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**A Bibliometric Analysis of the Research  
Publications: A Case Study of Arts & Science  
Institutions in Sivakasi**

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**Abstract**

*This current study attempts to find the research contributions of arts and science colleges in Sivakasi area. The data were retrieved from web of science database from the period of 1999 to 2018 and data were analyzed with the help of bibliometric analysis. The study further attempts to examine year wise publication, document wise distribution of the research papers, productivity of authors and the number of faculty members who collaborated with international researchers. This study concludes with the finding that rural area institutes are trying to compete with top ranked institutes in terms of research output with minimum available resources*

**Keywords**

*bibliometrics study, bibliometric, research publications, arts & science colleges, arts and science colleges, sivakasi, case study.*

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## INTRODUCTION

Bibliometric analysis is an evaluation tool for research contributions of scientific community. Russell & Russell defines the “bibliometric analysis of scientific activity is based on the assumption that carrying out research and communicating the results go hand in hand”. Mishra, V.K., (2015) concluded that, “the bibliometric study is a powerful tool and methodology for finding the ranking and reputation of the institutes in terms of their academic and research output”.

The purpose of this study is to analyze the growth and development of research publications in rural area institutions by using the techniques of bibliometric analysis. Through bibliometric study the scientific outputs are measured in various parameters viz. *distribution of publications year wise, Document Wise, Research Area Wise, Organizational Enhanced, Author wise, Source Title Wise, and Country Wise etc.* with the help of web of science database. In this study attempt to analysis the research contributions of three arts and science colleges in sivakasi town. These colleges are one of the best intellectual centers of Virudhunagar district.

## ABOUT SIVAKASI

Sivakasi is a city in Virudhunagar District in the Indian state of Tamil Nadu. This city is known for its firecracker, matchbox and printing industries. The Sivakasi was the most backward region in Tamilnadu before 2000. The illiterate ratio is very high. After 2000, this region is equally performing in higher education compared with nearby regions. According to 2011 censuses, there were five government schools: two primary schools, one middle school, one high school, one higher secondary school. There are ten other private schools in the town. There are two ranked engineering colleges, three arts and science colleges and three polytechnic colleges in the town. The research has selected only three Arts and Science College in Sivakasi town.

## OBJECTIVE OF THIS STUDY

- To find out year-wise distribution of the publication
- To examine the forms of publication
- To examine the research area of publications
- To examine the collaborative institutes and countries

## REVIEW OF LITERATURE

Radhakrishnan., & Velmurugan (2015) have analyzed the Periyar University faculty members publications from 1998 to 2014. The study found that the university provided necessary facilities to enhance its research possibility towards knowledge production. Hadiman, N., Mulka, K.R., & Kumar, N.S. (2015) revealed that IISER- TVM has published 157 scholarly research publication in the field of science and technology for the period 2008-2013. The annual growth rate is an average 11% and average citation per paper is 13.58. Moreover, the study found that, authors are collaborate with foreign authors from the USA, Germany, England and Italy. Nagarkar, S., Veer, C., & Kumbhar, R. (2015) attempted to quantitative analysis of papers published by faculty members of life science department of SPPU. The study found that the faculty members are very active in research in their core domain. Sivakumaran, K.S., Swaminathan, S., & Karthikeyan, G. (2012) the result of this study, most of the researches are popular to publish their research publications in the form of journal articles.

**METHODOLOGY**

Data were retrieved from the web of science database by searching the keyword of “Sivakasi” as address. This data base is one of the leading comprehensive citation database in the world. The analysis is based on the research output of faculty members of three arts and science colleges in sivakasi town. The time span was set from 1998 to 2018 as covered in the web of science database. The research used Abbreviations for the colleges’ names as AJ College - Ayya Nadar Janaki Ammal College, SFRC - Standard Fireworks Rajaratnam College for Women and Sri Kaliswari - Sri Kaliswari College (Autonomous), Sivakasi.

**ANALYSIS AND DISCUSSION**

**Distribution of Publications by Year Wise**

The data were collected from the period of 1998-2018. As shown in the above table 1 the AJ College published 177 research publications during our study period. In the year 2017, maximum number of 27 research papers were published. Followed by 2016, 21 publications and 2010, 15 publications. After 2010, the publication rates is reduced but over all publication rate is gradually increasing.

Year	AJ College	SFRC	Sri Kaliswari
1998	1	1	0
1999	2	0	0
2000	4	1	0
2001	8	0	0
2002	6	2	0
2003	8	0	0
2004	5	1	2
2005	4	0	2
2006	2	0	0
2007	4	1	0
2008	7	0	0
2009	8	0	2
2010	15	4	3
2011	6	0	2
2012	11	1	0
2013	10	10	1
2014	13	0	0
2015	12	8	0
2016	21	6	0
2017	27	9	0
2018	3	0	0

In SFRC college, the maximum number of publications was in the year 2013 (10 publications) followed by 2017, 9 publications. After 2012, the publication rate is gradually increasing. Sri Kaliswari College, has only 12 publications and the maximum number publication 3 is published in the year 2010 followed by the year 2009. After that the institute publication rate is very poor and low.

**Distribution of publications by Document Wise**

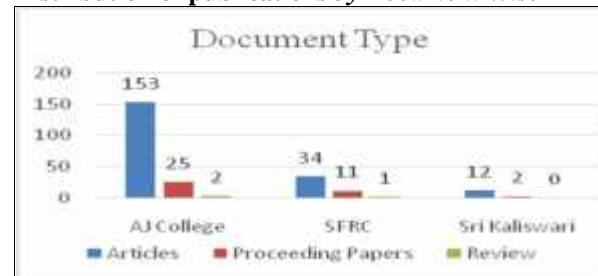


Figure 1: Distribution of publications by Document Wise

Table 1: Distribution of Year Wise Publications

Most of the publications were published in the form of Articles (AJ College, 85 %; SFRC: 74 % ; Sri Kaliswari College: 86 %) followed by the publications were published in Proceeding papers (AJ College: 13 %, SFRC: 24 % Sri Kalishwari College: 14 %). It is further to found that 1.1% & 2.17 % of publications of AJ College and SFRC college

publications are published in the form of Review and there is no publications from Sri Kaliswari College in the form of Review category.

**Distribution of Publications by Research Area Wise**

**Table 2:** Distribution of Publications by Research Area Wise

AJ College		SFRC		Sri Kaliswari	
Engineering	32	Chemistry	20	Pharmacology Pharmacy	6
Chemistry	28	Physics	18	Biotechnology Applied Microbiology	2
Mathematics	25	Electrochemistry	7	Plant Sciences	2
Computer Science	21	Material Science	7	Agriculture	1
Material Science	18	Polymer Science	7	Astronomy Astrophysics	1
Polymer Science	17	Computer Science	4	Computer Science	1
Crystallography	14	Mathematics	3	Energy Fuels	1
Environmental Science Ecology	13	Biochemistry Molecular biology	1	Infectious Diseases	1
Physics	13	Cell Biology	1	Integrative Complementary Medicine	1
Water Resources	10	Crystallography	1	Materials Science	1

The table 2 reveals the subject wise distribution of publications. In AJ College, 32 articles were published in the research area of engineering followed by the subject of chemistry with 28 publications, mathematics with 25 publications and computer science with 21 publications. Material science (18 publications), Polymer science (17 publications), crystallography (14 publications) environmental science ecology (13 publications) and water resources (10 publications) respectively. SFR College, 20 articles were published in chemistry stream and physics with 18 publications. Followed by each 7 articles have been published in

electrochemistry, material science and polymer science respectively.

Sri Kaliswari College has published more articles with Pharmacology Pharmacy (6 publications) and Biotechnology, applied microbiology and plant sciences each two publications, each one publications in Agriculture, astronomy, astrophysics, computer science, energy fuels, infectious diseases, integrative complementary medicine, materials science respectively.

**Distribution of publications by Organizational Enhanced**

**Table 3:** Distribution of publications by Organizational Enhanced

AJ College		SFRC		Sri Kalishwari	
Ayya Nadar Janaki Ammal College	177	Stand Fireworks Rajaratnam College for Women	44	Sri Kaliswari College	12
Madhurai Kmaraj Univesity	22	Materials Research Center, Coimbatore	18	Bharathiar University	5
Bharathidasan University	19	Bharathiar University	11	Manonmaniam Sundaranar University	4
Kamaraj Coll Engn Technol	15	Kalasalingam Univ	7	Ponnaiyah Ramajayam Coll	2
Thiagarajar College Of Engineering	15	Madurai Kamaraj University	6	Vhnsn Coll	2
Bharathiar University	9	Vellore Institute Of Technology	6	Gandhigram Rural Inst Deemed Univ	1
Mepco Schlenk Engn Coll	7	Alagappa University	5	Govt Arts Coll	1
National Taiwan University	7	Madras Christian College	4	Mvj Coll Engn	1
KCET	6	KCET	4	Prathyush Inst Technol Management	1
Annamalai Unviersity	5	National Taiwan University	3	Suganthi Devadason Marine Res Inst	1

The above *table 3* shows that productivity of authors' publications with collaborative institutes. The study found that the AJ College, 22 publications are collaborated with Madurai Kamaraj University, Madurai and 19 publications collaborated with Bharathidasan University, Trichy. Each 15 publications were collaborated with Kamaraj College of Engineering and Thiagarajar College of Engineering, Madurai. 9 publications collaborated with Bharathiyar University, Coimbatore, 7 with Mepco Schlenk Engineering College, Sivakasi and National Taiwan University and 6 with Kumara Guru College of Technology, Coimbatore and 5 with Annamalai University, Chidambaram. SFR College, 18 publications have collaborated with Materials Research Center, Coimbatore AND 11 with Bharathiyar University, Coimbatore. 7 publications were published with Kalasalingam University, 6 with

Madurai Kamaraj University, Madurai and Vellore Institute of Technology, Vellore. Followed by 4 with Madras Christian College, Chennai & Kumara Guru College of Technology, Coimbatore and 3 with National Taiwan University.

Sri Kaliswari College, 5 articles were collaborated with Bharathiyar University, Coimbatore and 4 with Manonmaniam Sundaranar University, Thirunelveli. 2 articles have collaborated with Ponnaiyah Ramajayam College and VHNSN College. Each one publication has collaborated with the following institutes viz. Gandhigram Rural Institute of Deemed University, Dhindugal, Government Arts College, MVJ college of Engineering, Prathyush Institute Technol Management, Suganthi Devadason Marine Res Inst.

#### **Distribution of publications by Authors**

**Table 4:** Distribution of publications by Authors

<b>AJ College</b>		<b>SFRC</b>		<b>Sri Kaliswari</b>	
Alagar M	19	Selvasekarapandian S	18	Lakshmanaperumalsamy P	4
Kannan N	19	Vijaya N	11	Ramesh N	4
Kathiresan Km	17	Karthikeyan S	10	Viswanathan Mb	4
Sundaresan B	17	Premalatha M	7	Dhasarathan P	2
Natarajan S	15	Genova Fkm	6	Paul Jaj	2
Krishnakumar Rv	14	Sanjeeviraja C	5	Venkatesan M	2
Archunan G	13	Selvalakshmi S	5	Ahilan A	1
Nandhini Ms	10	Mathavan T	4	Ashokraja C	1
Rajagopal T	10	Monisha S	4	Chordia Ma	1
Sivasamy P	10	Muthusubramanian S	4	Daniel T	1

The above *Table 4* analyzed the institution wise authors' contribution on research publications. It reveals that, the list of most productive authors based on their number of contributions based on web of science index.

Alagar and Kannan N. are the most productive author in AJ college followed by Kathiresan, K.M. Sundaresan B, Nadarajan S (15), Krishnakumar (14) and Archana G. (13). Remaining authors have contributed equally.

Selvasekara pandian S (18) is most productive author in SFR College followed by Vijaya N. (11) and Karthikeyan S (10) publications. followed by Premalatha M. (7), Genova FKM (6), Sanjeeviraja

and Selvalakshmi S (5). Remaining authors have contributed equally.

#### **Distribution of publications by Source Title Wise**

The above *Table 5* presents the analyzed institute faculty and researchers source title with their number of publications during our study period. It is found that, AJ College has published 11 publications with 2016 International Conference on Computing Technologies and Intelligent Data Engineering followed by 10 publications with ACTA Crystallographic Section E Structure Reports Online..

**Table 5:** Distribution of publications by Source Title Wise

AJ College		SFR College		Sri Kaliswari	
2016 International Conference on Computing Technologies and Intelligent Data Engineering Ictide 16	11	IONICS	7	Medicinal Chemistry Research	2
Acta Crystallographic Section E Structure Reports Online	10	Journal Of Applied Polymer Science	5	African Journal of Pharmacy and Pharmacology	2
ARS Combinatorial	5	Solid State Ionics Ionics for Sustainable World	4	Bioresource Technology	1
Journal of Materials Science Materials in Electronics	5	AIP Conference Proceedings	3	Digest Journal of Nano materials and Bio structures	1
Utilitas Mathematica	5	Journal of The Indian Chemical Society	3	Indian Journal of Microbiology	1
ACTA Crystallographic Section E Crystallographic Communications	4	ARS Combinatorial	2	Japanese Journal of Infectious Diseases	1
Applied Water Science	4	Dae Solid State Physics Symposium 2015	2	Journal of Ethno pharmacology	1
Discussiones Mathematicae Graph Theory	4	61 <sup>st</sup> Dae Solid State Physics Symposium	1	Journal of Medicinal Plants Research	1
Desalination and Water Treatment	3	Acta Crystallographica Section E Structure Reports Online	1	Neurocomputing	1
Indian Journal of Pure Applied Mathematics	3	Advanced Powder Technology	1	Pharmaceutical Biology	1

**Table 6:** Distribution of Publications by Country Wise

Country	AJ College	SFRC	SriKaliswari
India	177	44	12
Taiwan	7	3	
Austria	4	1	
Norway	3		
China	2		
South Korea	2		
USA	2		
Australia	1		
Canada	1		
Englad	1		
Fiji	1		
France	1		
Japan	1	4	
Mexico	1		
Qatar	1		
Singapore	1		
Slovakia	1		
Switzerland	1		

It is further found that 5 article are published with Ars Combinatoria, Journal Of Materials Science Materials in Electronics and Utilitas Mathematica Each 4 and 3 publications have published with Acta Crystallographica Section E Crystallographic Communications, Applied Water Science, Discussiones Mathematicae Graph Theory, Desalination and Water Treatment and Indian Journal of Pure Applied Mathematics. SFR College has published 7 publications with IONICS and 5 publications with Journal Of Applied Polymer Science. Equally the research publications are published with AIP Conference Proceedings, Journal of the Indian Chemical Society, Ars Combinatoria, Dae Solid State Physics Symposium 2015, 61<sup>st</sup> DAE Solid State Physics Symposium, ACTA Crystallographica Section E Structure Reports Online and Advanced Powder Technology. Sri Kaliswari College published all the each 2 publications with Medicinal Chemistry Research and African Journal of Pharmacy and Pharmacology. Each publication has published with Bioresource Technology, Digest Journal of Nanomaterials and Biostructures, Indian Journal of Microbiology.

**Distribution of Publications by Country Wise**

In geographical distribution analysis, in AJ College out of 177 publications, 50 publications were collaborated with foreign countries. 7 articles were collaborated with Taiwan, 4 authors from Austria, 3 authors from Norway, China South Korea and USA

have each two authors. Each one author from Australia, Canada, England, Fiji, France, Japan, Mexico, Qatar, Singapore, Slovakia and Switzerland respectively.

SFR Colleges has collaborated with only three countries. Four from Japan, 3 from Taiwan and 1 from Austria. Sri Kaliswari College has no collaboration with any foreign authors.

#### **KEY FINDINGS**

- Ayyanadar Janaki Ammal College has started the first publication in the year 1998. After that their publication growth is gradually increasing and last two years their publications are more than twenty research articles. It's helped this institute to top ranked with last year NIRF ranking.
- SFR College contribution is moderate and Sri Kaliswari College publications are very minimum. Compared to Ayyanadar Janajaki Ammal College, these two colleges need to concentrate more on research output.
- In research area, Sri Kaliswari College is research area is entirely different from other two colleges.
- In prolific authors, the SFR college in-house faculty member's contribution is very low.
- Geographical distribution wise, the Ayyanadar Janakai Ammal College collaborated with 17 countries. SFR college has collaborated with 3 countries only. Sri Kaliswari College has no collaboration with other countries.

#### **CONCLUSION**

The study focused on the research publications of the faculty members of three arts and science colleges from Sivakasi area between 1998-2018. The present study found that, Ayyanadar Janaki Ammal College has published 177 research publications with an average of 12.01% citation per paper, sum of time cited 2,126, citing articles 1,999 and h index is 9. SFR College has published 44 research publications with an average 4.64% citation per paper, sum of time cited with 204, citing articles 182 and h-index is 9. Sri Kaliswari College has published total 12 publications with 8.25 average citation per item, sum of time cited 99, citing articles 98 and h-index is 7. Compare to Ayyanadar Janaki Ammal College the other two institution's publications rate is very low. After 2009, SFR College publication growth rate has marginally increased. This study reveals that research collaborative institutions, the Taiwan is top ranked with Ayyanadar Nadar College and SFRC in geographical distribution wise. This study observed

that, Sivakasi is the rural part of Tamilnadu and these institutions are trying to compete with top ranked institutes in the country. However, last year in NIRF ranking, the Ayyanadar Janaki Ammal College became the top 10 ranked institute at the national level. The study concludes that, if the college administrations will encourage and support for research, the faculty members will be interested to involve in research and the research productivity growth will be at par with other central/state funded institutes.

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