

# The Slow Progress of Library and Information Science Research in Africa

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## ABSTRACT

This study maps the LIS research in the African continent based on data from Scopus for the period 1996-2016. Finds that LIS research is non-existent in many African countries, is in a formative stage in many others and is concentrated in a few countries such as Nigeria and South Africa. The study recommends cooperation among the African nations and, between African nations and other countries in the world, to bolster LIS research in the continent.

**Keywords:** Library and Information Science, Activity Index, Relative Specialization Index, Africa.

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## INTRODUCTION

Africa is second largest continent on the earth, now considered as the most strategic in terms of its natural and human resources. Africa is also a very youthful continent. According to a British Broadcasting Corporation (BBC) report, 41% of the population in Africa is under the age of 15 and about 19% are between ages of 15 and 24. So, about 60% of the population is under the age of 25<sup>1</sup>. Endowed with a multitude of resources including a young populace, Africa has enormous development opportunities.<sup>[1]</sup> However, despite the availability of rich resources, many African countries are struggling to tackle poverty and are faced with numerous socio-political, economic and technological development upheavals in varying degrees. Investment in human resources and other forms of capacity building, for example, through enhanced Science and Technology (S and T) activities will enable the continent to catch-up with the world's available S and T knowledge.

The advent of the new 'technological revolution', many a time perceived as the 'Fourth Industrial Revolution', has an impact on almost every aspect of human lives. Like other countries in the world, many of the African countries also aspire to contribute and benefit in the new phase of the information society. According to Schwab, in this new phase the response to the 4<sup>th</sup> Industrial Revolution must be integrated and comprehen-

sive, including various stakeholders.<sup>[2]</sup> LIS as a discipline and also as a profession is also undergoing sweeping changes but remains as an important constituent in the education, research and innovation which is a mainstay for the progress and development of any country. Hence, the growth and development of LIS as a discipline particularly in the African context is as important as any other discipline as it contributes to the advancement of other subjects as well.<sup>[3]</sup>

This paper attempts to map the LIS productivity of African countries using scholarly journal publications as an indicator. The paper uses bibliometric indicators for mapping the productivity in terms of scientific publications in LIS domain.

## Literature Review

Although traditional LIS education and research in the African continent started in the 1930s, the modern LIS Schools in the African continent is a more recent development. According to Ocholla (2008),<sup>[4]</sup> LIS schools in Africa started in 1938, but the number of LIS Schools in the continent has not substantially increased over a period of time. By the 1980s, there were only five LIS schools in Ghana, Nigeria, Senegal and Uganda, and eighteen LIS Schools in South Africa; and in 2008, there were more than sixty LIS schools in Africa. However only about 28 LIS schools are recognised by American Library Association (ALA) directory, 12 in South Africa, 2 in Algeria, 2 in Egypt, 2 in Kenya, 2 in Nigeria, 1 each in Botswana, Ethiopia, Ghana, Namibia, Morocco, Tanzania, Tunisia and Uganda. The LIS schools in many of the African countries are either not available or non-existent<sup>2</sup>. This reflects that LIS education and research is a neglected discipline.

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According to Ocholla and Shongwe,<sup>[5]</sup> original LIS schools' major focus was in education and training of librarianship. In the recent years, there is a significant growth in the number of LIS schools in various regions of Africa. Among those, Anglo-phone (English speaking) Africa has significant growth in LIS School followed those in Francophone (French-speaking) and Arabic-speaking African countries. Moreover, most of the LIS schools are located within the higher educational institutes or universities.<sup>[5]</sup>

Ocholla (2008)<sup>[4]</sup> observed that LIS education and research in Africa shared common trends. The major challenges facing LIS education include various types of regulations, potential LIS job markets, infrastructure and inadequate research funding. The study further observed that the collaboration of LIS schools in Africa is quite weak and largely informal. There is hardly any research collaboration amongst LIS schools in Africa (Ocholla, 2008).<sup>[4]</sup>

In the recent years, a gradual shift has been observed in some of the African LIS schools. According to Nalumaga,<sup>[6]</sup> a few library training institutions in Africa have strived to match global standards by aligning to the concept of 'iSchool'. However, LIS training schools in Africa perhaps have not yet embraced the 'iSchool', concept but are gradually moving towards this.

A bibliometric study on the LIS research profile of Africa has observed that LIS researchers are mostly from the universities.<sup>[7-8]</sup> Nigeria and South Africa are the two prominent countries in the continent that are active in research as indicated by the higher number of publications and also because there are some prolific LIS researchers from these two countries. Aina and Mooko<sup>[7]</sup> observed that beside these two productive African countries, a significant number of publications have emanated from the Department of Library and Information Studies, University of Botswana and the Faculty of Information Sciences, Moi University, Kenya. The major finding of the study was that the African LIS research is mainly concentrated on professional education, information science, library management and information technology. Further, the less number of publications from the African continent was perhaps due to the less number of LIS journals published from the continent.<sup>[7]</sup> The study also observed that among the fifteen top-ranked journals used by the researchers in Africa, only two were published from the continent.<sup>[7]</sup> Even Scopus currently indexes only one library and information science journal from Africa, the *African Journal of Library Archives and Information Science* is covered since 2008. However, African Journals Online (AJOL.info, an initiative supported by INASP) hosts about 13 open access scholarly journals in the areas of library information sciences, including the journal mentioned above.

There are very few studies to determine both the quantity and quality of LIS research in Africa. Onyanacha<sup>[8]</sup> used Web of Science and EBSCO Online and observed that the research output and impact of LIS literature on the continent is relatively low as compared to other disciplines. Similarly, the LIS research from Africa is quite minimal both at the national and the world total of LIS research output. The study further observed that South Africa was at the top in terms of both research output and citations. The two countries Nigeria and South Africa constituted about 70 percent of Africa's total LIS publications and citations.<sup>[8]</sup>

Looking at the limited studies on the LIS research mapping from Africa, this study is an attempt to map the overall research output in LIS subject areas from the countries in African continent using bibliometrics/ scientometrics tools. The scholarly publication data has been retrieved from the Scopus database of Elsevier Science for the period 1996-2016. The study further tries to map the strength and weakness of LIS research in the continent through publication count, Activity Index, Relative Specialization Index, and citation patterns.

## Objectives

The paper has the following objectives:

1. To trace the overall growth as well as the region-wise growth of LIS literature of African countries from 1996-2016;
2. To trace the LIS research activities among the African countries in terms of two indicators 'Activity index' and 'Relative Specialization Index';
3. To analyse the citation patterns of countries in this region.

## METHODOLOGY

To analyze the overall growth, citation patterns and other indicators of African countries' scholarly publication data from the Scopus database of Elsevier was downloaded for the 21 year period of 1996 to 2016. For the journal and institutional ranking data, the SCImago Journal and Country Rank developed by SCImago from the widely known algorithm Google PageRank<sup>TM</sup> was used.<sup>[9]</sup> According to Scopus: Content Coverage Guide,<sup>[10]</sup> the database covers about 22,800 titles from more than 5,000 publishers around the globe. Among the total 22,800 different types of titles, the database covers only about 129 journals from Africa. Among these 129 journals only one LIS journal; "*African Journal of Library Archives and Information Science*" is covered in Scopus. As there is no database that extensively covers African LIS literature and keeping in view that Scopus is by far the citation database with the largest coverage, this study is based on Scopus.

The SCImago Journal and Country Rank developed various science indicators including, journal, subject, and country based on the 27-major thematic subject areas. Among the broad 27 thematic areas, Library and Information Science falls under the Social Science. All African country publications were downloaded from the LIS subject categories. Further, this web portal also draws citation data from Scopus. The further analysis of LIS publications patterns of Africa, for example; the overall growth of publications, region-wise growth of publication, activity and relative specialization index, a study of citation pattern and so on are carried out using the downloaded data.

## RESULTS

### Growth of literature

The LIS literature from the African continent shows a linear cumulative growth pattern. In 1996, there was only about 57 articles related to LIS field indexed in Scopus. By 2016, this has risen to 299 articles. Figure 1 shows the growth of LIS literature from Africa. The overall growth pattern shows a linear growth. Among the five zones of Africa, most of the LIS research activities are concentrated in the West and the South zone. Among these two zones, Nigeria from the West Africa and South Africa from the Southern Africa are the major contributors of LIS research in Africa. North and East Africa have made nominal contributions. From just two articles from the North African region in 1998, the numbers have grown to 106 articles in 2015. The Central African countries have contributed only 13 articles published during 1996-2016.

The countries that do not have any LIS publications during 1996-2016 include Angola, Burundi, Cabo Verde, Central African Republic, Chad, Comoros, Democratic Republic of Sao Tome and Principe, Djibouti, Gabon, Gambia, Guinea-Bissau, Madagascar, Republic of Equatorial Guinea, Republic of South Sudan, Saharawi Arab Democratic Republic and Somali Republic. These countries are among the poorest countries in the world and have a very weak S & T infrastructure. Hence it is quite obvious that these countries have non-existent LIS research.

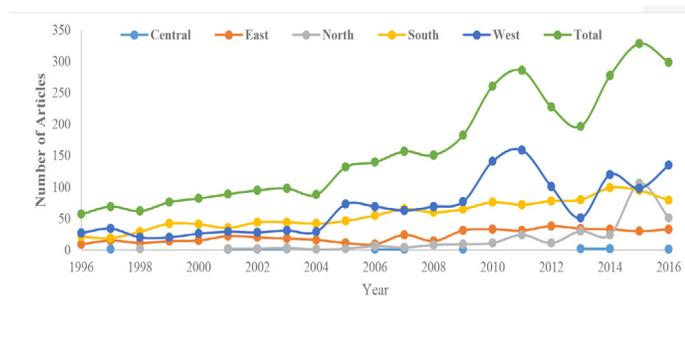


Figure 1: Growth of LIS Literature from Africa.

### Activity Index and Relative Specialization Index

In scientometrics exercises, two important indicators of specialisation are in use. In Activity index the share of publications of a given unit (institution, region or country) in a given subject area is compared with the total publication output (developed by Frame 1977) Relative Specialisation Index maps whether an entity has relatively higher or lower share of publication in a particular field compared to its overall publication in total.<sup>[11]</sup> (Schubert, Glänzel, and Braun, 1989, Schubert and Braun 1986). This study uses these two indicators “Activity Index” and “Relative Specialization Index” to map the strength of African countries in LIS research.

According to Ganzel,<sup>[11]</sup> Activity Index (AI) is defined as follows:

$$\text{Activity} = \frac{\text{the world share of the given country (region) in publications in the given field}}{\text{the overall world share of the given country (region) in publications}}$$

or, equivalently,

$$\text{Activity index} = \frac{\text{the share of the given field in the publications of the given country (region)}}{\text{the share of the given field in the world total of publications}}$$

The Relative Specialisation Index (RSI) is defined as

$$RSI = \frac{AI - 1}{AI + 1}$$

According to Aksnes, *et al.*<sup>[12]</sup> “The Relative Specialization Index (RSI) is an indicator that measures the research profile of a country by comparing the share of a given field in the publications of a given country with the share of the same field in the world total of publications. If measured over time, this indicator may be influenced in the world total by the increased representation of certain other countries with different research profiles”.<sup>[12]</sup>

Further, according to Ganzel,<sup>[11]</sup> RSI may take its values in the range [-1,1]. The value of RSI towards -1 indicates the activity in the subject is negligible and *or equals* = -1 shows that there is no activity in the subject. If the value of RSI = 1 shows the no other field other the given field is only active. RSI < 0 indicates a lower-than-average, RSI > 0 a higher-than-average activity; RSI = 0 reflects a completely balanced and the “average” situation.<sup>[11]</sup>

In terms of total scientific publications, South Africa tops with 213, 998 publications (globally ranked 35<sup>th</sup>), followed by Egypt (157,835), Tunisia (67,698), Nigeria (67,008) and

Algeria (49, 697). However, in the field of LIS, Nigeria tops in the African continent with 1,146 publications (globally ranked 20<sup>th</sup>) followed by South Africa (24<sup>th</sup> globally, 926 publications), Botswana (46<sup>th</sup> globally, 202 publications), Egypt (49<sup>th</sup> globally, 173 publications), Ghana (50<sup>th</sup> globally, 171 publications), Tunisia (58<sup>th</sup> globally, 173 publications), Kenya (60<sup>th</sup> globally, 116 publications) and Algeria (62<sup>nd</sup> globally, 102 publications).

Table 1 shows the position of the countries in terms of Science and technology publication, a global rank of countries in terms LIS publications, Activity Index and Relative Specialization Index.

The Activity Index and the Relative Specialization Index are in the following decreasing order: Botswana (AI=-0.035; RSI=-0.933), Sierra Leone (AI=0.032; RSI=-0.937), Swaziland (AI=0.018, RSI=-0.965), Nigeria (AI=0.017, RSI=-0.966), Ghana (AI=0.012, RSI=-0.967), Namibia (AI=0.012, RSI=-0.977) and so on. Although these countries are ranked low in terms of total LIS publications, AI and RSI shows that LIS Research in these countries is quite active than the other countries in the continent.

Fifteen countries in the African union have not produced any LIS articles. Hence, their activity index is zero and relative specialization index is -1. Although most of these countries have some publications indexed in Scopus, the number in activity Index and relative specialization index shows that these countries have no LIS research activity. The number indicated in the bracket shows their total number of publication during 1996-2016; Angola (844); Burundi (490), Cape Verde (238), Central African Republic (624), Chad (434), Comoros (117), Democratic Republic of Sao Tome and Principe (51), Djibouti (214), Equatorial Guinea (179), Gabon (2261), Gambia (2207), Guinea-Bissau (525), Madagascar (3555), Republic of South Sudan (0), Saharawi Arab Democratic Republic (11) and Somalia (136).

### Citation Analysis

In research evaluation, citations are very widely used to measure the impact of scientific publications.<sup>[13-14,11]</sup> According to Moed,<sup>[15]</sup> "Citation analysis involves the construction and application of a series of indicators of the 'impact', 'influence' or 'quality' of scholarly work, derived from citation data". Although there are many criticisms of citation analysis, it is widely accepted as a standard indicator in scholarly communication and in the assessment of research performance.<sup>[15]</sup>

Table 2 shows that Egypt is ranked 49<sup>th</sup> Globally in LIS research output but received highest (11.57) citations per paper. South African papers received 6.17 citations per paper. These two countries are highly productive countries from Northern and Southern part of Africa.

During the period 1996-2016, South Africa ranked 1<sup>st</sup> from Africa (213,998 documents) in overall scientific research output. South Africa received 12.57 citations per paper and Egypt 8.44 citations per paper which indicates that per paper citation of Egypt and South Africa is at par with the LIS research output.

Although Nigeria tops in terms of total LIS research output, per paper citation is quite low. During the period Nigerian papers received 2.19 citations per paper. This placed Nigeria at the 30<sup>th</sup> position with regard to citations per paper.

The self-citation per paper is quite high in Tunisia (about 41 percent), Nigeria (38 percent), Algeria (37 percent), Cameroon (26 percent) and Malawi (24 percent). The highest self-citations are received by Tunisian research output. Among the 155 total citations received in Tunisian research articles, 63 articles are self-citations. In Nigerian research output among the total 2,512 citations received to Nigerian LIS research 963 are self-citations (38.34 percent).

The h-index shows that South Africa has the highest number of LIS researchers with quite a substantial number and important publications. Countries with decreasing number of h-index are as follows; South Africa (31), Egypt (18), Nigeria (16), Botswana (15), Kenya (12), Ghana (10) Morocco (10), Tanzania (10).

## DISCUSSION

The overall scientific productivity from the African continent is growing<sup>[16]</sup> and as is shown in the present study, the cumulative research output in LIS field from African continent is also growing but at a rather slow pace. The total LIS literature from Africa is also quite low. The maximum number of 329 articles was published in the year 2015 which dropped to 299 articles in 2016. The reason for this sudden drop is not known but may have to do with the coverage of Scopus.

The region-wise growth pattern shows that Western Africa is the most productive region followed by Southern region. Rather than the region as a whole, the productiveness of these regions is owing to two countries, one each in the respective region. Nigeria in West Africa and South Africa in Southern Africa are more productive. Central Africa's contribution to the overall LIS research of Africa is quite minimal.

South Africa, Egypt, and Tunisia are active in scientific research as reflected from the increased publication activity but this does not seem to extend to LIS research. The activity index and relative specialization index show that LIS research in Africa is not focussed. It can be said that LIS research in the top producing countries are quite neglected discipline.

Citation analysis shows that some the countries' research outputs have received quite a good number of citations which indicate the importance of LIS research in Africa and its global relevance.

**Table 1: Activity Index and Relative Specialization Index of LIS Research from African Countries.**

Global Rank	LIS Rank	Country	Total Documents	LIS Documents	Activity Index	Relative Specialization Index
103	46	Botswana	5,852	202	0.035	-0.933
161	90	Sierra Leone	770	25	0.032	-0.937
152	98	Swaziland	1239	22	0.018	-0.965
52	20	Nigeria	67,008	1,146	0.017	-0.966
85	50	Ghana	13,851	171	0.012	-0.976
128	86	Namibia	2703	32	0.012	-0.977
173	129	Lesotho	528	5	0.009	-0.981
113	85	Zambia	4652	36	0.008	-0.985
184	138	Liberia	368	3	0.008	-0.984
86	63	Tanzania	13632	90	0.007	-0.987
88	67	Uganda	13279	73	0.005	-0.989
35	24	South Africa	213,998	926	0.004	-0.991
67	60	Kenya	27711	116	0.004	-0.992
77	70	Ethiopia	15696	65	0.004	-0.992
105	93	Malawi	5705	23	0.004	-0.992
115	102	Benin	4311	17	0.004	-0.992
130	108	Mauritius	2560	10	0.004	-0.992
97	89	Zimbabwe	8163	26	0.003	-0.994
51	58	Tunisia	67698	133	0.002	-0.996
56	62	Algeria	49697	102	0.002	-0.996
98	101	Senegal	8077	18	0.002	-0.996
99	106	Sudan	7043	12	0.002	-0.997
114	120	Libya	4633	7	0.002	-0.997
125	128	Mozambique	2802	5	0.002	-0.996
140	133	Niger	1814	4	0.002	-0.996
172	163	Seychelles	541	1	0.002	-0.996
175	165	Eritrea	520	1	0.002	-0.996
167	167	DR Congo	630	1	0.002	-0.997
171	174	Mauritania	544	1	0.002	-0.996
41	49	Egypt	157,835	173	0.001	-0.998
57	77	Morocco	47329	54	0.001	-0.998
89	112	Cameroon	12598	9	0.001	-0.999
110	130	Côte d'Ivoire	5271	5	0.001	-0.998
126	134	Mali	2797	4	0.001	-0.997
117	139	Congo	3779	3	0.001	-0.998
107	141	Burkina Faso	5426	3	0.001	-0.999
136	144	Rwanda	2166	3	0.001	-0.997
144	152	Togo	1640	2	0.001	-0.998
162	162	Guinea	739	1	0.001	-0.997

**Table 2: Citation analysis of African LIS research output.**

Global Rank	Country	Documents	Citable documents	Citations	Self-citations	Citations per document	H index
49	Egypt	173	167	2001	95	11.57	18
120	Libya	7	7	54	2	7.71	2
167	Democratic Republic Congo	1	1	7	0	7	1
24	South Africa	926	879	5717	1151	6.17	31
46	Botswana	202	201	1123	118	5.56	15
144	Rwanda	3	3	15	0	5	2
63	Tanzania	90	89	444	59	4.93	10
134	Mali	4	4	19	0	4.75	2
106	Sudan	12	12	52	5	4.33	4
60	Kenya	116	115	492	55	4.24	12
101	Senegal	18	18	73	11	4.06	6
70	Ethiopia	65	64	252	13	3.88	9
93	Malawi	23	23	85	20	3.7	6
85	Zambia	36	35	129	13	3.58	6
77	Morocco	54	50	190	34	3.52	10
67	Uganda	73	73	255	25	3.49	8
102	Benin	17	17	58	6	3.41	5
130	Côte d'Ivoire	5	5	17	0	3.4	2
128	Mozambique	5	5	16	0	3.2	2
98	Swaziland	22	22	67	3	3.05	4
112	Cameroon	9	9	27	7	3	2
162	Guinea	1	1	3	0	3	1
163	Seychelles	1	1	3	0	3	1
86	Namibia	32	32	94	5	2.94	6
89	Zimbabwe	26	24	74	3	2.85	4
108	Mauritius	10	10	28	4	2.8	3
50	Ghana	171	170	424	79	2.48	10
141	Burkina Faso	3	3	7	0	2.33	1
133	Niger	4	4	9	0	2.25	1
20	Nigeria	1146	1134	2512	963	2.19	16
62	Algeria	102	98	171	63	1.68	7
90	Sierra Leone	25	25	39	0	1.56	4
58	Tunisia	133	128	155	63	1.17	7
129	Lesotho	5	5	5	0	1	2
138	Liberia	3	3	3	0	1	1
152	Togo	2	2	2	0	1	1
139	Congo	3	2	2	0	0.67	1
165	Eritrea	1	1	0	0	0	0
174	Mauritania	1	1	0	0	0	0

## CONCLUSION

LIS research in Africa is growing at a slow pace and the continent continues to contribute marginally to the global LIS literature. Even the relatively more productive African countries like South Africa, Egypt and Nigeria have very low activity index and relative specialization index, which is an indicator that LIS research is on lower priority in the continent. As the continent is striving to step into to the global information economy, it is imperative that there is thrust on research and development across all areas including library and information science. As of now, only one LIS research journal from the continent is indexed in Scopus. Owing to the low coverage of journals from developing countries by international citation databases such as Web of Science and Scopus, a few countries like India have developed their own citation databases. A citation database for the African continent would be able to give a different picture of the research activities in the continent, not only in LIS but other disciplines as well. The more productive countries like South Africa, Egypt and Nigeria should take a leadership role in LIS for the African continent for enhancing research productivity in their own countries. Others should also join hands as well to expedite the process of creation of an African Citation Index. The African Citation Index (ACI), being developed by the Council for the Development of Social Science Research in Africa (CODESRIA), is not yet fully functional and the progress is very slow. However, AJOL.info has achieved a significant progress in organizing 521 scholarly journals, including 246 open access journals, through a single journal gateway. AJOL may think of co-development of ACI in association with CODESRIA.

Further research in the areas of collaboration and linkages of LIS schools among African countries as well as external collaborators will give the collaboration dynamics of LIS research in Africa. Also, the research areas using keyword will find the strength of LIS research. These supplementary studies will enlighten the strength and weakness of LIS research in Africa.

### Footnote:

1. How will a population boom change Africa? <http://www.bbc.com/news/world-africa-34188248> Accessed on 8<sup>th</sup> May 2018
2. World List of schools and departments of information science <http://www.ala.org/educationcareers/employment/foreigncredentiaing/worldlist>

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ABBREVIATIONS

**LIS:** Library and Information Science; **S and T:** Science and Technology; **AI:** Activity Index; **RSI:** Relative Specialisation Index.

## SUMMARY

This paper maps the scholarly output in Library and Information Science research of African countries using different bibliometric indicators. The study observed that LIS research in many of the African countries need to be strengthened.

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