Research Trends in Library and Information Science: Analysis of ALIS and DJLIT

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Abstract

The study analyses the research articles published in Annals of Library and Information Studies (ALIS) and DESIDOC Journal of Library and Information Technology (DJLIT) to identify the trend of research in Library and Information Science. Bibliographic information of research articles published in these journals during the year 2009-2013 has been collected for analysis. The results revealed that the contemporary LIS researchers are concentrating on 22 research domains amongst which scientometrics is leading with 15.53% of the total articles. The authorship pattern and citation analysis are found to be the core research area in scientometrics. Research on visualization methods and scientific mapping has been emphasized by the researchers community and becoming the core research area of scientometrics.

1 Introduction

'Research'- as described by Ranganathan is "a critical and exhaustive investigation to discover new facts, to interpret them in the light of known ideas, theories and laws, to revive the current laws and theories in the light of the newly discovered facts to apply the conclusion to practical purpose". India has a century old glorious history in research and education of library and information science (LIS). Starting with *Library Miscellany* in 1912 the number of scholarly LIS journal published from India has reached around 130 (Dutta and Sen, 2014). Studies on publication behavior of authors has shown that the Indian authors like to publish their research articles in the Indian journals (Patra and Chand, 2006; Chandrakar and Arora, 2010). The research in LIS is dynamic and multidisciplinary. Identification of research trends and direction of research activity is essential for further development of any subject and LIS is no exception. Barik and Jena (2014) explored the Scopus database and found a total of 385 research articles indexed in the field of LIS from India during the period of 2004-2013. The research trends in LIS in India as reflected through scholarly journals have been identified by Mittal (2011) through

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co-word analysis where Scientometrics leads the research arena as a conspicuous subject. Most of the authors analyses Ph.D. theses awarded by different universities to identify the research trends in LIS. The present study analyses research articles published in *Annals of Library and Information Studies (ALIS) and DESIDOC Journal of Library and Information Technology (DJLIT)* to identify the trend in LIS research.

2 Objectives

The present study has been carried out -

- To identify the important LIS research domains of contemporary researchers publishing from India.
- To determine the most popular domain(s) in LIS research published in India.
- To study the trends of research in the most popular domain amongst the LIS researches published in India.
- To study the authorship pattern in the most popular LIS research domain published in India.
- To study the preferred sources of information used by authors for their research in the most popular LIS research domain.

3 Scope

The present work is based on the bibliographic information of the research articles published on two LIS scholarly journal published from India namely - *"Annals of library and information studies" (ALIS)* and *"DESIDOC journal of library and information technology" (DJLIT).* The research articles published during the period 2009-2013 has been selected for the present study.

4 Methodology

4.1 Selection of Journals

While ranking the Indian LIS journals according to citations received and impact factor, Sen (2014) found that *Annals of Library and Information Studies (ALIS)* holds 1st rank and *DESIDOC Journal of Library & Information Technology (DJLIT)* ranked 3rd. The present study selects *ALIS* and *DJLIT* for identification research trend in LIS.

ALIS - a leading quarterly open access journal in library and information studies publishing original papers, survey reports, reviews, short communications, and letters pertaining to library science, information science and computer applications in these fields. In the year 1954, erstwhile INSDOC

launched *Annals of Library Science* as its first publication and Dr. S R Ranganathan was its first Editor. The journal's title was expanded to Annals of Library Science and Documentation in 1964 and again renamed in 2001 as Annals of Library and Information Studies.

DJLIT - an international, peer-reviewed, open access journal that publish the development in information technology application in LIS. It is meant for librarians, documentation and information professionals, researchers, students and others interested in the field. It is published bimonthly. It was formerly known as *'DESIDOC Bulletin of Information Technology (DBIT)'*.

4.2 Collection of Data

The bibliographic information of original research articles has been selected for the present study. Any other communications like reviews, short communications, letters etc. has not been considered for this study.

4.3 Representation of Subjects

Organization of subjects and order of precedence is determined through the DDC 23 edition. Author's Keywords are analyzed and term normalization is carried out according to DDC 23 edition.

4.4 Analysis

Simple counting method is used in data analysis. The results of the analysis are represented through tables and charts.

Scientometrics analysis has been carried out to understand the trend of research in LIS.

Title, keywords, authors and their affiliation, abstracts and full text of the journal articles have been analyzed for the present study

5 Analysis of Data and Representation of Results

The analysis of bibliographic data revealed the following information which has been represented through the use of graphs and tables.

5.1 Totality of Articles

ALIS and *DJLIT* together published 457 research papers during 2009-2013.

5.2 Distribution of Articles

ALIS Published 177 articles and *DJLIT* published 280 articles in during the studied period as shown in Figure 1.

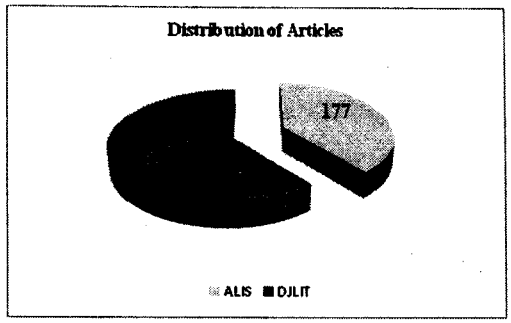

Fig 1: Distribution of articles

ALIS contributes 39% of the total articles whereas DJLIT contributes 61% of the articles.

5.3 Distribution of Subjects

The knowledge domains of the published articles are found to be distributed amongst 22 subjects namely - scientometrics, user studies, knowledge organization, bibliometrics, web-metrics, information communication technology (ICT) application in library, digital library, intellectual property rights (IPR), information retrieval, library management, consortia, e-learning, library automation, digital preservation, LIS education, open access, digital repository, public library, web 2.0 and information literacy.

The frequency of above mentioned subjects in the published articles of the studied journals has been listed in Table 1. The subjects of published articles are arranged according to their decreased frequency of publication.

Sl No	Descriptor	Frequency	Sl No	Descriptor	Frequency
1	Scientometrics	71	12	Consortia	15
2	User study	55	13	E-Learning	14
3	Knowledge organization	45	14	Library automation	13
4	Bibliometrics	44	15	Digital preservation	13
5	Web-metrics	22	16	LIS education	11
6	ICT application in Library	21	17	Open access	9
7	Digital library	20	18	Public library	9
8	IPR	19	19	Digital repository	8
9	Information retrieval	17	20	Web 2.0	8
10	Library services	17	21	Academic library	7
11	Library management	16	22	Information literacy	3

Table 1: Distribution of subjects

The Table 1 shows that scientometrics is the leading research domain with 71 research articles during the studied period. Therefore, an average of 14 scientometrics articles published per year.

5.3.1 Distribution of Articles of the most Popular Topic

Scientometrics has been found to be most popular topic of research amongst the research articles published in the studied journals. The distribution of the scientometrics articles in these journals has been presented in Table 2.

Sl No	Year	No of articles		Total
		ALIS	*DJLIT*	
1	2009	8	5	13
2	2010	10	5	15
3	2011	10	9	19
4	2012	3	3	6
5	2013	9	9	18
Total		40	31	71

Table 2: Year wise distribution of articles in scientometrics

The largest number of scientometrics articles published by *ALIS* in the year 2010 and 2011. Therefore, the most productive year is found to be 2011 with 26.76% of scientometrics articles and less productive year is 2012 with only 8.45% scientometrics articles.

5.3.1.1 Authorship in Scientometrics Research

A totality of 120 authors has been found to be contributing to the 71 scientometrics articles of the present study. The authorship pattern of these Scientometrics articles has been discussed in Table 3.

Sl No	Year	Single author	Two authors	Three authors	More than three authors
1	2009	1	7	4	1
2	2010	4	6	3	2
3	2011	3	8	6	2
4	2012	1	3	2	0
5	2013	4	10	3	1
	Total	13	34	18	6

Table 3: Authorship in scientometric research

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The result of the analysis as discussed in Table 3 reveals that, 18% of the scientometric articles are published by single author, 48% of the scientometric articles are contributed by two authors, while 25% of the scientometric articles are published by three authors and 9% of the articles are the contributions of groups of more than three authors. This is evident that majority of the research work has been done by two researchers.

5.3.1.2 Designation of Authors

The designation of contributing authors of scientometric articles is shown in Table 4.

Designation of authors	Year of Publication					Total
	2009	2010	2011	2012	2013	
Academic faculties i.e. Professor, lecturer etc.	0	3	4	1	12	20
Librarian	12	11	26	8	10	67
Information scientist	1	2	1	1	1	6
Scientific assistant	0	10	5	0	2	17
Technical staff	2	0	2	0	1	5
Scholar	2	0	1	0	2	5

Table 4: Designation of contributing authors

The result of the analysis as discussed in Table 4 reveals that 32% of the authors are librarians, 9.52% are academic faculty, 8% are scientific assistant, 2.85% are information scientist, 2.38% are technical staff and 2.38% are scholars. This is evident that librarians are at the top in publishing scientometric articles.

5.3.1.3 Gender Distribution of Authors in Scientometrics

The gender distribution of scientometrics article contributors is shown bellow in Figure 2.

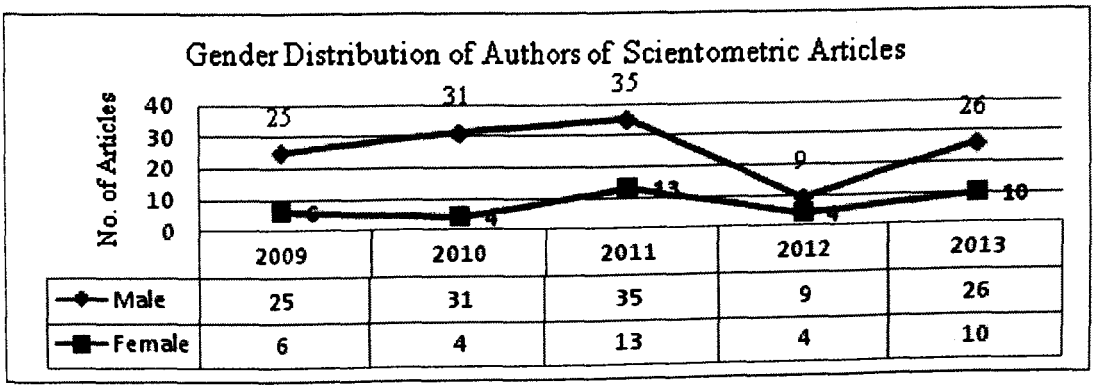

Figure 2: Gender distribution of authors in scientometrics

The Figure 2 shows that the male researchers produced more research output than female researchers. During the period 2009-2011 a gradual increase in both male and female authors is evident. In the year 2012, a sharp decrease in number of authors is also evident. Except for the year 2011 the number of female researcher is found to be consistent.

5.4 Trend of Scientometrics Research

Analysis of the 'Scope' of the articles on scientometrics revealed that the time span for data collection varies widely. Moreover, the 'Scope' of scientometrics research covers every sphere of knowledge. The following tables describe the different parameters used by the researchers in scientometrics research.

5.4.1 Distribution of Subjects in Scientometric Research

The articles on scientometrics are found to be studying 17 broad subjects listed on Table 5. The broad subjects studied in the scientometric articles are identified and assigned their names in accordance with DDC 23rd ed.

Sl No	Subjects	Year					Total
		2009	2010	2011	2012	2013	
1	Social science	0	0	0	0	2	2
2	Science and Technology	1	5	7	1	6	20
3	Physics	1	2	1	0	0	4
4	Chemistry	1	0	1	0	0	2
5	Computer science	0	1	1	0	0	2
6	Engineering	1	0	0	1	3	5
7	Solar cell	0	0	1	1	1	3
8	Botany	0	2	0	0	0	2
9	Genetics	0	1	0	0	2	3
10	Biophysics	0	1	0	0	0	1
11	Biochemistry	0	1	0	0	0	1
12	Biotechnology	1	0	0	0	0	1
13	Microbiology	1	0	0	0	0	1
14	Medical science	4	2	5	2	4	17
15	Agriculture science	2	0	2	0	1	5
16	Nutrition	1	0	0	0	0	1
17	Environmental science	0	0	1	0	0	1

Table 5: Distribution of 'subjects' in scientometric articles

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The results of the analysis revealed that 28% of the scientometric research has been carried out on Science and Technology, 24% on Medical Science, 7% on both Agriculture and Engineering, 6% on Physics, 4% on both Genetics and Solar cell while each of the following subjects namely - Chemistry, Social science, Botany and Computer Science covers 3% of the scintometric articles. Therefore, Science and Technology and Medical Science together cover the largest share of scientometric research.

5.4.2 Times span

The scientometrics researches necessitate the analysis of bibliographic information of research articles published during a specific time period. The time span of data collection varies widely. The present study creates six groups of time spans each of which covering five years of data. The analysis of data has been carried out on each of these six groups of time durations. The result of the analysis is presented in Table 6.

Sl No	Years	Time Span (in years)					
		1-5	6-10	11-15	16-20	20-24	Above 25
1	2009	3	4	1	2	0	3
2	2010	2	4	3	1	0	5
3	2011	1	9	3	1	0	4
4	2012	0	6	0	0	0	0
5	2013	1	8	2	1	0	7
	Total	7	31	9	5	0	19

Table 6: Different time span for scientometrics research

The results shows that- 10% articles are analyzing data of 1-5 years, 43% articles are covering 6-10 years, 13% articles are studying data of 11-15 years, 27% articles are taking data of 25 years and above. Interestingly no article is covering the time span of 20-24 years. This has been revealed that 6-10 years time span is used mostly by the authors for their research.

5.4.3 Distribution of Indicators

The following indicators have been found to be considered in scientometric researches.

5.4.3.1 Productivity Study

The growth in research articles indicates the productivity of components of knowledge generation cycle. The analysis on growth and productivity has been reported by 34 articles as shown in Table 7.

Sl No	Year	Productivity Study			
		Subject wise	Individual Author	Institution wise	Country wise
1	2009	7	0	5	1
2	2010	9	2	3	1
3	2011	9	1	6	3
4	2012	2	0	2	2
5	2013	7	2	7	2
	Total	34	5	23	9

Table 7: Productivity study

In productivity study, 48% articles has analyzed subject wise productivity, 32% Institution wise, 13% country wise and 7% individual author wise.

5.4.3.2 Collaborative Pattern

Collaboration is said to have taken place when two or more investigators are working together. About 32% articles are engaged in collaboration study as shown in Table 8.

Sl No	Year	Subject wise	Author	Institutional	National	International	Publication Wise	Designation wise
1	2009	1	3	1	1	1	1	0
2	2010	1	2	3	1	2	3	0
3	2011	1	3	4	5	6	0	0
4	2012	0	1	3	2	4	1	0
5	2013	1	5	3	5	7	5	1
	Total	4	14	14	14	20	10	1

Table 8: Collaborative pattern study

The Table 8 shows that 5.19% articles studied collaboration amongst different subjects, 18 % of the studies discuss about collaboration amongst each of the following: author to author, institutions and nations, 26% of the articles studied international collaborations.

5.4.3.3 Authorship Pattern

Authorship study is found to be major topic of interest amongst the productivity researches. It accounts of about 44% as shown in Table 9.

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Years	Year of Publication				
	2009	2010	2011	2012	2013
No. of articles	6	6	8	1	10

Table 9: Authorship pattern studied by the researchers

The Table 9 shows that 32.25% authorship pattern study has been done in 2013, 25% in 2011, 19.35% in each of 2009 and 2010 both, 3.22% in 2012. It is evident that highest number of the authorship pattern study has been carried out in the year 2013.

During 2009-2010 the number of articles researching upon authorship pattern remains the same, which increases during 2010-2011 followed by a sudden decrease during 2011-2012. However, during 2012-2013 the authorship study is shown to increasing sharply.

5.4.3.4 Citation Analysis

Citation analysis refers to references in one text to another text, with information on where that text can be found. Citation analysis is useful for understanding subject relationship, author effectiveness, publication, trends and so on. About 29.58% articles are studying citation analysis as shown in Table 10.

		Year of Publication					
Sl No	Citation Analysis - Types	2009	2010	2011	2012	2013	Total
1	Most cited author	0	0	0	0	3	3
2	Most cited paper	1	5	5	1	6	18
3	Most cited journal	1	2	1	1	2	7
4	Most cited institute	1	2	0	0	0	3
5	Self citation	0	0	0	0	1	1
6	Subject wise citation of articles	1	1	1	0	2	5
7	Citing journal	1	1	0	0	1	3
8	Impact factor	0	0	2	0	2	5
9	Immediacy index	0	0	0	0	1	1
10	New journal diffusion factor	0	0	0	0	1	1
11	Year-wise appearance of citation	0	2	0	0	1	3
12	Citation impact	0	1	0	0	3	4
13	Citation pattern according to publisher	0	1	0	0	0	1
14	Age of citation	1	0	0	0	0	1
15	Obsoletion study	1	0	0	0	1	2
	Total	7	15	9	2	23	

Table 10: Citation analysis in scientometric research

The citation analysis study is carried out under 15 headings as described in Table 10. The majority of the researchers studied most cited paper which accounts for 31%, followed by most cited journal the amount of which is 12%.

5.4.3.5 Growth Study

The study on pattern of growth is an important indicator in scientometrics study. The study on growth of literature in different subject domains, publication, institutions, national output etc, has been reported in 31% of the scientometrics articles as shown in Table 11.

Sl No	Year	Growth of				
		Subjects	Publications	Institutions	National output	International output
1	2009	2	2	1	0	1
2	2010	3	6	1	0	2
3	2011	6	3	0	0	0
4	2012	1	1	0	1	0
5	2013	0	7	0	0	0
		12	19	2	1	3

Table 11: Growth study

The Table 11 reveals that 54% article is about subject growth rate, 86.36% is publication growth rate, 9% is institutional growth rate, 13.63% is about international and only 4.54% national growth rate.

5.4.3.6 Study of Journals

The dynamic behaviour of knowledge domains could be traced through the study of scattering of journals. Since, the knowledge domains of every subject changes so as the reporting scientific journals. Therefore, changes of scientific journals in a subject maps the direction of evolution of a specific domain of that subject.

Only 4 articles are found to be discussing scattering of journals with the help of Bradford's law as shows in Table 12.

Scientometrics indicator	Year of Publication					Total
	2009	2010	2011	2012	2013	
Scattering of journals and Bradford's law	0	2	1	0	1	4

Table 12: Distribution of articles on study of journals

Therefore, 5.63% articles studied the scattering of journals and Bradford's law.

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5.4.3.7 Sources of Information

Scientometrics researches are principally based on bibliographic information. The inventory into the 'Scope' of published articles on scientometrics revealed that there are 11 number of sources used for collection of bibliographic data as found in Table 13.

Sl No	Name of the Sources	Year of Publication					Total
		2009	2010	2011	2012	2013	
1	Scopus citation database	2	4	11	5	7	29
2	Web of Science	2	6	7	1	5	21
3	Citation window	3	3	3	3	4	16
4	Annual report, conference, seminar proceedings, etc.	1	2	3	0	2	8
5	Website of concerned institutions	0	0	2	0	3	5
6	INIS-database	1	0	1	0	0	2
7	INSPEC	1	0	0	0	0	1
8	MEDLINE	0	0	0	0	3	3
9	PubMed	1	0	2	0	0	3
10	CAB-CD	0	1	0	0	0	1
11	Journals	0	1	0	0	2	3

Table 13: Sources of information in scientometrics research

The analysis of bibliographic data revealed that 32% researches are based on Scopus citation database, 23% research on Web of Science, 17% research on Citation window, 6% research are carried out on website of concerned institutions under study, 3% researches used PubMed, 3% research used MEDLINE, 2% research are based on INIS database, 1% on INSPEC and 1% CAB-CD database. Therefore, the Scopus citation database is revealed as the preferred source of information of scientometric researches of the present study.

6 Discussion

The analysis of the bibliographic data of the present study revealed that the contemporary LIS researches are concentrated on 22 domains namely - scientometrics, user studies, knowledge organization, bibliometrics, webmetrics, information communication technology (ICT) application in library, digital library, intellectual property rights (IPR), information retrieval, library management, consortia, e-learning, library automation, digital preservation, LIS education, open access, digital repository, public library, web 2.0 and information literacy.

Scientometrics has been evolved as the leading the research domain and its share to the totality of the research topics is 15.53%.

Following scientometrics the share of other three research domains namely- user studies, knowledge organization and bibliometrics is 12.03%, 9.85% and 9.62% respectively. Therefore, scientometrics, user studies, knowledge organization and bibliometrics are together contributing about half of the contemporary LIS researches.

The study of authorship pattern is found to be at the centre of scientometrics researches. About 44% of the scientometrics articles are analysing authorship pattern. It is an indicator of emphasis on study of human resource.

A trend in collaborative pattern study which accounts for 32.39% is an indicator of collaborative initiatives across the research domains.

About 29.57% of the scientometrics articles are analysing citation analysis.

Therefore, the scientometrics research is principally analysing the authorship pattern (43.66%), collaborative pattern (32.39%) and citation analysis (29.57%).

The research on user studies, knowledge organization, bibliometrics, ICT application on libraries, IPR, digitations, digital library, information retrieval and consortia are found to be frequent in this study.

7 Conclusion

The results of the present study are an indicative of diversity in research interests amongst the LIS researchers. In spite of covering a little time span of five years the analysis of bibliographic data indicates a few prominent changes in the trend of scientometrics research. The result of the analysis emphasizes the shift in methodology of scientrometric researches. This has been revealed that the visualization methods and scientific mapping in scientometric research are attracting attention of researchers which is supposed to be grabbing the core research arena of scientometrics. Interestingly, this study reports a lesser number of articles on scattering of scientific journals.

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