

Analysis of the Publications of the PSG College of Arts and Science: A Bibliometric Study

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Abstract

The study examined the analysis of research publications of the faculty of PSG College of Arts and Science, Coimbatore. Data has been downloaded during the selected ten years between 2001 and 2015 from the Scopus database. Among the 430 papers published in the span of 15 years, highest number of 69 papers was published in the year 2015. The total numbers of citation received by the papers were 3938 and the citing articles were 284. The h-index of PSG is 31. This study reveals that PSG has notably contributed to the research in arts, physical sciences, life sciences, environmental science; social sciences, pharmacology and material sciences and the publications of faculty have increased significantly during the last five years.

Keywords: Research publications, Research output, PSG College of Arts and Science, Scopus, Scientometrics

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INTRODUCTION

The quality of research output is totally depending on the information used and produced as a result of research. Scientific output in the form of publications can be measured by using bibliometric/scientometric techniques like number of publications based on author, institution, country, year, type, subject and citation etc. In this study, the researcher has made an attempt to study the research publications productivity of the faculty of PSG College of Arts and Science (PSGCAS), Coimbatore by using scientometric techniques.

REVIEW OF LITERATURE

Sudhier and Priyalakshmi have studied the research publication trend among the scientists of Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram, and found that 87% of the research publications among the 1076 papers were multi-authored and most of them were published in foreign journals [1].

Aswathy and Kopikuttan analyzed the publication pattern of three Universities in Kerala viz., University of Kerala, Calicut University and Mahatma Gandhi University and found that there is no significant difference in experience and productivity but

the increase in age and experience has resulted the more collaborative papers [2].

Mandhirasalam analyzed the publication output of Coimbatore College of Technology (CIT) and reported the significant contribution (86.38%) in the total publication output 639 (papers) exits from the year 2006 onwards [3].

Mandhirasalam analyzed the publication output of Thiagarajar College of Engineering (TCE) and reported the significant contribution (82.23%) in the total publication output 1497 (papers) exits from the year 2008 onwards [4].

Bathrinarayanan and Tamizhcelvan have studied the research output in MEMS contributed by the global research output during the period of 2010 to 2014 and the publications (22303) analyzed the scientometric tools such as relative growth rate Doubling Time are analyzed [5].

Mandhirasalam analyzed the publication output of PSG College of Technology (PSGCT) and reported that 2357 papers were published in the span of 44 years, i.e., from 1971 to 2014 and 2112 papers (89.6%) were published during the last ten years [6].

OBJECTIVES

The objectives of the study include:

- To find out the year-wise research productivity of PSG CAS during 2001 to 2015.
- To know the forms of publications output of PSG College of Arts and Science.
- To determine the most productive authors and authorship pattern.
- To identify the research collaboration of PSG College of Arts and Science with other Countries and Institutions.
- To examine the subject areas of publications.

METHODOLOGY

Data about the research publication of faculty of PSG were downloaded from the Scopus database during the selected ten years between 2001 and 2015. Scopus, a product of Elsevier is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings [7]. It gives a comprehensive overview of the world's research output in the fields of science, technology, medicine, social science and arts and humanities. It offers the number of citations has received by each published document. It has a facility to calculate h-index of authors and institutions. The keywords 'PSG College of Arts and Science' was used in the search option selecting the affiliation category.

ANALYSIS AND INTERPRETATION

Table 1 describes the year wise distribution of number of publication indexed in Scopus

database from 2001 to 2015.

It could be noted from the Table 1 that there was a gradual increase in the number of publications started from 2001 with seven publications and 2015 was the most productivity year with 69 publications followed by 2014 with 52 publications. Further, it was found that the research output during the last 5 years contributes 250 (58.1%) publications among the total 430 publications in the last 15 years.

Relative Growth Rate (RGR) and Doubling Time of Publications

Table 2 discussed the relative growth rate of the publications during the year between 2001 and 2015. The relative growth rate has decreased in the number of publications/pages per unit of time. The relative growth rate and doubling time model developed by Mahapartra (1985) [8]. The doubling time for article output has increased from 0.91 in 2002 to 4.08 in 2015. It could be deduced from the above discussion that the relative growth rate is decreased from 0.76 to 0.17 during the study period.

Ranking of Authors based on Publications

The following Table 3 describes the ranking of authors based on publications.

The Table 3 shows that Rajendran R is the most productive author with 45 (10.6%) publications followed by Pattabhi S with 27 (6.3%) publications and Michael A with 26 (6.0%) publications (Figure 1).

Table 1: Year-wise Output of Publication.

Year	Records	Percent	No. of articles cited	Total citation score
2001	7	1.6	6	346
2002	8	1.9	7	149
2003	8	1.9	6	578
2004	10	2.3	8	403
2005	15	3.5	11	243
2006	16	3.7	12	168
2007	19	4.4	13	223
2008	23	5.3	21	326
2009	35	8.1	30	330
2010	39	9.1	32	357
2011	39	9.1	24	167
2012	40	9.3	26	168
2013	50	11.6	24	201
2014	52	12.1	31	122
2015	69	16.1	33	157
Total	430	100	284	3938

Table 2: Relative Growth Rate (RGR) and Doubling Time of Publications.

S. No	Year	No. of Records	%	Cumulative	W1	W2	RGR	DT
1	2001	7	1.6	7	...	1.95
2	2002	8	1.9	15	1.95	2.71	0.76	0.91
3	2003	8	1.9	23	2.71	3.14	0.43	1.61
4	2004	10	2.3	33	3.14	3.50	0.36	1.93
5	2005	15	3.5	48	3.50	3.87	0.37	1.88
6	2006	16	3.7	64	3.87	4.16	0.29	2.39
7	2007	19	4.4	83	4.16	4.42	0.26	2.67
8	2008	23	5.3	106	4.42	4.67	0.25	2.77
9	2009	35	8.1	141	4.67	4.95	0.28	2.48
10	2010	39	9.1	180	4.95	5.20	0.25	2.77
11	2011	39	9.1	219	5.20	5.39	0.19	3.65
12	2012	40	9.3	259	5.39	5.56	0.17	4.08
13	2013	50	11.6	309	5.56	5.73	0.17	4.08
14	2014	52	12.1	361	5.73	5.89	0.16	4.33
15	2015	69	16.1	430	5.89	6.06	0.17	4.08
Total		430	100	2278				

Table 3: Ranking of Authors based on Publications.

S. No	Author	Records	Percent	No. of articles cited	Total citation score
1	Rajendran R	45	10	39	401
2	Pattabhi S	27	6.3	24	1118
3	Michel A	26	6	19	142
4	Anguraj A	21	4.9	15	179
5	Shanti K	17	4	15	238
6	Karthikeyan T	16	3.7	10	21
7	Thilagavathi G	15	3.5	15	209
8	Kathirvelu K	14	3.3	11	890
9	Manonmani S	14	3.3	13	333
10	Meenatchisundaram S	13	3	12	131

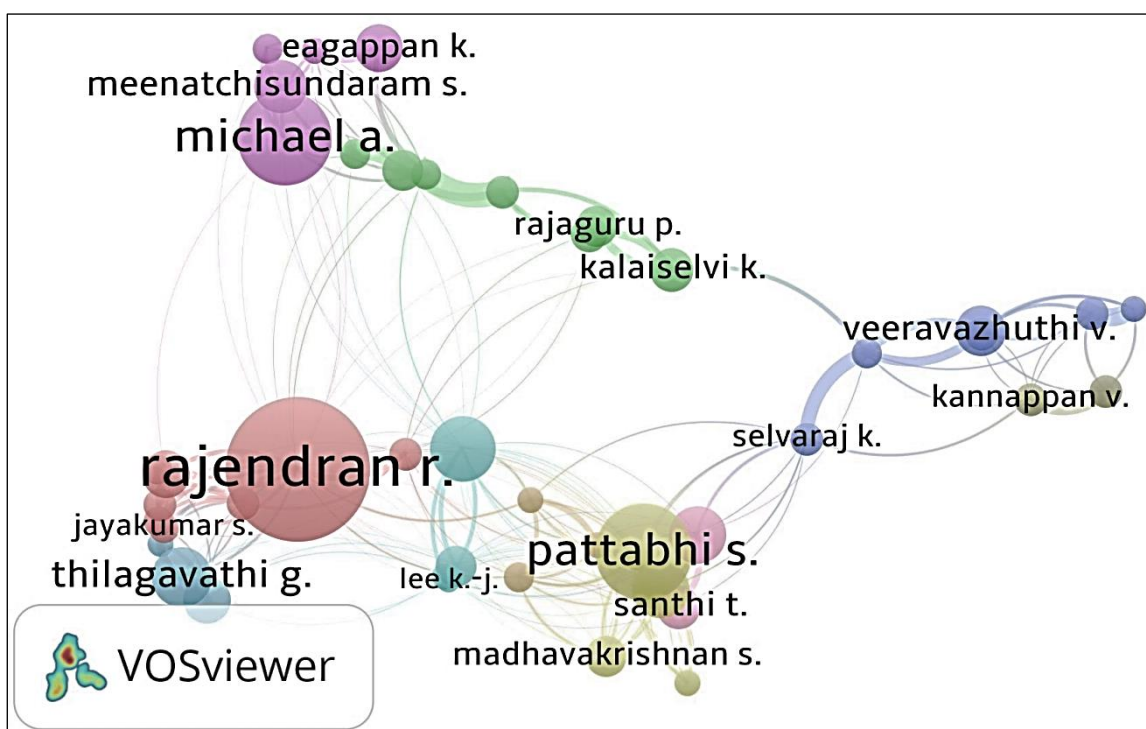


Fig. 1: Mapping and Clustering of Authors Productivity.

Authorship Pattern

Table 4 reveals that a total of 1569 authors have contributed 430 articles and the average no. of authors per article observed to be 3.6. Among 430 articles, only 15 articles (3.5%) are written by a single other and 415 (96.5%) articles are written by multiple authors. Two and three author’s articles involved highest percentage 229(53.2%) and the rest of the articles are contributed by more than three authors.

Degree of Collaboration of Publications

Collaborations is a joint effort among two or more researchers both physically and intellectually to work together in a research. Degree of collaboration varies from one subject to another. Extend of collaboration can be measured with the help of multi-authored papers. Collaborative co-efficient is used to measure the collaborative research publications. Collaborative co-efficient is a ratio of the number of collaborative research publications during a particular period of time. According to the formula of Subramanyam to determine the degree of collaboration in a discipline, the value of collaboration will be

between 0 and 1. To examine the degree of collaboration of publications, the number of single authored and multi-authored publications is calculated using the Subramanyam formula; $C = \frac{Nm}{Nm + Ns}$ [9].

Where, C is the Degree of Collaboration, Nm is the Number of multi-authored publications, Ns is the Number of single authored publications.

$$\text{Hence, } c = \frac{415}{415 + 15} = 0.97$$

Hence, it is found that the degree of collaboration of publications of PSG College of Arts and Science faculty is 0.97.

Type of Publication

The productivity of the author based on the type of publications is depicted in the following Table 5.

It is found from the Table 5 that the faculties of PSG College of Arts and Science publish their research findings in the form of articles 373 (86.8%) in journals as the medium for publications. They have also presented their papers in the conferences and found 31 papers (7.2%) in the proceedings.

Table 4: Authorship Pattern.

S. No	No. of Authors	No. of Publications	%	Authorship Pattern	%
1	Single	15	3.5	15	1
2	Two	136	31.6	272	17
3	Three	93	21.6	279	18
4	Four	77	17.9	308	20
5	Five	47	10.9	235	15
6	More than Five +	62	14.5	460	29
Total		430	100	1569	100

Table 5: Type of Publication.

Publication Type	Records	Percent	No. of articles cited	Total citation score
Article	373	86.8	263	3762
Conference Paper	31	7.2	11	24
Book Chapter	9	2.1	0	0
Review	9	2.1	6	133
Letter	3	0.7	1	5
Article in Press	2	0.5	2	3
Editorial	1	0.2	0	0
Erratum	1	0.2	0	0
Note	1	0.2	1	11
Total	430	100	284	3938

Remaining forms like review, book chapter, etc. is contributed very less 26 with (6%) in the total publications

Country Wise Collaborations

The productivity of the author publications based on the country wise collaborations is depicted in the following Table 6. Table 6 shows that faculty of PSG College of Arts and Science has collaborated with South Korea 21 (4.9%) publications. It also shows that PSGCAS has collaborated and contributed six papers with Spain, China, and Malaysia. The rest of the publications collaborate with other countries like Saudi Arabia, Singapore, Hungary, Taiwan, Brazil and Qatar.

Ranking of Collaborative Institutions

The productivity of the author publications based on the collaborative Institutions is depicted in the following Table 7. It is found from the Table 7 that researchers from 160 institutions have collaborated with faculty of PSG College of Arts and Science for research

and publications. Among them PSG College of Technology, Coimbatore stands first with 47(11%) publications, Bharathiar University with 36(8.4%) publications.

Ranking of Subject Wise Distribution

Table 8 shows that the subject wise distribution. There are 93 articles (21.6%) published by the author of PSGCAS on Chemistry followed by Environmental Science with 82 articles (19.1%), Material Science with 78 articles (18.1%), Biochemistry, Genetics and Molecular Biology with 77 articles (17.9%). The next position was taken by Engineering with 69 articles (16%), Pharmacology and Toxicology with 63 articles (14.7%). Authors have contributed papers more or less equally on Chemical Engineering, Agricultural and Biological sciences, Physics and Astronomy and Medicine. From the above analysis, more number of publications was made on Chemistry and also shows that lot of interdisciplinary research has done.

Table 6: Country wise Collaborations.

Country	Records	Percent	No. of Articles Cited	Total Citation Score
South Korea	21	4.9	20	325
China	6	1.4	5	42
Malaysia	6	1.4	4	105
Spain	6	1.4	5	110
Saudi Arabia	5	1.2	3	16
Singapore	4	0.9	3	15
Hungary	3	0.7	3	82
Taiwan	3	0.7	3	3
Brazil	2	0.5	2	46
Qatar	2	0.5	2	2

Table 7: Ranking of Collaborative Institutions.

Rank	Institution	Recd.	%	No. of Articles Cited	Total Citation Score
1	PSG College of Technology	47	11	40	518
2	Bharathiar University	36	8.4	27	419
3	Karpagam University	17	4	13	179
4	Chonbuk National University	15	3.5	14	264
5	Coimbatore Institute of Technology	13	3	10	65
6	Presidency College, Chennai	12	2.8	9	41
7	Avinashilingam University for Women	11	2.6	4	19
8	PSG Institute of Medical Sciences and Research	11	2.6	7	148
9	Defence Research and Development Organisation India	9	2.1	6	231
10	CMS College of Science and Commerce	8	1.9	7	33

Table 9 reveals that International Journal of Pharma and Bio Sciences published 14(3.3%) papers among 144 journals, International Journal of Pharmacy and Pharmaceutical Sciences published 11(2.6%) papers, Indian Journal of Fibre and Textile Research, Indian Journal of Science and Technology and Man Made Textiles in India published 10 (2.3) papers each among 144 Journals.

Table 10 reveals that out of 426 papers 146 papers were not cited. Six papers were cited more than 100 times and 12 papers were cited 51–100 times, respectively. From the Table

10, it can be concluded that the quality of 18 papers is high when compared to other papers. It is clear from the Table 11 that paper titled 'Utilization of various agricultural wastes for activated carbon preparation and application for the removal of dyes and metal ions from aqueous solutions' published by Kadirvelu K et al. in the journal of Bioresource Technology in 2003, is the most cited paper of PSG College of Arts and Science and has received 310 citations. Paper titled 'Removal of Cr (VI) from aqueous solution by adsorption onto activated carbon' published by Selvi K et al. Bioresource Technology in 2001 comes second with 260 citations.

Table 8: Ranking of Subject wise Distribution.

Rank	Subject	Recd.	%	No. of Articles Cited	Total Citation Score
1	Chemistry	93	21.6	66	561
2	Environmental Science	82	19.1	61	1082
3	Materials Science	78	18.1	63	751
4	Biochemistry, Genetics and Molecular Biology	77	17.9	43	492
5	Engineering	69	16	35	241
6	Pharmacology, Toxicology and Pharmaceutics	63	14.7	42	365
7	Chemical Engineering	50	11.6	43	1356
8	Agricultural and Biological Sciences	48	11.2	37	1236
9	Physics and Astronomy	47	10.9	38	239
10	Medicine	40	9.3	24	252

Table 9: Ranking of Journals based on Publications.

Rank	Journal	Recd.	%	No. of Articles Cited	Total Citation Score
1	International Journal of Pharma And Bio Sciences	14	3.3	5	6
2	International Journal Of Pharmacy And Pharmaceutical Sciences	11	2.6	6	8
3	Indian Journal Of Fibre And Textile Research	10	2.3	10	121
4	Indian Journal Of Science And Technology	10	2.3	7	53
5	Man Made Textiles In India	10	2.3	3	5
6	Indian Journal Of Environmental Protection	8	1.9	6	38
7	Asian Journal Of Microbiology Biotechnology and Environmental Sciences	7	1.6	2	5
8	Bioresource Technology	7	1.6	7	895
9	Asian Journal Of Chemistry	6	1.4	2	2
10	E Journal Of Chemistry	6	1.4	6	62

Table 10: Citation Statistics.

No. of Citations Received by Papers	No. of Papers	Percentage (%)
Uncited Papers	146	33.9
Less than 1–10	203	47.2
11–25	47	11.0
26–50	16	3.7
51–100	12	2.8
More than 100	6	1.4

Table 11: Ranking of Papers based on Global Citation Score (GCS).

Rank	Paper, Author, Journal	GCS
1	Utilization of various agricultural wastes for activated carbon preparation and application for the removal of dyes and metal ions from aqueous solutions, Kadirvelu K, Kavipriya M, Karthika C, Radhika M, Vennilamani N, Pattabhi S, <i>Bioresource Technology</i> , 2003, 87(1), 129–132	310
2	Removal of Cr (VI) from aqueous solution by adsorption onto activated carbon, Selvi K, Pattabhi S, Kadirvelu K, <i>Bioresource Technology</i> , 2001, 80(1), 87–89	260
3	Biochemical methane potential of fruits and vegetable solid waste feedstock's, Gunaseelan VN, <i>Biomass and Bioenergy</i> , 2004, 26(4), 389–399	152
4	Removal of hexavalent chromium using distillery sludge, Selvaraj K, Manonmani S, Pattabhi S, <i>Bioresource Technology</i> , 2003, 89(2), 207–211	147
5	Activated carbon from industrial solid waste as an adsorbent for the removal of Rhoda mine-B from aqueous solution: Kinetic and equilibrium studies, Kadirvelu K, Karthika C, Vennilamani N, Pattabhi S, <i>Chemosphere</i> , 2005, 60(8), 1009–1017	113
6	Mercury (II) adsorption by activated carbon made from sago waste, Kadirvelu K, Kavipriya M, Karthika C, Vennilamani N, Pattabhi S, <i>Carbon</i> , 2004, 42(4), 745–752	101
7	Removal of malachite green from aqueous solution by activated carbon prepared from the epicarp of <i>Ricinus communis</i> by adsorption, Santhi T, Manonmani S, Smitha T, <i>Journal of Hazardous Materials</i> , 2010, 179(1-3), 178–186	98
8	Antimicrobial textiles - An overview, Ramachandran T, Rajendrakumar K, Rajendran R, <i>Journal of the Institution of Engineers (India), Part TX: Textile Engineering Division</i> , 2004, 84(2), 42–47	86
9	Biosynthesis, characterisation and anti-bacterial effect of plant-mediated silver nanoparticles using <i>Artemisia nilagirica</i> , Vijayakumar M, Priya K, Nancy FT, Noorlidah A, Ahmed ABA. <i>Industrial Crops and Products</i> , 2013, 41(1), 235–240	85
10	Regression models of ultimate methane yields of fruits and vegetable solid wastes, sorghum and napier grass on chemical composition, Gunaseelan VN, <i>Bioresource Technology</i> , 2007, 98(6), 1270–1277	74

CONCLUSIONS

From the observations made in this study, it can be concluded that PSG College of Arts and Science has published 430 articles during the period of study. The finding of overall growth rate of publications has shown increasing trend during the study period. There is highest publication in the year 2015. Consequently the doubling time for publications has shown an increasing trend. The present study shows that highest number of articles has appeared in the area of Chemistry followed by Environmental Science. From the analysis multi-authored contribution occupied extreme position. Single authored contribution is very less. Degree of collaboration of authorship pattern indicates the trend towards collaborative as well interdisciplinary research.

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