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Google Scholar-based citation analysis of Indian library and information science journals

Swapan Kumar Patra

Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi-110067, India,
Email: skpatra@gmail.com

Indian library and information science (LIS) journals are not indexed in Web of Science (*WoS*) database and lately Scopus® database of Elsevier B.V. has indexed three Indian LIS journals. Hence, Google Scholar (GS) is the only available global database for the citation analysis of Indian LIS journals. Based on GS, this study has traced the citation and authorship patterns of selected LIS journals. Although, GS covers wide spectrum of scholarly literature worldwide, this study found that Indian LIS journals have low visibility even in GS database. In terms of citations, multiple-authored articles generally got more citations than the single-authored articles. This study suggests LIS researchers to increase collaborations for better visibility of their research.

Keywords: Google Scholar; Citation Analysis; Library and Information Science Journals; Publish or Perish; India

Introduction

Library and information science (LIS) journals have long history in India. The genesis of LIS journals in India is more than a century old. The first Indian LIS journal, *Library Miscellany* was published in 1912. However, the journal was short-lived and stopped publication in 1919. Thereafter, a number of library and information science journals have been published from India. A couple of journals have been established by Dr. S. R. Ranganathan, 'the Father of Library Science in India'[1]. Quite a few have been in publication for more than 50 years. These include *IASLIC Bulletin*, *Library Herald* and *Annals of Library and Information Studies.* It is estimated that there are about 100 journals currently published from India in English and other regional languages. Despite its long history, the coverage of the Indian LIS journals in secondary and tertiary databases is limited. It is only very recently that *Scopus* database of Elsevier B.V. has started indexing three LIS journals from India. These journals are *Journal of Digital Information Management (from 2007 onwards) DESIDOC Journal of Library and Information Technology* (from 2013 onwards) and *Annals of Library and Information Studies (from 2012 onwards)* (Journal Rankings SJR, 2013)[2]. However, no Indian LIS journal is indexed in Thomson Reuter's Web of Knowledge (WoK). LIS scholars argue that non-coverage of Indian LIS journals in prominent citation indexing databases are owing to many drawbacks that include publication delays, predominantly Indian editorial boards, inadequate review policy, poor subject coverage, and so on[3]. However, a huge volume of LIS literature is published in a large number of Indian LIS journals. The recently launched *Indian Citation Index* (ICI) indexed about 22 Indian LIS journals with very limited coverage (2004 onwards). So, a vast amount of LIS literature is missing in indexing and abstracting databases. In the recent years, Google Scholar (GS) has emerged as a third alternative to the two well-known citation databases, the *Web of Knowledge* and *Scopus.* The free availability of *Google Scholar* and its extensive coverage is being looked at by researchers for evaluative studies despite its many limitations[4-6]. The two well-established citation databases hardly index Indian LIS journals, GS is the only currently available option to map the citation pattern of Indian LIS journals.

To analyze the strength and weaknesses of Indian LIS journals, this article examines the citation pattern of Indian LIS journals as reflected in *Google Scholar*. This study used freely available downloading tool called 'Publish or Perish'[7] to download data from GS. The downloaded data was analyzed to map the citation trends of Indian LIS journals.

Literature review

Citations provide links to the intellectual heritage foundation for the citing paper. It also provides the historical context for displaying the unique contributions of the citing paper[8]. A substantial amount of literature is available on pros and cons of journal impact factors, its uses and misuses[9]. In spite of its criticisms, the journal impact factors and journal rankings within a JCR subject category are widely used for various evaluation purposes. The general criticisms about the citation analysis are; the citation counts include negative citations (citations to incorrect results), and self-citations (citations to the works of the citing authors). However, according to Garfield 'citation analysis can introduce a useful measure of objectivity into the evaluation process at relatively low financial cost if it is properly used'[10].

A number of studies have identified core LIS journals where Indian LIS researchers publish their research output[11,12] and also in the South Asian regions[13]. Although, *WoS* does not index Indian LIS journals, articles published in Indian LIS journals and, cited by the SCI/SSCI source journals, are available in *WoS* as cited references. The indexing based on the 'cited reference search' shows that *Annals of Library and Information Studies*, *DESIDOC Journal of Library and Information Technology*, *SRELS Journal of Information Management*, *IASLIC Bulletin* are prominent Indian LIS journals[1]. The citation trends of articles published in Indian LIS journals between 1975 and 1985 contained a low rate of citations in comparison to other subjects. Simultaneously, it was observed that, the number of research-orientated publications has increased in Indian LIS journals during 1970's and 1980's[14]. After the study by Mahapatra, in 1994, no such study tried to map the overall citation pattern of Indian LIS journals as a whole. However, there are many studies that carried out citation analysis of individual journal for example, *Journal of Biosciences*[15], *Annals of Library Science and Documentation*[16] and so on.

A number of studies from different countries have used GS for citation analysis. Onyancha has analyzed Sub-Saharan African Library and Information Science Journals[17], Ma et. al. has analyzed co-citation patterns of information science in China using Chinese Google Scholar[4]. However, citation analysis of Indian LIS journals using GS is not available. Hence this study is an attempt to analyze the citation pattern of selected journals from the available citations in GS.

Objectives of the study

- To create a publication profile (number of article published, citation received, h-index and g-index) of selected LIS journals
- To study authorship patterns of Indian LIS journals; and
- To chart citation trends of selected journals based on authorship patterns.

Methodology

In recent years, many scholarly articles have compared the coverage, features, and citation analysis capabilities of Google Scholar, Scopus and Web of Science[18]. Scholars have observed advantages and limitations of one database with that of other[19,20]. The major advantage of GS is that it is freely available. Besides this, the search can be performed at a modest speed[21]. However, Harzing has pointed out the following limitations of GS. *Firstly,* in GS search many non-scholarly citations also creep in; *secondly* many scholarly journals are excluded and not indexed in GS; *thirdly* its coverage might be uneven across different disciplines. *Fourthly,* GS sometimes exclude older publications and *finally* its automatic processing sometimes creates illogical results[22]. Although, there are severe criticisms of Google Scholar, it is increasingly becoming popular among LIS and other professionals as a highly efficient information source and services[23, 24].

Publish or Perish is a software program that retrieves and analyzes academic citations from GS. It can download records from GS and Microsoft Academic Search[23]. For this study Publish and Perish software was used to retrieve data pertaining to Indian LIS journals for citation analysis. Indian LIS journals were selected from International Standard Serial Number (ISSN) assigned by National Institute of Science Communication and Information Resources (NISCAIR). Also, various other web-based lists were consulted to prepare a comprehensive list of Indian LIS Journals. A list of about 96 journals related to LIS field was prepared from the ISSN database. A number of journals in the list were new and with ISSNs being assigned recently. Many of these new journals are

online only journals. The following journals yielded very few records from GS search. For example, *e-library Science Research Journal* (3 records), *SALIS Journal of Library & Information Science* (2 records), *SALIS Journal of Information Management and Technology* (1 record), *SST Journal of Advances in Librarianship* (2 records), *Professional Journal of Library and Information Technology* (4 records) and many more have very few records. Hence these journals were not considered for the analysis. From this list, the journals which are more than five years old are taken for further analysis. It was noted that a couple of journals have changed their names and continued publications. For example, *Annals of Library Science and Documentation* has changed its name to *Annals of Library and Information Studies* and continued its publication from 2001. *SRELS Journal of Information Management* was known earlier as *Library Science with a Slant to Documentation*. *DESIDOC Bulletin of Information Technology* has changed its name to *DESIDOC Journal of Library & Information Technology* in 2008.

Many journals have ceased publication. For example, the famous LIS journal *Herald of Library Science* has stopped its publication in 2006. So in the present study, the analysis is based on journals which are at least five years old and have more than 10 articles indexed in GS. This limits the number to 15 journals. The Google Scholar's records for those selected journals are downloaded in MS Excel for further analysis. The selected journals for this study are; *Annals of Library and Information Studies, COLLNET Journal of Scientometrics and Information Management, DESIDOC Journal of Library & Information Technology, Herald of Library Science, IASLIC Bulletin, ILA Bulletin, Indian Journal of Library and Information Science, International Journal of Library and Information Science, International Library Movement, Kelpro Bulletin, Library Herald, Library Progress (International), Pearl : A Journal of Library and Information Science, SRELS Journal of Information Management,* and *World Digital Libraries.* The search for all the above selected journals is limited for 14 years (2000-2013).

Results

Using the freely available software Harzing's Publish and Perish tool[24] available from the website www.harzing.com, the records were searched during the month of June 2014. As GS is dynamic and regularly updated, the number of articles as well as the citations will vary with time. As discussed in methodology section, from the master list of about 96 journals, data from 15 journals that fulfilled the selection criteria were downloaded and analzyed using Excel.

Among the sample of 15 Indian LIS journals selected for this study, *SRELS Journal of Information Management* has published the maximum number of articles (731). The number of articles published in the journals in the decreasing order are as follows; *DESIDOC Journal of Library & Information Technology* (601), *Library Herald* (382), *Annals of Library and Information Studies* (339), *Herald of Library Science* (319) and so on (Table 1).

The average citations of Indian LIS journals vary from maximum 4.21 to minimum 0.29. *Annals of Library and Information* studies has got the highest citation per paper (4.21). *ILA Bulletin* and *Indian Journal of Library and Information Science* have average citations per article above three. *DESIDOC Journal of Library & Information Technology*, *Kelpro bulletin*, *COLLNET Journal of Scientometrics and Information Management*, *IASLIC Bulletin* and *International Library Movement* have around two citations per paper. Rest of the journals has received below two citations per article.

Annals of Library and Information Studies, DESIDOC Journal of Library & Information Technology, SRELS Journal of Information Management have h-index above 10. These journals also have high g-index (Table 1). Beside these three journals, four other journals (*Library herald, International Journal of Library and Information Science, COLLNET Journal of Scientometrics and Information Management, IASLIC Bulletin)* have g-index above 10. These journals are quite old and already well-established in the field.

Authorship pattern

Single authorship is most common in all journals. However, *COLLNET Journal of Scientometrics and Information Management* has average number of authors above 2 per paper. Rest of the journals have average authors per paper between 1.2 to 1.9 (Table 2). The journals having more than 50 percent single authored articles include *Herald of Library Science*

Table 1—Brief profile of major LIS journals

Journals	Years	Frequency	Papers	Citations	Citation/ paper	h index*	g-index**
Annals of Library and Information Studies	13	4	339	1427	4.21	17	22
COLLNET Journal of Scientometrics and Information Management	8	2	141	330	2.34	8	15
DESIDOC Journal of Library & Information Technology	13	6	601	1708	2.84	14	22
Herald of Library Science (Ceased in 2006)	7	4	319	91	0.29	4	5
IASLIC Bulletin	14	4	165	338	2.05	8	11
*ILA Bulletin****	9	4	66	250	3.79	8	10
Indian Journal of Library and Information Science	13		157	40	3.08	4	5
International Journal of Library and Information Science	13	12	194	283	1.47	8	11
International Library Movement	14	4	15	30	2	3	3
Kelpro bulletin	14	2	21	53	2.52	3	5
Library herald	14	4	382	320	0.84	8	11
Library Progress (International)	12	2	125	81	0.65	4	5
Pearl : A Journal of Library and Information Science	13	4	249	109	0.44	4	5
SRELS Journal of Information Management	14	6	731	1000	1.37	11	17
World Digital Libraries	6	2	82	45	0.55	4	4

***** The h-index[25] was proposed by J.E. Hirsch in 2005. By definition h-index is *"A scientist has index h if h of his/her N_p papers have at least h citations each, and the other (N_p-h) papers have no more than h citations each"*.

****** The g-index[26] was proposed by Leo Egghe in 2006. It gives more weightage to highly-cited articles. g-index can be defined as **"***Given a set of articles ranked in decreasing order of the number of citations that they received, the g-index is the (unique) largest number such that the top g articles received (together) at least g^2 citations"*

*** Continuing as *Journal of Indian Library Association* from 2009 onwards.

(81 percent), *International Library Movement* (80 percent), *Kelpro Bulletin* (66 percent), *Library Herald* (65 percent), *IASLIC Bulletin* (54 percent) and *World Digital Libraries* (52 percent). Among these journals *Annals of Library and Information Studies* has the lowest rank in single authored article (34 percent).

The more single authorship articles show that there is lack of collaboration among the scholars in the field. However, it is only an indicative trend of selected journals' citation pattern available as in GS. Study of other journals and also journals from other subject areas would perhaps give a better picture of trends on this.

Cited and uncited papers

Based on the citation trend of LIS journal articles, the journals have been grouped into three categories. Category A includes those journals that have more than 50 percent of their articles cited. In this category, we have *Annals of Library and Information studies* (66.37 percent), *DESIDOC Journal of Library and Information Technology* (62.23 percent) and *IASLIC Bulletin* (54.55 percent).

Category B includes those journals with more than 30 percent but less than 50 percent articles are cited. These journals are COLLNET Journal of Scientometrics and Information Management, International Journal of Library and Information Science, SRELS Journal of Information Management, Library Progress (International) and Library Herald. In the last category, we have journals with less than the 30 percent of articles cited. These journals are World Digital Libraries, Pearl: A Journal of Library and Information Science, Herald of Library Science and Indian Journal of Library and

Table 2—Authorship patterns of LIS journals

Journals	Papers	Total Authors	Authors / Paper	Single author	Two authors	Three authors	More than three authors
COLLNET Journal of Scientometrics and Information Management	141	293	2.1	49	50	27	15
Annals of Library and Information Studies	339	641	1.9	115	155	61	8
International Journal of Library and Information Science	194	361	1.9	71	85	33	5
Library Progress (International)	125	226	1.8	45	60	19	1
Pearl : A Journal of Library and Information Science	249	437	1.8	108	99	37	5
World Digital Libraries	82	145	1.8	43	20	15	4
DESIDOC Journal of Library & Information Technology	601	1021	1.7	297	216	67	22
ILA Bulletin	66	115	1.7	28	27	11	0
Indian Journal of Library and Information Science	157	272	1.7	70	66	18	4
IASLIC Bulletin	165	268	1.6	89	55	17	4
SRELS Journal of Information Management	731	1205	1.6	345	311	63	12
Library herald	382	552	1.4	248	102	29	3
Kelpro bulletin	21	28	1.3	14	7		0
Herald of Library Science	319	382	1.2	259	57	3	0
International Library Movement	15	18	1.2	12	3		0

Table 3—Cited papers and un cited papers of Indian LIS journals

Journals	Papers	Cited papers	Percentage cited	Un cited papers	Percentage un cited
Group A					
Annals of Library and Information Studies	339	225	66.37	114	33.63
DESIDOC Journal of Library & Information Technology	601	374	62.23	227	37.77
IASLIC Bulletin	165	90	54.55	75	45.45
Group B					
COLLNET Journal of Scientometrics and Information Management	141	63	44.68	78	55.32
International Journal of Library and Information Science	194	81	41.75	113	58.25
SRELS Journal of Information Management	731	289	39.53	442	60.47
Library Progress (International)	125	38	30.40	87	69.60
Library Herald	382	115	30.10	267	69.90
Group C					
World Digital Libraries	82	22	26.83	60	73.17
Pearl : A Journal of Library and Information Science	249	55	22.09	194	77.91
Herald of Library Science	319	54	16.93	265	83.07
Indian Journal of Library and Information Science	157	17	10.83	140	89.17
Others					
ILA Bulletin	66	62	93.94	4	6.06
International Library Movement	15	13	86.67	2	13.33
Kelpro Bulletin	21	18	85.71	3	14.29

Table 4—Authorship patterns of cited and un cited papers

Journals	Single author			Two authors			Three authors			More than three authors		
	Total	Cited	Un cited	Total	Cited	Un cited	Total	Cited	Uncited	Total	Cited	Un-Cited
Annals of Library and Information Studies	115	75	40	155	122	33	61	52	9	8	0	8
COLLNET Journal of Scientometrics and Information Management	49	18	31	50	24	26	27	15	12	15	6	9
DESIDOC Journal of Library & Information Technology	297	177	120	216	143	73	67	42	25	22	12	10
Herald of Library Science	259	39	220	57	13	44	3	2	1	0	0	0
IASLIC Bulletin	89	42	47	55	38	17	17	9	8	4	1	3
ILA Bulletin	28	27	1	27	26	1	11	9	2	0	0	0
Indian Journal of Library and Information Science	70	6	64	66	7	59	18	4	14	4	0	4
International Journal of Library and Information Science	71	27	44	85	33	52	33	17	16	5	4	1
International Library Movement	12	10	2	3	3	0		0	0	0	0	0
Kelpro Bulletin	14	13	1	7	5	2		0	0	0	0	0
Library Herald	248	59	189	102	45	57	29	11	18	3	0	3
Library Progress (International)	45	11	34	60	20	40	19	7	12	1	0	1
Pearl : A Journal of Library and Information Science	108	19	89	99	21	78	37	14	23	5	1	4
SRELS Journal of Information Management	345	93	252	311	153	158	63	35	28	12	8	4
World Digital Libraries	43	11	32	20	4	16	15	6	9	4	1	3
Total	1793	627	1166	1313	657	656	400	223	177	83	33	50

Information Science. In the Others category, *ILA Bulletin*, *International Library Movement* and *Kelpro Bulletin* have been included. Although these journals show high percentage of cited papers, it was found

that Google Scholar has not indexed all the papers of these journals which is resulting in the higher percentage of cited papers. This once again reveals the indexing limitation of Google Scholar. The cumulative details of cited and uncited trends are given in the Table 3.

Table 4 shows the authorship pattern of cited and uncited articles. Although the authorship and citation pattern varies between journals, but the general trend is that the two-authored and three-authored articles are cited more than the single-authored articles.

Among the total 1,793 single-authored articles of 15 journals, 627 single-authored articles are cited (about 35 percent) and 1,166 single-authored articles (75 percent) are not cited. Among the total 1,313 two-authored articles, 657 articles (50 percent) are cited and 656 articles (about 50 percent) are not cited.

Among the total 400 three-authored articles, 223 (about 56 percent) are cited and 177(44 percent) are not cited. In the case of the 83 more than three authored articles, 33 (about 40 percent) are cited and about 50 (60 percent) are not cited. The reasons for less citation of more than three-authored articles are not apparent and require further investigation. However, the general trend of Indian LIS citation pattern is that the articles with more than one author are likely to get more citations.

Conclusion

General authorship pattern and citation trends of Indian LIS journals are investigated in this article. Indian LIS journals are not covered in *WoS* and coverage in Scopus and ICI database is very limited. So Google Scholar (GS) is the only viable option for citation analysis of Indian LIS journals. Although, there are criticism of GS in terms of currency, accuracy and coverage, still it is the only viable option for citation analysis of Indian LIS journals. Initially, this study started with about 96 journals. The list was prepared from the list of ISSN number assigned by NISCAIR database. Form that list it is observed that, many new journals have recently come up in the field of LIS in India. Many of them are available both in print and in online version and a couple of them maintain only online editions. Searching with these entire names in GS has yielded only a few journals with limited coverage. Although, it has not been clear about the content and coverage of GS, but it is generally assumed that GS has a wide coverage than any other databases. Even with this extensive coverage, articles from Indian LIS journals represent less. It means that Indian LIS journals are not maintaining their online indexing or archiving properly.

During the study period (2000-2013), *SRELS Journal of Information Management* has published the maximum number of articles. However, *Annals of Library and Information Studies* have got the maximum number of citations (4.21) and also highest h-index. These two journals are quite old and have created a name for themselves in Indian LIS field.

One important finding of this study is the generally two or more-authored articles are cited more than the single-authored articles. The collaborative research is more cited and perhaps more relevant than the single authored articles. Indian LIS researchers should focus more on collaborative research for better visibility and relevance.

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