

Scholarly Funded Research Projects And Its Publications & Citations Impact: A Study On State Universities Of Tamil Nadu

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Abstract

This study focuses on funded research projects and funded research publications. The faculty members research projects details data were collected from 8 State Universities such as Alagappa University, Annamalai University, Bharathiar University, Bharathidasan University, Madurai Kamaraj University, Manonmaniam Sundaranar University, Periyar University and University of Madras. The funding publication data taken from web of science database. The study aims to analyze the university wise research projects, funded and non funded publications, funding publication citations and h-index, top department and top faculty of individual institution. A new relative indicator called Relative Funding Index is introduced in this study. The study found that Annamalai University has received 614 (18.65%) research projects. It is further found that University Grants Commission has sponsored 741 research projects in state universities of Tamil Nadu and University Grants Commission and Department of Science and Technology funding publications are received highest citations. It is further found that Department of Marine Biology (Annamalai University) has received 181 research projects and Chandrasekaran, S (Centre for Rural Development, Annamalai University) has received highest (64) research projects.

Keywords: Funding research, Funding Research projects, Funding publications, Funding ratio, Relative Funding Index.

1. Introduction

Research Projects plays the important role in any higher learning institutions to evaluate the Institution research contributions. The term bibliometrics was first used by Alan Pritchard in 1969, with definition—the application of mathematics and statistical methods to books and other media of communication (Pritchard, 1969).^[1] The Research funding increases the research activities as

well as the productivity of researchers within the field and collaboration of other fields. Funding can be considered as a qualitative measure of research as competitive funding requires peer reviewing. The Research funding performance indicators are as follows: total research funding, number of project applications submitted and number of grants awarded. Based on these indicators, to describe the relations of research input to research outcome, combined and more efficient indicators can be used to success rate of project applications, funding per research staff, publications per funding and growth in research funding.^[2] The major funding agencies in India (Board of Research in Nuclear Sciences (BRNS)^[3], Council of Scientific & Industrial Research (CSIR)^[4], Defence Research & Development Organization (DRDO)^[5], Department of Biotechnology (DBT)^[6], Department of Electronics and Information Technology^[7], Indian Council of Agricultural Research (ICAR)^[8], Indian Council of Medical Research (ICMR)^[9], University Grants Commission (UGC)^[10], Department of Science and Technology (DST)^[11] and Indian Council of Social Science Research^[12], etc. Now-a-days Higher learning institutions are evaluated by the NAAC and NIRF for the quality and ranking based on the research contributions. Hence it is important to analyze the projects and funding by every year for the betterment of institution.

2. Review of Literature

Jeyapragash, B., Muthuraj, A., and Rajkumar, T (2019)^[13] described the analysis of Bharathidasan University Faculty Members Research Projects. The data were collected from Bharathidasan University Website (www.bdu.ac.in) during December 2018. The study found that 516 projects from 101 faculty members from science and social science departments. The study also found that Chemistry department has contributed more projects than other departments and University Grants Commission (UGC) has funded more projects than other funding agencies.

Jeyapragash, B., Muthuraj, A., and Rajkumar, T (2019)^[14] analyzed the research project contributions of Alagappa University. The data were collected from Alagappa University Website (<https://alagappauniversity.ac.in/>) during March 2019. The study found that 574 projects from 126 faculty members from Arts, Education, Management and Science departments. The study also found that Industrial Chemistry department has contributed more projects than other departments and University Grants Commission (UGC) has funded more projects than other funding agencies.

Ashkan Ebadi and Andrea Schiffauerova (2013)^[15] reviewed the papers that investigated the impact of funding on scientific output and on scientific collaboration. For the output, the focus is on the number of articles as a measure of the scientific productivity and the number of citations that a paper received as an indicator of the quality. Various methodological approaches have been adopted (e.g. bibliometrics, statistical analysis) for this purpose. Reviewing the literature revealed that although the general assumption of the positive effect of funding on scientific development is completely (or partially) acknowledged in some studies, one can also find some contradictory results. In addition, it noted that analysing the impact of funding on scientific output has attracted more attention of the researchers while investigating the impact of funding on collaboration has been only recently taken into consideration. The paper concluded by comparing the major results

and methodologies of the reviewed studies while highlighting the research gaps. **Wang Xianwen., Liu Di., Ding Kun and Wang Xinran (2012)**^[16] reported research on analyzing the impact of government funding on research output. 500,807 SCI papers published in 2009 in 10 countries are collected and analyzed. The results showed that, in China, 70.34% of SCI papers are supported by some research funding, among which 89.57% are supported by National Natural Science Foundation of China (NSFC). Average grants per funding-supported paper in China is 2.95, when in the USA the number is 2.93 and in Japan it is 2.40. The results of funding agency analysis showed that, China, Germany and Spain are single funding agency dominated countries, while USA, Japan, Canada and Australia are double funding agencies dominated countries, and the source of funding in UK, France and Italy is diversified. **Devare, Medha, Rikert, Jon Corson, McCue, Janet, Chiang, Kathy, Lowe, Brian, & Caruso, Brian (2007)**^[17] described the implementation of VIVO profile management system of life science communities. This helps to access for scholarly activity in the life sciences at Cornell – VIVO (<http://vivo.library.cornell.edu>) – transcends campus, college and department structure to provide Cornell faculty, students, and administrative and service officials, prospective faculty and students, external sponsors, and the public an integrated view of the life sciences at Cornell. It also provides the faculty profiles with affiliations to departments, fields, or research units, research projects, courses, seminars, and facilities relevant to life scientists regardless of the campus, college, or department in which the entity resides.

3. Research Methodology

The current faculty member's data were collected from websites of State Universities of Tamil Nadu. The Universities are Alagappa University^[18], Annamalai University^[19], Bharathiar University^[20], Bharathidasan University^[21], Madurai Kamaraj University^[22], Manonmaniam Sundaranar University^[23], Periyar University^[24] and University of Madras^[25]. It is found that 3292 faculty research projects by 856 faculty members (data as on 19th Oct 2021). The funding research publications and citations data taken from Web of Science Database.^[26] The following keywords were used in the combined fields of funding sponsor: “university grants commission*” AND “department of science and technology*” AND “department of biotechnology*” The search was carried out on Oct 2021 and restricted the results by articles, reviews and proceeding papers published during 1989-2021. The study is also aimed to analyze University wise research projects, top department & top faculty members of individual university and funding wise research publications & citations with funding ratio and relative funding index. The Data were analyzed using Excel and using simple calculations.

Funding publications:

Research publications that acknowledge research grant funding.

Funding Ratio (FR):

To calculate the funding ratio, the following formula given by Tan et.al^[27] is used.

FR = funded publications / total publications ×100%

$$FR = \frac{FP}{TP} \times 100\%$$

Where FP is the number of funded publications and TP is total number of publications for the calculating unit.

Relative Funding Index:

There is no indicator to compare the funding projects and funding publications. In this context, a new relative indicator called Relative Funding Index (RFI) is introduced in this study^[28].

RFI = funding projects / funding publications ×100%

RFI -1 indicating funding projects and RFI- 2 indicates funding publications. This indicator characterizes funding research productivity.

4. Objectives of the Study

The following are the major objectives of this study.

- To find out the University wise research projects of State Universities of Tamil Nadu.
- To identify the funded and non-funded publications.
- To investigate the funded publications of top three funding agencies in web of science.
- To measure the funded publication citations and h-index of top three funding agencies.
- To analyze the top department research projects of individual university.
- To identify the top faculty member research projects of individual university.

5. Data Analysis and Interpretation

5.1 University wise Research Projects of State Universities of Tamil Nadu

Table.1 University wise Research Projects of State Universities of Tamil Nadu

S. No	University	Short Name	Research Projects	% of 3292
1	Alagappa University	ALA U	574	17.43
2	Annamalai University	AU	614	18.65
3	Bharathidasan University	BDU	516	15.67
4	Bharathiar University	BU	321	9.76

5	Madurai Kamaraj University	MKU	302	9.19
6	Manonmaniam Sundaranar University	MSU	281	8.53
7	Periyar University	PU	259	7.86
8	University of Madras	UM	425	12.91
Total			3292	

Table 1 shows that University wise research projects of state universities of Tamil Nadu. The Annamalai University has received highest (614 and 18.65%) number of research projects and placed first rank and it is followed by Alagappa University has received 574 (17.43%) research projects and placed second rank. It is further found that Manonmaniam Sundaranar University has received only 259 (7.86%) research projects and placed last rank.

5.2 University wise funded and non-funded research publications

Table.2 University wise funded and non-funded research publications

S. No	University	Funded Publications	Non-Funded Publications	Total Publications	FR
1	Alagappa University	1855	1791	3646	50.87
2	Annamalai University	1989	5494	7483	26.58
3	Bharathidasan University	2487	3013	5500	45.21
4	Bharathiar University	2220	4337	6557	51.18
5	Madurai Kamaraj University	1873	2885	4758	64.92
6	Manonmaniam Sundaranar University	648	1053	1701	61.53
7	Periyar University	993	1713	2706	36.69
8	University of Madras	2409	7293	9702	24.82
Total		14474	27579	42053	34.41

Table 2 indicates that University wise funded and non-funded publications with funding ratio. Overall 34.41% of research publications were funded. The Madurai Kamaraj University has produced 64.92% funded research publications followed by Manonmaniam Sundaranar University has produced 61.53% funded publications. It is observed that 24.82% funded publications produced by University of Madras. It should be noted here that in Web of Science (WoS) 34.41% publications are funded and also focused funding research by state universities.

5.3 Funded Projects and Publications with Relative Funding Index (RFI)

Table.3 Funded Projects and research publications with Relative Funding Index (RFI)

S. No	University	Funding Projects	Funded Publications	RFI
1	Alagappa University	574	1855	30.94
2	Annamalai University	614	1989	30.86
3	Bharathidasan University	516	2487	20.74
4	Bharathiar University	321	2220	14.45
5	Madurai Kamaraj University	302	1873	16.12
6	Manonmaniam Sundaranar University	281	648	43.36
7	Periyar University	259	993	26.08
8	University of Madras	425	2409	17.64
	Total	3292	14474	22.74

The university funding projects and funding publications with relative funding index (RFI) is shown in Table 3. The Bharathidasan University has received 516 research projects and produced 2487 funded research publications with 20.74 RFI followed by University of Madras has received 425 research projects and produced 2409 funded research publication with 17.64 RFI. It is observed that Alagappa University and Annamalai University has produced average of funding publication with 30% of RFI.

5.4 Funding Agency wise University Research publications in Web of Science

Table.4 Funding Agency wise University Research publications in Web of Science

S. No	University	UGC			DST			DBT		
		Projects	Pub	%	Projects	Pub	%	Projects	Pub	%
1	Alagappa University	189	658	12.70	55	736	14.18	24	421	32.02
2	Annamalai University	-	720	13.89	-	532	10.25	-	102	7.76
3	Bharathidasan University	129	939	18.12	83	1133	21.83	53	241	18.33
4	Bharathiar University	70	643	12.41	46	720	13.87	14	76	5.78
5	Madurai Kamaraj University	101	863	16.65	42	720	13.87	34	223	16.96
6	Manonmaniam Sundaranar University	40	224	4.32	26	234	4.51	6	47	3.57
7	Periyar University	80	331	6.39	55	294	5.66	9	32	2.43
8	University of Madras	132	805	15.53	56	822	15.84	21	173	13.16

	Total	741	5183	100	363	5191	100	161	1315	100
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Table 4 indicates that university wise major fund research projects and funding publications. This table covers University Grants Commission (UGC), Department of Science and Technology (DST) and Department of Biotechnology (DBT). The University Grants Commission (UGC) funding has provided highest (189) research projects with 658 funded research publications in “Alagappa University”. The Department of Science and Technology (DST) has provided highest (83) research projects with 1133 funded publications in “Bharathidasan University”. It is further found that The Department of Biotechnology (DBT) has provided highest (53) research projects with 241 funding publications in “Bharathidasan University”.

5.5 Funding publications citations and h-index

Table.5 Funding publications citations and h-index

S. No	University	UGC			DST			DBT		
		Citations	%	H-Index	Citations	%	H-Index	Citations	%	H-Index
1	Alagappa University	10538	12.59	46	9280	11.14	44	8879	38.23	43
2	Annamalai University	11152	13.32	46	7390	8.87	40	2257	9.72	25
3	Bharathidasan University	14670	17.53	49	17662	21.20	57	3882	16.71	31
4	Bharathiar University	9360	11.18	46	11260	13.52	51	1008	4.34	17
5	Madurai Kamaraj University	19524	23.33	61	17663	21.20	62	3052	13.14	26
6	Manonmaniam Sundaranar University	2159	2.58	23	3418	4.10	28	1266	5.45	13
7	Periyar University	5068	6.06	35	5026	6.03	38	547	2.36	14
8	University of Madras	11227	13.41	44	11605	13.93	47	2336	10.06	27
	Total	83698	100		83304	100		23227	100	

Table 5 indicates that university wise funding publications citation and h-index. The Madurai Kamaraj University has received highest (19254 and 23.33%) citations with 61 h-index of UGC sponsored publications. It is found that Manonmaniam Sundaranar University has received lowest (2159 and 2.58%) citations with 23 h-index of UGC sponsored publications. It is

observed that Annamalai University, Alagappa University and Bharathiar University has received 46 h-index of UGC funding publications. The Bharathidasan University and Madurai Kamaraj University has received highest (17662 & 17663 and 21.20%) funding publication citations with 57 and 62 h-index. The Manonmaniam Sundaranar University has received lowest (3418 and 4.10%) publication citations with 28 h-index of DST funded. It is found that Alagappa University has received highest (8879 and 38.23%) citations with 43 h-index of DBT funding publications. The Periyar University has received lowest (547 and 2.36%) publication citations with 14 h-index of DBT funded.

5.6 Top department of individual university

Table.6 Top department of individual university

S. No	Department	Short Name	Research Projects	% of 3292
1	Department of Industrial Chemistry	ALA U	54	1.64
2	Department of Marine Biology	AU	181	5.49
3	Department of Chemistry	BDU	58	1.76
4	Department of Physics	BU	47	1.42
5	Department of Molecular Microbiology	MKU	19	0.57
6	Department of Biotechnology	MSU	24	0.72
7	Department of Chemistry	PU	45	1.36
8	Department of Inorganic Chemistry	UM	29	0.88
Total			3292	

Table 6 indicates that top department of individual university. It is found that Department of Marine Biology (Annamalai University) has received highest number of (181 and 5.49%) research projects and placed first place followed by Department of Chemistry (Bharathidasan University) has received 58 (1.76%) research projects and have placed second place. It is further found that Department of Molecular Microbiology (Madurai Kamaraj University) has received less number of (19 and 0.57%) research projects have placed eighth place.

5.7 Top faculty member of individual University

Table.7 Top faculty member of individual university

S. No	Faculty and Department	Short Name	Research Projects	% of 3292
1	Murugan, K. R (Sociology)	ALA U	45	1.37
2	Chandrasekaran, S (Centre for Rural Development)	AU	64	1.94

3	Palaniandavar, M (Chemistry)	BDU	18	0.55
4	Sathishkumar, R (Biotechnology)	BU	12	0.36
5	Muthuchelian, K (Bioenergy)	MKU	17	0.52
6	Murgesan, A.G (Environmental Science)	MSU	36	1.09
7	Perumal, P (Biotechnology)	PU	20	0.61
8	Sumathi, S (Anthropology)	UM	22	0.67
Total			3292	

Table 7 shows that top faculty member of individual University. Chandrasekaran, S (Centre for Rural Development, Annamalai University) has received highest (64 and 1.94%) research projects and placed first position and it is followed by Murugan, K. R (Department of Sociology, Alagappa University) has received 45 (1.37%) research projects and have placed second position. It is further found that Sathishkumar, R (Department of Biotechnology, Bharathiar University) has received least number of (12 and 0.36%) research projects and placed last position.

6. Results and Discussions

- Annamalai University has received 614 research projects but the research project details are not available in individual faculty profiles. Hence the study recommends to update the research project details in the faculty profiles for the better visibility.
- Periyar University and Manonmaniam Sundaranar University has received less number of research projects.
- Bharathidasan University and University of Madras has published 2400 above funding publications.
- Alagappa University has received highest number of (189) research projects from University Grants Commission.
- Bharathidasan University has received highest number of (83) research projects from Department of Science and Technology and 53 projects from Department of Biotechnology.
- Bharathidasan University has received highest number of (83) research projects from Department of Science and Technology and 53 projects from Department of Biotechnology.
- Bharathidasan University has received highest number of (14670) funding publication citations from University Grants Commission and 17662 citations from Department of Science and Technology.
- The State Universities of Tamil Nadu has received majority of the funding from University Grants Commission, Department of Science and Technology, Department of

Biotechnology, Indian Council of Medical Research and Indian Council of Social Science Research.

- The state universities should apply other funding agencies like DAE, MoES, NCNSNT, SCERT, MSJE, SERB, UWPFE, WNRF, Malcolm & Elizabeth Adishesiah Trust, European Molecular Biology Organisation, NBHM, Indo-French, UKIERI and UNICEF, etc.

7. Conclusion

Research projects are most important in any university or institution to show their strength to the outside world. Hence faculty members of the institution or university to update their research contributions as research papers, projects, awards and honors, patents, etc.. in their website on regular basis. This paper recommends Annamalai University has update their website and Periyar University has concentrate get more funding. These leads to the institution to get more visibility, collaboration and funding.

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