SCIENTOMETRIC STUDY ON INDIAN JOURNAL OF INFORMATION SOURCES AND SERVICES ON WEB OF SCIENCE

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ABSTRACT

The study is based on the Scientometric evaluation of 284 publications published on Indian journal of Information Sources and services during the period of 2014 -2023. The six scientometric tools Annual Growth Rate (AGR), collaborative index (CI), collaboration coefficient (CC), Degree of collaboration (DC), Relative Growth Rate (RGR) and Doubling Time (DT)and Type of Documents have been used for the data analysis.

KEY WORDS: scientometrics, Degree of Collaboration, Web of Science

1. INTRODUCTION

Scientometrics is a branch of the science 'Science of Science'. Haitun treats 'Scientometrics', as scientific disciplines, which performs reproducible measurements of scientific activity1. Now a day's scientometrics is one of the truly interdisciplinary research fields extended to almost all scientific fields. Scientometrics applications are used to measure scientific activities, mainly by producing statistics on scientific publications indexed in databases. These applications are extremely valuable methods for evaluating research output, to know about the author productivity and citation analysis in science and technology. Scientometric tools can be used to measure and describe countries, universities, research institutes, journals, specific research topics and specific disciplines. This paper focuses on quantitative study of "Indian Journal of Information Sources and Services" by applying simple scientometric techniques.

2. REVIEW OF LITERATURE

Tupe S.K & Khaparde V.S , (2016) The Present study deals a Scientometric analysis of 4813 references appended to 217 articles contributed by the authors in Information Technology and Libraries on DOAJ. during

the period of 2005-2014.The study examines Authorship Pattern ,Relative Growth Rate and Doubling Time of Articles ,Year wise degree of collaboration It is seen that the single authorship trend in increasing. The study revealed that most of the articles (57.14%) of articles were contributed by single authors. USA is the top producing country with 178 (82.03%) publications of the total output. The mean relative growth rate for the last five years 2010 to 2014 reduced to (0.13). While the Doubling time for different years [Dt(p)]gradually increased from (1.00) in 2006 to (7.70) in 2014. The mean doubling time for the first five years (i.e. 2005 to 2009) is only (1.69) which is increased to (5.69) during the last five years (2010 to 2014). The maximum references used print references i.e.3154 whereas 1659 references were web references.

Padme, S L & Vaishali, K (2016) Bibliometric Analysis of Indian Journal of Chemistry Section A. International Journal of Information Dissemination and Technology, 6(2), 103-106. Bibliometric Analysis has been undertaken for the period of five years (2010 to 2014). In the present study, an attempt has been made to analyze the year-wise distribution of articles, find out the issue- wise distribution of articles, authorship pattern of Journal articles, year- wise degree of collaboration, institute-wise distribution of papers, and geographical distribution of articles authors also ranking of leading contributors in the articles.

Kharat,P.P & Dr. Khaparde,S.Vaishali (2018) Scientometric Profile of Presbyopia in Medline Database. International Journal of Library and Information Studies, 8(2), Scientometric Analysis has been undertaken for period of five years (2010 to 2014). The present study is based on 3356references appended to 123 articles contributed on Medline Database. The findings revealed various aspects of the characteristics and patterns of contributions of the study.

Velmurugan (2014) described the pattern of authorship and collaborative research on Indian Journal of Pure and Applied Physics for the year 2009 -2012. The study discussed the various factors such as year wise, author wise, volume wise, issue wise distribution of contributions during the period of study. The study used the scientometric indicators such as DC, RGR, and DT to measure the data.

3. DEFINITIONAL ANALYSIS

Scientometric- The term scientometrics came into being as a Russian term for the application of quantitative methods to the history of science (Dobrov & Korennoi, 1969).Its scope and objectives have since broadened substantially. One can say that "Scientometrics" is a wide-ranging field encompassing bibliometerics. Scientometrics evolved out of a wide range of studies pertaining to the quantitative aspects of scientific endeavours, like, publications, journals, scatter of scientific literature, citation processes and patents, etc.

Web of Science

Web of Science (previously known as Web of Knowledge) is a website that provides subscription-based access to multiple databases that provide comprehensive citation data for many different academic disciplines. It was originally produced by the Institute for Scientific Information (ISI) and is currently maintained by Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters.

4. SCOPE & LIMITATION OF THE STUDY

The present study is based on the Scientometric evaluation of publications in Indian Journals of Information Sources and services 2014 – 2023.

5. DATA COLLECTION
Data collected from the Indian Journal of Information Sources and services for the period of 2014-2023 i.e. 10 years. A total number of 284 publications were received. The data was downloading and analyzed by using the Excel sheet. The data is used to find the annual growth rate and measures of DC, CI and CC in the Indian journal of Information Sources and services.

6. OBJECTIVES OF THE STUDY

- To estimate the annual growth rate (AGR) of publications.

- To measure the DC, and collaborative index (CI) of Information Sources and services.

- To measure the Collaborative co-efficient of publications.

- To find out the form wise distribution of publications.

- To find out the Relative Growth Rate (RGR) and Doubling Time (DT) of publications.

- To find out country-wise distribution of contribution.

8. DATA ANALYSIS

The analysis will be done as per the parameters laid down in the objectives of the study. The data collection & analysis is done for Scientometric study on Indian Journal of Information Sources and Services On web of Science of total 284 articles was collected & was analyzed as per the objective laid down as well as by using various statistical tools.

To estimate the annual growth rate (AGR) of Publications

Table 1 AGR of research publications			
Year	Volume	Total no. of publications	AGR
2014	4	25	
2015	5	14	-44
2016	6	16	14.29
2017	7	19	18.75
2018	8	57	200
2019	9	85	49.12
2020	10	17	-80
2021	11	17	0
2022	12	14	-17.65
2023	13	20	42.86

The growth rate is a measurement which is essential in any field. In meaning the growth of the number of publications in a particular discipline, this is often a measure of the annual increase or decrease. Here, the AGR has been determined as per the formula given below.

$$AGR = \frac{End\ value - First\ Value}{First\ Value} \times 100$$

In this study, the end value is 14 in the year 2014; the first value is 25 in the year .Table 2
Shows that the year on the change in the number of documents was -44% in 2015, 14.29% over the respective next year.

To measure the DC, and collaborative index (CI) of Indian journal of Information Sources and Services
To show the trend towards multiple authorships in a discipline, many studies have used either
The mean number of authors per paper, termed the CI by Lawani (1980) and the proportion of multiple authored papers, called Degree of Collaboration (DC) by Subramanyam (1983) as a measure of the strength of collaboration in a discipline.

Table 2 Degree of collaboration				
Year	Single authored	Multiple authored	Total	DC
2014	4	21	25	0.84
2015	6	8	14	0.57
2016	4	12	16	0.75
2017	4	15	19	0.79
2018	15	42	57	0.74
2019	20	65	85	0.76

2020	5	12	17	0.71
2021	5	12	17	0.71
2022	5	9	14	0.64
2023	6	14	20	0.70
Total	74	210	284	0.74

Table No. 2 shows that in the 10 years period, the multi authorship publications are higher and predominant than single authored. The multi authored articles are highest in the year 2019 with degree of collaboration (DC) was 0.76. It is seen that the multi authorship trend in increasing

Collaborative index					
Year	Single Author	Two Author	Three Author	> Four Author	Total	CI
2014	4	17	3	1	25	1.24
2015	6	6	2	0	14	1.71
2016	4	10	2	0	16	1.88
2017	4	11	4	0	19	1.42
2018	15	35	4	3	57	1.91
2019	20	50	12	3	85	1.98
2020	5	7	1	4	17	2.24
2021	5	6	3	3	17	2.24
2022	5	5	3	1	14	2
2023	6	6	5	3	20	2.25
Total	74	153	39	18	284	2.00

Collaborative Index

$$CI = \frac{\sum A_{j=1} j f_i}{N}$$

Collaborative Index provides the year wise mean number of authors per multi authored paper. CI ranges from 2 (2022) to 2.25 (2023) with an average of 2.00 per multi authored paper.

To measure the Collaborative co-efficient of publications

According to Ajiferuke et al.(1988) who have shown the mean number of authors per paper, the proportion of multiple authorship as a measure of degree of collaboration in a discipline, is inadequate. Therefore, they have proposed a measure combining some of the merits of both measures into what is known as Collaborative Coefficient.

Suppose, if a paper has a single author, the author receives one credit; if two, each receives ½ credits. In general, if we have „n‟ authors each receive 1/n credits. Hence, the average credit awarded to each author of a random paper is E [1/n], a value which lies between 0 and 1. If „0‟ is to correspond to single authorship, then the CC is defined as:

$$CC = 1 - E [1/n]$$
$$= 1 - (1/j) \ p \ (N=j)$$
And its sum $\sum$ rate = 1-f1+(1/2)f2+(1/2)f3+…(1/k)fk N

Based on the data in the Table 3.
$$CC = 1 – [f1 + (1/2) f2 + (1/3) f3 +… + (1/k) fk] / N$$

CC = 1 – {[4 + (1/2) 17 + (1/3) 3+ (1/4) 1] / 25 / N}

= 1 – {[4 + 8.5 + 1+ 0.25] / 25}

= 1 – [13.75 / 25]

= 1 – 0.55

= -0.45

Table No.3 Collaborative co-efficient						
Year	Single Author	Two Author	Three Author	> Four Author	Total	CC
2014	4	17	3	1	25	0.45
2015	6	6	2	0	14	0.31
2016	4	10	2	0	16	0.40
2017	4	11	4	0	19	0.43
2018	15	35	4	3	57	0.39
2019	20	50	12	3	85	0.41
2020	5	7	1	4	17	0.42
2021	5	6	3	3	17	0.43
2022	5	5	3	1	14	0.38
2023	6	6	5	3	20	0.43
Total	**74**	**153**	**39**	**18**	**284**	**0.41**

Table 3 shows that the CC has increased from 0.45 in 2014 to 0.43 in 2023 indicating that research among analyst is fairly collaborative with an average CC of 0.43.

To find out the form wise distribution of publications

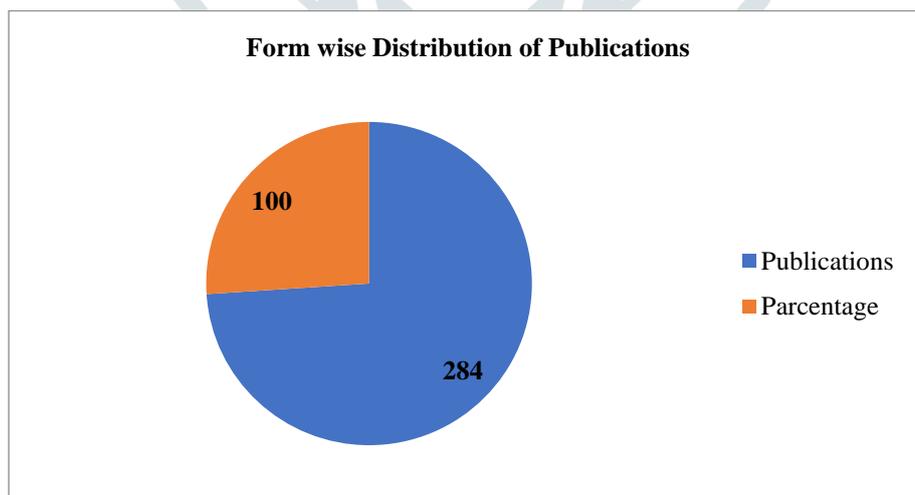| Table 4 Form wise Distribution of Publications		
Type of Documents	**Publications**	**Percentage**
Article	284	100
Total	**284**	**100**

Figure 1 Form wise Distribution of Publications

Table No. 4 & Figure no.1 gives the publications were divided in to 1 document types, the form wise distribution of publications out of the total 284 Article 284(100%)

To find out the Relative Growth Rate (RGR) and Doubling Time (DT) of publications

Table No. 5 Relative Growth Rate & Doubling Timing of publications								
Year	No. of Pub	Cumulative Frequency	W1	W2	RGR	RGR Mean	DT	DT Mean
2014	25	25	0	3.22	3.22		4.64	
2015	14	39	3.22	3.66	0.44		0.64	
2016	16	55	3.66	4.01	0.34	0.98	0.50	1.41
2017	19	74	4.01	4.30	0.30		0.43	
2018	57	131	4.30	4.88	0.57		0.82	
2019	85	216	4.88	5.38	0.50		0.72	
2020	17	233	5.38	5.45	0.08		0.11	
2021	17	250	5.45	5.52	0.07	0.15	0.10	0.22
2022	14	264	5.52	5.58	0.05		0.08	
2023	20	284	5.58	5.65	0.07		0.11	

Table No.05 It noticed that the mean relative growth for the first five years 2014 to 2018 is (0.98), and the mean relative growth rate for the last five years 2019 to 2023 reduced to (0.15). The mean doubling time for the first five years (i.e. 2014 to 2018) is only (1.41) which is increased to (1.41) during the last five years (2019 to 2023). Thus as the rate of growth of publications was decreased, the corresponding Doubling Time was increased.

Geographical Distribution of contributions at international level (Country-Wise)
Geographical distributions of contributions at International level. Geographical distribution of contributions at international level is shown in Table No. 6

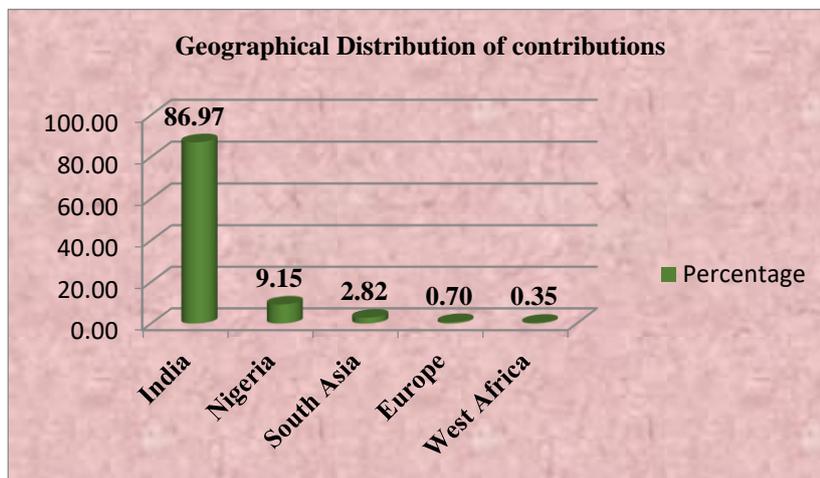| Table No. 6: Geographical Distribution of contributions		
Country-Wise	Frequency	Percentage
India	247	86.97
Nigeria	26	9.15
South Asia	8	2.82
Europe	2	0.70
West Africa	1	0.35
Total	284	100

Figure 2 Form wise Geographical Distribution of contributions

Table No. 6 & Figure 2 shows the Geographical distribution of contributions at international level. Table No. 6 indicates that the majority of the contributions where contributed by India 247 (80.97%) were as the minimum contributions were contributed by West Africa, 1 (0.35%) respectively.

9. FINDINGS & CONCLUSION

 The potential of stem cell to change the face of medical treatment has brought it to the forefront of medical science in recent years. It is observed in the present study that, the number of publications in Indian journal of Information Sources and services on Web of Science 2014 – 2023 has 284 publications in ten years. Multi authorship publications are higher and predominant than single authored. The multi authored articles are highest in the year 2012 with degree of collaboration (DC) was 0.76 and the average of CC of 0.43.The highest publication of proceeding form. The Collaborative Index varies from 2 in 2022 with highest collaboration of 2.25 in 2023. India is the highest productive country.

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