Research productivity of Journal of Optics: A Scientometric Study

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Abstract

The journal has wide circulation in India and abroad among the physician and technologist both from academic and research organization. Manufacturing organization in the area, in the core and defence sector is also using this journal either through corporate membership or by subscriptions. Present study has been discussed about year-wise distribution of articles, authorship pattern, degree of collaboration, mean, median, range, standard deviation, relative growth rate, doubling time, source-wise and institution-wise contribution and other scientometric parameters during 2007-2013

Keywords

Scientometric; Optics; Research Productivity; Bibliometrics

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INTRODUCTION

Scientometric research, the quantitative mathematical study of science and technology, encompassing both bibliometrics and economic analysis, is expanding at an enormous pace. This is evidence in increasing attendance rates at important industry conference and the dedicated journals. Indeed, if one were to pick up an issue of any of the leading journals in the field today, one would find research covering article output, citation relationships between disciplines and geographical analysis also linked to this study.

The Journal of Optics is quarterly publication of the Optical Society of India – a premier association of scientist and technologist of our country, established in 1965, and is engaged in the promotion and dissemination of knowledge of optics in all its branches, pure and applied. The journal is being regularly published since 1972. The Journal of Optics publishes research papers on results of original and applied research of sufficient merit in all branches of optical physics and technology such as science of vision, colour, photometry. Illumination, optical/opto-electronic materials and devices, optical testing and standardization, spectroscopy, laser, holography, fibre optics, nonlinear optics, optical and opto-electronic systems and instrument, image processing, optical computing etc.

LITERATURE REVIEW

Rajeswari, Seethai RM and Mani V (2014), has examined leprosy control is characterized by an integrated delivery of basic leprosy services provided at the peripheral level knowing the availability of its related literature. It includes the utilization and strengthening of integrated referral facilities to deal with leprosy related acute and chronic complications through well known of the research in the field. Such a strategy helps careful planning and different approaches at the national and sub national levels. This paper address the Leprosy research in India level and research production during the year 1960 to 2012.

S. L. Sangam Former Professor, Chairm and Shivaranjini S. Mogali (2014), has been made to map social science literature. The mapping of knowledge domains has been done in order to understand the positions of its various subfields and their relative position. The Social Science forms a very vast field and comprises many of subfields or disciplines. The different schemes of classification

systems have been used to locate the position of each subject which comes under social science namely DDC, CC, UDC, and Web of Science.Sanjeevi. K (2012), has examined research publications in the field of Medical Research are increasing year by year. In this paper the authors have studied bibliometrics analysis of the Indian Journal of Medical Research [IJMR] for the period of five years between 2000 and 2005. The authors analyzed the year-wise publication of the journal, authorship pattern, source-wise publication, etc.R.Karpagam, et al. (2012),), study explores the growth of Stem Cell research in India during 2001–2010. To compare Indian's output of stem cell research several parameters like global publication share and rank, average citation per paper for 5 years block period, authorship pattern, collaborative Index, Collaborative Coefficient, Degree of Collaboration, etc. In the past, the citation potential was studied at journal level considering the average number of references in established groups of journals (for example, the crown indicator is based on the journal subject categories in the Web of Science database). Singh. K.P, Harish Chander, (2014), indicated that the majority of the contributions by single authors and most cited documents are journal articles. The study highlights the chronological distribution of articles, authorship pattern, geographical distribution of authors, institutions wise distribution, citation pattern and length of articles. Shubhada Nagarkar (2014), studied bibliometric parameters including number of papers, number of citations received, institutional collaborations, productivity of journals, subject categories and authorship pattern have been used to carry out the analysis of the research contributions made by the faculty members of the Department of Chemistry at University of Pune. The data set was collected from the Web of Science (WoS) database for the period of about 14 years (1999-2012). Meena.M, Nagarajan.M (2013), evaluated Indian malaria research out put during 1974–2013 using different bibliometric indicators. Data have been downloaded from Scopus database for the period 1974–2013 using the keywords Indian and malaria in the title and abstract fields. The study examined the pattern of growth of the output, its collaboration with other countries, profile of different countries in different subfields.

OBJECTIVES

- To investigate chronological growth of journal of optics literature;
- To study authorship pattern of the published literatures;
- To enumerate making of prolific contributors and their affiliated institutions;
- To identify degree of collaboration among the authors;
- To know the cited documents and their numbers.
- To find the growth of literature using RGR and Dt

METHODOLOGY

The data for the study was downloaded from the journal's website for seven years from 2007-2013. The data consists of year of publication with the volume number, l locations, total number of authors, number of references cited by the article etc. The data was downloaded on MS-Excel sheets. Data was analysed to meet the objectives mentioned above. For studying some parameters mentioned under the objectives. Complete count method have been followed for the analysis of the data.

Table 1: Year-wise distribution of articles

Year	Vol. No.	No. of Issue Published	No. of Article Published	Mean	Median	Range	Standard Deviation
2007	37	4	34 (13%)	36.3	24	27	9.03
2008	38	4	36 (14%)				
2009	39	4	28 (11%)				
2010	39	4	24 (10%)				
2011	40	4	38 (15%)				
2012	41	4	51 (20%)				
2013	42	4	43 (17%)				
Total		28	254 (100%)				

Table 1. presents that pattern of growth of articles over the period of study. It denotes that highest number of article published in 2012 (20%), in 2013 has second position, in 2011 occupies third place and lowest number of article published in 2010(10%) out of 254 publications and mean value is 36.3, median is 24, the range value is 27 and the standard deviation is 9.03.

Table 2: Relative Growth Rate and Doubling Time

Year	Total No. of Article Publish	Cumulative	W1	W2	RGR	Dt
2007	34	34	O	3.526	3.526	0.196
2008	36	70	3.526	4.248	0.722	0.959
2009	28	98	4.248	4.584	0.336	2.062
2010	24	122	4.584	4.804	0.220	3.150
2011	38	160	4.804	5.075	0.271	2.557
2012	51	211	5.075	5.351	0.276	2.510
2013	43	254	5.351	5.537	0.186	3.725
Total	254	508	5.537	6.230	0.693	1

$R(a) = (\ln W2 - \ln W1) / (t2 - t1)$
Where, W2 and W1 are the cumulative number of publications in years t2 and t1.
$Dt = 0.693/R(a)$

Table 2 indicates the sequential distribution relative growth rate and doubling time of journal of optics during 2007 – 2013. It is that the RGR value has been degreased (3.526 – o.693), but Dt value is being increase (0.196 – 1).

Table 3: Authorship Pattern of Journal of Optics during 2009-2013

Year	No. of Communications.	Authorship Pattern				
		Solo	Two	Three	Four	>Four
2007	34	4	8	11	6	5
2008	36	5	10	7	8	5
2009	28	3	7	8	6	4
2010	24	4	5	6	6	4
2011	38	5	6	12	9	6
2012	51	7	10	14	12	8
2013	43	6	9	13	8	7
Total	254	34	55	71	55	39
Percentage		13%	22%	28%	22%	15%

Table 3. It is observed that three authored contributions (28%) is found to be most predominant, followed by two and four authors contribution is (22%), above four authors contribution is (15%) and single author contribution (14%) occupies least position.

Table 4: Degree of Collaboration

Year	Non-collaboration (Ns)	Percentage (%)	Collaboration (Nm)	Percentage (%)	Degree of Collaboration (DC)
2007	4	1.5	30	11.8	0.882
2008	5	1.9	30	11.8	0.857
2009	3	1.1	25	9.8	0.892
2010	4	1.5	21	8.3	0.840
2011	5	1.9	33	13.0	0.868
2012	7	2.8	44	17.3	0.862
2013	6	2.3	37	15.0	0.860
Total	34	13.0	220	87.0	0.866

Degree Collaboration (DC) – a proxy measure for research collaboration among the contributors was conceived by using Subramaniam formula, as the ratio of the number of collaborative contributions to the total number of research contributors published in the discipline during the certain period of time. Mathematically it can be referred as,

DC = Nm/Nm+Ns or,

(DC) JoO =220/220+34= 0.866

*JoO – Journal of Opptics

Where, Nm refers to collaborative communications and Ns indicates the number of single-authored communications.

Table 5. shows that collaboration scenario of the contributors of the Journal of Optics during 2007-2013. Out of total 254 communications, about 87% collaborated by multiple – authors ranging from two to nine co – authors and rests were non – collaborative. Table also shows the degree of collaboration of JoO varied inconsistently from 0.882 to 0.860 during the study period. Average degree of collaboration is impressive (0.866) but not overwhelming. Gradual increase (11.8% to 15.0%) of multi - authored communications over the years of JoO clearly indicates prevalence of team or group research amongst the optical society. Similar observation has also found in different fields of basic and applied sciences.

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Table 4: Types of document referenced in Journal of Optics during 2007 – 2013

Sources	Year							Total
	2007	2008	2009	2010	2011	2012	2013	
Journal Articles	117	136	147	156	212	223	206	1197 (42.4%)
Books	126	98	130	104	180	116	174	928(32.9%)
Internet	4	5	7	8	12	19	16	71(2.6%)
Proceedings	37	31	42	36	43	42	33	264(9.3%)
Dissertations/ Theses	12	23	19	24	19	18	20	135(4.8%)
Standards	2	2	2	4	4	7	10	31(1.0%)
Others	16	21	37	32	23	42	28	199(7.0%)
Total	314 (11.1%)	316 (11.2%)	384 (13.6%)	364 (12.8%)	493 (17.5%)	467 (16.6%)	487 (17.2%)	2825 (100%)

Year-wise references were analyzed to understand how the number of references has changed during the period of 2007 – 2013.Table 4. It is observed that in 2011 references (17.5%) is found to be most predominant, in 2013 has taken second place (17.2%), in 2011has taken third place (20%) and in 2007 has appeared in least place (11.1%). When we see source – wise distribution of respondent, journal article occupies first place (42.4%), books take second position (32.9%) and standrads are in last place (1.0%).

Table 5: Institution-wise Contribution on Journal of Optics during 2007-2013

S. No.	Name of the Institution	No. of Article Published	Percentage
1	Tezpur University, Tezpur	26	17.1
2	IIT, Madras	23	15.1
3	Burdwan University, Burdwan, India	20	13.2
4	NIT, Durgapur	17	11.1
5	University of Culcutta, Kolkata	16	10.5
6	CSIR, Pilani	14	9.2
7	RRCAT, Indore	11	7.2
8	University of Pune, Pune	10	6.6
9	SGSITS, Indore, M.P., India	8	5.3
10	Indian Institute of Aerophysics, Bangalore	7	4.7
	TOTAL	152	

Table 5. reveal that 254 paper ere published in Journal of Optic affiliated to 32 institution from 6 countries. A rank list of affiliated institution of the publications has been prepared based on the aggregated value of contributions from respective institutions. It is indicated that Tezpur University has appeared on the top position (17.1%), followed by IIT, Madras has appeared second position (15.1%), Burdwan University, Burdwan has appeared third position (13.2 %) and Indian Institute of Aerophysics, Bangalore has obtained least position.

CONCLUSION

The analysis has revealed that maximum number of articles has been published in 2012 (20%), the relative growth rate is being degreased (3.526-0.693) to find out growth of literature of doubling time is increased (0.196 – 1). The article mean value is 36.3, median is 24, the range value is 27 and the standard deviation is 9.03 multi-authored contributions is more predominant (87%), journal articles are highly referenced by the contributors (42.4%). When we see institution-wise output of journal of optics, it is obseved that Tezpur University occupies first position followed by IIT, Madras, Burdwan University, Burdwan.the study helpful to subject expert of optics, researchers, Scientist and others.

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