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Bibliometric Analysis of Publication Trends in Sri Ramakrishna Mission Vidyalaya College of Arts and Science (SRMVCAS)

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Abstract:

The present study examines the Bibliometric Analysis of Publication Trends in Sri Ramakrishna Mission Vidyalaya College of Arts and Science (SRMVCAS) during 2001-2020 using the Scopus database. Its goal is to look at how SRMVCAS's research activity has grown and developed as evidenced by its publication output. A total of 740 records have been obtained and studied in accordance with the goals. During the study period, more articles published in 2017 and 2020 with 83 (11.22%) articles and the highest number of papers published in Optik journal (59) and ranked first. Researchers are interested in joint authorship rather than solo authorship pattern. Chandrasekaran, J. is the most prolific author with 168 records (h-Index=21) and the United States is the top collaborative country with 25 (3.38%) records and Bharathiar University is the top collaborative organisation with 67 records and ranked first and 704 records are published in the form of article type.

Keywords: SRMVCAS, Bibliometrics, Authorship Pattern, Highly Cited Papers, Bradford's Law

1. Introduction

Sri Ramakrishna Mission Vidyalaya College of Arts and Science (SRMVCAS) was started in 1964 with the blessings of Srimat Swami Madhavananda Maharaj and has completed 56 years of purposeful service to the student community and society. The college follows the great ideals placed before the country by Sri Ramakrishna, Swami Vivekananda, and Mahatma Gandhi. The institution believes that the greatness of a man is to be judged by his attitude, outlook, and devotion rather than by the work he does. The College was Re-accredited by NAAC with 'A' grade in the year 2016. It was conferred with autonomous status in the year 1981 and it was extended for a period of five years (2018-19 to 2022-23). The College offered 17 UG programmes and 6 PG programmes and one PG Diploma Programme. The College has so far produced 464 M.Phil and 160 Ph.D Scholars. SRMVCAS has secured 65th place in the National Institutional Ranking Framework (NIRF) of MHRD assessment under College Level for the year 2020. The "Deen Dayal Upadhyay Centres for Knowledge Acquisition and Up-gradation of Skilled Human Abilities and Livelihood (DDU-KAUSHAL CENTRE)" (to offer Vocational Courses) was started in 2015 with the help of UGC sanctioned funds. The aim of this initiative is to make students' independent, meet their own demands, excel in their chosen career and prosper in their lives through the "Earn While you learn" system. This scheme has a great impact on society as it creates skilled human resource by providing working experience and hands-on training in the industry which is, unfortunately, a neglected factor in our conventional education system. The Incubation Centre of the College started in association with Quzera Web Technologies Pvt. Ltd.

A number of studies have been published before that show the research output of different institutions/universities around the world as reflected in international databases like Scopus and Web of Science. The purpose of this study is to look at how SRMVCAS research productivity has developed and grown as evidenced by the number of publications it has produced.

2. Literature Review

The literature survey reveals that research productivity analysis is not a new research area and quite a few studies have been done by researchers for individual institutions and for the specific subject areas. Numerous surveys have been conducted by researchers in various subjects to

measure the research output of institutions - quantitative and qualitative. Many bibliometric analyses have also been undertaken for measuring individual research institutes. Bibliometric studies are generally conducted to find out the contribution of researchers in various institutions and subjects.

Amir Latif and Ikram UI Haq (2020) evaluated the research productivity of Shifa Tameer-e-Millat University (STMU) from 2012 to 2018. Data was collected from online resources (Medline/PubMed, Scopus, Google Scholar, and Web of Science) and Bibliometric analysis was used to find out the number of publications, research collaboration, authorship pattern, and the most frequently used journals. 231 documents were published by 1202 authors during the study period. It was found that a minimum (3-publications) was produced in 2012 and a maximum (66-publications) were produced in 2018. Most of the research was conducted on Pharmacology (31) followed by medical education (30) and medicine (23).

Manoj Kumar Verma, Saumen Das, and Manoj Kumar Sinha (2019) conducted a study on the research productivity of the Department of Computer Science, Assam University from 2010 to 2016. Data was collected from Scopus Database. It was found that Computer Science Department has published 154 papers during the study period. 45 papers were published in 2016 which is the highest publication and 5 papers were published in 2012 which is the lowest among all the years of study. The highest average citation per paper was in 2012 (3-citations/paper).

Kalimuthu, Jayabal, and Baby (2018) analysed the publication productivity of Bharathiar University, Tamil Nadu. It was found that 4265 publications on Bharathiar University indexed and cited in the Scopus Database during 2006 – 2016. The highest number of publications (814, 19.09%) was published in 2016. The authorship and collaboration trend is towards multi-authored. Degree of collaboration (0.99), Collaborative Index may vary every year. The majority of the research output has published in journals. Researchers preferred to publish in the International Journal of Applied Engineering Research journal. The data does not fit into Bradford's law regarding the core journals.

Siwach and Parmar (2018) conducted research contributions by CCS Haryana Agricultural University, Hisar during 2001-2015 with the help of the Scopus database. Out of 2649 articles, the Agricultural and Biological Sciences subject was dominating subject with 2038 publications.

College of Veterinary Science was the highest collaborative institution with 141 articles and the top ten collaborative institutions are from India. Annals of Biology 325 was the most preferred journal and N. Khetarpaul Department of Food and Nutrition with 63 publications was the most prolific author during the study period. 97.17 percent publication was with two or more than two authored articles. Three authors' collaboration dominated and the collaboration coefficient was calculated to be 0.668.

Das and Maharana (2016) in their paper research productivity of Sikkha 'O' Anusandhan University (SOAU) during 2009- 2013: A Bibliometric Analysis, analysed that the university's annual distribution of publication ranges between 8-146 papers with an average of annual publication of 89-90 papers per year. Out of 459 papers, only 12 papers have been contributed by a single author which causes a high degree of collaboration i.e. 0.97.

Baskaran (2013) analysed a bibliometric study on the research productivity of Alagappa University from 1999-2011 based on the Web of Science database. It found that Multi-authored articles were more which is 750 (96.64 %) and single-authored papers were only 26 (3.35 %) from a total of 776 published articles. The Degree of collaboration was fluctuating from 0.92 to 0.98 and the mean observed 0.96. South Korea was the most collaborative country with 7.61 percent of articles from total research output. Central Electrochemical Research Institute was the dominating institution with 129 (16.62 %) publications and Material Science with 172 (22.26 %) articles was the most dominating subject in the study.

Baby and Kumaravel (2012) conducted a bibliometric analysis of Periyar University faculties' research productivity from 1998 to 2010. Data were retrieved from Scopus Database. The analysis shows that 322 research papers were published during the study period. It was found that the publication trend during 1998-2010 is fluctuating. The year 2010 was most productive with 102 publications followed by 2009 (73) and 1998 was the least productive with only one publication. Most of the research work is published in Journals.

3. Methodology

This study is based on the articles published by the academic staff of Sri Ramakrishna Mission's College of Arts and Science, Bharathiar University, Tamil Nadu within the period of twenty (20) years from 2001-2020. The data were collected from the Scopus database. Data collected were analyzed and presented using tables and graphs for interpretation.

4. Statement of the Problem

Academic staff members in any university/institution all over the world are expected to carry out research as well as communicating the research findings in reputable publishing outlets. This is because research productivity has become crucial in determining academic staff promotion, appointment, career advancement as well as the rating of the university/institution. Studies have shown that bibliometric analysis has not been carried out on academic staff research output in Sri Ramakrishna Mission's College of Arts and Science. It is, therefore, imperative to carry out the bibliometric analysis of academic staff research productivity in Sri Ramakrishna Mission's College of Arts and Science, Bharathiar University, Tamil Nadu in order to determine their research pattern and productivity.

5. Analysis and Interpretations

5.1 Year wise Distribution of Publications of SRMVCAS

Year-wise distribution of publications is an important indicator of the publication productivity of an institution. Table-1 portrays research trends of Sri Ramakrishna Mission Vidyalaya College of Arts and Science (SRMVCAS) for a period of 20 years ranging from 2001 to 2020.

Table 1 Year wise Distribution of Publications and Annual Growth Rate

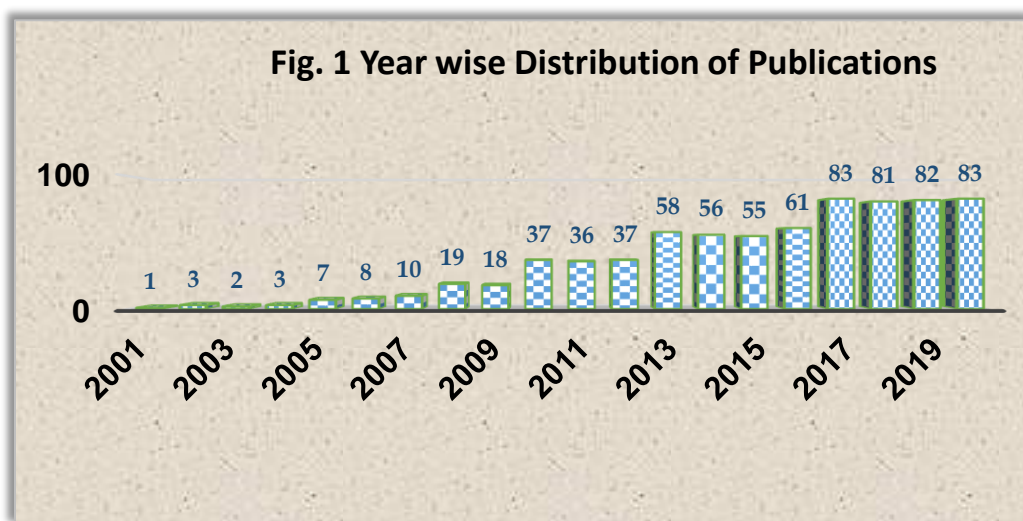
Year wise Distribution of Publications				
Sl. No.	Year	Records	% of Records	AGR
1	2001	1	0.14	
2	2002	3	0.41	2.00
3	2003	2	0.27	-0.33
4	2004	3	0.41	0.50
5	2005	7	0.95	1.33
6	2006	8	1.08	0.14
7	2007	10	1.35	0.25
8	2008	19	2.57	0.90
9	2009	18	2.43	-0.05
10	2010	37	5.00	1.06
11	2011	36	4.86	-0.03
12	2012	37	5.00	0.03
13	2013	58	7.84	0.57

14	2014	56	7.57	-0.03
15	2015	55	7.43	-0.02
16	2016	61	8.24	0.11
17	2017	83	11.22	0.36
18	2018	81	10.95	-0.02
19	2019	82	11.08	0.01
20	2020	83	11.22	0.01
Total		740	100	0.36(mean)

As indicated in the table 1 and Fig.1, SRMVCAS faculties have contributed 740 publications in different scholarly journals during the study period. The above table shows that there is a significant increase in publication started from 2001 with one publication and 2017 and 2020 is the most productive year with 83 (11.22%) publications followed by 2019 and 2018 with 82 (11.08%) and 81 (10.95%) publications respectively. However, there was a gradual growth of publications during the study period. Further, the growth rate is a measurement which is essential in any field. In meaning the growth of the number of publications in a particular discipline, this is often a measure of the annual increase or decrease. Here, the AGR has been determined as per the formula given below.

$$AGR = \frac{End\ Value - First\ Value}{First\ Value} \times 100$$

Table 1 shows the highest average growth rate (2.00%) in the year 2002 and a highest negative growth rate (-0.33%) in the year 2003. The annual average growth rate is (0.36%).

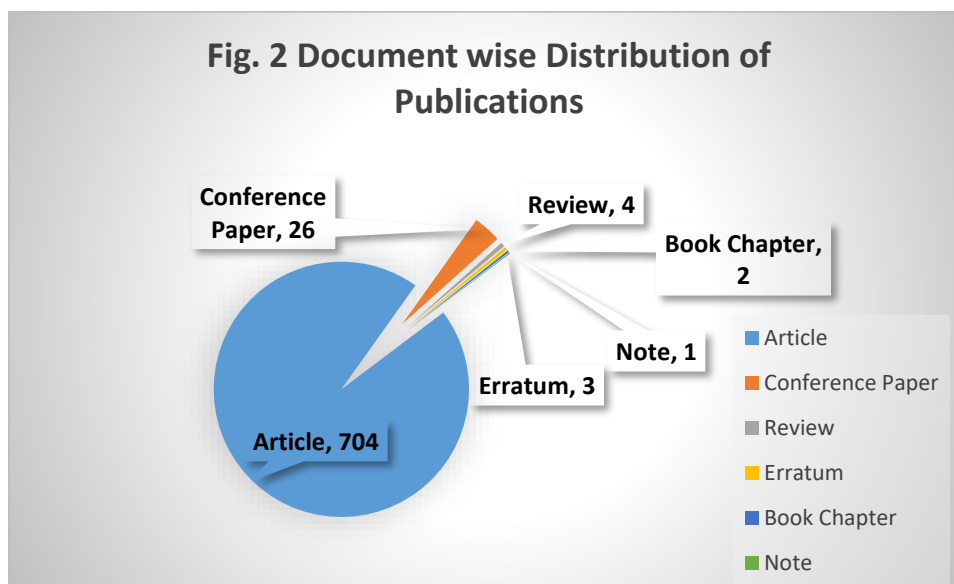


5.2 Document wise Distribution of Publications

Table 2 presents the distribution of published literature according to type. Out of the 740 published papers, 704 (95.14%) were journal articles followed by 26 (3.77%) Conference proceedings 26 (3.51%) Reviews, 4 (0.54%) Erratum 3 (0.41%) Book Chapter 2 (0.27%) and Note 1 (0.14%). The highest number of publications of journal articles indicate that the authors from SRMVCAS were involved enough in various meaningful research activities to disseminate their research findings through scholarly journals.

Table 2 Document wise Distribution of Publications

Sl. No.	Document Type	Records	%
1	Article	704	95.14
3	Conference Paper	26	3.51
6	Review	4	0.54
4	Erratum	3	0.41
2	Book Chapter	2	0.27
5	Note	1	0.14



5.3 Authorship Pattern of Contribution of SRMVCAS

Nowadays, research is carried out by a group of researchers rather than by a single researcher. Therefore, the data were analysed to know the authorship pattern of SRMVCAS. Through collaboration, researchers share and exchange knowledge and techniques that bring in a mixture of positive scientific thoughts. In the above fact, an attempt has been made by researchers

of SRMVCAS. The authors of SRMVCAS published 740 papers which are indexed in the Scopus database shows that they preferred to publish contributed by three authors (31.35%) followed by five authors (22.03%), four authors (20.95%), two authors (11.76%), six authors (9.46%) and so on. Based on the data presented below table indicates that the research output of the authors of SRMVCAS is fairly collaborative.

Table 3 Authorship Pattern of Contribution

Authorship Pattern of SRMVCAS													
Year	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten	>Ten	Total	%
2001	0	1	0	0	0	0	0	0	0	0	0	1	0.14
2002	0	2	0	0	1	0	0	0	0	0	0	3	0.41
2003	0	0	2	0	0	0	0	0	0	0	0	2	0.27
2004	0	0	2	0	0	1	0	0	0	0	0	3	0.41
2005	0	0	5	1	1	0	0	0	0	0	0	7	0.95
2006	0	0	3	1	2	1	0	1	0	0	0	8	1.08
2007	0	1	2	3	3	0	1	0	0	0	0	10	1.35
2008	0	0	6	2	8	3	0	0	0	0	0	19	2.57
2009	0	2	4	2	3	6	1	0	0	0	0	18	2.43
2010	0	8	8	8	11	2	0	0	0	0	0	37	5.00
2011	0	4	14	5	7	3	1	1	1	0	0	36	4.86
2012	0	7	14	4	10	1	0	1	0	0	0	37	5.00
2013	0	5	17	16	12	7	1	0	0	0	0	58	7.84
2014	0	9	20	14	7	5	1	0	0	0	0	56	7.57
2015	0	8	19	9	16	2	1	0	0	0	0	55	7.43
2016	0	3	18	19	15	6	0	0	0	0	0	61	8.24
2017	0	11	26	18	18	8	1	0	1	0	0	83	11.22
2018	0	13	22	20	18	6	2	0	0	0	0	81	10.95
2019	0	9	35	15	13	6	4	0	0	0	0	82	11.08
2020	0	4	15	18	18	13	6	2	5	1	1	83	11.22
Total	0	87	232	155	163	70	19	5	7	1	1	740	100.00
%	0	11.76	31.35	20.95	22.03	9.46	2.57	0.68	0.95	0.14	0.14	100	

From the above, it is seen that no author published their contribution in single, throughout the study period. The authors have a tendency to publish their research papers multi-authored rather than single-authored.

5.4 Most Productive Authors of SRMVCAS

Table 4 Most Productive (Top 20) Authors of SRMVCAS

Sl. No.	Author	Department	Records	Rank	h-Index
1	Chandrasekaran, J.	Physics	168	1	21
2	Dhandapani, M.	Chemistry	72	2	15
3	Ponnuswamy, V.	Physics	65	3	19
4	Jayabalakrishnan, C.	Chemistry	58	4	16
5	Jayaprakash, R.	Physics	57	5	23
6	Kanagarajan, K.	Mathematics	47	6	8
7	Babu, B.	Physics	42	7	13
8	Chandramohan, A.	Chemistry	37	8	15
9	Ganga, B.	Mathematics	36	9	16
10	Amirthaganesan, G.	Chemistry	34	10	10
11	Abdul Hakeem, A.K.	Mathematics	32	11	15
12	Suresh, R.	Physics	30	12	13
13	Mariappan, R.	Physics	28	13	17
14	Maadeswaran, P.	Physics	25	14	11
15	Muthusamy, A.	Chemistry	24	15	10
16	Vivek, D.	Mathematics	24	15	5
17	Marnadu, R.	Physics	23	16	6
18	Raja, G.	Chemistry	23	16	11
19	Saravanabhavan, M.	Chemistry	23	16	11
20	Jayamurugan, P.	Physics	22	17	9
21	Harikrishnan, S.	Mathematics	20	18	3
22	Balaji, M.	Physics	19	19	8
23	Muthuraja, P.	Chemistry	19	19	4
24	Chinnusamy, V.	Chemistry	18	20	11
25	Ilayabarathi, P.	Research and Development Centre	18	20	7
26	Kandhaswamy, M.A.	Chemistry	18	20	9

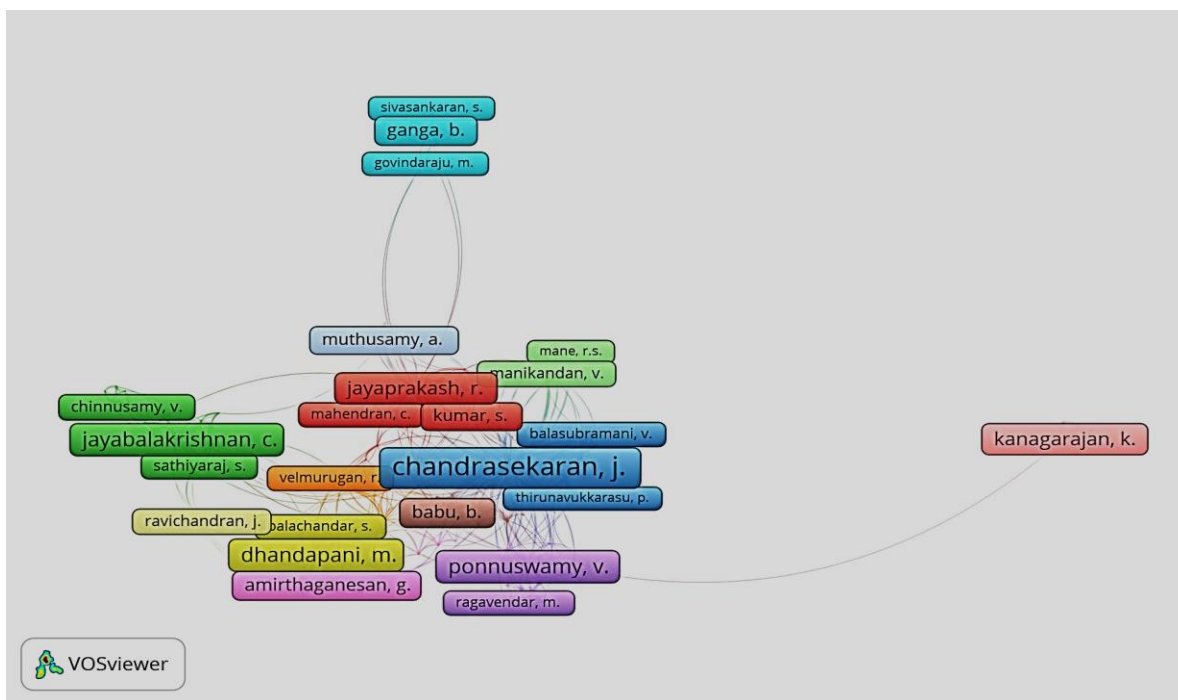


Fig.3 Network Visualisation of Productive Authors from VOSviewer

The scientist with a good number of publications is always an asset of an organization/institute. So it is important to know the authors having a good number of publications. The most productive authors of SRMVCAS are depicted in table 4.

The above table shows the list of the top 20 prolific authors with their ranking according to their frequency of occurrence. The most prolific author of SRMVCAS is Chandrasekaran, J. (h-Index=21) Dept. of Physics who has contributed 168 research articles and is ranked 1st in the most prolific authors list. 2nd rank is obtained by the author Dhandapani, M. (h-Index=15) Dept. of Chemistry who has contributed 72 research articles. Ponnuswamy, V. (h-index=19) Dept. of Physics has contributed 65 research articles and is placed on 3rd rank.

5.5 Highly Cited Papers of SRMVCAS.

The highly cited document reveals the impact of research findings depicted in that document. The value of a research paper is of course enhanced with the citation it receives. So it is important to know the most cited documents of an organization/institution.

Table 5 Highly Cited Papers of SRMVCAS

Highly Cited Papers of SRMVCAS				
Author	Title	Year	Citation	Bibliography Details
Rashidi, M. M., et al.	Buoyancy effect on MHD flow of Nano fluid over a stretching sheet in the presence of thermal radiation	2014	286	<i>Journal of Molecular Liquids</i> 198 (2014): 234-238.
Arunkumar, T., et al.	An experimental study on a hemispherical solar still	2012	123	<i>Desalination</i> 286 (2012): 342-348.
Krishnakumar, T., et al.	Microwave-assisted synthesis and characterization of flower shaped zinc oxide nanostructures	2009	120	<i>Materials Letters</i> 63.2 (2009): 242-245.
Arunkumar, T., et al.	The augmentation of distillate yield by using concentrator coupled solar still with phase change material	2013	116	<i>Desalination</i> 314 (2013): 189-192.
Krishnakumar, T., et al.	CO gas sensing of ZnO nanostructures synthesized by an assisted microwave wet chemical route	2009	110	<i>Sensors and Actuators B: Chemical</i> 143.1 (2009): 198-204.
Krishnakumar, T., et al.	Microwave-assisted synthesis and characterization of tin oxide nanoparticles	2008	108	<i>Materials letters</i> 62.19 (2008): 3437-3440.
Arunkumar, T., et al.	Effect of water and air flow on concentric tubular solar water desalting system	2013	107	<i>Applied energy</i> 103 (2013): 109-115.
Mariappan, R., M. Ragavendar, and V. Ponnuswamy.	Growth and characterization of chemical bath deposited Cd 1-xZnxS thin films	2011	100	<i>Journal of alloys and compounds</i> 509.27 (2011): 7337-7343.
Suresh, R., V. Ponnuswamy, and R. Mariappan.	Effect of annealing temperature on the microstructural, optical and electrical properties of CeO ₂ nanoparticles by chemical precipitation method	2013	98	<i>Applied Surface Science</i> 273 (2013): 457-464.
Mariappan, R., V. Ponnuswamy, and P. Suresh.	Effect of doping concentration on the structural and optical properties of pure and tin	2012	92	<i>Superlattices and Microstructures</i> 52.3 (2012): 500-513.

	doped zinc oxide thin films by nebulizer spray pyrolysis (NSP) technique			
Hakeem, AK Abdul, N. Vishnu Ganesh, and B. Ganga.	Magnetic field effect on second order slip flow of Nano fluid over a stretching/shrinking sheet with thermal radiation effect	2015	90	<i>Journal of Magnetism and Magnetic Materials</i> 381 (2015): 243-257.
Krishnakumar, T., et al.	Microwave-assisted synthesis and investigation of SnO ₂ nanoparticles	2009	90	<i>Materials Letters</i> 63.11 (2009): 896-898.
Chandrasekaran, J., et al.	Hybrid solar cell based on blending of organic and inorganic materials - An overview	2011	79	<i>Renewable and Sustainable Energy Reviews</i> 15.2 (2011): 1228-1238.
Janarthanan, B., J. Chandrasekaran, and S. Kumar.	Performance of floating cum tilted-wick type solar still with the effect of water flowing over the glass cover	2006	75	<i>Desalination</i> 190.1-3 (2006): 51-62.
Oommen, R. Y., and S. Jayaraman.	Development and performance analysis of compound parabolic solar concentrators with reduced gap losses - Oversized reflector	2001	75	<i>Energy conversion and management</i> 42.11 (2001): 1379-1399.

The list of highly cited publications with the cited reference analysis is obtained and the result showed in Table 5. Out of these publications, Rashidi, M. M., et al. (2014) scored the highest citations (286), Arunkumar, T., et al. (2012) occupied the second position with 123 citations. A third position was occupied by Krishnakumar, T., et al. (2009) with 120 citations. The top three cited authors published their papers in the *Journal of Molecular Liquids*, *Desalination*, and *Materials Letters* respectively.

5.6 Top 10 Journals of SRMVCAS

The core journals used to publish research articles are provided in table 6. Optik journal ranks first with a total of 59 articles, Journal of Molecular Structure has 48 articles with the rank second. Journal of Material Science: Materials in Electronics have 24 articles to rank third. Material science in Semiconductor Processing has 21 articles with the fourth rank. Spectrochimica Acta-Part A Molecular and Biomolecular Spectroscopy have 19 articles with the fifth rank. Optoelectronics and Advanced Materials, Rapid Communications has 15 articles with the sixth

rank. Crystal Research and Technology, and Journal of Magnetism and Magnetic Materials has 14 articles with the seventh rank. Acta Crystallographica Section E: Structure Reports online has 12 articles with the eighth rank. Applied Organometallic Chemistry, Discontinuity, Nonlinearity, and Complexity, Journal of Physics and Chemistry of Solids, Materials Letters and Superlattices and Microstructures were 11 articles with rank nine. Journal of Inorganic and Organometallic Polymers and Materials and Nonlinear Studies has 9 articles with the tenth rank. The remaining articles were published in various journals.

Table 6 Top 10 Journals of SRMVCAS

Journals	Records	Rank
Optik	59	1
Journal of Molecular Structure	48	2
Journal of Materials Science: Materials in Electronics	24	3
Materials Science in Semiconductor Processing	21	4
Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy	19	5
Optoelectronics and Advanced Materials, Rapid Communications	15	6
Crystal Research and Technology	14	7
Journal of Magnetism and Magnetic Materials	14	7
Acta Crystallographica Section E: Structure Reports Online	12	8
Applied Organometallic Chemistry	11	9
Discontinuity, Nonlinearity, and Complexity	11	9
Journal of Physics and Chemistry of Solids	11	9
Materials Letters	11	9
Superlattices and Microstructures	11	9
Journal of Inorganic and Organometallic Polymers and Materials	9	10
Nonlinear Studies	9	10

5.7 Bradford's Law of Scattering

Bradford Law of scattering is used as a tool to study the output of journals. Bradford's Law of Scattering states the quantitative connection between journals in this law the journals are arranged in descending order of productivity and divided into equal zones. Where the number of periodicals is distributed in the nucleus and succeeding zones, these zones will be 1: n: n², where n is a multiplier (Bradford, 1948). Hence, considering this expression in the present study, the total 740 articles are divided into three groups as presented in Table 7.

Table 7 Scatter of Journals and Articles over Bradford's zone

No. of Journals	No. of Articles	Total No. of Articles	Zone
1	152	152	1 (33.92%)
2	27	54	
3(6)	15	45(251)	
4	11	44	2 (35.54%)
5	9	45	
6	6	36	
7	7	49	
8	2	16	
9	2	18	
11(50)	5	55(263)	
12	1	12	3 (30.54%)
14	2	28	
15	1	15	
19	1	19	
21	1	21	
24	1	24	
48	1	48	
59(212)	1	59(226)	
		740	

It is clear from Table 7 that the first zone (core journals) contained 6 journals with 251 (33.92%) articles. The second zone (allied journals) contained 50 journals with 263 (35.54%) articles. The third zone (alien journals) contained 212 journals with 226 (33.35%) articles.

Bradford's algebraic interpretation of the law is $1: n: n^2$. The connection of each zone in this study is 6:50:212. Here, 6 is the number of journals in the nucleus zone.

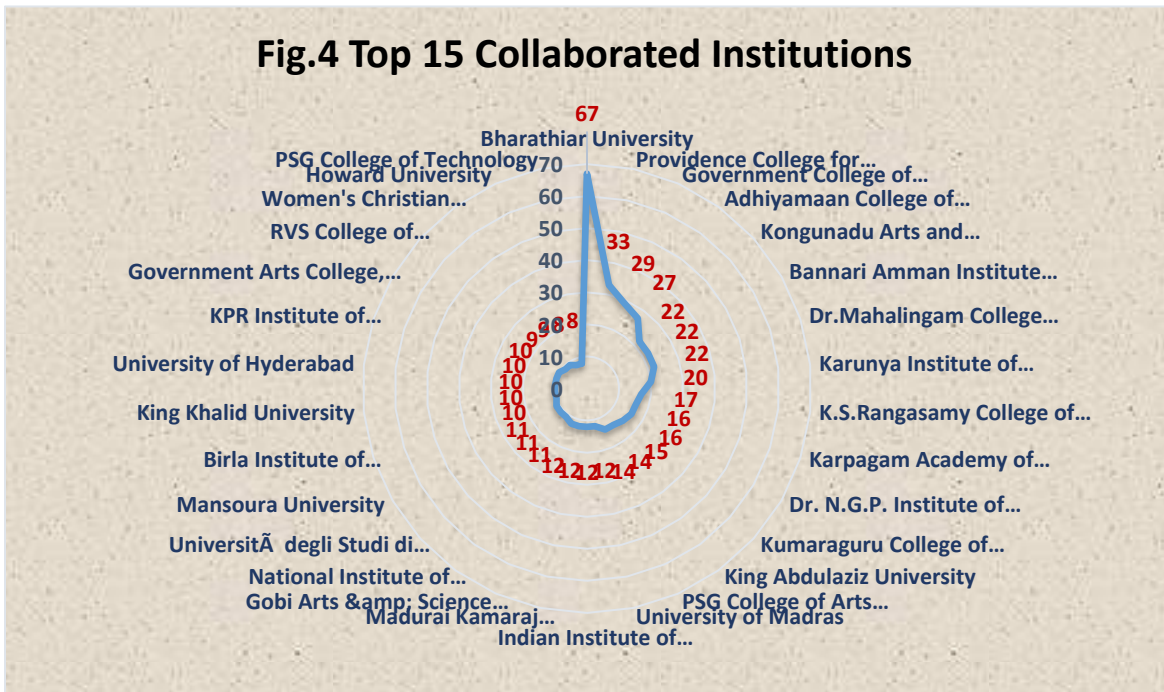
5.8 Institution-wise Distribution of Papers

The list of the top 15 institutions collaborating with SRMVCAS for the period 2001-2020 is in table 7. It is clear from the table that SRMVCAS has collaborated papers with Bharathiar University (67 papers), Providence College for Women (33 papers), Government College of Technology (29 papers), Adhiyamaan College of Engineering (27 papers), Kongunadu Arts and Science College, Bannari Amman Institute of Technology and Dr. Mahalingam College of Engineering & Technology (22 papers each).

Table 7 Top 15 Institutions Collaborated with SRMVCAS

Sl. No.	Institutions	Records	Rank
1.	Bharathiar University, Coimbatore	67	1
2.	Providence College for Women, Coonoor	33	2
3.	Government College of Technology, Coimbatore	29	3
4.	Adhiyamaan College of Engineering	27	4
5.	Kongunadu Arts and Science College	22	5
6.	Bannari Amman Institute of Technology	22	5
7.	Dr.Mahalingam College of Engineering & Technology	22	5
8.	Karunya Institute of Technology and Sciences	20	6
9.	K.S.Rangasamy College of Technology	17	7
10.	Karpagam Academy of Higher Education	16	8
11.	Dr. N.G.P. Institute of Technology	16	8
12.	Kumaraguru College of Technology	15	9
13.	King Abdulaziz University	14	10
14.	PSG College of Arts & Science	14	10
15.	University of Madras	12	11
16.	Indian Institute of Science, Bengaluru	12	11
17.	Madurai Kamaraj University	12	11
18.	Gobi Arts & Science College	12	11
19.	National Institute of Technology, Tiruchirappalli	11	12
20.	Università degli Studi di Messina	11	12
21.	Mansoura University	11	12
22.	Birla Institute of Technology and Science, Pilani	10	13
23.	King Khalid University	10	13
24.	University of Hyderabad	10	13
25.	KPR Institute of Engineering and Technology	10	13
26.	Government Arts College, Coimbatore	10	13
27.	RVS College of Engineering and Technology, Coimbatore	9	14
28.	Women's Christian College Nagercoil	9	14
29.	Howard University	8	15
30.	PSG College of Technology	8	15

Fig.4 Top 15 Collaborated Institutions



It has been noticed that with the top 15 institutions, SRMVCAS collaborated with international universities/ institutions i.e. King Abdulaziz University (14 papers), Universit  degli Studi di Messina and Mansoura University (11 papers each), King Khalid University (10 papers), Howard University (8 papers). It is inferred that the contributors from SRMVCAS publish their research work with many institutions/universities of India as well other foreign universities/institutions.

5.9 Collaboration with other Countries

SRMVCAS researchers have been actively involved in research collaboration with international authors. Table 8 shows the top 15 frequently collaborative countries for SRMVCAS. The United States was the top collaborated country with 25 (3.38%) records followed by Saudi Arabia with 24 (3.24%) records, South Korea with 17 (2.30%) records, Italy with 16 (2.16%) records and so. It is better for any institution where collaboration with other countries takes place as the exchange of ideas, knowledge, and information is the backbone of any institution/university.

Table 8 Collaborated Countries of SRMVCAS

Collaborating Countries with SRMVCAS			
Sl. No.	Country	Output	% of 740
1.	United States	25	3.38
2.	Saudi Arabia	24	3.24
3.	South Korea	17	2.30
4.	Italy	16	2.16
5.	Egypt	12	1.62
6.	Japan	11	1.49
7.	Iran and Romania	Each 10	1.35
8.	Portugal	9	1.22
9.	China and Thailand	Each 8	1.08
10.	Pakistan and South Africa	Each 7	0.95
11.	Malaysia and Turkey	Each 6	0.81
12.	Australia and Taiwan	Each 4	0.54
13.	Mexico, Qatar and United Arab Emirates	Each 3	0.41
14.	Chile and Nigeria	Each 2	0.27
15.	Colombia, Germany, Hong Kong, Oman, Singapore, Tanzania and Viet Nam	Each 1	0.14

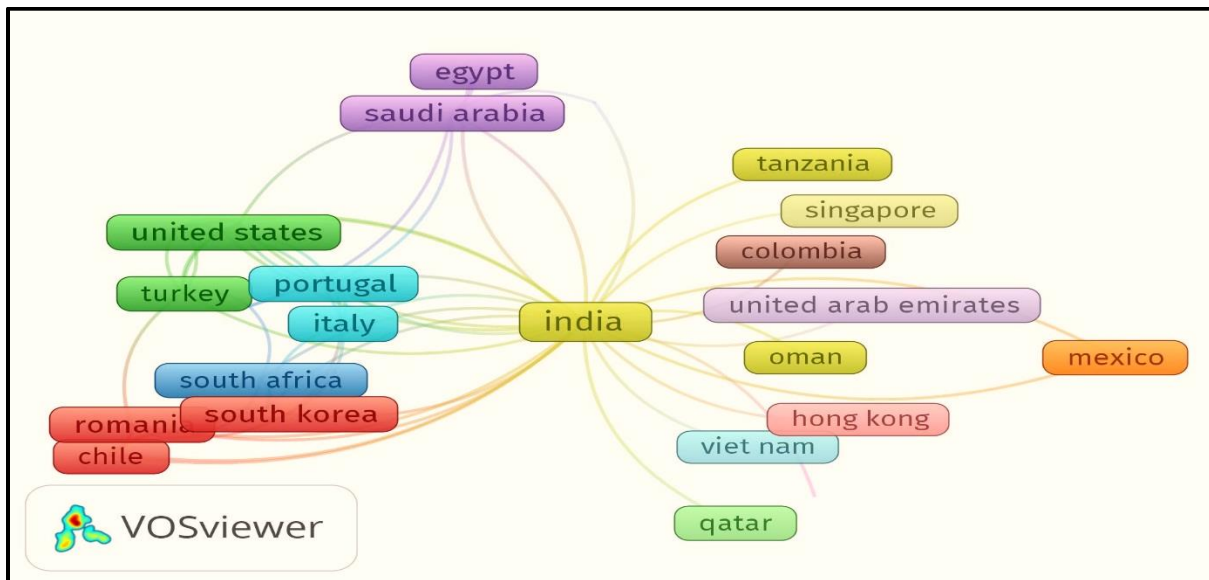


Fig.5 Network Visualisation of Collaboration Countries from VOSviewer

6. Conclusion

The present study mainly highlights the quantitative as well qualitative analysis of Sri Ramakrishna Mission Vidyalyaya College of Arts and Science (SRMVCAS) from 2001 to 2020. The major finding of the study showed that SRMVCAS published 740 papers. The highest number of papers published by the contributors in the years 2017 and 2020 with 83 (11.22%) papers. Most of the papers are published in the form of the article 704 (95.14%) followed by Conference proceedings 26 (3.51%) and Chandrasekaran, J (168), Dhandapani, M (72), and Ponnuswamy, V (65) were the most prolific contributor during the period under study with h-Index 21, 15, and 19 respectively. Three authored papers (31.35%) dominated during the period under study. SRMVCAS researchers have a tendency to publish their papers in multi-authored rather than solo publication. The Journal distribution pattern does not fit into Bradford's law of scattering in the present study. Optik journal ranks first with 59 articles and Rashidi, M. M., et al. (2014) scored the highest citations (286). Bharathiar University, Providence College for Women, Government College of Technology are the most collaborative institutions within a country while at international level, SRMVCAS highly collaborated with United States, Saudi Arabia, and South Korea.

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