

# BIBLIOMETRIC ANALYSIS OF INTERNATIONAL JOURNAL OF BIOLOGICAL SCIENCE

**Tahir Ahmed Bat**

Library Assistant/Instructor at SKUAST-K, Shalimar

Email: [tahirbatt2015@gmail.com](mailto:tahirbatt2015@gmail.com)

**Iqbal Farooq**

Email: [Iqbaibhat48@gmail.com](mailto:Iqbaibhat48@gmail.com)

## 1.0 Introduction:

Bibliometrics is a research method used in library and information science. It is a quantitative study of various aspects of literature on a topic and is used to identify the pattern of publication, authorship, and secondary journal coverage to gain insight into the dynamics of growth of knowledge in the areas under consideration. This can lead to better organization of information resources, which is essential for effective and efficient use. Bibliometrics has attained sophistication and complexity with a national, international, and interdisciplinary character.

The Bibliometrics is a type of analytical method, which analysis and explorer the knowledge to the society. It is quantitative study of various aspects of document used to identified the pattern of publications, authorship, citations and coverage of journals etc. this consequently leads to the better organization of information resources, which is essential for effective and efficient use. The bibliometric study also involves the process of collection, counting, analysis and interpretation of citations given in the printed documents.

The great Library Scientist, S.R. Ranganathan, coined the term "Librametry", which historically appeared first and perhaps seemed proper to streamline the services of librarianship. Bibliometrics is just analogous to Ranganathan's 'Librametrics', the Russian concept of 'Scientometrics', FID's 'Informetrics' and to some other well established sub-disciplines like 'Econometrics', 'Psychometrics', 'Sociometrics', 'Biometrics', 'Technometrics', 'Chemometrics', 'Climetrics', where mathematical and statistical calculus have been systematically applied to study and solve problems in their respective fields. Now-a- days, the term 'Scientometrics' is used for the application of quantitative methods to the history of science and obviously overlaps with bibliometrics to a considerable extent.

## 2.0 Problem

The application of bibliometrics to the literature has proved useful in understanding the nature of literature generation and production. It has become an essential tool in the hands of librarians/information analysts to select and retrieve the documents and information and above all to provide up to-date and intensive service to the users. Therefore these applications of statistical and mathematical procedures to keep to work for the betterment of profession and its academic growth.

These studies indicate the quality, quantity, maturity and productivity of a particular subject. The present study therefore makes an attempt to carry out Bibliometrics study of an open access journal 'international journal of biological science

## 3.0 Scope

The scope of the study is limited to the bibliometric study of open access journal in the field of science "International journal of biological science,, covering the volumes published from( 2005 – 2015).

## 4.0 Objectives of the Study:

The present study has been undertaken with the objective of analyzing the following aspects.

1. To find out volume wise contributions.

2. To find out category wise classification of papers.
3. To find out the authorship pattern.
4. To determine the geographical distributions of contributions in the journal.

### **5. Methodology:**

The methodology applied in the present study is bibliometric analysis, which is used to study in detail the bibliographic features of the articles of the references at the end of each article published in international journal of biological science from 2005-2015. For this the relevant data are collected and recorded. Then they are tabulated and analysed for making observations.

### **6.0 International Journal of Biological Sciences:**

International Journal of Biological Sciences publishes peer-reviewed scientific papers of significance in all areas of biological sciences. The Journal targets wide ranges of international audiences of researchers and biotechnology company employees. The scope of the Journal includes cell biology, developmental biology, structural biology, microbiology, molecular biology & genetics, biochemistry, biotechnology, biodiversity, ecology, marine biology, plant biology, and bioinformatics. Articles of cross-disciplined research between biology and mathematics, physics, information science, material science and others are also considered. Selected papers from scientific meetings may be published as special issues of the Journal. International Journal of Biological Sciences.

The International Journal of Biological Sciences is a peer-reviewed open access scientific journal published by Ivyspring International Publisher. It publishes original articles, reviews, and short research communications in all areas of biological sciences. Articles are archived in PubMed Central. The editor-in-chief is Chuxia Deng (National Institutes of Health).

### **6.1: Growth of Literature in Biological Science:**

The increase in the production rate of scientific output has long been recognized. Plausible causes of such a trend include the increasing number of scientists worldwide, the consequently larger number of discoveries worth communication to peers, public and posterity, as well as administrative pressure to publish e.g. in order to get or maintain postdoctoral and tenured positions at academic institutions. The ever-increasing number of scientific publications results in increasing specialization, due to the sheer impossibility for both scientists and laymen to keep up with the whole of one's own main field of interest, let alone following what is happening in neighboring and distant disciplines. Publication growth trends have been documented in various fields, from neuroscience to bioinformatics and plant biotechnology.

Biology, the science of life, is a key scientific area for achieving sustainability, *i.e.* human use of resources which preserves the environment so that human needs can be met also by future generations. Whilst many other scientific disciplines are also essential for sustainability (e.g., the social sciences, including economics; climate science; information and energy technology, *etc.*), biologists have much to contribute to sustainable development because ecosystems throughout the planet have evolved smart ways to recycle resources, thus making the biosphere sustainable. Whilst not all biological publications are directly relevant to current efforts to improve the sustainability of modern human civilization, investigating trends in biological publications is important from a sustainability point of view. This is because current rates of production of biological publications are contributing to information overload, which may make it harder for key advances towards sustainability to reach the intended audience (e.g., students, policy makers, journalists, the public, other scientists).

A search was carried out in WOS (all citation databases: Science Citation Index Expanded, Social Sciences Citation Index, Arts & Humanities Citation Index, Conference Proceedings Citation Index-Science, Conference Proceedings Citation Index-Social Science & Humanities, and Index Chemicus) in January 2012. WOS does not yet include many new journals, thus providing more conservative results (*i.e.* a lower boundary for the observed publication growth patterns). The year 1991 was chosen as starting point for the study given that abstracts are searched in WOS starting from that year. Keywords used (in the field: Topic) were: biology, the nine sub-fields explicitly covered by the new Royal Society journal *Open Biology* ("cell biology", "developmental biology", "structural biology", "molecular biology", "biochemistry, neuroscience, immunology, microbiology, genetics), and nine additional sub-fields used by the Royal Society manuscript central website to categorize submissions (bioengineering, bioinformatic\*, biomaterial\*, biomechanic\*, biophysic\*, biotechnolog\*, ecolog\* and evolut\*, "systems biology", and "synthetic biology").

The number of published papers per year markedly increased in all investigated sub-fields. The greatest increase in terms of the slope of the linear regression (i.e. the average additional number of published papers per year) was observed for genetics, the largest sub-field among those investigated. The shallowest slopes of these linear regressions were observed for the niche areas of structural and developmental biology, as well as for bioengineering

The ratio of the 2010 vs. 1991 publications was greatest for structural biology (23 times), neuroscience (17) and biomaterials (16). The lowest values for this ratio were observed for molecular biology (2.3) and biochemistry (1.8). The proportion of papers published over the last five years compared to the whole literature corpus (1991–2010) was highest for synthetic biology (94%), systems biology (84%) and bioinformatics (65%). The same result was obtained using the proportion of papers published over the last three years only. Also in this case, the lowest proportions were observed for molecular biology and biochemistry (about 30% of 1991–2010 papers published over the last five years, and 20% over the last three years).

### **7.0 Review of Literature:**

Various authors have done bibliometric analyses of papers published in various journals in different fields. **Thanuskodi (2010)** has done bibliometric analysis of the journal 'Library Philosophy and Practice' from 2005-2009. The majority of articles of bibliometric study contain bibliographic references to journals, books, conference proceedings, dissertations, etc **Singh, Mittal and Ahmad(2006)** conducted a bibliometric study of literature on digital libraries. The important findings are that most articles (61 percent) are single authored; author productivity is not in agreement with Lotka's Law, except in one case where the number of articles is three; the maximum number of articles were published in 2003 with English being the most productive language; maximum articles were published in the journal D-lib Magazine; distribution of articles nearly follows Bradford's Law; and USA ranked first for maximum number of journals

**Malathy, S (2015)** studied that Journal of Spacecraft and Technology, an in-house publication of ISRO Satellite Centre publishes the research activity of the centre. This paper presents bibliometric study of the journal published during 1991 to 2012, which includes 22 volumes with 330 papers and 2597 citations. The analysis was made on different parameters like year-wise distribution of articles for the period of study (1991-2012), length of articles, authorship pattern of contributions, author productivity, degree of collaboration among coauthors and gender-wise distribution of papers. It also presents Institution-wise contribution, group-wise (only ISAC) contribution, ranked list of prolific/productive authors, number of citations appeared in papers and form-wise distribution of citations. This study provides the insight and development of the journal towards excellence.

**Patra, Bhattacharya and Verma** in 2006 analyzed the growth pattern, core journals and authors' distribution in the field of bibliometric using data from Library and Information Science Abstract (LISA) and found that the growth of literature does not show any definite pattern. **Dhiman** (2000) has done ten year bibliometric study Ethnobotany Journal published during 1989-1998. In this paper examines year-wise, institution-wise, country-wise, authorship pattern, range of references cited and length of the articles. **Nattar** studies on Indian Journal of Physics during 2004 to 2008 revealed that 238 articles were contributed in 2004, followed by 200 articles in 2005 out of total 829 articles. Authorship pattern showed that two-authored articles were 275, followed by 221 three-authored articles, 136 four-authored articles, etc. Geographical distribution showed that 91.64 % of contributions were India; 1.5 % contributions were from Bangladesh, etc. Out of 13481 citations, 8851 were journals and 3303 were books. **Hazarika(2003)** in his study "Bibliometric Analysis of Indian Forester: 1991-2000" revealed that, in a single year contribution highest 156 articles have been contributed in 1996 at a rate of 11.13%. Institutions under the Indian Council of Forestry Research and Education (ICFRE) have contributed highest 487(34.74%) articles among the participating organizations. **Khaparde (2011)** stated in his study "Bibliometric Study of Electronic Journal of Academic and Special Librarianship." that single author contributions have dominated the journal with 47.95% of contributions, and in geographical based distribution of articles India have occupied the top position with 28.41% publications.

**Roy (2013)** revealed in his study "Journal of Documentation: A bibliometric study" that the degree of collaboration is 0.51 i.e. majority of the library and information scientists prefer to contribute their papers jointly. About 6.21% citations are self-cited by the respective authors.

A study by **Das & Sen** on Journal of Biosciences in 2000 showed that 18.68 % articles were single-authored, 52.71 % were double- and triple-authored, and the remaining 28.61 % were joint contributions of four or more authors. Of the citations, journal articles comprised 85.89 % and monographs 10.1 %. Indian contributions comprised 5.53 % of

the citations. Of the citing articles, 30 were by Indian authors, 3 by foreign authors and 1 (2.94 %) jointly by Indian and foreign authors. Of the total citations, 10.87 % were author self-citations and 0.57 % were journal self-citations.

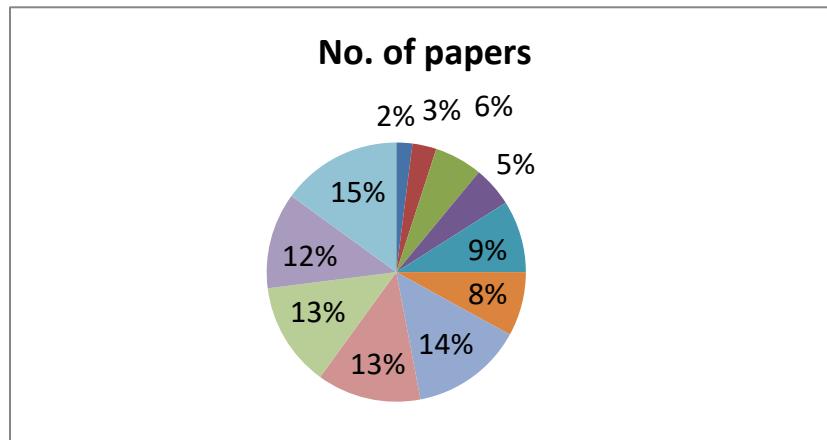
**Manoj Kumar and Murthy** (2011) focused DESIDOC Journal of Library and Information Technology (DJLIT) is one of the premier journals of library and information science being published in India. The analysis covers various parameters like growth pattern, content coverage, authorship patterns, subject-wise distribution of articles, etc.

**8.0 Data Analysis:**

**8.1 Volume Distribution of Contributions:**

**Table: 1- N = 935**

Volume	1	2	3	4	5	6	7	8	9	10	11
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
No. of paper	19	30	60	51	79	74	131	124	121	110	136
Percentage	2	3	6	5	9	8	14	13	13	12	15



**Fig. 1: Year wise distribution**

Table 1 and adjacent figure shows that volume 11(year 2015) has the highest number of papers out of 935 it has 136 papers and the volume1 (year 2005) has least number out of 935 it has 19 papers

**8.2 Category-Wise Classification of Papers:**

**Table -2: N = 935**

Category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	No. of articles	%
Research paper	8	20	39	37	54	47	98	93	101	78	115	690	73.79
Review	5	5	10	7	15	14	22	22	11	27	17	155	16.57
Short research papers	4	0	0	0	0	0	0	0	1	0	0	5	0.53
Short research communication	0	2	7	5	8	6	6	4	5	4	1	48	5.13
Letter to editor	0	2	1	2	0	2	1	0	0	0	0	8	0.85
Editorial	1	1	2	0	0	1	2	1	0	1	1	10	1.06
Technical report	0	0	1	0	0	0	0	0	0	0	0	1	0.1
Letter	0	0	0	0	1	1	2	0	1	0	2	7	0.74
Erratum	1	0	0	0	1	1	0	1	2	0	0	6	0.64
Commentary	0	0	0	0	0	1	0	3	0	0	0	4	0.42
Communication	0	0	0	0	0	1	0	0	0	0	0	1	0.1

<b>TOTAL</b>	<b>19</b>	<b>30</b>	<b>60</b>	<b>51</b>	<b>79</b>	<b>74</b>	<b>131</b>	<b>124</b>	<b>121</b>	<b>110</b>	<b>136</b>	<b>935</b>	<b>100</b>
--------------	-----------	-----------	-----------	-----------	-----------	-----------	------------	------------	------------	------------	------------	------------	------------

Table 2 focuses that the category wise classification of the papers published during period from 2005 to 2015. The study reveals that the maximum number of articles published as under the category of research paper i.e. 690 (73.79%), whereas 155 (16.57%) articles published under the review category. There were a small numbers of articles published as under the technical report and communication category, i.e., 1 (0.10%).

**8.3 Volume Wise Authorship Pattern of Articles:**

Table- 3: N = 935

Year	Volume	Single Author	Two Authors	Three Authors	Four Authors	Five Authors	More than Five Authors	Total
2005	1	3	5	5	2	1	3	19
2006	2	7	6	4	7	4	2	30
2007	3	6	9	11	12	13	9	60
2008	4	3	1	9	9	9	20	51
2009	5	2	6	17	12	14	28	79
2010	6	4	13	8	11	12	26	74
2011	7	5	11	10	20	13	72	131
2012	8	3	10	12	17	15	67	124
2013	9	1	9	9	15	17	70	121
2014	10	5	8	11	10	12	64	110
2015	11	-	1	12	14	8	101	136
	Total	39	79	108	129	118	462	935

**8.3.1 Authorship Pattern of Articles:**

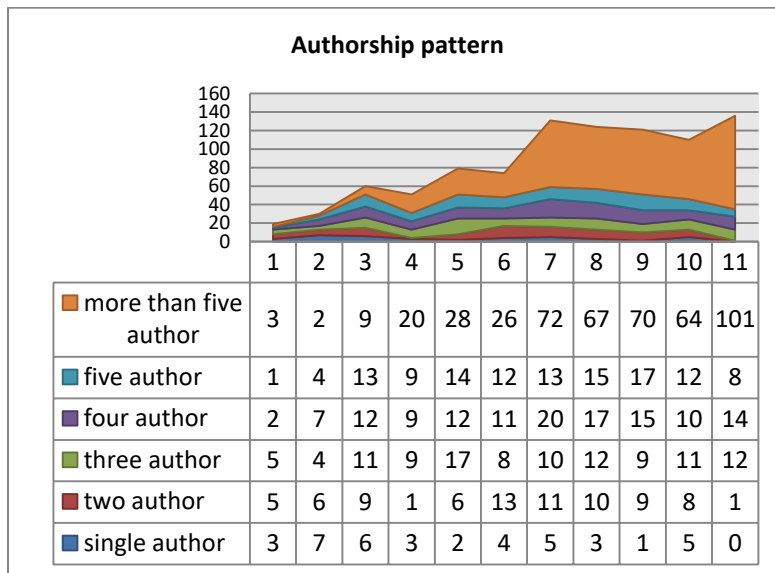


Fig. 2: Authorship Pattern of Articles

From Table 3 we can see there are 39 single author articles, 79 two author articles, 108 three author articles, 129 four author articles, 118 five author articles, 462 more than five author articles. Table-3 gives a better and clearer picture of the authorship distribution pattern. Out of 935 articles 462 are more than five author publications in the *IJBS* during the period of 2005-2015. Data indicates that the more than five authored papers are maximum.

## 9.0 Findings and Conclusion:

International Journal of Biological Sciences is a peer-reviewed open access scientific journal published by Publisher. The following general conclusion can be drawn from the results of this study.

- International journal of biological science has 11 volumes and 935 articles during the period 2005-2015.
- The study indicates that maximum number of articles were published in the year 2015 with 136 articles and least number of articles in year 2005
- The study indicates that more number of articles were contributed by more than five author 462. This is followed by five author with 129 of articles and four author 118 and articles contributed by three author 108. And articles contributed by two author 79 and articles by one author is 39
- It is revealed majorities of the articles were published in research papers category 690 papers and least was published in communication
- It is found that highest number of contributions by a country is by china who is at the top. China has contributed in 462 papers.

## 10.0 References:

1. Borgman, C. L. (1990), Editor's introduction, In: Borgman, C. L. (ed.), *Scholarly communication and bibliometrics*, Sage Publications Inc., 10-27
2. Garfield, E. (1983) *Citation Indexing-Its Theory and Application in Science, Technology, and Social Sciences*. Online Information Review, 28(3). Retrieved from <http://kaptur.wordpress.com/2012/05/28/minting-dois-for-research-data-in-the-uk/>.
3. Hjerpe, Roland (1980). "A Bibliography of Bibliometrics and Citation Indexing & Analysis" (TRITA-LIB-2013). Stockholm: Royal Institute of Technology Library.
4. Hood, W. W., & Wilson, C. S. (2001). The literature of bibliometrics, scientometrics and informetrics. *Scientometrics*, 52 (2), 291-314. DOI: 10.1023/A:1017919924342
5. Maheshwarappa, B. S. (1997). *Bibliometrics: An overview*. In G. Devarajan (Ed.), *Bibliometric studies 1-10*, 294.
6. Martyn, J. (1975). Citation analysis. *Journal of Documentation*, 31 (4), 290-297.
7. Maurice Vergeer (2013) Introduction to Webometrics: Quantitative Web Research for the Social Sciences, *Journal of Information Technology & Politics*, 10:2, 241-243, DOI: 10.1080/19331681.2012.728386
8. Pritchard, A. 1969. Statistical bibliography or bibliometrics? *Journal of Documentation*, Vol. 25, no. 4: 348-349. [http://danpritchard.com/Citation\\_analysis](http://danpritchard.com/Citation_analysis)
9. Rubin, Richard (2010). *Foundations of library and information science* (3rd ed.). New York: Neal-Schuman Publishers. Retrieved from.
10. Small, H., Greenlee, E. (1990), A co-citation study of AIDS research, In: Borgman, C. L. (ed.), *Scholarly communication and bibliometrics*, Newbury Park, CA: Sage Publications Inc., 166-193.
11. Sen, B.K. (2004). Cybermetrics meaning, definition scope and constituents. *Annals of Library and Information Studies*, 51 (3), 116-120.
12. Sudhler, K.G., Abhila I.S., (2011). "Publication productivity of social scientists in the center for development studies, Thiruvananthapuram: A Bibliometric Analysis" 8<sup>th</sup> international CALIBER, 662-679.
13. Thomson Reuters. (2009). *Journal Citation Reports on the Web : the recognized authority for evaluating journals*. Retrieved from <http://isiwebofknowledge.com/media/pdf/jcrwebfs.pdf>.
14. Wouters, P. (1999b). *The citation culture*. Unpublished doctoral dissertation, University of Amsterdam