

Full Length Review Article

AUTHORSHIP TRENDS AND COLLABORATIVE RESEARCH IN BHARATHIYAR UNIVERSITY RESEARCH OUTPUT: A SCIENOMETRIC STUDY

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This paper scientometric analysis of research publication productivity of the Barathiyar University data has been downloaded from the scopus database from 2009 – 2013. Among the 1576 papers are published in the span of 5 Years, the highest number of 452 papers was published in the year 2013. The majority of the Bharathiar University research outputs are published in joint authorship (98.86%). The average degree of collaboration is 0.99. Journal articles are occupied the top position with the highest number of article 1419 (90.04%). Maximum no. of articles are published in English Language 1575 (99.87%).

Key words: Scientometrics, Bharathiyar University Research Publication output from Scopus Database, Bibliometrics, Authorship Pattern and Degree of Collaboration

INTRODUCTION

The scientometrics focused on the study of scientific information if given by Braun *et al.* (1987): “Scientometrics analysis the quantitative aspects of the generation, propagation and utilization of scientific information in order to contribute to a better understanding of the mechanism of science research activities. Scientometrics is a field of science dealing with the quantitative aspects of groups of people, matters and phenomena in science and their relationships, but which do not primarily, belong within the scope of particular scientific discipline (Vinkler, 2001). The aim of scientometrics is to reveal characteristics of scientometrics phenomena and process in scientific research for more sufficient management of science. Kepler (1597) stated that “the mind comprehends a thing the more correctly the closer the thing approaches towards pure quantity as its origin”, underlining the importance of the application of scientometrics in practice (Peter Vinkler, 2010).

Bharathiar University

The Bharathiar University was established at Coimbatore by the Government of Tamil Nadu in February, 1982 under the provision of the Bharathiar University Act, 1981 (Act 1 of 1982). The Postgraduate Centre of the University of Madras, which was functioning in Coimbatore before 1982 formed the core of the Bharathiar University. In May, 1985 the University received the recognition from University Grants Commission (UGC) New Delhi for the purpose of grants. The University named after the great national poet Subramania Bharathi is enshrined with the motto “Educate to Elevate”.

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University have 1000 acres free from pollution, 12 kms. Away from the Coimbatore City. Now 108 colleges are affiliated in this university. This includes 19 Women’s Colleges, 85 Co-educational colleges, 4 Men’s Colleges and including one Airforce Administrative college and two constituent Colleges and PG Study centre. This university has 35 Departments in this campus, dedicated to teaching and research including 13 schools and school of distance education (www.b-u.ac.in).

Review of Literature

Goyal *et al.* (2013) has been evaluated his research papers in authorship patterns and collaborative research trends in the field of chemical sciences the authorship trends and collaborative research are studied in the field of Chemical Sciences based on the data collected from Indian Journal of Chemistry Section-B (IJCB) published during the 2002-2011. Outcome of the study shows that multi authored articles 97.24% prevail the single authored articles 2.75%. The degree of collaboration in the field of chemical sciences is 0.97. Average number of authors per paper varies from 3.21-3.78. This study is in support for the fact that chemical sciences research is collaborative in all aspects.

Bathrinarayanan, and Tamizhchelvan, (2013) has analysis the bibliometric analysis of the MEMS output in Scopus database during the year 1988 -2012. A total of 86978 records are retrieved and data analyzed. Scientometrics tools such as, Relative Growth Rate and Doubling Time, block-year wise distribution of article, growth and country wise article were analyzed. Type of document has been analyzed. Manickaraj *et al.* (2014) has examined his article the research output in Wireless Communication published during the period of 2001– 2012 based on the bibliographic records extracted from SCOPUS Database.

The analysis includes year wise output, language wise distribution, leading contributors (country, institute and author) and most preferred journals. A total of 9565 articles published during this study period. The United States published most of the articles and most of the articles are in English. IEEE Journals preferred by researchers in the field of Wireless Communication.

Objective of the Study

The present study has been undertaken with the objective of analyzing the following aspects. All the details such as authors, title, year of publication, affiliation of institution, etc., of all article published from 2009-2013 were recorded for the following analysis.

Analysis of Articles

- To make an analysis of the growth of literature from 2009-2013.
- To determine the subject distribution of articles.
- To find out the document type.
- To study the source title.
- To find out the ranking of leading university.
- To find out the authorship pattern
- To find out the Degree of Collaboration

Methodology

The methodology applied in the present study is bibliometric analysis, which is used to study in detail the bibliographic feature of the articles based on Scopus database on 2009-2013. For this the relevant data are collected and recorded. Then they are tabulated and analysis for making observations.

Scope

A total number of 1576 articles published during the period 2009-2013 have been recorded for the present study. Top 25 numbers of considerations for tabulation.

Year wise Publication

The Table 1 and Figure 1 shows that Bharathiar university published the maximum number of articles published in 2013 (452) (26.68%) and minimum of 2009 (183) (11.61%) articles. The average of the published articles is 315 articles per year.

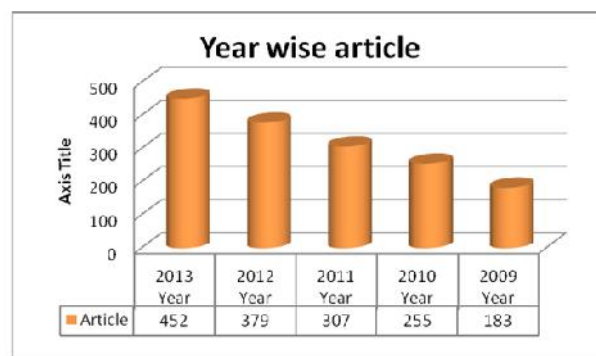


Figure 1. Year Wise Publication

Subject wise Publication

Table 2 shows that a majority of subject is Chemistry 389 (13.09%), second place of majority subject is Physics and Astronomy 340 (11.41%) and third place is Materials Science 298 (10%) of total 2979 hits for the selected period.

Document Type

Table 3 and Figure 2 shows that a majority of the contributors preferred Articles as the source of information which occupied the top position with the higher number article 1340 (85.03%), the second highest position is occupied by Conference Papers with 175 (11.10%) and third place is article in press 22 (1.40%) of the total 1576 hits.

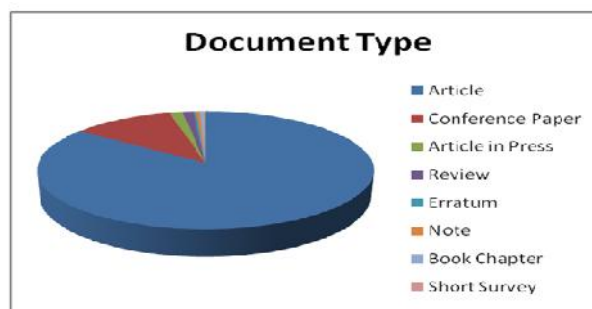


Figure 2. Document Type

Source Title wise Publication

Table 4 shows that Acta Crystallographica Section E Structure Reports Online is a majority of source area of 37 (9.61%), second in Spectrochimica Acta Part A Molecular and Biomolecular Spectroscopy 32 (8.31%) and third majority place is Parasitology Research 27 (7.01%) of total 958 hits.

Table 1. Year wise Distribution of Articles

S.No	Year	Article	%	Cumulative article	Cumulative %
1	2013	452	28.68	452	28.68
2	2012	379	24.05	831	52.73
3	2011	307	19.48	1138	72.21
4	2010	255	16.18	1393	88.39
5	2009	183	11.61	1576	100.00
Total		1576	100.00		

Table 2. Subject wise Distribution of Article

S.No	Subject Area	Article	%	Cumulative article	Cumulative %
1	Chemistry	389	13.06	389	13.06
2	Physics and Astronomy	340	11.41	729	24.47
3	Materials Science	298	10.00	1027	34.47
4	Biochemistry, Genetics and Molecular Biology	273	9.16	1300	43.64
5	Engineering	260	8.73	1560	52.37
6	Computer Science	215	7.22	1775	59.58
7	Medicine	195	6.55	1970	66.13
8	Pharmacology, Toxicology and Pharmaceutics	187	6.28	2157	72.41
9	Agricultural and Biological Sciences	184	6.18	2341	78.58
10	Mathematics	177	5.94	2518	84.53
11	Chemical Engineering	133	4.46	2651	88.99
12	Immunology and Microbiology	103	3.46	2754	92.45
13	Environmental Science	95	3.19	2849	95.64
14	Energy	23	0.77	2872	96.41
15	Multidisciplinary	21	0.70	2893	97.11
16	Earth and Planetary Sciences	20	0.67	2913	97.78
17	Business, Management and Accounting	15	0.50	2928	98.29
18	Decision Sciences	13	0.44	2941	98.72
19	Neuroscience	10	0.34	2951	99.06
20	Psychology	6	0.20	2957	99.26
21	Social Sciences	6	0.20	2963	99.46
22	Veterinary	5	0.17	2968	99.63
23	Economics, Econometrics and Finance	4	0.13	2972	99.77
24	Dentistry	3	0.10	2975	99.87
25	Arts and Humanities	2	0.07	2977	99.93
26	Health Professions	2	0.07	2979	100.00
Total		2979	100.00		

Table 3. Document Type Distribution

S.No	Document Type	Article	%	Cumulative article	Cumulative %
1	Article	1340	85.03	1340	85.03
2	Conference Paper	175	11.10	1515	96.13
3	Article in Press	22	1.40	1537	97.53
4	Review	18	1.14	1555	98.67
5	Erratum	6	0.38	1561	99.05
6	Note	6	0.38	1567	99.43
7	Book Chapter	5	0.32	1572	99.75
8	Short Survey	2	0.13	1574	99.87
9	Editorial	1	0.06	1575	99.94
10	Letter	1	0.06	1576	100.00
Total		1576	100.00		

Table 4. Top 25 Source Title wise Distribution

S.No	Source Title	Article	%	Cumulative Article	Cumulative %
1	Acta Crystallographica Section E Structure Reports Online	37	9.61	37	9.61
2	Spectrochimica Acta Part A Molecular and Biomolecular Spectroscopy	32	8.31	69	17.92
3	Parasitology Research	27	7.01	96	24.94
4	International Journal of Pharmacy and Pharmaceutical Sciences	26	6.75	122	31.69
5	International Journal of Pharma and Bio Sciences	25	6.49	147	38.18
6	Aip Conference Proceedings	20	5.19	167	43.38
7	Food Science and Biotechnology	16	4.16	183	47.53
8	Advanced Materials Research	15	3.90	198	51.43
9	Communications in Computer and Information Science	15	3.90	213	55.32
10	Asian Pacific Journal of Tropical Biomedicine	13	3.38	226	58.70
11	European Journal of Scientific Research	13	3.38	239	62.08
12	Asian Pacific Journal of Tropical Medicine	13	3.38	252	65.45
13	Nonlinear Analysis Hybrid Systems	12	3.12	264	68.57
14	Asian Pacific Journal of Cancer Prevention	12	3.12	276	71.69
15	Journal of Ethnopharmacology	11	2.86	287	74.55
16	Applied Surface Science	11	2.86	298	77.40
17	Dalton Transactions	10	2.60	308	80.00
18	Journal of Molecular Modeling	10	2.60	318	82.60
19	Synthetic Communications	10	2.60	328	85.19
20	Inorganica Chimica Acta	10	2.60	338	87.79
21	European Journal of Medicinal Chemistry	10	2.60	348	90.39
22	Rsc Advances	10	2.60	358	92.99
23	Materials Research Bulletin	9	2.34	367	95.32
24	Journal of Alloys and Compounds	9	2.34	376	97.66
25	Tetrahedron Letters	9	2.34	385	100.00
Total		385	100.00		

Table 5. Top 25 Affiliation wise Distribution

S.No	Affiliation	Article	%	Ranking	Cumulative article	Cumulative %
1	Bharathiar University	1569	77.75	1	1569	77.75
2	Karpagam University	29	1.44	2	1598	79.19
3	Bharathidasan University	28	1.39	3	1626	80.57
4	PSG College of Technology	25	1.24	4	1651	81.81
5	Chonbuk National University	24	1.19	5	1675	83.00
6	Kalasalingam University	24	1.19	6	1699	84.19
7	Youngstown State University	23	1.14	7	1722	85.33
8	Bhabha Atomic Research Centre	23	1.14	8	1745	86.47
9	University of Madras	21	1.04	9	1766	87.51
10	Annamalai University	20	0.99	10	1786	88.50
11	Howard University	18	0.89	11	1804	89.40
12	Alagappa University	18	0.89	12	1822	90.29
13	NGM College	18	0.89	13	1840	91.18
14	Periyar University	17	0.84	14	1857	92.02
15	Karunya University	17	0.84	15	1874	92.86
16	Kongunadu Arts and Science College India	16	0.79	16	1890	93.66
17	National Institute of Technology Tiruchirappalli	15	0.74	17	1905	94.40
18	National University of Singapore	15	0.74	18	1920	95.14
19	Texas A and M University	15	0.74	19	1935	95.89
20	National Taiwan Ocean University	15	0.74	20	1950	96.63
21	Jimma University	15	0.74	21	1965	97.37
22	Loyola College India	14	0.69	22	1979	98.07
23	Rajah Serfoji Government College Autonomous	13	0.64	23	1992	98.71
24	Karpagam University	13	0.64	24	2005	99.36
25	PSG College of Arts and Science	13	0.64	25	2018	100.00
Total		2018	100.00			

Table 6. Authorship Pattern

S.No	No of Author	No of articles	Percentage (%) of the article	Cumulative Percentage (%) of the article
1	Single author	18	1.14	1.14
2	Two author	483	30.65	31.79
3	Three author	354	22.46	54.25
4	Four author	259	16.43	70.69
5	Five author	201	12.75	83.44
6	Six author	117	7.42	90.86
7	More than six author	144	9.14	100.00
Total		1576	100.00	

Table 7. Degree of Collaboration

Year	Total of articles	No. of author article	Percentage of single author article	No. of Multi author article	Percentage of Multi author article	Degree of Collaboration
2013	452	3	0.66	449	99.34	0.99
2012	379	3	0.79	376	99.21	0.99
2011	307	7	2.28	300	97.72	0.98
2010	255	2	0.78	253	99.22	0.99
2009	183	3	1.64	180	98.36	0.98
Total	1576	18	1.14	1558	98.86	0.99

Table 8. Source Type Distribution

S.No	Source Type	Article	%	Cumulative Article	Cumulative %
1	Journals	1419	90.04	1419	90.04
2	Conference Proceedings	114	7.23	1533	97.27
3	Book Series	35	2.22	1568	99.49
4	Books	5	0.32	1573	99.81
5	Trade Publications	3	0.19	1576	100.00
Total		1576	100.00		

Table 9. Language wise Distribution

S.No	Language	Article	%	Cumulative Article	Cumulative %
1	English	1575	99.87	1575	99.87
2	Spanish	1	0.06	1576	99.94
3	Turkish	1	0.06	1577	100.00
Total		1577	100.00		

Affiliation Based Publication

Table 5 shows that the affiliation rank is Majority of Bharathiar University 1569 (77.75%), second ranking is Karpagam University 29 (1.44%) and third ranking is Bharathidasan University 28 (1.39%) of total 2749 hits for the duration 2009-2013.

Authorship Pattern

Table 6 and Figures 3 are show that the authorship patterns, which related that the majority of the Bharathiar University research outputs, are published in joint authorship (98.86%) and single authorship (Individual) (1.14%). The 1576 article analysis results are shows that only 18 (1.14%) articles are in single author, 483(30.65%) articles are in two authors and 354 (22.46%) articles in three authors. Then the 721(45.75%) articles are published in four authors and more than four authors. These data analysis are clearly shows that researchers prefer to do work in collaboration.

Table 7 and figure 4 shows that Bharathiar University research output for the selected five years total no of 1576 articles, only 18(1.14%) articles are in single author and remaining 1558 (98.86%) articles are in two or more authors. The research ratio of collaboration work was found to be very high compare with single authors working. The research work article ratio is 86.5:1 between multi authors and single authors.

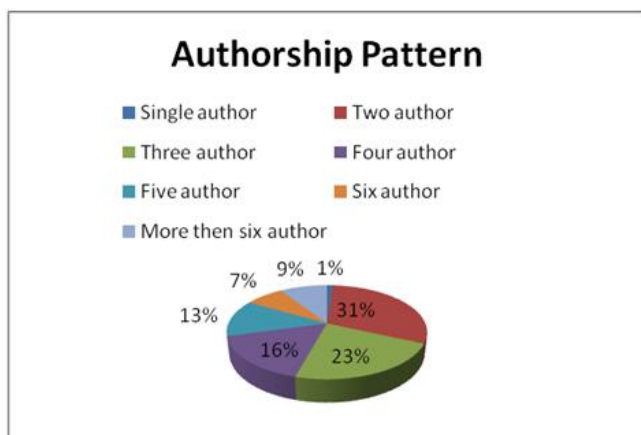


Figure 3. Authorship Pattern

Degree of Collaboration

The degree of collaboration can be calculated by the formula given below:

Degree of Collaboration (C) = $\frac{\text{No. of Multiple Authors}}{\{\text{No. of Multiple Authors} + \text{No. of Single Authors}\}}$ By using this formula the degree of collaboration in the Bharathiyar University research output has been calculated and provided in Table 7 and figure 4.

The degree of collaboration was calculated for 5 years from 2009-2013. In the year 2010, 2012 and 2013 the degree of collaboration is 0.99 and followed by the year 2009 and 2011 is 0.98.

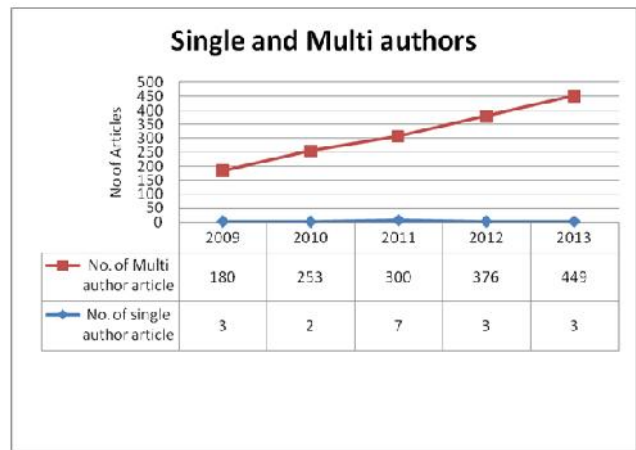


Figure 4. Degree of Collaboration

Source type Distribution

In this study Table 8 shows that a majority of source is Journals 1419 (90.04%), next majority sources is Conference proceedings 114 (7.23%) and third one is Book Series 35 (2.22%) in a total number of 1576 hits.

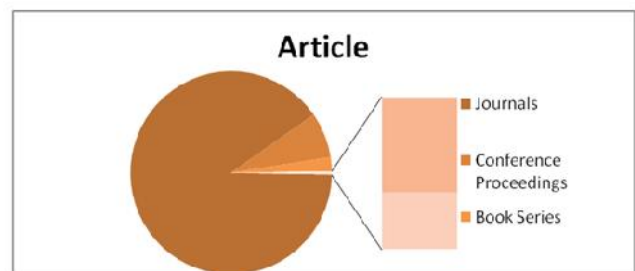


Figure. 5 Source type Distribution

Language wise Distribution

Table 9 and Figure 6 shows that majority of articles in English Language 1575 (99.87%) and next place is Spanish and Turkish in 1 (0.06%) of total 1577 hits.

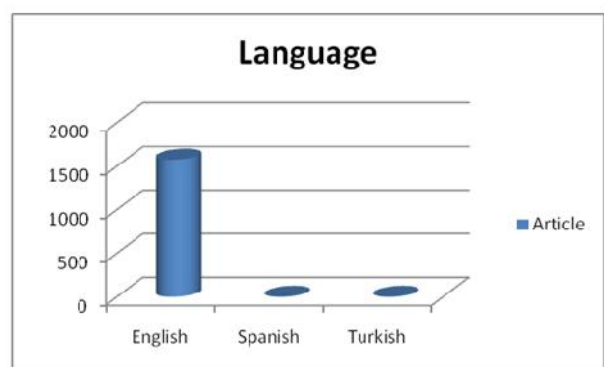


Figure 6. Language wise Distribution

Finding and Conclusion

Scientometric analysis result output of Bharathiyar University for the period 2009-2013 from the scopus database the maximum number of articles are published in 2013 (452) (26.68%).

A majority of subject area is covered in Chemistry 389 (13.09%). In this study a majority of the contributors preferred Articles as the source of information which occupied the top position with the higher number article 1340 (85.03%). The Acta Crystallographic a Section E Structure Reports Online is a majority of source area of 37 (9.61%). The affiliation rank is Majority of Bharathiar University 1569 (77.75%) and the majority of the Bharathiar University research outputs, are published in joint authorship 1558 (98.86%) and single authorship (Individual) 18 (1.14%).

The average degree of collaboration is 0.99. Most of the trend for every year showed that collaborative research work. Based in the research a majority of source is Journals 1419 (90.04%) and majority of articles in English language 1575 (99.87%). The data summarized here the above results are the Bharathiyar University, Coimbatore region has made important contribution of research publication for period of 2009-2013.

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