
Research Productivity of Physicist as Reflected in Google Scholar

Manjunatha G

Project Fellow
Dept.of Studies and Research in Library and Information Science
Tumkur University, Tumakuru-572103
E-mail:manjudurga10@gmail.com

Gayathri. S

Student
Dept.of Studies and Research in Library and Information Science
Tumkur University, Tumakuru-572103
E-mail:sgayathri722@gmail.com

B. T. Sampath Kumar

Professor
Dept. of Studies and Research in Library and Information Science
Tumkur University, Tumakuru-572103
E-mail:sampathbt2001@gmail.com

Abstract

The study intended to know the research productivity of Physicist as reflected in Google Scholar database. The number of articles included in the Google scholar database, the number citations received by each articles and h-index of each Physicist are considered to measure the research productivity. In order to know the research productivity, the term "Physics" was entered in the search box of the Google Scholar and the data has been collected for further analysis. The study found that Glen Cowan from UK has received the highest number of citations (210675) among the Physicist across the globe and the Gagan Mohanty has received 102599 citations among the Indian Physics scholars.

Keywords

Research productivity; Physicist; Google scholar and h-index

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1. INTRODUCTION

India has a long and distinguished history as a country of knowledge, learning and innovation. In the recent past, however, it has failed to realize its undoubted potential as a home for world class research. During the 1980s and 90s, the output of India's research was almost static while other countries grew rapidly, particularly in Asia. China expanded with an intensity and drive that led it rapidly to overtake leading European countries in the volume of its research publications. India is just beginning on this gradient (Adams, King and Singh, 2009). India's rate of filing patents is on the rise because of the entry of multinational corporations, but it is measurably low per capita, compared to others. In 2013, South Korea filed over 4,400 patents per one million of population while India could manage only 17. In 2011, for instance, China's scholars published almost five times more research papers as compared to their Indian counterparts. It is not that Indian spending is much lower than other countries when it comes to investing in research. Even as the US spends over \$3,43,000 per researcher, India manages to spend \$1,71,000, which is more than what countries like Pakistan and Spain manage, and almost equal to China's spending of \$1,73,000 per researcher (Jain, 2015)..

Keeping in view the need and importance of research in India, this study has been undertaken to measure the research productivity of Physicist across the globe.

2. OBJECTIVES OF THE STUDY

The study has been conducted to know the citation counts and h-index of the Physicist with the following objectives:

- To know the percentage of Physics scholars who have created Google Scholar My citation Account.
- To identify the most productive country, institute/university as well as the most productive researcher based on the h-index.
- To know the number of citations, h-index and i-10 index of Physicist.
- To calculate the average citations, h-index and i10 index of the Physicist.

3. SCOPE AND LIMITATIONS OF THE STUDY

The study aims to find out the Citation counts and h-index of Physics scholars using Google scholar

database. Thus, this study is confined to only research scholars of Physics discipline. Only top 1000 research scholars working in various universities, research institutions, colleges etc., across the world who have created Google Scholar my citation account are considered for the study.

4. Methodology

In the first step, an attempt has been made to identify the number of scholars who have created Google scholar my citation account. For this purpose, the terms “Physics” was entered in the search box of the Google Scholar My Citation Account. After entering the term in the search box of the Google scholar My Citation Account, a total of 4500 hits were retrieved. The number of hits received i.e. 4500 shows the number of scholars who have created the Google scholar my citation account. Since it is a time bound study, it was planned to select only first 1000 scholars for further analysis.

Table1: Number of Scholars who have created Google scholar my citation account across the world

Sl. No.	Country	No. of authors	Total citations	Average citations
1	USA	444	16459678	37071.34
2	UK	89	3497545	39298.25
3	Germany	66	1948638	29524.81
4	Italy	41	1632897	39826.75
5	Russia	36	1678913	46636.47
6	Switzerland	34	1644635	48371.61
7	India	32	1032303	32259.46
8	china	30	1531876	51062.53
9	Canada	21	1047698	49890.38
10	Sweden	17	567535	33384.41
11	Australia	15	326028	23,287.71
12	Japan	15	615346	41023.06
13	Colombia	12	461624	38468.66
14	Turkey	12	673055	56087.91
15	Finland	9	417754	46417.11
16	South Korea	9	209076	23230.66
17	Denmark	8	475634	59454.25
18	Israel	8	281295	35161.87
19	Mexico	8	290455	36306.87
20	Netherlands	8	260056	32507
21	Spain	8	187472	23434
22	Austria	7	274208	39172.57
23	South Africa	7	151649	21664.14
24	Portugal	6	206798	34466.33
25	Brazil	5	259369	51873.8

26	Croatia	5	298385	59677
27	France	4	118484	29621
28	Belgium	3	193079	64359.66
29	Hungary	3	149742	49914
30	Ireland	3	72572	24190
31	Poland	3	57553	19184.33
32	Singapore	3	52413	17471
33	Slovenia	3	81431	27143.66
34	Ukraine	3	50456	16818.66
35	Czech republic	2	39524	19792
36	Namibia	2	37680	18840
37	New Zeland	2	62447	31223.5
38	Pakistan	2	92060	46030
39	Sri Lanka	2	86140	43070
40	Cyman Islands	1	44814	44814
41	Ecublens	1	16204	16204
42	Egypt	1	50138	50138
43	Greece	1	15472	15472
44	Hong Kong	1	36284	36284
45	Iran	1	47877	47877
46	Gelderland	1	98592	98592
47	Norway	1	20985	20985
48	Oman	1	15691	15691
49	Rome	1	71184	71184
50	Tiwan	1	24997	24997
51	Toronto	1	118887	118887
52	Lebanon	1	11747	11747

Table-1 shows the number of scholars who have created Google Scholar my citation account. It can be seen from the table that out of 52 countries, the majority of USA scholars (444) have created their Google scholar my citation account followed by UK (89) and Germany (66). This clearly indicates that of the 1,000 scholars, the highest number of faculty members who have created Google scholar my citation accounts are from USA.

Table 2: Ranking of countries based on number of citations

Sl. No.	Country	No. of authors	Total citations	Average citations
1	USA	444	16459678	37071.35
2	UK	89	3497545	39298.25
3	Germany	66	1948638	29524.82
4	Russia	36	1678913	46636.47
5	Switzerland	34	1644635	48371.61
6	Italy	41	1632897	39826.75
7	China	30	1531876	51062.53

8	Canada	21	1047698	49890.38
9	India	32	1032303	32259.46
10	Turkey	12	673055	56087.91

Table-2 shows the ranking of countries based on the number of citations received to the articles. It can be seen from the table that of the 61 countries, the scholars from USA have received highest citations followed by UK (3,49,7545) and Germany (1,94,8638). Table shows that authors from USA, UK and Germany occupied the 1st, 2nd and 3rd place in terms of number of citations received for their articles.

Table 3: Ranking of Scholars Based on Number of Citations

Rank	Name	Country	Citations
1	Glen Cowan	UK	10675
2	John P. Perdew	USA	91743
3	Alan Heeger	USA	76368

4	Gustavo E. Scuseria	USA	69206
5	W. Taylor	Canada	118887
6	Darien Wood	USA	115418
7	Bernd Stelzer	Canada	114143
8	Nicolo de Groot	Netherland	108592
9	Gilvan Augusto Alves	Brazil	108103
10	Eduard De La Cruz Burelo	Mexico	02184

The table -3 indicates the world's top 10 authors based on the number of citations. The table reveals that Glen Cowan from UK has received the highest number of citations (210675) and he is in 1st place. It can also be seen from the table that John P. Perdew (191743) from USA and Alan Heeger (176368) from USA stands at the second and third place respectively. The table also indicates that Gilvan Augusto Alves from Brazil (108103) and Eduard De La Cruz Burelo from Mexico (102184) are in 9th and 10th place respectively.

Table 4: Ranking of Indian scholars based on the number of citations

Sl. No	Name	University / Institution	No. of Articles	Citations	h-index	i-10 index	Average citation
1	Gagan Mohanty	TIFR, Bombay	1403	102599	136	795	73.12
2	Prolay Mal	NISER, Bhubaneswar	861	93137	120	447	108.17
3	Jyothsna Komaragiri	Indian Institute of Science, Bangalore	817	92079	131	439	112.7
4	Kumar Srivastava	Chandigarh University, Punjab	2500	74293	111	633	29.71
5	CP Singh	Banaras Hindu University, Uttar Pradesh	3000	42389	87	483	14.12
6	Raghunath Sahoo	Indian Institute of Technology, Indore	368	40057	99	105	108.85
7	Pradip Kumar Sahu	Institute of Physics, Bhubaneswar	427	18948	71	170	44.37
8	Arun Kumar	Indian Institute of Technology, New Delhi	1600	17861	51	280	11.16
9	A. K. Sood	Indian Institute of Science, Bangalore	520	17166	53	245	33.01
10	Pramod Kumar Mishra	Kumaun University, Uttarakhand	1600	12733	49	339	7.95

The table-4 shows the ranking of Indian scholars based on number of citations received by each scholar for their articles. It also shows the number of articles included in the Google Scholar database (Web visibility) as well as average citation per article. It can be seen from the table that Gagan Mohanty has received 102599 citations followed by Prolay Mal (Number of articles=861 and Number of

citations=93137) and Jyothsna Komaragiri (Number of articles=817 and Number of citations=92079). The average citation per article of the scholar is also given in the table-4. It can be seen from the above table that Jyothsna Komaragiri has received highest average citation (112.7) followed by Raghunath Sahoo (108.85) and Prolay Mal (108.17) respectively.

Table 5: Year wise Growth of Citations of citations of Indian scholars (2011-2017)

Sl. No	Name of the authors	2011	2012	2013	2014	2015	2016	2017	SD	Correlation	p-value
1	Gagan Mohanty	5402	8990	11909	12551	14696	17326	11790	3836.86	0.777	.040
2	Prolay Mal	5770	10905	13382	12117	14625	16097	10456	3364.9	0.589	.164
3	Jyothsna Komaragiri	5920	10955	12492	12288	15352	16618	11065	3458.11	0.661	.106
4	Kumar Srivastava	3677	6910	9588	9963	12855	14159	9272	3508.34	0.760	.047
5	CP Singh	3194	3197	3718	4055	4032	4458	3210	509.91	0.436	.328
6	Prof. Raghunath Sahoo	3567	3346	3837	4318	4526	5265	3895	651.87	0.652	.112
7	Pradip Kumar Sahu	594	1124	1825	2736	3324	4701	3778	1480.19	0.949	.001
8	Arun Kumar	774	1148	1971	2351	2475	2600	1829	690.91	0.734	.060
9	A. K. Sood	1260	1395	1597	1652	1684	1800	1476	185.58	0.642	.120
10	Pramod Kumar Mishra	719	977	1151	1426	1557	1858	1512	387.49	0.905	.005

The table-5 shows the growth of citations of Indian scholars from the year 2011-2017. The Correlation analysis shows that there is a significant association between the year and the no. of citations received by the research articles this shows that the research scholars Gagan Mohanty (p= .040), Kumar Srivastava (p= .047) , Pradip Kumar Sahu (p= .001), and Pramod Kumar Mishra (p= .005) have consistency to receiving citations to their articles 2011-1017.

5. Discussion and Conclusion

The study shows that the physics scholars from USA (16459678) received highest citations followed by UK (3497545) and Germany (1948638). The study reveals that from UK Glen Cowan has received the highest citations (210675) and stands in the 1st place. It can also be seen from the table that John P. Perdew (191743) from USA and Alan Heeger (176368) from USA have received 2nd and 3rd place respectively in the ranked list. Whereas the Indian authors are concerned, Gagan Mohanty has secured the first place among the Indian scholars who received the highest citations (102599), Prolay Mal (93137) & Jyothsna Komaragiri (92079) are in 2nd and 3rd place respectively. The citations UK and USA scholars at global level seem to be very high compared to Indian scholars.

Surprisingly, there is no single scholar from India has got place in the world top ten scholars with high citations. This indicates that the Indian research scholars need to publish more quality articles in highly reputed journals. It is also necessary publish articles in the journals having high impact factor.

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