
BIBLIOMETRIC ANALYSIS WITH SPECIAL REFERENCE TO AUTHORSHIP PATTERNS AND COLLABORATIVE RESEARCH IN THE LIBRI: INTERNATIONAL JOURNAL OF LIBRARIES AND INFORMATION SERVICES

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Abstract

The ultimate purpose of the present study is to explore the bibliometric analysis of the LIBRI: International Journal of Libraries and Information Services journal during the period of 2011-2015. The analysis covers sundry features of the journal such as its yearly output of articles, subject distributions, geographical distributions of authors, authorship patterns, relative growth rate and double time of publication. The result concludes that 140 research articles were published

in the LIBRI journal during the stipulated span i.e. 2011-2015, in which 63 (45%) articles were written by a single author whereas 77 (55%) articles were multi-authored. In the study, the average degree of author collaboration was 0.55 and it ranged from 0.57 to 0.58.

Keywords: LIBRI; Bibliometric Analysis; Authorship Pattern; Author Productivity; Degree of Collaboration

1 Introduction

This is an age of research and expedition in every field of knowledge. The consequent increase in the production of information is best reflected in the literature of every discipline. Due to the expeditious growth and burgeoning development, libraries engender various studies, which must be efficacious in nature. These studies resulted in discernment and application of suitable quantitative measuring techniques known as Bibliometrics. Bibliometric studies project the pattern of literature growth, its use, correlate diverse branches of knowledge, build up template of collection, productivity and influence authors, etc.

2 Libri: International Journal of Libraries and Information Services

LIBRI is a peer-reviewed international journal, was launched in 1950 with the aim to facilitate information exchange among library and information science professionals worldwide. It is a scholarly journal published quarterly in English language. It publishes case studies, theoretical explanation, latest development in the discipline etc.

3 Literature Review

Several studies have been conducted to investigate the trends of authorship patterns and collaborative research in the different branches of knowledge. The present study made an endeavor to cover a spectrum of works that transcend discussions about the diverse techniques of bibliometric with authorship trends and collaborative research in the international journal LIBRI. In this direction, Velmurugan and Radhakrishnan (2015) made an attempt to discover quantitative research output of "Webology" journal amid the traverse 2007-2013. It had been ascertained that the utmost numbers of research articles were contributed by single authors, though the least numbers of research articles were published by multi-authors with the degree of collaboration 0.506. Similarly, Khaparde and Pawar (2013) conducted a study to identify the tendency of authorship pattern and collaborative research in the area of Information Technology from the LISA database amid the span of 2000 to 2009. It was noticed that the articles appeared in the Information technology area by multi-authors were higher and dominated over the articles by single authors. In the same way Ding, Schubert and Chowdhury (1998) investigated the research collaboration towards the sphere of Information retrieval and discovered that there was a paradigm shift from single authorship to multi-authorship. Researchers in the field of Information retrieval are coming together to exploit

the resources and created knowledge in a better way. Likewise, Arya and Sharma (2011) examined the coordinated efforts in research and authorship trend within the vicinity of veterinary sciences all around the globe with unique locus to India from 'CABI abstracts' during the span i.e. 2006-2010. The results of the study unconcealed that collaborative research has been favored by the researchers over that of lone research. Moreover, average degree of collaboration was found 0.84 that additionally designates predominance of collaborative research over solo research. In parallel, Mani (2014) directed a bibliometric investigation of Malaysian Journal of Library and Information Science to examine the authorship pattern, contributor profitability, articles written by single and multiple authors, most prolific researcher and level of collaborative efforts. Normal number of authors per paper is 2.06. The most astounding number of creator profitability i.e., 72 (12.52%). During the span of study, maximum 180 (64.51%) number of the articles contributed by multi-author with 0.64 degree of collaboration. Hussain and Fatima (2011) in their studies, discussed the various issues like authorship pattern, distribution of articles subject wise and year wise, forms of documents cited etc.. They reported substantial growth towards collaborative research and quality of articles appeared in the journal were considerably excellent.

Authorship is an overt phenomenon reflecting the modern practices by pellucidly exhibiting patterns of communication, proficiency and coordinated effort and impacts among scholars albeit the fact that their capacities and potentials aren't nicely understood. Thus, the erudition of this relationship is expedient in the study of their vigor in communication among scholars. It additionally avails in assessing scientific productivity and in determining research patterns of a subject or specialty (Ding, Schubert and Chowdhury, 1998). The authorship collaboration research is a well-apperceived attribute of the cutting edge science and there has been a steadfast trend towards inflated collaborative research in all branches of knowledge amid the existing century. It is conjointly been found that the rapidity of increased in multiple authorship pattern dappled considerably within the vicinity of each and every fragment of knowledge (Amsaveni, Manikandan and Manjula, 2013).

4 Objectives of the Study

The objectives of the present study are as follows: to make an analysis of articles published in LIBRI during the period 2011-2015; to examine the contributions by year and issue; to investigate authorship patterns by year and issue; to find out the relative growth rate and double time of publication; to study author productivity; to identify the degree of author collaboration.

5 Methodology

The proposed study is conducted on the 5 volumes, 20 issues of the LIBRI journal published during the stipulated span of study i.e. 2011-2015. The data were gathered from the LIBRI journal website (<http://www.degruyter.com/view/j/libri>) through which 140 research articles composed from volume 61 in 2011 to volume 65 in 2015.

Research contributions by issue and year, authorship patterns, degrees of author collaboration and author's productivity were recorded. These data were organized, calculated, tabulated, and analyzed by using simple arithmetic and statistical methods for its results.

6 Results and Discussions

6.1 Growth of Literature (Year & Subject Wise Distribution of Publication)

Year	Volume	No. of Issues	No. of articles	Percentage
2011	65	4	28	20.00%
2012	64	4	29	20.72%
2013	63	4	28	20.00%
2014	62	4	31	22.14%
2015	61	4	24	17.14%
Total			140	100%

Table I. Year wise distribution of articles

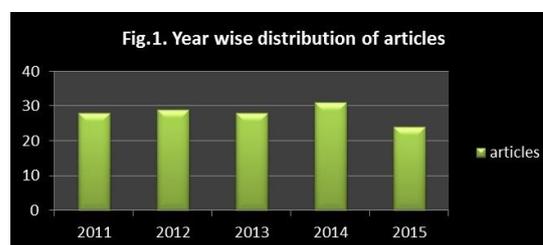


Figure 1: Year wise distribution of articles

In order to find out the number of research articles during the span of study under the purview of LIBRI journal, a year wise analysis was made.

Table I demonstrated the year wise distribution of 140 research articles published during the period of study,

i.e. 2011-2015 in the journal LIBRI. On an average per year, the LIBRI journal has published 28 research articles. Table I clearly divulges that highest number of articles - 31 (22.14%) were published in the year 2014, whereas the lowest number of 24 articles (17.14%) were published in the year 2015.

Subject	No. of Articles	Rank	Percentage
Library Profession & School/ Academic/ Special/Public libraries	33	1	23.57%
Library & Information Science	19	2	13.57%
Digital Libraries, Information and Communication Technology	17	3	12.14%
Information Service/ Reference Service	16	4	11.43%
Information Literacy	14	5	10.00%
Web2.0, Social Media	13	6	9.29%
Information Seeking Behavior	12	7	8.58%
User Studies	8	8	5.71%
Knowledge Management/ Information Management	4	9	2.86%
Library Automation/ Library Automation Software	2	10	1.43%
Research Methodology	1	11	0.71%
Bibliometrics/ Scientometrics/ Webometrics	1	11	0.71%
Total	140		100%

Table II. *Subject wise distribution of Articles*

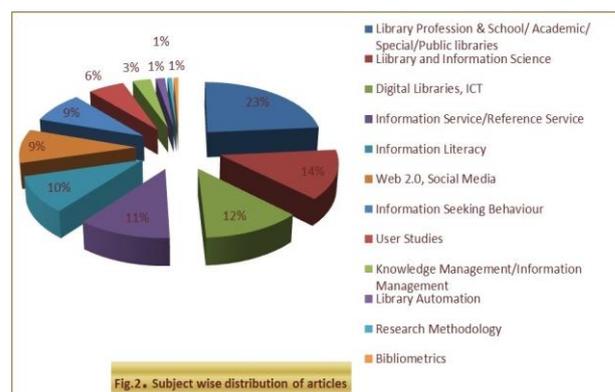


Figure 2: *Subject wise distribution of article*

With a view to identify the major subject areas in which research articles have come in LIBRI journal, a detailed analysis was made. The titles of the research articles were examined in order to ascertain their specific subject. For the analysis, major subject division from DDC (23rd edition) was used and the subject headings given by Sears list of Subject Heading (21st edition) were also helpful to determine the specific subjects.

Table II reveals the contribution of research articles published on various subjects in the LIBRI journal. The analysis shows that the majority of the research articles appeared under Library Profession & School/ Academic/Special/Public libraries with 33 (23.57 %) followed by Library & Information Science 19 (13.57%), Digital Libraries, Information and Communication Technology 17 (12.14%), Information Service/ Reference Service 16 (11.43%), Information Literacy 14 (10%), Web2.0, Social Media 13 (9.29%), Information Seeking Behavior 12 (8.58%), User Studies 8 (5.71%), Knowledge Management/ Information Management 4 (2.86 %), Library Automation/ Library Automation Software 2 (1.43%), Research Methodology 1 (0.71%) and Bibliometrics/Scientometrics/ Webometrics 1 (0.71%).

6.2 Geographical Distribution of Articles

Country	No. of Articles	Percentage
South Africa	23	16.43%
USA	18	12.86%
Nigeria	12	8.57%
Taiwan	8	5.72%
Malaysia	7	5.00%
United Kingdom	7	5.00%
China	6	4.29%
Kuwait	5	3.58%

Korea	5	3.58%
Canada	4	2.87%
Germany	4	2.87%
Iran	4	2.87%
Croatia	3	2.15%
Pakistan	3	2.15%
Israel	2	1.42%
Finland	2	1.42%
Turkey	2	1.42%
Spain	2	1.42%
Australia	2	1.42%
Iceland	2	1.42%
Singapore	2	1.42%
Latvia	1	0.71%
Texas	1	0.71%
Japan	1	0.71%
India	1	0.71%
Portugal	1	0.71%
West Indies	1	0.71%
Denmark	1	0.71%
Sweden	1	0.71%
Cuba	1	0.71%
Jordan	1	0.71%
New Zealand	1	0.71%
Massachusetts	1	0.71%
Brazil	1	0.71%
Scotland	1	0.71%
Botswana	1	0.71%
Poland	1	0.71%
Slovenia	1	0.71%
Total	140	100%

Table III. *Geographical Affiliation of Authors*

The data regarding research articles were analyzed according to their country of origin. Table III gives the geographical distribution of research articles in the LIBRI journal. This table contains a list of 38 countries, wherein the number of research articles published from these 38 countries is 140.

South Africa ranks first with 23 articles forming 16.43% of the total 140 articles. It is followed by USA contributing with 18 articles (12.86%), Nigeria ranks next to USA with 12 articles (8.57%). This is followed by Taiwan, Malaysia, UK, and China sharing the fourth, fifth, fifth, sixth places respectively, with their article contribution 8 (5.72%), 7 (5%), 7 (5%), 6 (4.29%) respectively.

From the above table, we can infer that seven countries (South Africa, USA, Nigeria, Taiwan, Malaysia, UK, China) which share the first six ranks contribute approximately with 61.43% research articles published during the stipulated period. The rest of the research articles (38.57%) are from 37 countries. It can be concluded that South Africa contributed with a maximum number of research articles to the LIBRI journal followed by USA, Nigeria, Taiwan, Malaysia, UK, China

6.3 Relative Growth Rate and Double Time of Publication

The Relative Growth Rate [R(P)] and Doubling Time [Dt(P)] of Publication are given below in Table IV. From the analysis, it was found that there is a sudden decrease in the relative growth rate of Publication [R(P)] with the rate of 0.71 in 2012 to 0.19 in 2015. The mean relative growth of the five years (i.e. 2011 to 2015) showed a growth rate of 0.40. The analogous doubling time [Dt (P)] progressively increases from 0.98 in 2012 to 3.64 in 2015. The mean Doubling Time of the five years (i.e. 2011 to 2015) was 2.14. Therefore, the speed of growth of publication was reduced, whereas the corresponding Doubling Time was exaggerated. (Appendix)

6.4 Authorship Pattern

Year	Number of Authors							Total
	One	Two	Three	Four	Five	Six	Seven and more	
2011	12	8	6	1	1			28
2012	13	10	3	2			1	29
2013	14	7	4		1	1	1	28
2014	14	9	7	1				31
2015	10	8	4		2			24
Total	63	42	24	4	4	1	1	140

Table V. *Authorship Pattern*

With a view to identify the extent of research conducted by individuals in collaboration with each other, the number of authors mentioned in the research articles was counted and analyzed. Table V displayed the authorship pattern of research articles that contributed to LIBRI journal for the duration of 2011 to 2015.

It is clear from the analysis that multiple authorship has the foremost publications, i.e. 77 (55%) articles, whereas the single authored has 63 (45%) articles. The multi authorship patterns were cautiously studied to reveal more insight on the collaborative effort. Maximum number of articles were with two authors 42 (30%), articles with three authors 24 (17.14%), articles with four authors 4 (2.86%), articles with five authors 4 (2.86%) and articles with more than five authors were 3 (2.14%).

It is emerging that Collaborative research is very much a feature of the library and information Science education. This demonstrates a pattern that more researchers and library experts are meeting up to accomplish the research activities and studies in library and Information science field.

6.5 Author Productivity

The scientific profitability of researcher is measured by the quantity of productions delivered by them in a specific timeframe. With respect to creator efficiency, a year insightful itemized examination was made.

*Average Authors per Paper (AAPP) = Number of authors/ Number of papers.

Productivity per author= Number of papers/ Number of authors.

Year	Total no. of Articles	No. of Authors	AAPP*	Productivity Per Year
2011	28	55	1.96	0.51
2012	29	66	2.28	0.44
2013	28	70	2.50	0.40
2014	31	57	1.84	0.54
2015	24	48	2.00	0.50
Total	140	296	2.11	0.48

Table VI. Author Productivity

Table VI exhibited the information identified to author productivity, which demonstrates that the total average number of authors per paper is 2.11 and the average productivity per author is 0.48. The most astounding number of author productivity, i.e., 70 (2.50) was distributed in the year 2013

6.6 Degree of Collaboration in Research

The level of coordinated effort in research was discovered utilizing the equation stipulated by Subramanyam (1983). The equation is

$$C = Nm / Nm + Ns$$

Where C= degree of collaboration in a discipline

Nm = Number of multi-authored research articles in the discipline

Ns = Number of single authored research articles in the discipline

$$C = Nm / Nm + Ns$$

$$C = 77 / 140$$

$$C = 0.55$$

Thus the degree of collaboration (C) during the overall 5 years (2011-2005) is 0.55. But when we calculate the year wise degree of collaboration for 5 years the results arise different as given in table VII.

Year	Single Authored Paper (Ns)	Multi Authored Paper (Nm)	Total (Nm+Ns)	Degree of Collaboration
2011	12	16	28	0.57
2012	13	16	29	0.55
2013	14	14	28	0.50
2014	14	17	31	0.55
2015	10	14	24	0.58
Total	63	77	140	0.55

Table VII. Volume wise Degree of Collaboration

Table VII demonstrated the year wise degree of author collaboration. It is clearly depicted from the table VII, that the degree of collaboration ranges from 0.57 to 0.58 and the average degree of collaboration is 0.55. However, multi-authored articles have been increased in recent years. In 2012, there were 12 single authored contributions and 16 multi-author papers, and in 2015, there were 10 single authored articles and 14 multi-author contributions. It can be concluded that multi authorship is dominated over single authored contributions.

7 Findings & Conclusion

The scholarly nature of the LIBRI journal has been improving over the years. The growth in the number and variety of communication included the nature of

papers and the background of contributors are all evidences of this. During the course of years the LIBRI journal had expanded its scope. But within the period of study, not much variation in its contents is seen. During the stipulated span of study 2011-2015, the LIBRI journal published 140 research articles and maximum number of articles appeared in the area of "Library Profession & School/ Academic/Special/Public libraries" with 33 (23.57%). Furthermore, the present study reveals that the highest number of research articles were from South Africa with 23 (16.43%). The authorship patterns have changed from the overwhelming retired single authors to expand multi-author joint efforts as of late. In the present study, multiple authorship has the most prolific publications, i.e. 77 (55%) articles while the single authorship pattern has 63 (45%) articles. Indeed, even among the collaborating authors, the nature of collaboration is generally bestowed to two authors. The Relative Growth Rate of Publication [R(P)] decreases with the momentum of 0.71 in 2012 to 0.19 in 2015. The mean relative growth of the five years (i.e. 2011 to 2015) showed a growth rate of 0.40. The corresponding Doubling Time for different years [Dt (P)] gradually increased from 0.98 in 2012 to 3.64 in 2015. The mean Doubling Time of the five years (i.e. 2011 to 2015) was 2.14. The degree of collaboration ranges from 0.57 to 0.58 and the average degree of collaboration is 0.55.

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Received: 2016-06-20. Accepted: 2016-06-27

Appendix

Year	No. of Articles	Cumulative no. of Articles	Log _e 1 ^P	Log _e 2 ^P	[R(P)]	Mean [R(P)]	[Dt(P)]	Mean [Dt (P)]
2011	28	28	-	3.33	-	0.40	0.98	2.14
2012	29	57	3.33	4.04	0.71			
2013	28	85	4.04	4.44	0.40			
2014	31	116	4.44	4.75	0.31			
2015	24	140	4.75	4.94	0.19			

Table IV Relative Growth Rate and Double Time of Publication