

Feature Article : Indian National Research Productivity in Library and Information Science

The INFLIBNET Centre has recently formed the Bibliometric Group to undertake bibliometric studies and to measure the impact of access to e-resources (provided to universities by the Centre) on research productivity in universities. The Group has started working with the data from Web of Science and other databases subscribed by the Centre for analysing the research output. As part of the study, the Group has come out with its first study on research output in library and information science. The study on "Indian national research productivity in library and information science" is presented by Shri Rajesh Chandrakar, Scientist B (LS) and Dr. Jagdish Arora, Director, INFLIBNET Centre. The study was assisted by Shri Pallab Pradhan, Project Associate (LS), Mrs. Preeti Sharma, Project Officer (LS) and Shri Imran Mansuri, Project Assistant (LS) of the Centre.

The value and importance of libraries for higher education and research has received due recognition in India since ancient period, when India had Gurukul educational system with Takshashila (6th Century BC), Vikramshila (6th Century AD), Nalanda (4th Century AD) and Sirpur (4th Century AD) ancient seat of learnings. Historically, the Nalanda had huge library equivalent to a nine-story building (Chandrakar & Arora, 2009). The library had hand-written manuscripts and secret reading materials pertaining to study and research in science, astronomy, medicine, logic, philosophy, Buddhism, Hinduism, and literature. Research carried out during this period under various stalwarts is well known. Some of these scholars were Aryabhata, Bhaskaracharya II, Acharya Kanad, Nagarjuna, Acharya Charak, Acharya Sushrut, Varahamihir, Acharya Patanjali, Acharya Bharadwaj, Acharya Kapil and Kautilya. These scholars conducted research in the field of astrophysics & mathematics, algebra, atomic theory, chemistry, medicine, surgery, astrology & astronomy, yoga, aviation, cosmology and economics, etc. The manuscripts written by them are marvels of research conducted in ancient period that created landmark in the society. These manuscripts are *Aryabhatiyam*, *Lilavati*, *Bijagnita*, *Siddhant Shiromani*, *Surya Siddhant*, *Vaisheshik Darshan*, *Ras Ratnakar*, *Rashrudaya*, *Rasendramangal*, *Arogyamanjari*, *Yogasara*,

Charak Samhita, *Shushrut Samhita*, *Panchsiddhant*, *Bruhad Samhita*, etc.[1]. Besides, the Vedic literatures in the form of *Vedas*, *Upanga*, *Upa-Veda*, *Ayur-Veda*, *Brahmana* and *Pratishakhya* embodies universe of knowledge.[2]

The present higher education system in India was established after the independence from the Britishers in 1947. Since last 6 decades, the growth in the area is remarkably high. The number of universities has increased to more than 550 and colleges have increased to more than 22,000 from 20 universities and 500 colleges in 1947. In addition, Central Government has established 16 new universities, 6 IIMs and 8 IITs in different states of the country (Chandrakar & Arora, 2009). However, considering the geographical area and population of the country, the wings of the higher education system need to be strengthened and widened. The need for expansion of higher education has been expressed by several academicians and policy makers at various occasions keeping in view the literacy rate, gross enrolment ratio (GER) in the higher education and research productivity of the country.

The INFLIBNET Centre has taken a decision to analyze the research output of the country in different subject domains to support policy makers on higher education system in the country. The report on research output in the library and information science is first in the series started by the Centre. The decision to conduct bibliometric study and evaluating the research output of the nation is influenced by the importance given to the higher education system as well as political will to increase visibility of research work done in India and to improve ranking of educational institutions in global perspective.

World University Rankings and Research Productivity

There are three reputed global rankings of the world universities presented by the three different institutions, i.e. Academic Ranking

of World Universities compiled by the QS World University Ranking, Times Higher Education World University Ranking and Shanghai Jiao Tong University. These three institutions have used different sets of indicators and criteria for ranking the universities. However, all the three ranking indicate to one core area i.e. "research". The ranking criteria used by them are briefly described below for reference:

QS World University Ranking: Indicators used are "Academic Peer Review" (61.25 %), "Employer Review" (8.79 %), "Student Faculty" (0.05%), "Citations Per Faculty" (32.40 %), "International Faculty" (0.14 %) and "International students" (0.10 %). [3]

Times Higher Education: Indicators used are: "research" (30 %), "citations" (32.5 %), "teaching" (30 % for learning environment), "industry income" (2.5 %) and "international mixes" (5 %). [4]

Shanghai Jiao Tong University for Academic Ranking of World University: Indicators used are: "Research Productivity" (20 %), "Research Impacts" (30 %) and "Research Excellence" (50 %). [5]

Review of their "ranking criteria" and "study indicators" reveals that the "research" gets maximum weightage in the study of ranking of world universities, which is supported by its publication in "peer-review" journals followed by "citations" per article. Thus, it is important for an academic institution to channelise its maximum resources for conducting of higher quality research to obtain a good ranking into the list of the world university. Further, it is also important for an institution to demonstrate positive impact, cost-benefits and return on investment (ROI) to its administrators. The quality of the education co-relates with the research productivity in terms of scholarly output of international repute is one of the crucial indicators for measuring the cost benefits and ROI of an institution.

The Library and Information Science

The history of library science teaching and research in India is comparatively new. The term "library science" seems to have been used first in the "Panjab Library Primer" in 1916 published by the University of the Panjab, Lahore (now in Pakistan). The University was also the first University in Asia to have opened first library science school in Asia. In 1931, Dr. S. R. Ranganathan, Father of Library Science in India, wrote a book entitled "The Five Laws of Library Science". Library Science and Information Science are now used synonymously.

Presently, the country has around 100 library and information science schools in universities and colleges awarding degrees on library and information science. Besides the regular courses, some of the library schools also impart us education by correspondence

and distance education mode. Moreover 33 institutions, deemed to be universities and colleges have library schools affiliated to some of the universities (Data collected from different sources such as University Handbook, University websites, etc.). As per the data available through the theses database of the Centre, 62 library schools provide doctoral degree in library and information science. 60 universities who are member of the UGC-Infonet Digital Library Consortium have been provided access of about 50 International peer-reviewed electronic journals since establishment of the Consortium in 2004 (trial access of e-resources started from year 2003). The Documentation, Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore and National Institute of Science Communication and Information Resources (NISCAIR), New Delhi are two national level institutions that provide two years integrated Fellowship and Associateship degrees in library and information science.

Source Data for Study

In the global perspective, the bibliometric studies often called science indicators studies is performed on the publications and citation data obtained from citation indices published by Thompson Reuters, which includes Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (AHCI) as multidisciplinary citation resource. These citation databases published by Thompson Reuters on the Web of Science platform indices about 10,000 high-quality core journals from every field. The Group observes that countries with significant scientific and industrial enterprises have used bibliometrics study on Web of Science data. The institutions from different countries use these indicators from Web of Science to find the national research output. Most of the countries who use Web of Science for bibliometric study are Argentina, Australia, Belgium, Brazil, Chile, China, Finland, France, Germany, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, Taiwan and the United States. (Thompson Reuters, 2008)

For studying doctoral research in India, INFLIBNET's union database of theses [7] is used along with other scholarly research publications. The database has more than 2,34,200 bibliographic records of the Ph.D. theses awarded by the Indian academic universities and institutions on different subjects.

The data for the present study is taken from 86 high impact, peer-review international journals in library and information science indexed in the SSCI database on the Web of Science platform. The data allowed us to examine on area of research interest and strength of library and information science professionals in India and international links of nation's library schools.

Methodology

The study is based on the 11 years articles published during the years 2000 to 2010 and indexed in the SSCI database. The study covers only scholarly "articles" indexed in the database. The study includes the research publications of the Indian authors and their affiliated international collaborators. The result from the SSCI database was imported in the MS Excel for further study and analysis. The study is restricted to the library schools, academic institutions and research labs of the country. The research publications from the Information and Library Network (INFLIBNET) Centre, Ahmedabad is also used in the study as it is a nodal centre for academic institutions of the country facilitating resource sharing and networking among universities through its various programmes and projects.

Research Publications

In the last decade from 2000 to 2010, India has published 302 research papers in 86 International peer-reviewed journals which are indexed in SSCI database on Web of Science platform. As per the data from SSCI, India has achieved substantial growth in its annual output of research publications in the field of library and information science. Table 1 and figure 1, depicts gradual increase in the number of research articles indexed in the SSCI database from 2000 to 2010. It reveals that after an essentially "no growth" period from 2000 to 2004, the growth in the number of publication has sharply increasing from 20 in 2004 to 44 in 2010. The research publications in the form of article has more than doubled from 2004 to 2010, essentially, because of accessibility of more than 50 International peer-review e-journals in library and information science under the UGC-Infonet Digital Library Consortium to the library schools and member libraries of the Centre since 2004.

Year	No. of Publications
2000	17
2001	22
2002	18
2003	22
2004	20
2005	28
2006	33
2007	22
2008	37
2009	39
2010	44
Total	302

Table 1: Articles in LIS covered in SSCI, WoS

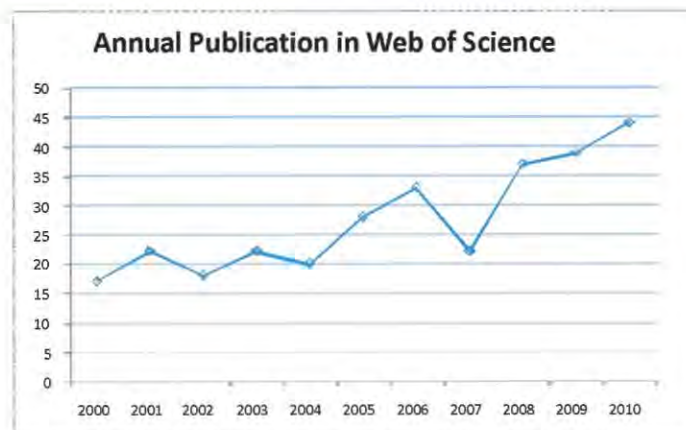


Figure 1 : Increase in India's Research output in Library and Information Science from 2000 to 2010

Research Publications and Institutional Affiliations

The study of the research output in library and information science reveals that the country has about 100 library schools in universities and 33 library schools in other institutions, but the result of scholarly output in library and information science discipline paints gloomy picture as compare to the number of library schools available in the country. The table 2 lists on top 29 institutions who made its presence in Web of Science database with at least 4 articles shows that apart from DRTC, Bengaluru and NISCAIR, New Delhi, only 8 library schools are included in the list. Other institutions in the top 29 list are institutions and R&D labs including INFLIBNET Centre. The table 3 lists top 22 library schools of the country who has at least 2 articles indexed in the Web of Science database with DRTC and NISCAIR who lead the list at rank 1 and 2, respectively. It is observed that about 35 library schools i.e. one-third in the country has published at least one article that is indexed in the Web of Science database.

Sl. No.	University/Institute's Name	Record Count	Ranking
1.	National Institute of Science Technology & Development Studies, CSIR, New Delhi	48	1
2.	DRTC, ISI, Bengaluru	16	2
3.	National Institute of Science Communication & Information Resources (NISCAIR), New Delhi	14	3
4.	Indian Institute of Technology, New Delhi	12	4
5.	Indian Institute of Technology, Kharagpur	12	4
6.	INFLIBNET Centre, Ahmedabad	11	5
7.	Bhabha Atomic Research Centre, Mumbai	10	6
8.	Central Leather Research Institute, CSIR, Chennai	9	7
9.	University of Delhi, Delhi	8	8
10.	Indian Institute of Management, Kolkatta	7	9
11.	Karnataka University, Dharward	7	9

12.	MS Swaminathan Research Foundation, Chennai, Tamil Nadu	6	10
13.	Sambalpur University, Orissa	6	10
14.	Indian Institute of Management, Ahmedabad	5	11
15.	Indian School of Business, Hyderabad	5	11
16.	Indira Gandhi National Open University, New Delhi	5	11
17.	Management Development Institute, Gurgaon, Haryana	5	11
18.	University of Mysore, Karnataka	5	11
19.	Aligarh Muslim University, Delhi	4	12
20.	Banaras Hindu University, Uttar Pradesh	4	12
21.	Central Glass and Ceramic Research Institute, West Bengal	4	12
22.	National Informatics Centre (NIC), New Delhi	4	12
23.	National Centre for Science Information (NCSI), IISc, Bengaluru	4	12
24.	National Institute of Technology, Tamil Nadu	4	12
25.	National Physics Laboratory, CSIR, New Delhi	4	12
26.	National Research Laboratory for Conservation of Cultural Property (NRLC), Lucknow, Uttar Pradesh	4	12
27.	North-Eastern Hill University, Meghalaya	4	12
28.	University of Madras, Chennai, Tamil Nadu	4	12
29.	Utkal University, Bhubaneswar	4	12

Table 2: Top 29 Institutions with at least four articles indexed in the Web of Science database

Sl. No.	University/Institute's Name	Record Count	Ranking
1.	Documentation Research and Training Centre (DRTC), ISI, Bengaluru	16	1
2	National Institute of Science Communication & Information Resources (NISCAIR), New Delhi	14	2
3	University of Delhi, Delhi	8	3
4	Karnataka University, Dharwad	7	4
5	Sambalpur University, Sambalpur	6	5
6	Indira Gandhi National Open University, New Delhi	5	6
7	University of Mysore, Mysore	5	6
8	Aligarh Muslim University, Delhi	4	7
9	Banaras Hindu University, Varanasi	4	7
10	North Eastern Hill University, Shilong	4	7
11	University of Madras, Chennai	4	7
12	Utkal University, Bhubaneswar	4	7
13	Jiwaji University, Gwalior	3	8
14	University of Calcutta, Kolkata	3	8

15	University of Pune, Pune	3	8
16	Annamalai University, Annamalai, Chennai	2	9
17	Bangalore University, Bagalore, Karnataka	2	9
18	Gauhati University, Assam	2	9
19	Kuvempu University, Karnataka	2	9
20	Panjab University, Chandigarh	2	9
21	University of Jammu, Jammu	2	9
22	University of Mumbai, Mumbai	2	9

Table 3: Top 22 Library Science Schools with at least Two Articles Indexed in the Web of Science Database

Indian Collaboration with Foreign Countries

The assessment of India's top twenty research collaborations in the field of library and information science with the foreign countries over past ten years reveals that USA stands top in terms of co-authorship with the Indian institutions. Belgium stands second, England third and China stands fourth in the international collaboration. There are six countries having collaboration for at least two research papers. Overall Indian collaboration with foreign countries is very poor in the field of library and information science. Steps towards collaboration need to be looked into and it should be strengthened. The Indian representation on research publications in the international peer-review journals is very poor and that could be the reason of poor collaboration with foreign countries.

Country	Number of Articles
USA	28
Belgium	9
England	6
Peoples Republic of China	4
Germany	3
Netherlands	3
Bangladesh	2
Brazil	2
Finland	2
Iran	2
Kenya	2
Singapore	2
Antigua & Barbua	1
Bulgaria	1
Canada	1
Denmark	1
France	1
Nigeria	1
South Africa	1
Switzerland	1
Taiwan	1

Table 4: Indian Collaboration with Foreign Countries in the LIS Discipline

Author's Productivity and Their Ranking

Author's productivity can be calculated from the number of papers an author has published within a given period of time. The most productive Indian authors in library and information science are given in the table 5. The table reveals that there are only 24 authors who have published at least 4 articles during 2000 to 2010. The profession needs serious introspection in terms of research publications in the high impact peer-review journals.

Sl. No.	Name of the Author	Number of Articles	Ranking
1	Garg, Kailash C.	12	1
2	Gupta, B. M.	12	1
3	Kumar, Vijai	10	2
4	Kumar, Suresh	8	3
5	Rao, I. K. Ravichandra	8	3
6	Rao, Siriginidi Subba	8	3
7	Bhattacharya, Sujit	7	4
8	Chandrakar, Rajesh	7	4
9	Jeevan, V. K. J.	7	4
10	Arunachalam, S	6	5
11	Basu, Aparna	6	5
12	Kademani, B. S.	6	5
13	Kalyane, V. L.	6	5
14	Panda, Krushna C.	5	6
15	Prathap, Gangan	5	6
16	Sagar, Anil	5	6
17	Anuradha, KT	4	7
18	Arora, Jagdish	4	7
19	Dhawan, S. M.	4	7
20	Karisiddappa, CR	4	7
21	Kundra, Ramesh	4	7
22	Mittal, Rekha	4	7
23	Padhi, Pitambar	4	7
24	Sangam, S. L.	4	7
25	Suryawanshi, D. G.	4	7

Table 5: Author's productivity and their ranking

It is opined that most of the Indian authors publish their research articles in the Indian journals, however, most Indian journals in library and information science are either not indexed in the SSCI database or has fewer representations at the International level. The steps need to be taken to improve the standards of Indian library and information science journals for enabling them to include in the International databases like Web of Science and Scopus. Publishers of the Indian journals should make their efforts in making their journals of International repute by following international standards of electronic publishing of scholarly journals.

Contribution of Doctoral Research

According to theses database on IndCat platform, more than 62 library schools of the country has research level course and awards doctoral degree. The bibliographic records are available in theses database are contributed by the member libraries of the Centre. The data in theses database is taken from the notification received from the universities and announcement in the University News. So far, the country has awarded more than 1020 doctoral degrees in library and information science since 1957. According to the theses database of the Centre, the library schools in the country have awarded 589 doctoral degrees during 2000 to 2010. Although, the actual number is much higher since the records in the theses database is limited within the INFLIBNET source. The study reveals that the library schools have awarded more doctoral degrees than the number of high quality scholarly articles written by Indian library and information science professionals. Chandrashekhar and Ramasesh (2009) listed 802 doctoral degrees of Indian library schools from 1957 to 2008. As per the theses database of the Centre, the year-wise doctoral degrees awarded by the Indian library science schools are given below:

Year	No. of Doctoral Degrees
2000	34
2001	29
2002	71
2003	56
2004	63
2005	56
2006	50
2007	73
2008	68
2009	37
2010	52
Total	589

Table 6: No. of Doctoral Degrees in Library and Information Science in the IndCat

The current scenario of library and information science research in the country is dismal. The issue of poor quality of research in library and information science has been raised many times by Indian professionals. Satija (2010) depicts a poor picture of research scenario of library and information science in the country. He enumerated a number of facts and figures to highlight poor scenario of library and information science research in India. Satija assigns ghost writing, outsourcing of data processing, data cooking and rampant plagiarism as main reasons of the deteriorating condition of research in library and information science in the country. Kaula (1992) had also raised his concerned and said, "the LIS departments have little or no understanding and cooperation

with the central library ... the problem is more psychological than academic ... much harm has been done to the teaching of library science by the disharmony". The quality of research in the country is a major concern.

Conclusion

The study reveals factual information on library and information science research in India. The availability of e-resources through UGC-Infonet Digital Library Consortium have made deeper impact on research productivity of the country in library science domain. During the period 2000 to 2003, the research productivity was almost static with "no growth". The trial access of e-resources under the Consortium started during the year 2003. The influence and impact of the availability of e-resources through consortium is visible immediate after 2004. The research productivity is risen sharply after 2004. In the year 2010, the research productivity has just doubled from the year 2004. The impact is very impressive, but compared to developed countries, the library science research in India is still at infancy stage. The library science schools of the country need to introspect themselves and devote their time and energy towards conducting qualitative research on contemporary topics in library and information science.

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Staff News

Dr. Jagdish Arora

Member, Editorial Board, Indian Science Abstracts (ISA)

Member, Council, NISCAIR, New Delhi

Sh. Ashok Kumar Rai

Sh. Ashok Kumar Rai was invited as resource person by following institutions to deliver lectures on INFLIBNET Activities and N-LIST Programme:

- Meeting of College Principals under MP Higher Education, Bhopal, Madhya Pradesh, October.12, 2010
- UGC Sponsored Workshop for Colleges at Ramkrishan Mission Residential College, Kolkata, West Bengal, November 19, 2010.

- UGC Sponsored INFLIBNET Awareness Programme for Colleges, Karim College Jamshedpur, Jharkhand, December 20, 2010
- The Manthan South Asia Award 2010 Session: Sustainable Digital Approach For Education, Learning & Skill Development, New Delhi, December 18, 2010

Sh. H G Hosamani

Sh. H G Hosamani, Scientist-B (LS) of INFLIBNET Centre was invited by Academic Staff College, Dr Babasaheb Ambedkar Marathwada University, Aurangabad to deliver lectures on N-LIST and SOUL 2.0 in 10th UGC Sponsored Refresher Course in Library & Information Science on "New Horizons in Library Management" organized during 3rd to 23rd December 2011. **IN**