



SCIENTOMETRICS ANALYSIS OF WORLD ASTRONOMY SCIENCE RESEARCH DURING 1989-2015

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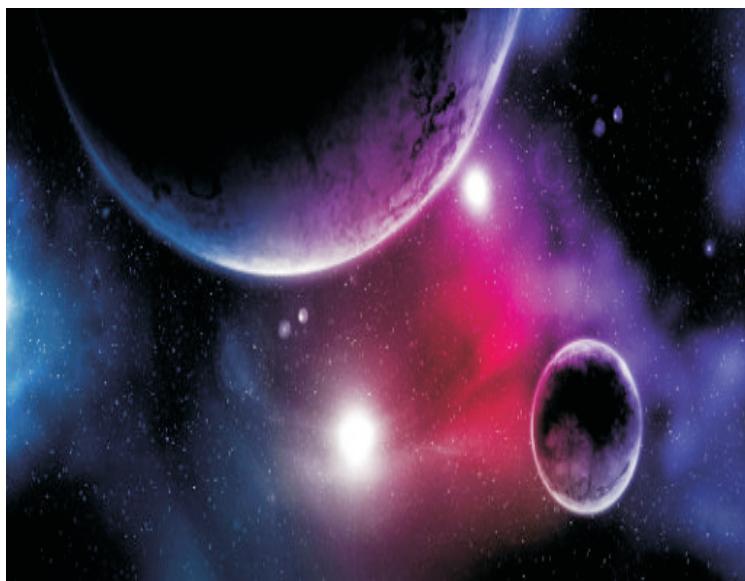
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ABSTRACT

The present *Scientometric analysis* of 2592 research articles published in the 'web of science' is an online subscription based scientific citation indexing services. Data collected using the web of science during 1989-2015 and analyzed using Microsoft excel. The present study focus on author pattern and author productivity, citations range, year wise publication, publications of organization, Journal wise publication, and multi authored with degree of collaboration, publications of language, publications of different countries, the *Scientometrics analysis* of "world Astronomy Science" research during 1989-2015. There are 2592 papers were published in 'web of science' in 27 years,



KEYWORDS: *Scientometrics, Prolific Authors, Research Output, Authors productivity, Degree of collaboration, Authorship pattern, Citation pattern, H-index.*

INTRODUCTION :

The present *Scientometrics* study has been conducted to evaluate the growth of research output published on the subject of "world Astronomy Science" in 'web of science'. WOS is an online subscription-based scientific citation indexing services. Data collected using the web of science and analyzed using Microsoft excel. The study focus on the analysis of authorship pattern, most prolific authors, likes most prolific year wise, Institution wise, journal wise, subject wise, language wise and geography affiliation of contributors of the articles published in the database *Scientometrics* profile of world Astronomy Science research during 1989-2015. There are 2592 articles published in 'web of science' in 27 years. The study result shows that the highest number of articles done (30) by Anonymous, the highest number of articles (142) published in the years of 2009 and 2014, the Organization wise highest number of articles (113) Max Planck Society published and the highest number of articles (122) published in the journal of *ISIS*, the highest number of the articles (796) published on the subject of 'Astronomy Astrophysics and the highest number of articles (2401) published in 'English language' and the highest number of the articles (903)

published by USA.

REVIEW OF LITERATURE

Saini (2014) study reveals that the development of bibliometrics, scientometrics, webometrics and informatics studies in library and information science is a multi discipline or economics activities. Eswan (2014) the scientometrics study shows that scientometrics tools can be used to measure and compare the scientific activities at various levels of aggregation including Institution sectors, provinces and countries etc. Mohanty and Maharana (2016) the scientometrics study to analyze based on the database of science Direct to 25 hottest papers in arts and Humanities journal. The study comprehensive survey work using bibliographic records derived from Science Direct top 25 hottest papers database during 2005-2014 and this paper vigorously tries to give a complete view of the evaluation of research outcomes. Madhu Bala and Pratap Singh (2014) the scientometric study explain about input and output resources in term of organizational structure. Scientometric is the Science of measuring and analyzing Science. Modern Scientometric is mostly based on the work of Derek J.de Solla Price and Eugene Garfield. This paper critically analyses 316 scholarly communications published in the Indian Journal of Biochemistry & Bio-Physics. Paliwal (2015) the study shows that Analyses 177 research papers in five volumes 56 to 60, (2009 - 2013) in Annals of library and Information studies. The study gives status of Library and information science research & importance of library science in India.

OBJECTIVE

The major objectives of the current study covering the "World Astronomy science" during the period 1989-2015 is

- To find out the types of documents and year wise published papers.
- To calculate authorship patrons of the papers.
- To examine the number of record and citation received.
- To find out the most prolific author of the journal.
- To find out the language wise and country wise published papers
- To know the organization wise (universities) contribution.
- To find the journal wise publications in the particular subject.

METHODOLOGY

The data collected from the web of science (WoS). WoS published by Thomson Reuters, the Fundamental data relating to total publications during 1989-2015, has been data collected using web of science, the search strategy used for collecting data for "World Astrology science" in the basic search field for the years 1989-2015 to download the records on the title "Astronomy science" in WoS. A total number of 2592 records were downloaded and using Microsoft excel for analyze data.

DATA ANALYSIS AND INTERPRETATION

Table-1 Astronomy Science (1989-2015): Types of documents published

Type of Document	No of items published	% of 2592
Journal article	1653	63.77
Reviews paper	656	25.30
Proceedings paper	283	10.93
Total	2592	100.00

Table 1 shows that among the different types of documents were published, total 2592 research papers were published during 1989 to 2015, highest contributions had been done in the form of journal articles with 1653 (63.77%), followed by reviews paper with 656 (25.30%) and followed by proceedings paper 283 (2.60%).

Table 2: Ranking of most Prolific authors of the “World Astronomy Science”

Sl No.	Field Author	Record Count	% of 2592	H-index	Citation	ACPI
1	Anonymous	30	0.011	0	0	0
2	Halzen F	24	0.009	11	620	25.83
3	Gingerich O	18	0.006	1	1	0.06
4	Lorenz E	17	0.006	5	337	19.82
5	Melnick G J	15	0.005	10	482	32.13
7	Harwit M	13	0.005	8	428	32.92
8	Neufeld D A	12	0.004	10	501	41.75
9	Goldsmith P F	12	0.004	11	543	45.25
10	Snell R L	11	0.004	9	622	56.55
11	Heck A	11	0.004	3	27	2.45
12	Goldstein B R	11	0.004	5	80	7.27
13	Agrawal P C	11	0.004	3	42	3.82
14	Weekes T C	10	0.003	4	277	27.70
15	Tolls V	10	0.003	8	442	44.20
16	Schieder R	10	0.003	8	436	43.60
17	Peacock A	10	0.003	6	426	42.60
18	Frontera F	10	0.003	4	405	40.50
19	Erickson N R	10	0.003	8	441	44.10
20	Bergin E A	10	0.003	10	466	46.60

Table 2 shows that the contribution of top twenty authors who contributed for the world Astronomy Science during 1989-2015 in world. ‘Anonymous’ being considered productivity author in the field of ‘astronomy science research’ as he tops (30) total record. Followed by Halzen F 2nd rank number of record (24), among the authors he had good number of citation (620) as well as H-index (18) and followed by Gingerich O 3rd rank number of record (18) as well as H-index Citations and ACPI. And followed by Snell R L 10th rank number of record (11), among the authors he had highest number of citation (622) as well as H-index (18), and ACPI (56.55). Finally the table focus just highest number of publication won’t give much credit to the authors, if it is not having quality which reflected with H-index.

Table 3 Collaboration of Authorship pattern in published papers

Sl. No	No of Author	Record count	%
1	Single	1747	67.4
2	Two	296	11.42
3	Three	151	5.82
4	Four	126	4.86
5	Five	88	3.4
6	Six and above	184	7.1
	Total	2592	100.00

Table 3 shows that the authorship pattern of the papers published in world Astronomy science research during 1989-2015 of the study. Among the 2592 papers were published in 27 years, out of 2592 papers, the highest number of papers 1747 (67.40%) had been contributed by single authors, followed by two authors with 296 (11.42%) papers, 151 (5.82%) papers were contributed by three authors, followed by 126 (4.86%) papers contributed by four authors, And following papers 88 and 184 papers were contributed by five authors, six authors and seven and above authors.

Table 4 Year wise distribution of papers

Sl. NO.	Years	Total Count	% of 2592	Sl. NO.	Years	Total Count	% of 2592
1	2015	142	5.42	15	2001	96	3.7
2	2014	130	5.01	16	2000	109	4.21
3	2013	116	4.45	17	1999	76	2.9
4	2012	103	3.92	18	1998	89	3.4
5	2011	102	3.92	19	1997	86	3.31
6	2010	91	3.51	20	1996	93	3.51
7	2009	142	5.42	21	1995	82	3.1
8	2008	91	3.51	22	1994	89	3.41
9	2007	72	2.7	23	1993	75	2.81
10	2006	87	3.3	24	1992	92	3.51
11	2005	117	4.51	25	1991	89	3.42
12	2004	108	4.16	26	1990	81	3.11
13	2003	89	3.43	27	1989	81	3.12
14	2002	84	3.24		Total	2592	100%

Table 4 reveals that the distribution of papers in "World Astronomy Science" during 1989-2015. The web of science published 2592 papers during the period 1989-2015. Among the 27 years highest number of papers were published in the years of 2009 and 2015 contributing 142 (5.42%) papers, followed by 130 (5.01%) papers were contributed in 2014, 117 (4.51%) papers in 2012, 116 (4.45%) papers in 2013, 109 (4.21%) papers in 2000, and following the years 2004, 2012 and 2011 were contributed 108 (4.16%), 103(3.92%), 102(3.92%) Finally the table shows that except 2006 and 2007, the number of papers is increased every year.

Table 5 Institution wise distribution of the papers (Top 20 Institution)

Sl. No	Field : Organizations	Record Count	% of 2592	H-index	Citation	ACPI
1	Max Planck Society	113	0.043	23	2157	19.09
2	National Aeronautics Space Administration NASA	110	0.042	24	2637	23.97
3	University of California System	100	0.038	21	1842	18.42
4	Harvard University	79	0.030	21	2039	25.81
5	Centre National DE LA Recherche Scientifique CNRS	78	0.030	14	1137	14.58
6	Smithsonian Institution	69	0.026	18	1656	24.00
7	California Institute of Technology	65	0.025	18	1148	17.66
8	Goddard Space Flight Center	53	0.020	19	2053	38.74
9	Observatoire DE Paris	46	0.017	13	724	15.74
10	Consiglio Nazionale Delle Ricerche CNR	44	0.016	12	1923	43.70
11	University of California Berkeley	43	0.016	16	1079	25.09
12	Russian Academy of Sciences	41	0.015	7	210	5.12
13	University of Wisconsin System	40	0.015	15	776	19.40
14	PSL Research University Paris	40	0.015	11	418	10.45
15	University of Cambridge	39	0.015	6	269	6.90
16	European Space Agency	39	0.015	11	2400	61.54
17	University of Wisconsin Madison	38	0.014	14	740	19.47
18	CEA	37	0.014	12	962	26.00
19	University of London	36	0.013	11	450	12.50
20	Tata Institute of Fundamental Research	36	0.013	7	136	3.78

Table 5 shows that rank list of top 20 institutions. Max Planck Society topped in the rank list with 113 publications, 2157 citation, 19.09 ACPI and 23 H-index, Followed by 2nd rank of National Aeronautics Space Administration NASA have 110 publications and 2637 highest number of citation as well as 23.97 ACPI and 24 H-index, 100 publications, 1842 citation, 18.42 ACPI and 21 H-index by University of California System, Tata Institute of Fundamental Research is 20th position with 36 publication, 136 citation, 3.78 ACPI and 7 H-index.

Table 6 Journal wise Publication (Top 20 Journals)

Sl. No	Source Titles	Record Count	% of 2592	H-index	Citation	ACPI
1	ISIS	122	0.047	3	51	0.42
2	Nuclear Instruments Methods In Physics Research Section A Accelerators Spectrometers Detectors And Associated Equipment	121	0.046	18	1119	9.25
3	Journal For The History Of Astronomy	89	0.034	4	39	0.44
4	IAU Symposia	68	0.026	2	11	0.16
5	Advances In Space Research	52	0.020	9	230	4.42
6	Astronomy Astrophysics	47	0.018	18	2441	51.94
7	Astrophysics And Space Science	44	0.016	6	84	1.91
8	Publications Of The Astronomical Society Of Australia	42	0.016	8	368	8.76
9	British Journal For The History Of Science	42	0.016	5	93	2.21
10	Nature	38	0.014	3	44	1.16
11	Astronomy Geophysics	38	0.014	3	46	1.21
12	Experimental Astronomy	36	0.013	6	437	12.14
13	Astrophysical Journal	35	0.013	23	2233	64.31
14	Publications Of The Astronomical Society Of The Pacific	34	0.013	10	727	21.38
15	Astroparticle Physics	34	0.013	13	805	23.68
16	Annals Of Science	32	0.012	2	18	0.56
17	Quarterly Journal Of The Royal Astronomical Society	27	0.014	3	28	1.04
18	Library Journal	25	0.009	0	0	0
19	Astronomische Nachrichten	25	0.009	3	36	1.44
20	Proceedings Astronomical Society Of Australia	24	0.009	2	23	0.96

Table 6 shows that rank list of top 20 journals. The highest number of record with 122 publications, 51 citations, 0.42 ACPI and 3 H-index. 2nd rank with 121 publications, 1119 citations, 9.25 ACPI and 18 H-index and Astrophysical Journal is 13th rank with 35 publications in the out of top 20 journal and highest number of citations with 2233, 64.31 ACPI, and 23 H-index, the journal of Proceedings Astronomical Society Of Australia have 20th rank in the present table with 24 publications, 23 citations, 0.96 ACPI and 2 H-index,

Table 7 Subject wise Publication

Sl. No	Field: Web of Science Categories	Record Count	% of 2592	H-index	Citation	ACPI
1	Astronomy Astrophysics	796	0.307	52	14965	18.80
2	Physics	537	0.207	35	5614	10.45
3	History Philosophy of Science	401	0.154	12	423	1.05
4	Engineering	206	0.079	19	1745	8.47
5	Instruments Instrumentation	168	0.064	18	1425	8.48
6	Nuclear Science Technology	145	0.055	19	1278	8.81
7	Science Technology other Topics	143	0.055	9	472	3.30
8	Spectroscopy	122	0.047	18	1120	9.18
9	Education Educational Research	92	0.035	17	725	7.88
10	Optics	88	0.033	13	682	7.75

Table 7 shows that out of the 2592 papers were published in Astronomy science during 1989-2015 in the world, the topic of Astronomy science and other astronomy science related to different subjects. The highest number 796 papers were published in Astronomy Astrophysics with 14965 citations, 18.80 ACPI, 52 H-index, followed by Physics 537 papers, 5614 citations, 10.45 ACPI, 35 H-index, followed by History Philosophy of Science 401 papers, 423 citations, 1.05 ACPI, 12 H-index and followed by the rest of the subjects were published Decreasing of papers.

Table 8 Language wise

Sl. No	No of Language	Record count	% of 2592	H-index	Citation	ACPI
1	ENGLISH	2401	92.63	64	23181	9.63
2	FRENCH	65	2.50	2	9	0.13
3	GERMAN	38	1.46	1	6	0.15
4	SPANISH	30	1.01	1	8	0.27
5	ITALIAN	24	0.92	1	1	0.04
6	RUSSIAN	12	0.46	4	60	5.00
7	PORTUGUESE	10	0.38	2	5	0.50
8	Other 6 Languages	12	0.46	1	6	0.46
	Total	2592	100.00			

Table 8 shows that out of the 2592 papers were published in different languages, More number of Records 2401 (92.63%) and 23181 citation in English language, followed by 65 (2.50%) papers in French, 38 (1.46%) papers in German and remaining of the languages were published decreases of papers Spanish 30 (1.01%) papers, Italian 24 (0.92%) papers, Russian 12 (0.046%) papers and the lowest 12 (0.46%) papers published in Portuguese language.

Table 9 Country wise Publication

Sl. No	country	Record	% of 2592	H-index	Citation	ACPI
1	USA	903	0.348	51	11295	12.51
2	ENGLAND	276	0.106	23	2408	8.72
3	GERMANY	231	0.089	31	5463	23.65
4	FRANCE	196	0.075	20	2016	10.29
5	ITALY	145	0.055	20	2872	19.81
6	AUSTRALIA	126	0.048	20	1626	12.90
7	SPAIN	95	0.036	12	2053	21.61
8	NETHERLANDS	93	0.035	18	3715	39.95
9	JAPAN	84	0.032	17	1586	18.88
10	CANADA	83	0.032	11	568	6.84
11	INDIA	68	0.026	9	376	5.53
12	RUSSIA	58	0.025	9	351	6.05
13	SCOTLAND	49	0.018	11	742	15.14
14	PEOPLES R CHINA	40	0.015	9	379	9.48
15	SWITZERLAND	28	0.010	12	1442	51.50

Table 9 reveals that out of 2592 papers were published during 1989-2015, based on the "Astronomy Science" papers published in different countries, in that top 15 countries USA is the highest 903 papers, 11295 citation, 12.51 ACPI and 51 H-index. England is the 2nd rank with 276 papers, 2408 citation, 8.72 ACPI and 23 H-index. Germany is the 3rd rank with 231 papers, 5463 citation, 23.65 ACPI and 31 H-index. Netherlands is 8th rank of with 93published papers with 3715 citation, 39.95 ACPI and 18 H-index and 15th rank with 28 papers, 1442 citations, 51.50 highest ACPI, 12 H-index.

CONCLUSION

In conclusion, above the study in "Web of science" has published 2592 papers in "Astrology science research" during 1985-2015, majority of research done by the type of Journal articles, the most prolific authors by 'Anonymms' has published highest contribution of 30 papers and less number of 11 articles, the highest number of 622 citation and 56.55 ACPI, The highest number of 1747 articles was published by single author. Majority of papers were published in the years of 2009 and 2015 with 142 papers. In organizations wise Max Planck Society has published highest number of 113 papers, the journal of ISIS and Nuclear Instruments Methods in Physics Research Section accelerators Spectrometers Detectors and Associated Equipment were published highest number of papers, majority of papers were published in the field of Astronomy Astrophysics, 2401 papers published in English language, finally the highest number with 903 papers were published in USA.

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