Research Assessment of Anna University during 1979 – 2013: A Scientometric Study

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Abstract

This paper reviews the research contribution of the Anna University in period of publication output. The study period is taken from during the year 1979 to 2013. Data was analyzed various subject fields contributed by staff and research scholars of university to published in science citation indexed (SCI) journals, the Scopus citation database has been used to retrieve the publications. Whole study period the highest doubling time (DT) was found in the year 2003. The author Ramasamy P has been published 487 (5.96%) articles and stands in first place. Total 8084 papers were collected from 119892 citations.

Keywords: Publication, relative growth rate, institution, subject, journal

1. Introduction

Scientometrics are used to measure scientific activities, mainly by producing statistics on scientific publications indexed in databases. It is a flexible tool used to study the scientific communities, to conduct scientific/strategic, technical, technological or competitive monitoring, to design and manage research programs and evaluate research. They are particularly expensive methods for appraise research output, situation studies and perform insight studies in science and technology. Scientometric tools can be used to assess and evaluate the systematic activities at various levels of aggregation together with institutions/departments, zones, region and countries. They can also be used to measure research collaborations, to map scientific networks and to watch the progress of scientific fields. The terms bibliometric and scientometrics have been initiate by Pritchard, Nalimov & Mulchenko in 1969. Pritchard defined the term Bibliometrics as the application of mathematical and statistical methods to books and other communication medium, Nalmov & Mulchenko describe Scientometric as the application of those quantitative methods which are dealing with analysis of science viewed as an information process.

2. About the University

Anna University was established on 4th September 1978 as a unitary type of University. It offers higher education in Engineering, Technology and allied Sciences relevant to the current and projected needs of the society.Besides promoting research and disseminating knowledge gained therefrom, it fosters cooperation between the academic and industrial communities.The University was formed by bringing together and integrating two well-known technical institutions in the city of Madras.

- College of Engineering, Guindy (CEG)(1794)
- Madras Institute of Technology, Chrompet (MIT)(1949) and three Technological Departments of the University of Madras.
- Alagappa College of Technology (ACT)(1944)
- School of Architecture and Planning (SAP)(1957)

Situated in the southern part of the city of Madras (Chennai), the University's main campus extends over 100 hectares abutting the Adyar River on the north and Raj Bhavan on the south. The Madras Institute of Technology at Chrompet constitutes the second campus of the University which extends over 20 hectares. Both the campuses have a variety of buildings serving the various needs of the University community. A third campus extending over 80 hectares is located at Taramani near the Instronic campus, Adyar. The Bioprocess Laboratory donated by SPIC is located at present in this campus and a few more centers of advanced studies, like National Institute of Fashion Technology (NIFT), Sugar Research Institute, Mechatronics Institute, Entreprenuership Development Park, and Convention Centre will also be housed there in future. Since December 2001, it has become a large, highly renowned Affiliated University, having brought into its fold about 520 Self-financing Engineering Colleges six Government Colleges and three Government-aided Engineering colleges located in various parts of Tamilnadu State. The Anna University ,which is of the affiliated type is a member of the Association of Indian Universities, the Association of Commonwealth Universities and Partner of UNESCO International Center for Engineering Education (UICEE). UGC have accredited Anna University with Five Star Status in 2002 which is the highest rating. With proven capabilities both in academic and research areas, Anna University was able to receive this honour for a period of five years for excellence in Technical Education.

3. Objective of the Study

The objective of the present study is to examine the trend of research collaboration of both staff and research scholars of Anna University. The main objective s of this study are to:

1. Examine the year wise distribution of the publications in Anna University
2. Analyze the relative growth rate (RGR) and doubling time (DT) of research productivity
3. Find out the single author vs. multi author research productivity
4. Institution wise research output
5. Subject wise research output
6. Journal wise paper output
7. Source wise distribution of papers

4. Methodology

The studies aspire to evaluate the research publication of Anna University in various field of science. The data's retrieved from the Web of Science database. The research output identified on web of science for used the string "Anna Univ" in the author affiliation field. The publications span covered 12 years (1979-2013) which is taken as the prime source for the present study. The total publication downloaded during the study period 8084 papers for analysis. HistCite software is the main tool used for the analysis of the data set and MSexcel is used for diminutive analysis.

5. Analysis
5.1. Growth of Research Productivity

The research output of the Anna University is given in Table 1. From the table, it is observed that there is an increase the number of publications were published in in 1979 (0.01%) and in 2012 (10.42%). It is observed that there is less than 1 % publications brought from 1979 to 1992, and less than 5% publications brought from 1993 to 2004 it is also observed that more than 10 % of publications occurred in the year 2012 with 112 TLCS and 536 TGCS.

Table 1:   Growth of research productivity

S. No	Year	No. of output	Percent	Cumulative percent	TLCS	TGCS
1.	1979	1	0.01	0.01	0	6
2.	1980	11	0.14	0.15	7	50
3.	1981	36	0.45	0.59	42	133
4.	1982	47	0.58	1.17	68	179
5.	1983	34	0.42	1.59	36	104
6.	1984	46	0.57	2.16	27	144
7.	1985	28	0.35	2.51	12	108
8.	1986	66	0.82	3.33	90	312
9.	1987	65	0.80	4.13	40	190
10.	1988	52	0.64	4.77	34	283
11.	1989	52	0.64	5.42	59	241
12.	1990	80	0.99	6.41	55	294
13.	1991	70	0.87	7.27	73	358
14.	1992	73	0.90	8.17	87	553
15.	1993	88	1.09	9.26	81	716
16.	1994	105	1.30	10.56	185	584
17.	1995	110	1.36	11.92	171	984
18.	1996	171	2.12	14.04	201	1169
19.	1997	142	1.76	15.79	182	992
20.	1998	166	2.05	17.85	278	1411
21.	1999	178	2.20	20.05	252	1676
22.	2000	208	2.57	22.62	342	2062
23.	2001	194	2.40	25.02	314	1913
24.	2002	251	3.10	28.13	517	3388
25.	2003	291	3.60	31.73	411	3318
26.	2004	346	4.28	36.01	653	4992
27.	2005	406	5.02	41.03	435	5023
28.	2006	498	6.16	47.19	405	4888
29.	2007	488	6.04	53.23	373	4021
30	2008	600	7.42	60.65	386	3246
31	2009	593	7.34	67.98	285	2618
32	2010	594	7.35	75.33	332	2200
33	2011	718	8.88	84.21	310	1533
34	2012	842	10.42	94.63	112	536
35	2013	434	5.37	100.00	6855	50225
Total		**8084**	**100**			

5.2. Relative Growth Rate (RGR) and Doubling Time (DT)

The relative growth rate is the increase in number of articles/pages per unit o f time. The Mean relative growth rate over the specific period of interval can be calculated from the following equation.

$$R(1-2) = \frac{W_2 - W_1}{T_2 - T_1}$$

There exists a direct equivalence between the relative growth rate and the doubling time. If the number of articles/pages of subject double during a given period at the beginning and end o dthis period must be logarithms of number 2. If natural logarithm is used this difference has value of 0.693.

thus the corresponding doubling time for each specific period of interval and for both articles and pages can be calculated by the formula

Doubling time =0.693/R

Table 2:   Relative growth rate (RGR) and Doubling time of publications

S. No	Year	No. of output	W_1	W_2	RGR	DT
1.	1979	1		0	0	0
2.	1980	11	0	1.041	0	0
3.	1981	36	1.041	1.556	0.515	0.743
4.	1982	47	1.556	1.672	0.116	0.167
5.	1983	34	1.672	1.531	-0.141	-0.203
6.	1984	46	1.531	1.662	0.131	0.189
7.	1985	28	1.662	1.447	-0.215	-0.310
8.	1986	66	1.447	1.819	0.372	0.537
9.	1987	65	1.819	1.812	-0.007	-0.010
10.	1988	52	1.812	1.716	-0.096	-0.139
11.	1989	52	1.716	1.716	0	0.000
12.	1990	80	1.716	1.903	0.187	0.270
13.	1991	70	1.903	1.845	-0.058	-0.084
14.	1992	73	1.845	1.863	0.018	0.026
15.	1993	88	1.863	1.944	0.081	0.117
16.	1994	105	1.944	2.021	0.077	0.111
17.	1995	110	2.021	2.041	0.02	0.029
18.	1996	171	2.041	2.232	0.191	0.276
19.	1997	142	2.232	2.152	-0.08	-0.115
20.	1998	166	2.152	2.220	0.068	0.098
21.	1999	178	2.220	2.250	0.03	0.043
22.	2000	208	2.250	2.318	0.068	0.098
23.	2001	194	2.318	2.287	-0.031	-0.045
24.	2002	251	2.287	2.399	0.112	0.162
25.	2003	291	2.399	3.464	1.065	1.537
26.	2004	346	3.464	2.539	-0.925	-1.335
27.	2005	406	2.539	2.608	0.069	0.100
28.	2006	498	2.608	2.697	0.089	0.128
29.	2007	488	2.697	2.688	-0.009	-0.013
30	2008	600	2.688	2.778	0.09	0.130
31	2009	593	2.778	2.773	-0.005	-0.007
32	2010	594	2.773	2.773	0	0.000
33	2011	718	2.773	2.856	0.083	0.120
34	2012	842	2.856	2.925	0.069	0.100
35	2013	434	2.925	2.637	-0.288	-0.416
Total		**8084**				

The table 2 reveals the growth rate of publications was observed during 1979 to 2013. The highest growth rate (1.065) was found in the year 2003 and observed next highest growth rate (0.515) was in the year 1981. The study early period onwards the growth rate level was not in even way. As well as the doubling time was initially increased (0.743) in the year 1981 subsequent year decreased during 1981 to 2002. Whole study period the highest doubling time in the year 2003 (1.537).

5.3. Institution Wise Department

The table 3 revels that institution wise department in the period of study 4019 institutions are involved. Table shows the output of top ten institutions publications. It is analyzed Anna Univ, Ctr Crystal Growth has got first place in top ten with 979(24.35%) records, 1168 TLCS, 6826 TGCS. Followed by Anna Univ, Dept Phys 765 (19.03%) and Anna Univ, Dept Chem with 761(18.93%). However anna university chemistry department has received more citations 10717 for 761 papers among all the departments.

Table 3: Institution wise Department

S. No	Institution wise department	Records	TLCS	TGCS
1	Anna Univ, Ctr Crystal Growth	979	1168	6826
2	Anna Univ, Dept Phys	765	800	5121
3	Anna Univ, Dept Chem	761	1399	9318
4	Anna Univ, Coll Engn	621	433	2585
5	Anna Univ, Dept Chem Engn	355	652	3781
6	Anna Univ, Ctr Biotechnol	267	368	2747
7	Anna Univ, Dept Mech Engn	227	151	1308
8	Anna Univ, Ctr Environm Studies	193	169	2600
9	Anna Univ, Alagappa Coll Technol	191	322	1915
10	Anna Univ, Madras Inst Technol	188	54	395

5.4. Country Wise Distribution

The table 4 shows the country wise document distribution of total output. 59 countries have been contributed in this research period. 8084 papers have been published in various countries. India has published 7853 papers which is top among others followed by Japan with 201, USA with 190 respectively.

Table 4: Country wise Distribution

1	India	7853	6814	49020
2	Japan	201	192	1929
3	USA	190	222	2451
4	Italy	178	39	1032
5	Malaysia	175	153	815
6	South Korea	174	169	1797
7	Germany	124	223	3033
8	UK	69	88	859
9	Canada	51	40	419
10	Taiwan	39	57	308

5.5. Source Wise Distribution Documents

The papers have been scattered in various documents such as article, note, proceeding, review, letter, discussion. Table 5 specified the source wise distribution of documents below table clearly indicated that 6005 papers have been published as an article which is the highest among the documents.

Table 5: Source wise Distribution Documents

1	Article	6005	6366	45639
2	Proceedings Paper	1312	66	209
3	Article; Proceedings Paper	320	268	2098
4	Note	129	97	474
5	Meeting Abstract	123	0	6
6	Review	97	32	1408
7	Letter	42	34	359
8	Editorial Material	35	2	49
9	Correction	12	0	0
10	Discussion	4	0	8

5.6. Author wise Distribution of Documents

The table 6 shows that published the top ten papers in this study period. Ramasamy.P has been published 482(5.96%) papers followed by the Jayavel R 218 (2.69%), Murugesan V 173 (2.14%) respectively.

Table 6:   Author wise Distribution of Documents

1	Ramasamy P	482	836	4107
2	Jayavel R	218	265	1739
3	Murugesan V	173	475	4667
4	Kumar J	164	176	868
5	Dhanasekaran R	140	153	700
6	Palanichamy M	130	297	2385
7	Gnanam FD	129	118	952
8	Alagar M	123	328	1108
9	Chinnakali K	119	133	578

6. Conclusion
This study brings out the performance of scientometric analysis. It mainly exposes the research growth of Anna university research output during 1979-2013. In the entire period of study, 8084 papers were published in 2143 Journals. In addition, 8724 authors were involved in this research field. The data's are collected from the 119892 citations. The table 6 indicates the author wise publication of papers, among this Ramasamy P is the highest 487(5.96%). India publishes 7853 papers which is top among the other countries .The highest productivity journals is the Journal Of Crystal Growth with 237 (2.93%) papers published in this research field. Most productivity of papers about 842 were published in the year of 2012. The Highest publication institution wise department Anna University centre for crystal growth with 979 papers. In this study it is investigated that relative growth rate 1.065 is highest in total study period. The doubling of publication is highest 0.743 in the year 2003.

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