of TETFUND support for research publications, or quality research in Nigerian universities, due to lack of national criteria for evaluation, assessment and ranking of publication outputs at the country level. The poor state of LIS research funding in Nigeria has limited the profession in relation to what is obtainable globally. Research outputs are used for performance evaluation of academic staff and institutional ranking of universities, and when there is limited funding of research at the institutional level, it affects the rating and perhaps the comparative analysis by individuals and institutions with similar institutions. Meanwhile, bibliometric methods have been utilized as tools to measure and assess the level of individual and institutional progress in publication outputs over a period of time. By this, it acts as a scientific indicator for the scientific evaluation of research outputs LIS. However, there appears to be a shortfall in assessment of LIS publication outputs in the country level as a result of limited funding, this study is timely and would investigate the bibliometric analysis of publication outputs in LIS for Nigeria: from 2000-2016 using the web of science database.

Aim and Objectives of the Study

The aim of this study is to examine the bibliometric analysis of publication outputs in LIS for Nigeria from 2000-2016 in the WOS database. This study also examined the following specific objectives:

1. To determine the Trends in publications outputs in LIS research in Nigeria.
2. To determine the authorship pattern in LIS publications in Nigeria.
3. To find out the extent of national collaboration in LIS research in Nigeria.
4. To find out the extent of international collaboration in LIS research in Nigeria.

Research Questions

1. The following research questions were raised to guide the study:
2. What is the trend of publication outputs in LIS research in Nigeria?
3. What are the authorship patterns in LIS research in Nigeria?
4. What is the extent of national collaboration in LIS research in Nigeria?
5. What is the extent of international collaboration in LIS research in Nigeria?

Scope of the Study

This study focuses on trends and research collaborations in LIS publication outputs in Nigeria from 2000-2016, using the WOS database as a source platform. This study is limited to the use of Social Science Citation Index (SSCI), Arts and Humanities Citation Index (A & HCI). This covers all articles published in LIS in Nigeria from 2000 – 2016 with regards to the variables of the study thus; trends in publication outputs, authorship patterns, national and international collaborations in LIS.

Literature Review

Bibliometric studies employed a numerical approach for the description, evaluation and monitoring of published research. These techniques have the potentials to bring a systematic, transparent and reproducible review process and then make better the quality of reviews. Bibliometrics provide a system/procedure of assessment and measurement of publication trends and outputs for institutional rating when compared. According to Kessler (1993) and Small (1973), bibliometric methods are not new. It started gaining a wider attention with the proliferation of easily accessible online databases, such as the Thompson Reuter's Web of Science (WOS), Google scholar, and Scopus (Elsevier), which contain embedded citation information. Uzun (2002) examined a set of 21 core journals in the field of library and information science (LIS) from 1980-1999 for articles. Using a bibliometric indicator, result

showed that among the countries with declining trends in the numbers of articles, LIS publications were receiving high priority in Nigeria and Pakistan whereas among those countries with raising trends in publications, received low priority like in China, Turkey and Taiwan.

Zupic and Cater (2014) in a study of bibliometric methods in management and organisation posit that, bibliometric methods permit writers to base their findings on aggregate bibliographic information produced by other researchers working in the field that express opinions through citation and collaborations. Bibliometric studies present quantitative rigour into the personal rating of literature. In recent times, the volume of research publications has impressively increased and because of this increase, researchers have found it difficult to keep pace with relevant literature in the field. Perhaps the use of bibliometric methods to handle the wealth of data, filter the works through estimating the impact and discover the underline structure in the field (Zupic& Cater, 2014). Velmurugan (2013) studied the bibliometric analysis of the annals of library and information studies; from 2007 and 2012. A total of 203 articles retrieved through the official website for statistical analysis. The results revealed that the highest numbers of contributions (21.19 %) were published in 2010. While the minimum number of (13.31%) was published in 2012.

Authorship model represents an important bibliometric procedure for reflecting current communication patterns, outputs and partnership among authors. Sweileh, Al-Jabi, Zyoud, Sawalha and Al Khalil (2014) in a study, used authorship pattern, authors productivity, most prolific authors, as variables of bibliometric analysis. The findings showed that ‘‘publication outputs from Palestine indicated constant growth since the Oslo Peace accords’’. This implies that, there was a significant relationship between number of collaborating countries with Palestine in one hand, quantity and quality of research activity in the other hand. Swain (2014) examined publication patterns of ‘‘International Information and Library Review (IILR) from 2004-2013’’, to predict the strong effect and influence of this established journal in the discipline. It was discovered that, IILR has published more single authorship papers than two authorship papers, while contributions in three authorships and more than three-authorship papers were less in comparison. The degree of partnership in IILR papers was found to be 0.45%, indicating lower intensity of collaborative trend of research. Mukherjee (2009) examined the ‘distribution of articles by authorship patterns, nature of partnership, and geographic distribution of articles. Findings of the study showed that, the researchers from the US and the UK dominated publication of articles published in the journal, although

Nigeria was also listed among the 47 countries that published articles in the journal. Meanwhile, it was observed that the highest aggregates of articles were by single authors estimated at (35.59%) followed by two authors (33.64%), three authors (16.10%) and four or more authors (14.68%) respectively. The study finally asserted that, trend of authorship pattern of the articles in the journal was toward partnership as 64.41% articles were published by multiple authors (2 or more authors). Swain (2011) studied ‘the nature and patterns of research in the journal Library Philosophy and Practices (LPP)’ and the study noted that, “the authorship output pattern of LPP had a partial compliance with Lotka’s Law (1926)”.

National collaborations simply explain the research partnership that takes place between or among authors or researchers within same institutions or outside other institutions but within same country or region. Also, research collaboration is an important mechanism when it comes to quality and quantity of national research output (He, Geng and Campbell-Hunt, 2009). Maluleka and Onyancha (2014) in a study sought to assess the extent of research collaboration in Library and Information Science (LIS) schools in South Africa between 1991 and 2012. Informetric research techniques were used to obtain relevant data for the study. And the data was extracted from two EBSCO-hosted databases, namely, Library and Information Science Source (LISS) and Library, Information Science and Technology Abstracts (LISTA). The search was limited to scholarly peer reviewed articles published between 1991 and 2012. The data was analyzed using Microsoft Excel ©2010 and UCINET for Windows ©2002 software packages. The findings revealed that research collaboration in LIS schools in South Africa has increased over the past two decades and mainly occurred between colleagues from the same department and institution. There were also collaborative activities at other levels, such as inter-institutional and inter-country, although to a limited extent.

International collaborations simply mean the research partnership that takes place between or among authors or researchers from a particular country with another country. Bhue and Bhoi (2015) in a study attempted to evaluate the growth, research collaboration and publication in the field of Library science between India and China on the basis of research articles published during 1996-2014. The data available in SCImago Journal & Country Rank portal were used. A Scientometric assessment of the growth of publication and collaboration of research articles in the field of LIS has been presented in the study by analyzing, annual output of research articles, its citations and collaboration by China and India.

Khaparde and Pawar (2013) identified so many factors that can account for the increase in multiple authored papers. These include: The desire of researchers to increase their visibility, popularity and recognition; increasing specialization in the fields of librarianship and information science; the requirement for more knowledge in order to make significant advances, a demand which often can only be met by pooling one's knowledge with others; the need to gain experience or train new researchers in the most effective way possible; increasing desire to obtain cross-fertilization across related library and information science (LIS) field; and the need to work in close proximity with others, in order to benefit from their skills and tacit knowledge. Collaborative authorship improves the quality of a written work by bringing together people with complementary areas of expertise.

Methodology

This study adopted a descriptive survey design. This is because, it provides detailed and accurate picture of the characteristics and behaviors of a particular population or subject. Population for the study comprised 270 of all research articles in Library and InformationScience in Nigeria from 2000 to 2016 that are indexed in the WOS database. The study adopted census sampling technique to establish the sample size of 270 using the entire population; hence a checklist was employed as instrument for data collection. The Web of Science Core Citation Index published by Thomson Reuters was used as instrument for data collection in the study. Thomson Reuters method that was used cover five databases in the Web of Science Core Citation Index: 'Science Citation Index', 'Social Science Citation Index', 'Arts and Humanities Citation Index', 'Conference Proceeding Citation Index and Book Citation Index. Two of these citation databases: SSCI and AHCI are selected and used for the study. The data obtained were analyzed by country (Nigeria to be specific). Publication counts and analysis were adopted and applied to determine the nature, types and range of publication outputs for Nigeria. The productivity of authors and institutions, source titles, citation analysis and funding agencies were analyzed using the parameters outlined in the search engine based on the variables of the study. Only authors indexed in the WOS database were analysed. An analysis was conducted using simple percentages.

Results and Discussion

Table 1: Trends of publication outputs in LIS research in Nigeria in Web of Science

S/N	Publication year	Number of publications	% of 270
1.	2000	7	2.593
2.	2001	2	0.741
3.	2002	3	1.111
4.	2003	11	4.074
5.	2004	6	2.222
6.	2005	21	7.778
7.	2006	11	4.074
8.	2007	13	4.815
9.	2008	19	7.037
10.	2009	11	4.074
11.	2010	25	9.259
12.	2011	15	5.55
13.	2012	23	8.519
14.	2013	20	7.407
15.	2014	29	10.741
16.	2015	26	9.630
17.	2016	28	10.370
	Total	270	

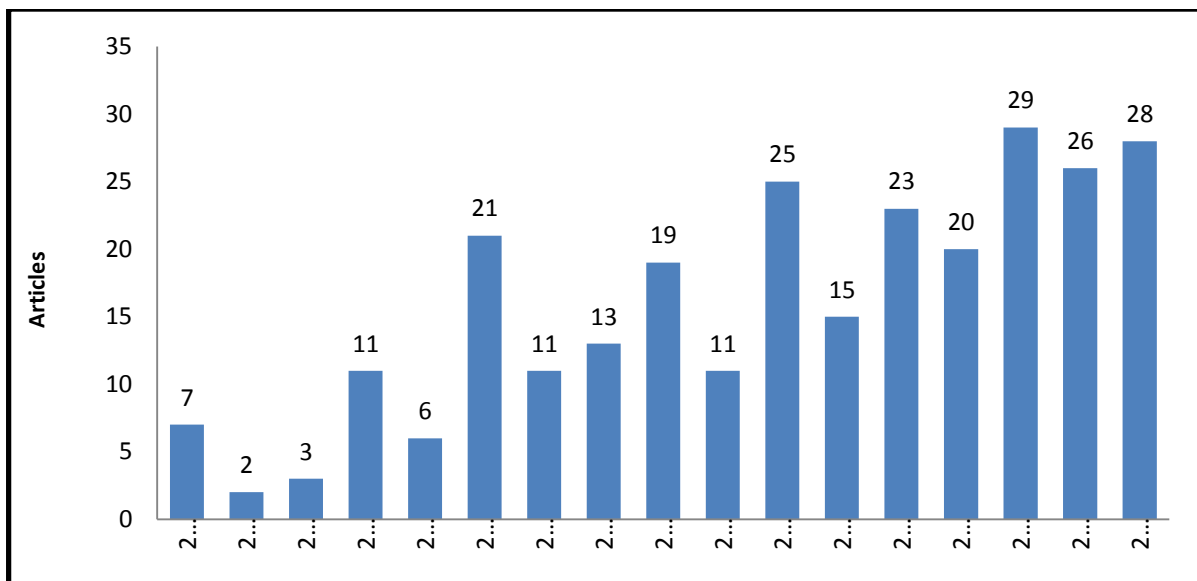


Table 1 shows the trend and growth of LIS publication outputs from 2000 to 2016 in the Web of Science database. The total publication outputs for LIS research in Nigeria from 2000 to 2016 was 270 articles; while the year 2014 witnessed the highest number of publications 29 (10.747%) outputs followed by 2016 which had about 28 articles (10.370%). Although, in the year 2001 and 2002, witnessed the lowest publication outputs with only 2 articles (0.741%); and 3 articles (1.111%), respectively. There was an upward increase in publication outputs in the year 2003 and a fluctuating trend in 2006 with 11 (4.074%) publications, 2007 with 13 (4.815%) publications; 2008 with 19 (7.037%) publications; 2009 with 11 (4.074%) publications and 2011 with 15 (5.556%) articles, respectively. Table1b showcases increased publication growth, although inconsistent or fluctuations in some instances like year 2000 with 7 publications while year 2001 and 2002 had 2 and 3 publications respectively. It further increased in 2003 with 11 publications, fluctuates in 2004 with 6 publications with the same trend up to 2016 with 28 publications.

Table 2: Authorship patterns in LIS research in Nigeria for top 20 authors

Authors' name	Organizations	Authorships patterns (single/multiple)				Degree collaboration	Number of articles
		One author	Two authors	Three authors	Four/more authors		
NWAGWU, W. E.	University of Ibadan	12	8	-	-	0.4	20
BARO, E. E.	NDU and	1	4	3	-	0.87	8
POPOOLA, S. O.	University of Ibadan	3	3	1	-	0.57	7
ASOGWA, B. E.	University of Nigeria, Nsukka	3	1	2	-	0.5	6
ODUWOLE, A. A.	Lagos State University	3	2	1	-	0.5	6
TIAMIYU, M. A.	University of Ibadan	1	3	1	1	0.83	6
ADOMI, E. E.	Delta State University	1	1	3	-	0.8	5
EZEMA, I. J.	University of Nigeria, Nsukka	1	4	-	-	0.8	5
OLATOKUN, W. M.	University of Ibadan	2	2	1	-	0.6	5
ANI, O. E.	University of Calabar	2	1	1	-	0.5	4
OKAFOR, V. N.	University of Nigeria, Nsukka	-	3	1	-	1	4
EHIKHAMENOR, F. A.	University of Ibadan	3	-	1	-	0.25	4
OMEKWU, C. D.	University of Nigeria, Nsukka	4	-	-	-	0.0	4
UGWOKE, B. U.	University of Nigeria, Nsukka	3	1	-	-	0.25	4
TELLA, A.	University of Ilorin	2	3	-	2	0.71	7

OJOKOH, B. A.	Federal University of Technology, Akure	-	1	1	1	1	3
OKIY, P. B.	Delta State University	2	-	1	-	0.33	3
OLORUNSOLA, R.	Redeemer University	-	2	-	1	1	3
OPARA, U. N.	Federal Polytechnic	3	-	-	-	0.0	3
OPEKE, R. O.	Babcock University	-	1	2	-	1	3
GRAND TOTAL		46	40	19	5	110	110
		(41.82%)	(36.36%)	(17.27%)	(4.55%)		

* Single author 46 papers (41.82%), *Multiple authors 64 papers (58.18%).

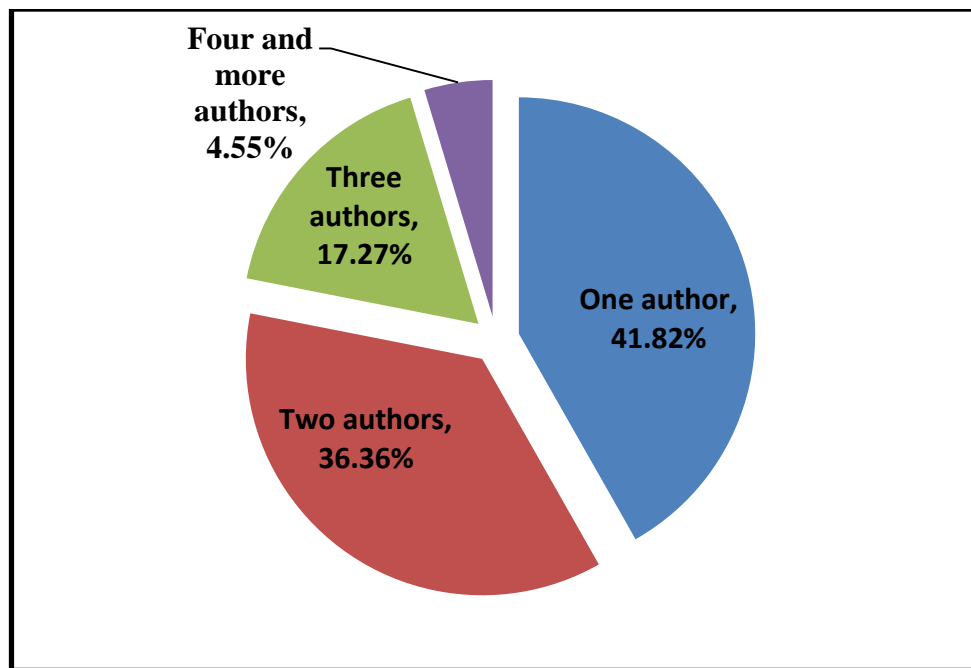


Figure 2: Authorship patterns.

Table 2 shows the collaborative authorship patterns in LIS in Nigeria in the WOS database over the period under investigation (from 2000 to 2016). The Table 2 concentrated on the top 20 authors that published in the Web of Science which produced 110 articles out of the 270 authored papers. From the 20 top ranked authors of LIS research in Nigeria, there was a progressive involvement of authors in research collaboration. The 270 articles produced by Nigerian researchers were noted to have come from either single authors or co-authored. Records showed that, single authored articles were estimated at 46 (41.82%), two authored articles were 40 (36.36%), three authored articles appeared 19 (17.27%); while four/more authored articles were estimated at only 5 (4.55%). However, this revealed the nature and types of research collaboration through single or multiple publications. Evidently, there were more co-authored articles (58.18%) than single authored articles (41.82%) as shown in the table and chart. Furthermore, there is limited collaborations outside the shores of Nigeria even collaborations between institutions within the country.

Table 3: National collaboration in LIS research in Nigeria 2000-2016

S/N	Authors	Total No. of articles	Organizations	Single authored	Multiple authored	Degree of collaboration
1.	NWAGWU, W. E.	22	University of Ibadan	12	5	0.22
2.	BARO, E. E.	8	NDU Bayelsa	1	10	1.25
3.	POPOOLA, S. O.	7	University of Ibadan	3	3	0.42
4.	TELLA, A.	7	University of Ilorin	2	4	0.57
5.	ASOGWA, B. E.	6	University of Nigeria, Nsukka	3	5	0.83
6.	ODUWOLE, A. A.	6	Lagos State University	3	2	0.33
7.	TIAMIYU, M. A.	6	University of Ibadan	1	8	1.33
8.	ADOMI, E. E.	5	Delta State University	1	7	1.4
9.	EZEMA, I. J.	5	University of Nigeria, Nsukka	1	3	0.6
10.	OLATOKUN, W. M.	5	University of Ibadan	2	3	0.6
11.	ANI, O. E.	4	University of Calabar	2	3	0.75
12.	OKAFOR, V. N.	4	University of Nigeria, Nsukka	0	5	1.25
13.	EHIKHAMENOR, F. A.	4	University of Ibadan	3	1	0.25

14.	OMEKWU, C. D.	4	University of Nigeria, Nsukka	4	0	0
15.	UGWOKE, B. U.	4	University of Nigeria, Nsukka	3	1	0.25
16.	OJOKOH, B. A.	3	Federal University of Technology, Akure	0	5	1.67
17.	OKIY, P. B.	3	Delta State University	2	2	0.67
18.	OLORUNSOLA, R.	3	Redeemer University	0	3	1
19.	OPARA, U. N.	3	Federal Polytechnic	3	0	0
20.	OPEKE, R. O.	3	Babcock University	0	3	1
Total Degree of Collaboration						13.72

Table 3 shows collaborating authors at the national level according to their degree of collaboration with the collaboration index also highlighted. This was done by ranking all authors who had three publications and more. It is pertinent to note that; majority of the authors with fewer than three articles had a very high degree of collaboration because most of them had only one or two co-authored publications.

From table 3, it is evident that the researchers who ranked high had a degree of collaboration above 0.6 while the one at the bottom stood below 0.4. Table 3 further revealed that, there were two authors who were estimated to have a perfect degree of collaboration, meaning, the number of multiple authored papers equalled the number of articles they authored: Such authors are: Olorunsola, R, and Opebe, R. O. respectively. Other authors who exhibited a high level of collaborations are: Adomi (DC = 1.4), Tihamiyu (DC = 1.33), Ojokoh (DC = 1.67), Baro (DC = 1.23), Okafor (DC = 1.25), Asogwa (DC = 0.83), Ani (DC = 0.75), Ezema (DC = 0.6), Olatokun (DC = 0.6) and Okiy (DC = 0.67) respectively. Meanwhile, majority of these authors had largely co-authored with either their research students or junior colleagues within their institutions or organizations. Moreover, some of the academics who recorded a higher degree of collaboration authored most of their papers under the tutelage of senior colleagues, of which some were former supervisors among others.

Table 4: International collaboration in LIS research in Nigeria 2000-2016

S/N	Authors	Total No. of articles	Organizations	Single authored	Multiple authored	Degree of collaboration
1.	NWAGWU, W. E.	22	University of Ibadan	12	2	0.1
2.	BARO, E. E.	8	NDU and	1	0	0
3.	POPOOLA, S. O.	7	University of Ibadan	3	0	0
4.	TELLA, A.	7	University of Ilorin	2	1	0.14
5.	ASOGWA, B. E.	6	University of Nigeria, Nsukka	3	0	0
6.	ODUWOLE, A. A.	6	Lagos State University	3	0	0
7.	TIAMIYU, M. A.	6	University of Ibadan	1	0	0
8.	ADOMI, E. E.	5	Delta State University	1	0	0
9.	EZEMA, I. J.	5	University of Nigeria, Nsukka	1	1	0.2
10.	OLATOKUN, W. M.	5	University of Ibadan	2	1	0.2
11.	ANI, O. E.	4	University of Calabar	2	0	0
12.	OKAFOR, V. N.	4	University of Nigeria, Nsukka	0	0	0
13.	EHIKHAMENOR, F. A.	4	University of Ibadan	3	1	0.25
14.	OMEKWU, C. D.	4	University of Nigeria, Nsukka	4	0	0
15.	UGWOKE, B. U.	4	University of Nigeria, Nsukka	3	0	0
16.	OJOKOH, B. A.	3	Federal University of Technology, Akure	0	1	0.33
17.	OKIY, P. B.	3	Delta State University	2	0	0

18.	OLORUNSOLA, R.	3	Redeemer University	0	1	0.33
19.	OPARA, U. N.	3	Federal Polytechnic	3	0	0
20.	OPEKE, R. O.	3	Babcock University	0	0	0
Total degree of collaboration						1.54

Table 4 shows the level of collaboration at which partnerships occur between researchers in Nigeria and their counterparts at the international level. This type of collaboration is sometimes referred to as international collaboration. Table 4 further revealed that, from data records from the Web of Science, not much has been done in area of international collaborations among researchers. Researchers who engaged at this level are Nwagwu (2) at 0.09 degree of collaboration, Tella (1) 0.14, Ezema (1) 0.2, Olatokun (1) 0.2, Ehikhamenor (1) 0.25, Ojokoh (1) 0.33 and Olorunsola (1) 0.33 respectively. It is also worth mentioning that the other factors that may have affected the results of collaboration at this level is the issue of research fellows attached to a national/local LIS school. Most of these researchers may have published with research fellows at the international level who happens to publish under the name of the same LIS School as the local researcher while actually from outside Nigeria.

There is also the issue of not engaging in international workshops, seminars and conferences which are avenues of researchers meeting and exchanging ideas that can translate to research collaboration. Also, is the issue of financing research and who becomes the first author in a given research. All these in one way or the other has a way of limiting the extent of international collaboration in LIS research in Nigeria. The records showed limited degree of international collaborations of LIS research in Nigeria.

Discussion of Findings

Trends in publication outputs in LIS research in Nigeria

The result showed that, not much has been achieved on the level of LIS publication outputs in Nigeria, considering the population size of the country, and the huge revenue accruing the enormous natural resources that the country is blessed with. Although, many factors can be responsible to affect research, such as; ‘the author’s choice of a journal for manuscript submission such as ‘the open access’, impact factor (IF), ‘specialty’, ‘publication fee’, ‘editorial and revision time’ (Sweileh *et al.*, 2014).

Meanwhile, there is an increasing and fluctuating trend in the yearly publication outputs of LIS research in Nigeria. This also confirms a recent study by Ani, Ngulube and Onyancha (2017) affirming an uncertain trend on the yearly publication outputs of LIS research in Nigeria. Similar results have been observed by Garg and Sharma (2017) in a study “Bibliometrics of Library and Information Science research in India during 2004-2015”, where a gradual decline was observed

from 2010 onward till 2015 with a slight increase in 2013 and with highest number of papers in 2010. The annual growth rate of LIS publications in Nigeria is highly inconsistent and has fluctuated during the time span of study. The highest rate for growth was observed for the year 2014 and the lowest rate was observed for the year 2001 and 2002 respectively. This does not speak well of the research output of LIS publications in Nigeria. There is need to intensify actions on publication outputs in LIS through research grants and supports at every level since the research outputs of any country depicts the capacity and progress made in a given field.

Authorship patterns in LIS research in Nigeria for top ranked authors

The analysis of this study was based on 20 top ranked authors and found out the authorship patterns/collaboration among LIS researchers in Nigeria from the WOS database. The findings revealed multiple authors dominated the published papers with 64 papers (58.18%) whereas single authors have a total of 46 papers (41.82%). Interestingly, looking at multiple authored papers according to how they are published, it was revealed that, single authored papers topped the list with 46 papers (41.82%) followed by two authored papers with articles 40 (36.36%) and four/more authored papers with 19 articles (17.27%) and four/more authored papers with 5 articles (4.55%).

Findings further revealed that LIS researchers in Nigeria prefer to collaborate with their colleagues within their institution or library as a result of working together in the same environment, the closeness that is associated with being colleagues. It is easier to co-author when working together in the same environment. This study also revealed co-authored papers with researchers or colleagues outside the institutions or library. This type of collaborative authorship pattern arises from meeting attendance in workshops, conferences, seminars and from former colleagues in places of former appointment.

This study revealed several reasons why authors collaborate: to pull their intellectual resources, to gain more knowledge, to have greater chance of increasing the quantity of their publication among others. It is pertinent to note that, co-authoring of an article with an experience colleague helps ‘to enhance the quality of the article and pull together expertise and skills’ (Adegbaye *et al.*, 2017). This finding confirms the study by Katz and Martin (1997) which revealed that ‘co-authored papers were more often found to be of excellent quality by peer reviewers than papers written by individual researchers. Similarly, through collaborations new researcher can closely

be mentored by more experienced researchers hence more knowledge is gained and more skills are acquired and improved upon.

National collaborations in LIS research in Nigeria

The finding of this study depicts the number of researchers engaging in collaborative research with fellow researchers in other institutions or within same institution across Nigeria. The findings of this study discovered that majority of the articles are co-authored compared to single authored papers. It was also revealed that the researchers were mainly colleague within same institution or library. The reason for this kind of partnership may be due to closeness or friendship working together in the same environment. The findings also showed Baro topped the list of national collaborators with 10 co-authored papers followed by Tamiyu with 8 co-authored papers, Adomi with 7 co-authored papers among others. Omekwu and Opara had the lowest co-authored records with zero collaboration. It is pertinent to note that research partnership enables researchers to share skills, ideas and techniques which suggests a way of transferring knowledge.

International collaborations in LIS research in Nigeria (2000-2016)

At this level, we are talking about collaboration at which partnership occurred between researchers in Nigeria and their counterparts internationally. The finding from this study revealed that, not much is done at this level. The study further revealed that, co-authored papers with foreign colleagues were very low, probably because of distance and other factors bothering on lack of attendance of international conferences, seminars and sponsorship.

The findings of the study showed that:

- There was an increasing and fluctuating trend in the yearly publication outputs of LIS research in Nigeria.
- 2 Multiple authors dominated the published articles.
- 3. Majority of the articles published were co-authored compared to single authored articles and were more of collaborations within same institution or nationally.
- 4. Co-authored articles with foreign colleagues were very low; suggesting low international collaborations in LIS research in Nigeria.

Conclusion

Bibliometric study of publication outputs of LIS is meant to measure scientific performance of individual authors, institutions and countries. It is believed that, by measuring and assessing the

various aspects of an article, bibliometrics becomes a veritable tools or instrument for annual global ranking of universities across the globe. By this, it becomes a measure of quantity and quality of publication outputs to a given field which x-rays the impact and progress in a particular profession. More so, publication outputs from a given institution or country represents the image of its research capacity and activity.

Authorship patterns and collaborations are sine qua non to quality research, a vital engagement which brings together skills, resources, ideas and permits for job division. Research collaborations among researcher helps to pull intellectual resources together, enhance knowledge and provide avenue for increasing the quality of publication. According to Adegbayeet *al.* (2017), co-authoring articles with experienced colleagues helps to enhance the quality of the article and skills and expertise. Collaborative authorship helps to deepen the relationship of colleague within the same institution and colleagues outside other institution for knowledge transfer and academic cooperation.

Recommendations

The following recommendations are made to facilitate the efficiency of bibliometrics in assessing every aspect of a written publication:

1. Researchers should endeavour to publish in journals that have impact factor like journals indexed in the Web of Science, Scopus and Google scholar.
2. Researchers should ensure that, they collaborate more with researchers outside their institution especially foreign authors.
3. Researchers should also ensure that, they publish or collaborate with experienced researchers in order to benefit from their research expertise and skills.

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