

A Scientometric Study on Neuro Science with Special Reference to Growth of Literature

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Abstract - Neuroscience, an interdisciplinary and rapidly expanding field, devoted to the scientific study of the nervous system. The growth in neurosciences, in the past two decade, in terms of research scientists, specialized departments with state-of-the-art infrastructure, and institutes with research facilities has been impressive. This main aim of this paper is to study quantitatively the literature published on Neuro sciences by using the bibliographic database namely Scopus. The objective of this paper is to examine the overall production of scientific articles in Neuroscience research during the period 1986-2015 in worldwide. The study finds that the total number of publications is between 100 and 1000 per year for the first fifteen years of study i.e. 1986-2000, more than 1000 but below 1500 during 2001 and 2004 and more than 3000 for the further study period 2005-2015.

Keywords: Neuro Science, Scientometric, Scopus

I. INTRODUCTION

Neuroscience is the study of the nervous system, which includes the brain, spinal cord, and the networks of sensory nerve cells, or neurons, throughout the body. (National Institute of Child Health and Human Development, n.d., para.1). Neuroscience, an interdisciplinary and rapidly expanding field, devoted to the scientific study of the nervous system. The growth in neurosciences, in the past two decade, in terms of research scientists, specialized departments with state-of-the-art infrastructure, and institutes with research facilities has been impressive. (Adarsh, B., & Gupta, B.M., (2010)). Scientometrics is the study of published literature and its usage. This includes studies of impact, diffusion of innovation, bibliographic coupling, citation and co-citation patterns and other statistical regularities in scientific and scholarly productivity and communication. (Information Library Network, n.d.). Today a common research tool is a Scientometric method which has already been widely applied in scientific production and research-trend studies in many disciplines of science and engineering (Almind, T.C., & Ingwersen, P (1997); Cronin, B., (2001) ; Moed, H.F., *et al.*, (1995)). The popularity in the adaptation of Scientometric techniques in various disciplines stimulated stupendous growth of literature on Scientometric and its related areas.

II. NEED FOR THE STUDY

Quantitative measurement of publications, citations and other parameters have been largely applied and used in

evaluating scientific research. Scientometric analysis of scientific publications is an important aspect of research endeavour in Information Science (Jeysankar, B., (2012)). On review of the literature it was found that, no such study has been conducted either at macro or micro level on the growth pattern of literature in the field of Neuro sciences. A large number of articles in journals, research papers presented in conferences, reports and so on are published on Neuro sciences.

Since there is a continuous generation of information in the field Neuro sciences, it is found essential to study quantitatively of the output of literature by applying scientometric tools/indicators. The significance of the study would benefit to identify the major areas of research in the field of 'Neuro Sciences' and to assess the extent of research carried out by scientists of different nations. Hence, it is proposed to study the literature published on Neuro sciences by using the bibliographic database namely Scopus.

III. OBJECTIVES OF THE STUDY

The major objective of the study is

To examine the overall production of scientific articles worldwide in Neuroscience research during the period 1986-2015.

A. Hypothesis

The following hypothesis is formulated for this study based on the objective. There exists substantial literature published worldwide on Neuroscience.

IV. METHODOLOGY

The investigator has adopted the following methodology in this study.

This study uses Scopus database for drawing publications data on Management Sciences, which is an international multidisciplinary database indexing over 15000 international peer reviewed journals in science and technology, besides more than 500 international

conference/seminar proceedings. The study uses 30 years publications data from 1986 to 2015 on Neuroscience domain collected from SCOPUS database. A total of 55,582 records were identified in the field of 'Neurosciences'. The collected data has been classified by

using Excel software and the same has been loaded in to SPSS 11.5 (Statistical Package for Social Sciences) for the purpose of analysis. The data collected from the SCOPUS database have been analysed to test the framed hypotheses.

V. ANALYSIS AND INTERPRETATION

TABLE I YEAR-WISE DISTRIBUTION OF PUBLICATIONS

S. No.	Year	papers	Percent	Cumulative Papers	Cumulative Percent	RoG	CAGR
1	1986	129	.2	129	.2	1.00	0.13
2	1987	161	.3	290	.5	1.25	0.12
3	1988	184	.3	474	.9	1.14	0.12
4	1989	181	.3	655	1.2	0.98	0.13
5	1990	286	.5	941	1.7	1.58	0.11
6	1991	302	.5	1243	2.2	1.06	0.11
7	1992	324	.6	1567	2.8	1.07	0.12
8	1993	439	.8	2006	3.6	1.35	0.11
9	1994	378	.7	2384	4.3	0.86	0.12
10	1995	404	.7	2788	5.0	1.07	0.12
11	1996	497	.9	3285	5.9	1.23	0.12
12	1997	480	.9	3765	6.8	0.97	0.12
13	1998	614	1.1	4379	7.9	1.28	0.12
14	1999	859	1.5	5238	9.4	1.40	0.10
15	2000	998	1.8	6236	11.2	1.16	0.10
16	2001	1069	1.9	7305	13.1	1.07	0.10
17	2002	1198	2.2	8503	15.3	1.12	0.10
18	2003	1483	2.7	9986	18.0	1.24	0.09
19	2004	1482	2.7	11468	20.6	1.00	0.10
20	2005	3338	6.0	14806	26.6	2.25	0.03
21	2006	3334	6.0	18140	32.6	1.00	0.03
22	2007	3801	6.8	21941	39.5	1.14	0.02
23	2008	3862	6.9	25803	46.4	1.02	0.02
24	2009	4726	8.5	30529	54.9	1.22	-0.01
25	2010	3513	6.3	34042	61.2	0.74	0.04
26	2011	3967	7.1	38009	68.4	1.13	0.02
27	2012	4320	7.8	42329	76.2	1.09	0.01
28	2013	4245	7.6	46574	83.8	0.98	0.02
29	2014	4547	8.2	51121	92.0	1.07	-0.01
30	2015	4461	8.0	55582	100.0	0.98	0.0
	Total	55582	100.0				

From the Table I and Fig. 1 and 2 indicate that the total number of publications is between 100 and 1000 per year for the first fifteen years of study i.e. 1986-2000, more than 1000 but below 1500 during 2001 and 2004 and more than 3000 for the further study period 2005-2015. The publications further gradually increases every year. It can be seen from the Fig.1 that there is a steady growth of

publications over the year. In the year 2005 it reaches 6.00% of global output. The cumulative output of Neuroscience are increasing every year by one percentage from 1970 to 1989 and further increases with 2 and more percentage till 2013. The Fig. 1 shows the exponential growth of Neuroscience publications over the period.

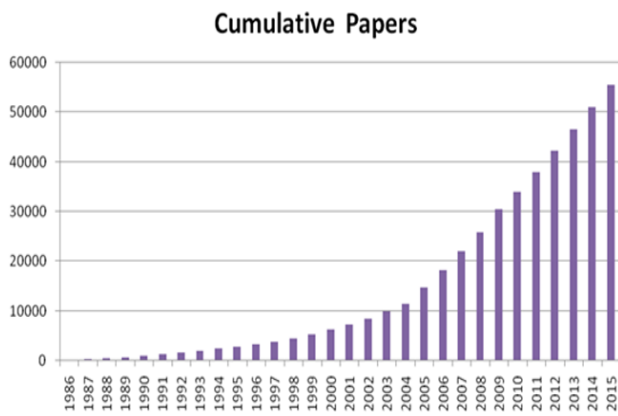


Fig. 1 Year wise Distribution of Publications

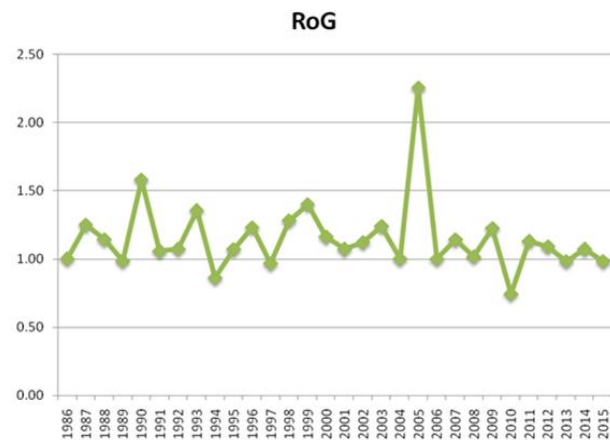


Fig. 2 Rate of Growth of Literature (RoG) Vs Year

The ratio of growth varies from 0.74 to 2.25. It is observed that from the year 1970 to till 2013, hardly any change in the growth ratio of publications. The rate of growth is very high in the year 2005 (2.25) and least during the year 1994 (0.86). However linear trend persists over the study period of 1986 – 2015. The CAGR ranges between -0.01 and 0.13.

VI. LIMITATIONS OF THE STUDY

The following are the limitations to the study:

1. This study is confined to the Scopus database alone.
2. Publications data published from 1986 to 2015 (30 years period) were only taken up for the study.

VII. FINDINGS

The literature output of Neuroscience research output has been studied. The study reported that the findings to determine the publication trend with respect to growth of literature on year-wise. It was found 55,582 records (97.58%) data from the scopus database during the period 1986–2015 (30 years). Major Findings of the study are as follows

1. The total number of publications is between 100 and 1000 per year for the first fifteen years of study i.e.

1986-2000, more than 1000 but below 1500 during 2001 and 2004 and more than 3000 for the further study period 2005-2015.

2. The publications further gradually increases every year. In the year 2015, it reaches 38.8 % of global output in the field of Neuro Science.
3. 38.8% of publications can be seen during the last block period of 2011 to 2015.
4. The rate of growth in Neuro Science is very high in the year 2005 (2.25%) and least during the year 2010 (0.74%).
5. Neuroscience publications get doubled within 8 years. During 2000 to 2013, the Neuroscience literature doubles within 10 years.
6. RGR value is increasing in the second and third block years and the fourth block year is slightly down.
7. The Dt() value ranges between 0.10 to 0.86 over the first three block years.

VIII. CONCLUSION

The study throws light on some of the basic facts related to scientometric aspect of Neuro Science. The results were quite encouraging particularly on Neuroscience research output. Research articles on Neuroscience gradually increases every year which indicates that there is a good scope for Neuroscience research across the world and indicates the importance of Neuroscience with special reference to Medical and Health sciences. The study revealed that the ratio of growth varies from 0.74 % to 2.25 % and it is also observed that there is no major change in the growth ratio during 1986 to 2015. A promising scientific productivity is shown in the Neuro Science across the world. This study provided practical information to researchers who look for studies on Scientometric and also would be helpful for researchers to conduct better researches that eventually could lead to more publications in this field.

REFERENCES

- [1] Adarsh, B., & Gupta, B.M. (2010). Mapping of Indian neuroscience research: A scientometric analysis of research output during 1999-2008. *Neurology India*, 58 (1), 35-41.
- [2] Almind, T.C., & Ingwersen, P. (1997). Informatic analysis on the World Wide Web, Methodological approaches to Webometrics. *Journal of Documentation*, 53(4): 404-426.
- [3] Cronin, B. (2001). Bibliometrics and beyond: some thoughts on web-based citation analysis, *Journal of Information Science*, 27(1): 1-7.
- [4] Jeyshankar, B., NageswaraRao, P., & Arivunithi. P. (2012).Scientometric Analysis of Research Output on Neutrino in India. *International Journal of Digital Library Services*, 2(2):74
- [5] Information and Library Network.(n.d.).Shodhganga Retrieved from https://inflibnet.ac.in/bitstream/10603/51423/5/05_chapter1.pdf
- [6] Moed, H.F. *et al.*, (1995). New bibliometric tools for the assessment of national research performance-Database description, overview of indicators and first applications. *Scientometrics*, 33(3): 381-422.
- [7] National Institute of Child Welfare & Human Development (n.d.).Neuro. Retrieved from [https://www.nichd.nih.gov/ health/topics/neuro](https://www.nichd.nih.gov/health/topics/neuro)