

Research Productivity in the University of Madras: A Scientometric Study

A. Rosaline Mary¹ and M. Dorairajan²

¹Librarian, Kalaikaviri College of Fine Arts, Tiruchirappalli

²Librarian, St. Joseph's College (Autonomous), Tiruchirappalli

Introduction

The measurement of research productivity performance in universities has become a periodical, routine affair in most of the developed countries. Till a few years ago, criterion for such a measurement remained question through various scales were under trial. Today, measuring the research performance of a university applying the scientometrics and bibliometric principles have become an accepted practice in the absence of any other suitable alternative mechanism despite criticism from a section of academic quarters. All kinds of peer reviewed research publication and their impact factor are taken into account besides a number of socio psychological factors influencing research performance or productivity of scholars involved in science communication.

The present study is on "Research Productivity in the University of Madras: A Scientometric Study".

University of Madras

The University of Madras is a public State university in Chennai, Tamilnadu. Established in 1857, it is one of the oldest and premier universities in India. The university was incorporated by an act of the Legislative Council of India. It is a collegiate research university and has six campuses in the city viz., Chepauk, Marina, Guindy, Taramani, Maduravoyal and Chetpet.

At present, there are 73 academic departments grouped under 18 schools, covering diverse area such as sciences, social sciences, humanities, management and medicine along with 109 affiliated colleges and 52 approved research institutions.

Objectives

- To analyse the rate of growth of scientific literature in the University of Madras.
- To find out the most prolific authors in the University of Madras.
- To identify the distribution of research productivity output of researchers in various journals.
- To identify the geographical area of research concentration.

Need for the study

The aim of the present investigation is to analyze research output of the University of Madras measured by the number of publications published

between 1989 to 2014 study period in the International and National, local journals and to identify the productivity and the international visibility of the universities.

Scope and Limitations

As a higher academic institute, major missions of a university are teaching, learning and research activities are the prime area of concern not only to the universities but also to the Government.

To pursue excellence and the performance of the university through the aggregate performance of the faculty members is essential. To evaluate the publication productivity of the university through its individual faculty members, no matter which department these faculty members are affiliated with. The present study focuses on the publications of the research scholars and faculty members are considered and further the study is carried out with the indexed records in web of science during the period of 1989 to 2014.

Data Collection

The publications of Universities are mostly in the form of articles in journals. The research papers abstracted and indexed in web of science database were taken as the primary source for the present study to identify the research performance of the universities.

Review of Literature

Raja and Balasubramani (2011) have analyzed plasmodium falciparum research publication in India measured from Histcite software and other tools. The results show that the growth of Indian literature in plasmodium faclicparum deposition and make the quantitative assessment of the research in terms of year-wise research output, geographical distribution, nature of collaboration, characteristics of highly productive institutions and the channel of communication used by the scientists.

Srinivasa Ragavan (2012) in his work was to analyze the scientometric parameters for Medicinal plant research publications. Investigator has compared the author productivity and citations by various institutions at national level. It could clearly see that during the period 1973-2009, a total 1265 publications were published at national level and the data has reflected in Web of Science database. This paper finds trend towards collaborative research is gaining momentum. As every work of researchers depends mainly on the library since it provides more scholarly information and hence these kinds of studies are more relevant in identifying thrust areas of research.

Dorairajan and Rosaline Mary (2015) this paper discussed about the scientometric Analysis of research productivity in Thiruvalluvar University during 1989-2014. It is noted that institutions were contributed 85 of the total research productivity. It is noted that Thiruvalluvar University contributed the highest number of research publication (83) at the same time at ranks first,

Global citation Score 446 only. Thiruvalluvar University collaborates with Anna university contributed only 13 research publication at the same time it ranks 9 Global citation Score and The lowest king Saud university contributed (3) at the same time it ranks Global citation score 5.

Dorairajan and Rosaline Mary (2015) this study aims to assess the publication productivity of the Universities in Tamil Nadu using Scientometric tools. The Web of Science database was used to retrieve relevant records. The performance of the most productive authors, institutions, most preferred type of documents, journals is assessed. The citation scores were used to rank the universities under study.

Analysis

In total 7251 articles, got indexed in Web of Science database during 1989-2014 from University of Madras, it is seen that 155 articles were published in 1989 and it is increasing gradually. During 2014 more number of articles was indexed in web of science that is 457 (6.30%) but in the year 2000 it was 189 records (2.60%) on an average there were 278 articles published per year.

The Relative Growth Rate of the publication productivity in the Madras University was 0.02 in the year 1990 and it was increased to 0.30 in the year 2000. But, it is reduced to 0.19 in the year 2010. The mean relative growth rate during the period 1989 to 1996 was 0.03. It is further increased to 0.110 between the periods 1997 to 2004. The steady growth of 0.241 in the period of 2005 to 2014 can be observed from the above analysis. With regard to Doubling Time of the productivity, it was 2.65 in the year 1990 and increased to 20.38 as the maximum in the year 1997. There is a slight change during 2007 (13.07) and 2013 (19.25) contrastingly, there is an increasing trend in the mean doubling time 5.213 in the year 1996 to 9.117 in the year 2004. Again, it is coming down 3.34 in the year 2014. It is inferred from the table that the research productivity in terms of relative growth rate and Doubling Time were in fluctuation.

During the period of study 1989-2014 web of science covers the papers published by 8477 authors from university of madras. Average number of author per article is 1.5. Among the authors it can be view that the Prof. D. Velmurugan with 387 records placed in first position contributed 5.3 percent of the articles while the author Prof. R. Raghunathan, who possesses the second position, contributed 291 records that is 4.0 percentages. The author Prof. VT Ramakrishnan with 10th rank contributed 104 articles during the study period that is 1.4 percent. It is clear from the analysis that Prof. D. Velmurugan received 552 local citations and 1429 global citations.

Out of 7251 articles published by University of Madras, 586 articles were published (8.1%) in Acta Crystallographica Section E-Structure as the most preferred journal.

Table 1: Year wise Distribution of research productivity in University of Madras

S. No.	Publication Year	Recs	Percent	TLCS	TGCS
1.	1989	155	2.1	151	887
2.	1990	159	2.2	169	1110
3.	1991	130	1.8	220	1272
4.	1992	156	2.2	203	1077
5.	1993	198	2.7	318	1663
6.	1994	179	2.5	257	1576
7.	1995	191	2.6	283	1612
8.	1996	202	2.8	429	1854
9.	1997	209	2.9	331	2007
10.	1998	226	3.1	426	2418
11.	1999	256	3.5	358	2244
12.	2000	189	2.6	354	2449
13.	2001	206	2.8	401	3445
14.	2002	223	3.1	267	2790
15.	2003	309	4.3	530	3796
16.	2004	280	3.9	476	3457
17.	2005	360	5.0	671	4738
18.	2006	447	6.2	558	6066
19.	2007	424	5.8	448	4592
20.	2008	397	5.5	490	4255
21.	2009	425	5.9	479	3583
22.	2010	351	4.8	294	3666
23.	2011	401	5.5	283	2286
24.	2012	354	4.9	202	1656
25.	2013	367	5.1	97	1209
26.	2014	457	6.3	35	599

Table 2: Relative growth rate and doubling time of the research output of University of Madras

S. No.	Year	No. of Recs	Loge 1 p	Loge 2 p	RGR	Mean	Dt	Mean
1.	1989	155	--	5.043	---	0.030	---	5.213
2.	1990	159	5.043	5.069	0.026		2.665	
3.	1991	130	5.069	4.868	0.201		3.448	
4.	1992	156	4.868	5.050	0.182		3.808	
5.	1993	198	5.050	5.288	0.238		2.912	
6.	1994	179	5.288	5.187	0.101		6.861	
7.	1995	191	5.187	5.252	0.065		10.661	
8.	1996	202	5.252	5.308	0.056		12.375	
9.	1997	209	5.308	5.342	0.034	0.110	20.382	9.117
10.	1998	226	5.342	5.421	0.079	8.772		
11.	1999	256	5.421	5.545	0.124	5.589		
12.	2000	189	5.545	5.242	0.303	2.287		
13.	2001	206	5.242	5.327	0.085	8.153		
14.	2002	223	5.327	5.407	0.080	8.663		
15.	2003	309	5.407	5.733	0.326	2.126		
16.	2004	280	5.733	5.635	0.098	7.071		
17.	2005	360	5.635	5.886	0.251	0.241	2.761	3.544
18.	2006	447	5.886	6.103	0.217		3.194	
19.	2007	424	6.103	6.050	0.053		13.076	
20.	2008	397	6.050	5.983	0.067		10.343	
21.	2009	425	5.983	6.052	0.069		10.043	
22.	2010	351	6.052	5.861	0.191		3.628	
23.	2011	401	5.861	5.994	0.133		5.211	
24.	2012	354	5.994	5.869	0.125		5.544	
25.	2013	367	5.869	5.905	0.036		19.25	
26.	2014	457	5.905	6.125	0.220		3.15	
Total		7251						

Table 3: Most Prolific Authors in University of Madras

Author	Recs	Percent	TLCS	TGCS
Velmurugan D	387	5.3	552	1429
Raghunathan R	291	4.0	756	2163
Ponnuswamy MN	229	3.2	155	927
Fun HK	178	2.5	352	814
Mohanakrishnan AK	164	2.3	382	846
Ravikumar K	155	2.1	182	357
Varalakshmi P	146	2.0	340	2233
Rajakumar P	130	1.8	307	757
Kandaswamy M	112	1.5	332	1585
Ramakrishnan VT	104	1.4	416	1235

Table 4: Journal-wise Distribution

Journal	Recs	Per-cent	TLCS	TLCS/T	TGCS	TGCS/T	TLCR
Acta Crystallographica Section E-Structure Reports Online	586	8.1	513	64.37	853	107.43	637
Acta Crystallographica Sec. C-Crystal Structure Communications	184	2.5	326	18.25	879	49.46	140
Current Science	124	1.7	77	4.50	638	46.41	72
Indian Journal of Animal Sciences	116	1.6	5	0.33	73	5.94	7
Tetrahedron Letters	105	1.4	399	54.62	1513	209.39	321
Molecular and Cellular Biochemistry	93	1.3	220	24.43	1383	164.53	210
Indian Veterinary Journal	90	1.2	2	0.14	39	2.37	2
Synthetic Communications	83	1.1	103	8.77	436	44.66	212
Medical Science Research	74	1.0	109	5.68	206	10.70	58
Chemico-Biological Interactions	65	0.9	128	16.10	1183	157.23	160

Table 5: Document wise Distribution

S. No.	Document Type	Recs	Percent	TLCS	TGCS
1.	Article	6488	89.5	8327	61488
2.	Meeting Abstract	199	2.7	0	25
3.	Note	167	2.3	155	709
4.	Article, Proceedings Paper	139	1.9	116	1180
5.	Letter	95	1.3	30	684
6.	Review	84	1.2	95	2144
7.	Editorial Material	31	0.4	2	57
8.	Correction	24	0.3	3	5
9.	Biographical-Item	8	0.1	0	7
10.	Book Review	7	0.1	0	0

It is found from the analysis that the major portions of the publications were in the form of articles i.e. 6488 (89.5%).

The analysis shows that 7251 papers were published in journals collaborated with the authors from 99 countries. The maximum of 4.3 percent of the articles were published in collaboration with United States of America (310 articles).

Table 6: Country wise Distribution

S. No.	Country	Recs	Percent	TLCS	TGCS
1.	India	7187	99.1	8646	65451
2.	USA	310	4.3	225	4762
3.	Malaysia	200	2.8	356	986
4.	Japan	143	2.0	99	2403
5.	South Korea	131	1.8	94	1231
6.	Germany	66	0.9	58	1330
7.	UK	54	0.7	42	2459
8.	France	51	0.7	49	943
9.	Canada	41	0.6	24	1031
10.	Mexico	34	0.5	44	472

Table 7: Institution wise Distribution

S. No.	Institution	Recs	Percent	TLCS	TGCS
1.	Anna University	487	6.7	349	3201
2.	Tamil Nadu Vet & Animal Science University	278	3.8	49	669
3.	University of Sains Malaysia	179	2.5	352	793
4.	Indian Institute of Chemical Technology	159	2.2	192	410
5.	Indian Institute of Science	125	1.7	137	1375
6.	Central Leather Research Institute	123	1.7	115	1213
7.	Indian Institute of Technology	122	1.7	89	1385
8.	Indira Gandhi Central Atomic Research	89	1.2	70	929
9.	SRM University	74	1.0	52	631
10.	Presidency College (Autonomous)	67	0.9	27	62

The publications made by the authors of University of Madras with other institutions were analyzed. It is inferred that 6.7 percent of the articles were published along with the Anna University by publishing 487 articles. Next to this 278 articles were published with Tamil Nadu Vet & Animal Science University (6.7%).

Table 8: Language wise Distribution

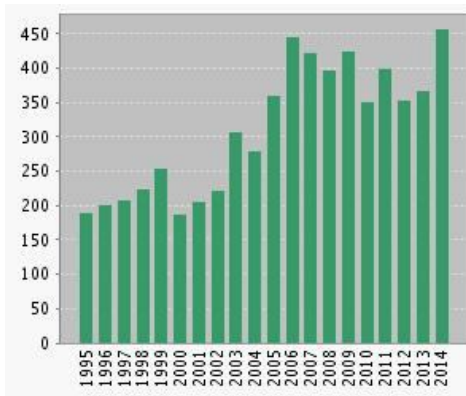
S. No.	Language	Recs	Percent	TLCS	TGCS
1.	English	7243	99.9	8729	66290
2.	German	4	0.1	1	4
3.	Spanish	2	0.0	0	10
4.	French	1	0.0	0	3
5.	Portuguese	1	0.0	0	0

It is observed that majority of the papers published (7423) were in English language i.e. 99.9 percent and very few papers were published in other languages such as German, Spain, French etc.

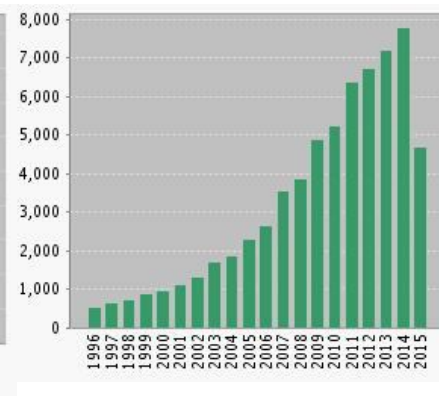
Citation Report of the University of Madras

This report reflects citations to source items indexed within Web of Science Core Collection. Perform a Cited Reference Search to include citations to items not indexed within Web of Science Core Collection.

Published Items in Each Year
The latest 20 years are displayed



Citations in Each Year
The latest 20 years are displayed



Results found	:	7251
Sum of the Times Cited	:	66306
Sum of Times Cited without self-citations	:	57264
Citing Articles	:	49990
Citing Articles without self-citations	:	46559
Average Citations per Item	:	9.14
h-index	:	75

From the citation report, it is found that the h-index of the research productivity in University of Madras is 75 with the sum of the times cited were 66306 and the articles cited were 49990. The average citation per item is 9.14.

Findings

- During 2014 more number of articles was indexed in web of science that is 457 (6.30%) but in the year 2000 it was 189 records (2.60%) on an average there were 278 articles published per year.
- It is inferred from the table that the research productivity in terms of relative growth rate and Doubling Time were in fluctuation.
- Among the authors it can be view that the Prof. D. Velmurugan with 387 records placed in first position contributed 5.3 percent of the articles while

the author Prof. R. Raghunathan, who possess the second position contributed 291 records that is 4.0 percentage

- It is found from the analysis that the major portions of the publications were in the form of articles i.e. 6488 (89.5%).
- The maximum of 4.3 percent of the articles were published in collaboration with United States of America (310 articles).
- From the citation report, it is found that the h-index of the research productivity in University of Madras is 75 with the sum of the times cited were 66306 and the articles cited were 49990. The average citation per item is 9.14.
- It is inferred that 6.7 percent of the articles were published along with the Anna University by publishing 487 articles. Next to this 278 articles were published with Tamil Nadu Vet & Animal Science University (6.7%).
- It is observed that majority of the papers published (7423) were in English language i.e. 99.9 percent and very few papers were published in other languages such as German, Spain, and French etc.

Conclusion

Nowadays, the publication productivity of an institution is given due importance while making the institution in the list of ranking them in the competitive world. In this regard this paper verified the research productivity of the University of Madras with the help of the indexed records in the database Web of Science. It is recommended to make necessary steps to motivate more number of faculty members to publish the articles in the peer reviewed international journals which are indexed in various databases such as Scopus, Social Science Citation indexes, Research Gate and Google Scholar etc to measure the impact factor and h-index etc.

References

1. Raja, S. and Balasubramani, R. (2011). Plasmodium falcipuram research publication in India: A Scientometric analysis, *Eur. J. Sci. Res.*, 56(3), 294-300.
2. Srinivasa Ragavan, S, Surulinathi, M and Neelakandan, B (2012). Indian Perspective of Medicinal Plant Research: A Scientometric Study, *Int. J. Pl. An and Env.Sci.*, 2(3), 195-203.
3. Dorairajan, M and Rosaline Mary, A (2015). Research Productivity of Thiruvalluvar University: A Scientometric Study, *IALA Journal*, 3(2), 59-62.
4. Dorairajan, M and Rosaline Mary, A. (2015). Publication Productivity in the Universities of Tamilnadu: A Scientometric analysis. *Int. J. multidiscip. Res. Rev.*, 1(10), 63-66.