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## Scientometric Analysis on the Research Output Performance of Periyar and Bharathiar Universities: A Comparative Study

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### Abstract

*The study provides a comparative assessment of the research contribution of the Periyar University and Bharathiar University. This study only focus from 2005 to 2014 on the data available in Web of Science. As per the sources available in the Web of Science 2531 article were published which includes in the year 2005, 118 (4.66%) articles were published by two universities. But the maximum no of article, 492(19.44%) in the year 2014. Among the 2531, 680(26.87%) articles from Periyar University and 1851 (73.3%) articles from Bharathiar University. It is pointed out that highest no. of articles published by Bharathiar University.*

### Keywords

Periyar University; Bharathiar University;  
Scientometric Analysis.

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## INTRODUCTION

Scientific productivity in the form of intellectual contributions and communicated in written form is commonly considered to be of fundamental importance to scientific career advancement. In the last two decades there has been an unprecedented growth of scientometric studies in different fields, mainly because of the government and private organizations that invest large amount of money for research activities need accountability. The Government of Tamil Nadu established the Periyar University in Salem on 17th September 1997 as per the provisions of the Periyar University Act, 1997. The University covers the area comprising the districts of Salem, Namakkal, Dharmapuri and Krishnagiri. The University got the 12 (B) and 2f status from the University Grants Commission and has been accredited by NAAC with A grade in 2015. The University is named after the Great Social Reformer E. V. Ramasamy affectionately called "Thanthai Periyar". The University aims at developing knowledge in various fields to realize the maxim inscribed in the logo "Arival Vilayum Ulagu" (Wisdom Maketh World). "Holistic development of the students" is the primary objective of the esteemed Periyar University. Thanthai Periyar had been advocating throughout his life the importance of being rational and created a stir by his self-respect movement. He incessantly toiled for social justice among people to liberating the downtrodden women and insisted on the priority of one's mother tongue. The Periyar Chair was created in 1998 to inculcate these ideas in the minds of students. The University tie-ups with various academic, research institutes and universities across the world to bring laurels to the academia. ([www.periyaruniversity.ac.in](http://www.periyaruniversity.ac.in))

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". In the University, every effort is harnessed to realize his dream of making educational institutions as a temple of learning. It is the aim of the University to participate in the task of inculcating necessary Knowledge, Skills and Creative Attitudes and values among the youth of the country to contribute more effectively towards establishing an equitable social

and economic and secular ideal of our nation.  
(www.b-u.ac.in)

## REVIEW OF LITERATURE

Vijayanathan, R. (2014) reported an open software engineering journals studies had taken for this study covers from 2007-2012. The paper analyses the authorship pattern, the range and frequency of articles published. The maximum number of papers published in "Open software engineering journals" during the study period is 16 research papers published in 2007 and the minimum number of papers are 5 in 2009. The results indicate that the trend is towards two authorship 6 and the degree of collaboration as 0.75. Panneerselvam, P. and Dhavaputhalvi, A.C. (2014) have analysed the Journal of Signal Processing and Systems from Springer publications was taken for this study. The authors have the facility to access this journal; hence it has been taken for the study. Thirty-eight volumes containing one hundred and seventeen issues published from the year 2004 - 2013 were considered for this analysis. The numbers of articles, number of authors, authorship pattern, collaborative works, etc. were analysed. More than three thousand authors published their papers in this journal during the last ten years, out of which, male authors have dominated in publications also authors from the USA and China have published in more numbers.

Ranganathan, A. and Balasubramani, R. (2014) have investigated Green Energy Research in India as revealed by the scholarly publication indexed in web of science (WoS) for a period of fifteen years from 1999 to 2013. It was seen that the analyses included research growth, author productivity, authorship pattern, Geographical distribution of the literature, citation analysis rank, global publications' share, citation impact, share of international collaborative papers and major collaborative partner countries and patterns of research communication in most productive journals. It also analyses the characteristics of most productive institutions, authors and high-cited papers. Vivekanandhan, S. and Bathri Narayanan, A.L. (2014) has carried on scientometric analysis of research publication productivity of the Barahiyar 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 is published in joint authorship (98.86%). The average

degree of collaboration is 0.99. Journal articles have occupied the top position with the highest number of article 1419 (90.04%). Maximum no. of articles is published in English Language 1575 (99.87%). Gupta, B.M., Anurag Saxena and Visakhi, P. (2013) has studied about the contribution of twenty agricultural universities to the mainstream scientific literature during 2007-2011 along two distinct, but interrelated dimensions of quantity (number of papers, number of international collaborative papers) and quality of research output (assessed through the citations received) A number of measures are used for inter-field and inter-university comparisons. Inter-field comparisons are made at the level of 10 macro subject fields.

## SCOPE OF THE STUDY

The aim the study is to analysis the research output performance of Periyar University and Bharathiar University. These two universities are started by the Government of Tamil Nadu and it has more no. of faculty members and students when comparing other universities. It is discussed about the research articles produced by the authors and citations.

## OBJECTIVES OF THE STUDY

The major objectives are framed with the exclusive notion of the present study as mentioned below:

- 1 To find out the year wise distribution of publications.
- 2 To identify the document type.
- 3 To examine the subject-wise breakup of publications.
- 4 To ascertain the authorship pattern.
- 5 To study source wise distribution of publications.

## METHODOLOGY

The present study data were collected from Web of Science database for the period 2005-2014. It can be seen that nearly 2531 bibliographic records of contribution in the field of Periyar and Bharathiar Universities over the period of 10 years. The researcher applied the search strings of Periyar University and Bharathiar University that has used for the data extraction from the database of Web of Science to download the records based on the above strings. A total of 2531 records were downloaded and analysed by using the Histcite software applications as per the objectives of the study

**Table 1 Shows Year wise Distribution of Periyar and Bharathiar Universities**

Sl. No	Year	Periyar University (PU)			Bharathiar University (BU)			Total (%age)
		Recs	TLCS	TGCS	Recs	TLCS	TGCS	
1	2005	18	15	339	100	168	1826	<b>118 (4.66)</b>
2	2006	12	19	215	104	174	1846	<b>116 (4.58)</b>
3	2007	33	39	184	103	178	1489	<b>136 (5.37)</b>
4	2008	47	64	539	126	216	1466	<b>173 (6.84)</b>
5	2009	67	115	701	135	138	1052	<b>202 (7.98)</b>
6	2010	81	91	763	192	170	1571	<b>273 (10.79)</b>
7	2011	70	90	476	212	331	1442	<b>282 (11.14)</b>
8	2012	97	87	463	258	367	1610	<b>355 (14.03)</b>
9	2013	107	53	272	277	134	971	<b>384 (15.17)</b>
10	2014	148	31	160	344	46	312	<b>492 (19.44)</b>
<b>Total</b>		<b>680</b>	<b>604</b>	<b>4112</b>	<b>1851</b>	<b>1922</b>	<b>13585</b>	<b>2531 (100)</b>

Table 1 indicates the year wise distribution of articles published by the various authors from Periyar University and Bharathiar University. During the period 2005-2014, 2531 articles were published which are Web of Science. Among the 2531, in the year 2006, 116 (4.58%) articles were published by two universities. But the maximum no of article, 492 (19.44%) in the year 2014. Among the 2531, 680 (26.87%) articles from Periyar University and 1851 (73.13%) articles from Bharathiyar University. It is pointed out that highest no. of articles published by Bhrathiar University.

**Table 2: Shows University Wise Distribution of Research Output during 2005 -2014**

Year	Periyar University	Bharathiar University	Total
2005	18	100	118
2006	12	104	116
2007	33	103	136
2008	47	126	173
2009	67	135	202
2010	81	192	273
2011	70	212	282
2012	97	258	355
2013	107	277	384
2014	148	344	492
Total	680	1851	2531
PaI*	26.87	73.13	100
Mean	68	185.1	<b>253.1</b>
SD*	42.48	85.86	<b>127.20</b>
CV*	62.46	46.38	<b>50.26</b>

PaI\* - Participative Index

SD\* - Standard Deviation  
 CV\*- Coefficient of Variance

Table 2 indicates the University wise distribution of articles published by various Periyar University and Bharathiar University. During the period 2005-2014, there were 2531 articles published which are covered in Web of Science. Out of 2531 total publication output, in the year 2006, 116 articles were published by the studied two universities. But the maximum number of articles is observed in the year 2014 which is accurate to 492. The output performances of both the Universities are found increasing year after year. The analysis of individual university performance shows the result that Bharathiar University (1851) has 3 times more publications output compared to Periyar University (680). Bharathiar University contributed 73.13 % of the Participative Index in the first place, Periyar University contributed 27.87% of Participative Index, it occupies the last position.

From the Table 3 it is clear that the percentage of multi-authored papers is high when compared to the single authored papers. In total there are only 17 (0.67%) single authorship papers, found in the study. Two authored papers are 593 (23.43%), three authored papers observed are 624 (24.65%) and four authored papers are 489 (19.32%). The papers authored by five and more than five joint authors are 354 (13.89%) and 454 (16.50%) respectively. The analysis reveals that of Bharathiar University, two authored papers the comprised highest score of 441 (23.83%) out of total 1851 articles the next comes three authored papers which are 414 (2.37%) in total respectively. Single authored papers are less of Bharathiar University i.e. 13 (0.70%). Periyar

University papers with highest in number i.e., 210 (30.88%) which is followed by two authored papers .

**Table 3 Shows the Authorship Pattern of publication of Periyar and Bharathiar Universities**

Sl. No	No. of Authors	Periyar University (PU)		Bharathiar University (BU)		Total Papers
		Papers	Authors	Papers	Authors	
1	Single	4 (0.59)	4 (0.16)	13 (0.70)	13 (0.17)	<b>17 (0.67)</b>
2	Two	152 (22.35)	304 (11.86)	441 (23.83)	882 (11.54)	<b>593 (23.43)</b>
3	Three	210 (30.88)	630 (24.58)	414 (22.37)	1242 (16.25)	<b>624 (24.65)</b>
4	Four	130 (19.12)	520 (20.29)	359 (19.39)	1436 (18.79)	<b>489 (19.32)</b>
5	Five	93 (13.68)	465 (18.14)	261 (14.10)	1305 (17.08)	<b>354 (13.99)</b>
6	Six	49 (7.20)	294 (11.47)	165 (8.91)	990 (12.95)	<b>214 (8.46)</b>
7	Seven	18 (2.65)	126 (4.91)	78 (4.21)	546 (7.14)	<b>96 (3.79)</b>
8	Eight	13 (1.91)	104 (4.06)	54 (2.92)	432 (5.65)	<b>67 (2.65)</b>
9	Nine	7 (1.03)	63 (2.46)	29 (1.57)	261 (3.42)	<b>36 (1.42)</b>
10	Ten& above	4 (0.59)	53 (2.07)	37 (2.00)	536 (7.01)	<b>41 (1.62)</b>
<b>Total</b>		<b>680 (100)</b>	<b>2563 (100)</b>	<b>1851 (100)</b>	<b>7643 (100)</b>	<b>2531 (100)</b>

**Table 4 Shows Year wise Distribution of Citations of Periyar and Bharathiar Universities**

Sl. No	Year	Periyar University		Bharathiar University		Total	% age
		Citation	%	Citation	%		
1	2005	339	8.24	1826	13.44	<b>2165</b>	<b>12.23</b>
2	2006	215	5.23	1846	13.59	<b>2061</b>	<b>11.65</b>
3	2007	184	4.47	1489	10.96	<b>1673</b>	<b>9.45</b>
4	2008	539	13.11	1466	10.79	<b>2005</b>	<b>11.33</b>
5	2009	701	17.05	1052	7.74	<b>1753</b>	<b>9.91</b>
6	2010	763	18.56	1571	11.57	<b>2334</b>	<b>13.19</b>
7	2011	476	11.58	1442	10.61	<b>1918</b>	<b>10.84</b>
8	2012	463	11.26	1610	11.85	<b>2073</b>	<b>11.71</b>
9	2013	272	6.61	971	7.15	<b>1243</b>	<b>7.02</b>
10	2014	160	3.89	312	2.30	<b>472</b>	<b>2.67</b>
<b>Total</b>		<b>4112</b>	<b>100</b>	<b>13585</b>	<b>100</b>	<b>17697</b>	<b>100</b>

Table 4 indicates the year wise distribution of article citation by various authors published by Periyar University and Bharathiar University. During the study period, 17697 citations were identified from Web of Science, it is observed that out of 1851 contributions, a total number of citations recorded is 17697. The percentage of citation is found high in the year 2005 (8.24) in periyar university but it decreased to 4.47 in the next two years. From 2008 the citation got increased and up to 2010 it was appreciable. From 2011 again it got decreased and in 2014 it is observed very less such as 3.89 while analysing the citation scored by Bharathiar University, it is somewhat better than Periyar University. The total numbers of citation are three times higher than the citations scored by Periyar University, The percentage level is found at fluctuation and not

constant. Yet the years 2009 and 2013 are noted very less compared to other years.

The table 5 indicates the distribution of publications based on the type of publication by the authors from Periyar University and Bharathiar University. Both the Universities concentrate on publishing their research output in the form of Journal Articles. Periyar University has produced 661 Journal Articles has produced 3 times more numbers in this form of publication. Bharathiar University has recorded about 18 researches at put in the form of review but Periyar University has shown only of in this form. Meeting Abstract is found third preferred forms by both Universities. The other types of publications are found less in numbers.

**Table 5 Shows Distribution of Document Type of Periyar and Bharathiar Universities**

Sl. No	Document Type	Periyar University (PU)			Bharathiar University (BU)			Total
		Recs	TLCS	TGCS	Recs	TLCS	TGCS	
1	Article	661	597	3983	1749	1887	13184	2410
2	Review	6	6	116	18	6	171	24
3	Meeting Abstract	5	0	0	40	1	4	45
4	Correction	3	1	1	7	0	1	10
5	Letter	3	0	0	2	1	2	5
6	Article; Proceedings Paper	1	0	12	31	27	218	32
7	Editorial Material	1	0	0	4	0	5	5
	<b>Total</b>	<b>680</b>	<b>604</b>	<b>4112</b>	<b>1851</b>	<b>1922</b>	<b>13585</b>	<b>2531</b>

**Table 6- Shows Source wise Distribution of Periyar and Bharathiar Universities**

Year	Article		Review		Meeting Abstract		Correction		Letter		Article; Proceedings Paper		Editorial Material		Total	
	PU	BU	PU	BU	PU	BU	PU	BU	PU	BU	PU	BU	PU	BU	PU	BU
2005	18	89	-	1	-	2	-	-	-	-	-	8	-	-	18	100
2006	12	102	-	-	-	1	-	-	-	-	-	1	-	-	12	104
2007	31	95	-	-	-	-	-	-	1	-	-	8	1	-	33	103
2008	46	121	-	-	-	1	-	-	-	-	1	4	-	-	47	126
2009	65	133	1	1	1	-	-	-	-	-	-	1	-	-	67	135
2010	78	176	-	3	2	6	1	1	-	-	-	6	-	-	81	192
2011	68	202	2	1	-	4	-	3	-	-	-	2	-	-	70	212
2012	96	242	1	1	-	12	-	1	-	1	-	1	-	3	97	261
2013	102	265	1	5	1	4	2	-	1	-	-	-	-	1	107	275
2014	145	324	1	6	1	10	-	2	1	1	-	-	-	-	148	343
Total	661	1749	6	18	5	40	3	7	3	2	1	31	1	4	680	1851

A study of data in table 6 indicates the source wise distribution of research output of Periyar and Bharathiar Universities. Journal articles that appeared in the journals have shown a predominant contribution 1749 and this source occupies the first position. The source of meeting abstract papers comes second in order 40 of sharing research output in Bharathiar University during the period of analysis. The article; proceedings paper form of publications occupies the third position 31 with respect to output in Bharathiar University research during the study period, the review as the source of output comes fourth 18 of the Bharathiar University output. Journal articles that appeared in the journals have shown a predominant contribution 661 and this source occupies the first position. The source of review papers comes second in order 6 of sharing research output of Periyar University during the period of analysis, The meeting abstract paper form of publications occupies the third position 5 with

respect to output of Periyar University research during the study period, Finally article; proceedings paper and editorial material as the source of contribute 1 of output in the overall publication.

Table 7 shows the top 20 subjects it includes various articles published by the authors from Periyar University and Bharathiar University which are available in the Web of Science during the period of 2005-2014. As per the sources available in the Web of Science more than 193 articles were Periyar University published from Spectroscopy subject which includes 117 (17.21%), Materials Science Multidisciplinary 74 (10.88%), Chemistry Multidisciplinary 70 (10.29%), Chemistry Physical 58 (8.53%) and Physics Applied 44 (6.47). Bharathiar University Published from Materials Science Multidisciplinary Subject which includes 186 (10.05%), Chemistry Physical 159 (8.59%), Chemistry Multidisciplinary 147 (7.94%),

Mathematics Applied 118 (6.38%) and Physics Applied 117 (6.32%).

**Table 7 - Shows Subject wise Distribution top 20 Articles of Periyar and Bharathiar Universities**

Sl. No	Subject	Periyar University (PU)		Bharathiar University (BU)		Total
		Recs	Per	Recs	Per	
1	Spectroscopy	117	17.21	76	4.11	193
2	Materials Science Multidisciplinary	74	10.88	186	10.05	260
3	Chemistry Multidisciplinary	70	10.29	147	7.94	217
4	Chemistry Physical	58	8.53	159	8.59	217
5	Physics Applied	44	6.47	117	6.32	161
6	Physics Multidisciplinary	41	6.03	76	4.11	117
7	Environmental Sciences	32	4.71	95	5.13	127
8	Biochemistry Molecular Biology	27	3.97	95	5.13	122
9	Mathematics Applied	26	3.82	118	6.38	144
10	Physics Condensed Matter	25	3.68	97	5.24	122
11	Optics	25	3.68	25	1.35	50
12	Crystallography	24	3.53	115	6.21	139
13	Chemistry Inorganic Nuclear	23	3.38	92	4.97	115
14	Biotechnology Applied Microbiology	23	3.3	88	4.75	111
15	Chemistry Organic	20	2.94	82	4.43	102
16	Polymer Science	19	2.79	16	0.86	35
17	Engineering Chemical	19	2.79	58	3.13	77
18	Chemistry Applied	19	2.79	37	2.00	56
19	Biophysics	16	2.35	31	1.68	47
20	Mathematics	13	1.91	44	2.38	57

## CONCLUSION

The research activity of Periyar University and Bharathiar University, this analysis is based on the publications data consisting of 2531 research papers published by the two universities researchers during 2005-2014. It was observed that 641 papers scored the highest citation Periyar University 763 in the year 2010 from Bharathiar University 1846 in the year 2006. The average citation per paper of total publications of Bharathiar University 73.13 and Periyar University 26.87 on the basis of the open citation window. The university has indeed progressed in terms of quality of research. The authorship pattern of Periyar and Bharathiar Universities research identified that the majority of papers are multi-authored, based on the data presented in the table indicates that the research output of the authors of Periyar and Bharathiar Universities is fairly collaborative. The trends towards collaborative research are gaining currency day-by-day. Every work of researchers depends purely on the library because it contains more source information. The researchers have become an

important entity wherein more and more researchers help to make it innovative.

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