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Collaborative Strength And Pattern Of Authorship Among Agricultural Universities In South India

Dr.P.Padma Assistant Professor Department of Library and Information Sciences Madurai Kamaraj University Madurai upswins@gmail.com

Abstract

This study has observed a total of 5111 publications in Agricultural Universities in South India research over a period of 30 years from 1989 to 2018 and indexed by Web of Science online Database indicates that the publication output in the Global level. The highest numbers of papers were published during the year 2017 with 504 records and the following year 2016 with 394 records. Overall, 14997 authors contributed in 1502 journals of the publications from 3602 number of institutions that were located in 131 numbers of countries. Contribution of journals, ranking of authors, preference of publication and frequency of keywords were also analyzed in this paper.

Keywords: Scientometric; Agricultural University; Web of Science; Authors Productivity; HisCite.

1. INTRODUCTION

The present study aims at analyzing the authorship pattern of research performance of Agricultural Universities in South India. Therefore, it is through publication, the scientists receive professional recognition and esteem as well as promotion, advancement, and funding for future research. Publication is so central to productivity in research that the work becomes 'a work' only when it takes a conventional, physical (that is published) form, which can be received, assessed and acknowledged by the professionals. (Ranganathan, C., & Balasubramani, R. 2013).). It could be seen clearly from the above discussion that Bibliometrics analysis is an important tool in analyzing any science and social science discipline. (Kumar, S. &Naqvi, S.H. 2014). By keeping this view in mind, the researcher intends to undertake the study on "Research Productivity of Agricultural Universities in South India: A Scientometric Analysis". (Velmurugan, C. 2014)

2. REVIEW OF LITERATURE

Singh studied an "Authorship pattern and collaboration coefficient of India in biotechnology research" during the 5 period (2001-2016) . The data was collected by the Scopus database.

During the period of study, it was found that the average number of authors each research papers was 4.92 recorded form India and the collaboration coefficient was 0.63 recorded. It was found that the multi-authored articles are higher on average in the comparison to single-authored publications. The RGR was decreasing and the corresponding doubling time was gradually increased from the marked period of study. (Singh, M.K. 2017).

Mani, K. T. (2014) conducted a bibliometric study of Malaysian Journal of Library and Information Science. The result of the study revealed that total number of 279 articles and 575 authors were published. Maximum number of contributions i.e., 28 (10.036%) were published in the year 2011. Average number of authors per paper is 2.06. The highest number of author productivity i.e., 72 (12.522%). Majority 180 (64.516%) of the total contributions represent collaborative research. The average degree of collaboration has come out with 0.64 during the study period.

Heidari&Safavi conducted a study on the Survey of Collaborative Coefficient of Article Authors in "Iranian Journal of Pathology" during the period of seven years i.e. 4 (2006-2012) . A total numbers of publications 288 recorded and 1078 authors had written them. The highest collaborative coefficient was recorded in the year 2008 and the average of collaborative coefficients of the authors is 0.60 during the period of study.

3. OBJECTIVES

The main objective of this study was to use Research Productivity of Agricultural Universities in South India: A Scientometric Analysis with special reference to research activities at global level:

- To analysis the author wise distribution;
- To identify the H-Index of authors distribution
- To analysis the author wise cited reference;
- To analysisthe author wise distributions of the publications.
- To note that authorship pattern of Agricultural Universities in South India;
- To identify Year – wise Collaborative Distribution of Publications;
- To identify the pattern of Co-Authorship Index.

4. METHODOLOGY

Sceintometric / Biobliometrics study is the examination of the frequency, patterns, chart, and graphs of citations in articles and books. Scientometric Study" is a study encompassing records output on Agricultural University from Web of Science (WOS) online database. The present study aims at analyzing the research output of Researchers in the field of Agricultural Universities in South India. It brings into focus the distribution of research output by following categories such as related growth of output and doubling time, authorship pattern, and core journals and so on.Besides statistical tools like trend analysis, correlation analyses and time series analyses were used to predict the future in Agricultural

Universities in South India research. The data were downloaded from web of science database and tabulated using 'hiscite' software and analyzed for the study Histcite is a software package used for scientometric analysis and information visualization. The study explores the research concentration in Agricultural Universities in South India and journal priority in publishing Agricultural Universities in South India articles.

5. DATA ANALYSIS

5.1. Author wise distribution of the publications

Ranking of Authors based on Publications

Table 1 Author wise distribution of the publications

S.No.	Author	Records	Percent	TLCS	Without Self Citations	TGCS	TLCR
1	Samiyappan R	103	3.299	9	1	71	4
2	Raguchander T	63	2.018	24	0	271	23
3	Anandham R	62	1.986	88	1	168	100
4	Velazhahan R	62	1.986	2	0	52	13
5	Raveendran M	60	1.922	51	0	114	60
6	Uthandi S	53	1.698	7	3	91	6
7	Karthikeyan G	49	1.57	12	2	135	13
8	Muthurajan R	48	1.537	5	2	162	3
9	Balachandar D	47	1.505	10	0	164	22
10	Nakkeeran S	47	1.505	4	0	35	3

Table 1 indicates ranking of authors by number of publications. Author Samiyappan R published highest number of articles for the study period with 103 records; next author Raguchander T published next highest number of articles for the study period with 63 records Anandham R and Velazhahan R published 62 records, Raveendran M published 60 records, and Uthandi S published 53 records

It is found from the analysis that LOTKAS law may not be applicable with regard to author productivity in proliferation of research in Research Productivity of Agricultural Universities in South India: A Scientometric Analysis as the research papers equally distributed by a large number of authors. It also shows that author Raguchander T got highest 271 global citations against 63 publications, followed by the author Anandham R with 168 global citations against 62 publications and third one is with more citations by Balachandar D having 164 global citations for 47 publications.

Among the top 10 authors, author Jin Y has append 100 references for its 32 publications which is followed by the authors Chen XM with 60 cited references for its 25 publications. There are only one author having more than 200 global citations, three authors having more than 150 global citations, two authors having more than 100 global citations and two authors having more than 50 global citations and rest as the follows.

5.3. Author wise Cited reference and Number of authors in Agricultural Universities in South India

Table 3 Distribution of Author wise Cited reference and Number of authors in Agricultural Universities in South India

S.No	Author	Records	CR	ACRPA	NA
1	Samiyappan R	103	280	7.00	124
2	Raguchander T	63	1042	31.58	225
3	Anandham R	62	653	20.41	407
4	Velazhahan R	62	573	20.46	109
5	Raveendran M	60	545	21.80	246
6	Uthandi S	53	601	25.04	135
7	Karthikeyan G	49	763	31.79	140
8	Muthurajan R	48	502	21.83	139
9	Balachandar D	47	793	34.48	177
10	Nakkeeran S	47	168	7.30	85

Table 3 shows that distribution of author wise distribution of the publications, cited reference and number of authors contributed the research publications. The highest number of authors 407 contributed 32 publications, followed by 246 authors contribute 25 publications, 225 authors contribute in 33 publications and 177 authors contribute 23 publications respectively. The highest average cited reference per author is 34.48 by Samiyappan R with 1033 records of the publications.

5.4. Author wise distributions of the publications

Table 4 Author wise distributions of the publications

Year	1	2	3	4	5	6	7	8	9	10	>10	Total
1989	5	3	7	5	0	0	0	0	0	0	0	20
1990	5	3	3	4	0	0	0	0	0	0	0	15
1991	17	11	11	8	1	1	1	0	0	0	0	50
1992	20	26	14	11	0	2	0	0	0	0	0	73
1993	15	17	15	8	2	0	0	0	0	0	0	57
1994	14	20	8	7	1	1	0	2	0	0	0	53
1995	17	11	11	9	2	1	1	0	1	0	0	53
1996	22	10	13	5	7	1	1	0	0	1	0	60
1997	22	13	9	6	5	2	3	0	1	0	0	61
1998	20	16	16	10	3	3	1	3	1	0	1	74
1999	13	21	15	14	5	2	1	2	2	0	2	77
2000	26	31	19	11	4	3	1	2	1	1	1	100
2001	21	23	31	13	8	6	2	2	2	1	2	111
2002	12	21	19	6	1	4	1	1	0	1	2	68
2003	13	27	24	16	14	5	0	0	1	2	1	103
2004	15	20	27	23	5	7	1	3	1	0	3	105
2005	20	26	22	18	12	4	2	1	1	0	0	106
2006	22	26	40	21	13	9	4	0	3	1	0	139
2007	14	37	41	30	12	8	8	2	1	0	2	155
2008	13	58	47	45	20	20	7	6	6	2	4	228
2009	25	51	53	41	37	20	7	7	3	5	3	252
2010	23	52	44	49	42	19	16	5	6	8	11	275
2011	28	51	69	54	46	17	17	7	10	3	5	307
2012	21	49	87	57	37	27	16	13	7	3	13	330
2013	20	60	66	57	41	25	9	7	5	4	8	302
2014	27	52	45	43	53	24	17	10	5	3	11	290
2015	49	58	73	67	53	25	13	10	7	10	9	374

2016	38	71	81	61	51	35	20	9	10	7	11	394
2017	51	90	94	101	64	36	28	11	7	4	18	504
2018	33	52	64	75	54	34	20	14	8	7	14	375
Total	641	1006	1068	875	593	341	197	117	89	63	121	**5111 (100)**

Table 4 shows that the highest number of the publications on 1068 records in third author productivity, the next followed by the two author's productivity with 1006, the fourth author's productivity with 875, the single author's productivity with 641, the fifth author's productivity with 593 and the sixth author's productivity with 341 records of the publications respectively and followed by other patterns.

5.5. Authorship pattern of Agricultural Universities in South India

Table 5 shows that Authorship pattern of Agricultural Universities in South India

Authorship Pattern	No. of Contribution	Percentage of Authors	Cumulative Percentage
1	641	12.54	12.54
2	1006	19.68	32.22
3	1068	20.90	53.12
4	875	17.12	70.24
5	593	11.60	81.84
6	341	6.67	88.51
7	197	3.85	92.36
8	117	2.29	94.65
9	89	1.74	96.39
10	63	1.23	97.62
>10	121	2.38	100
Total	**5111**	100.00	

The authorship pattern shows that the collaboration trend is dominant as only 12.54 percent are contributed by single authors. The highest productivity of publications output (20.90%) from three authors. This is followed by second level two authors' contribution (19.68%), third level highest productivity of publications output (17.12%) from four author's and fifth level highest productivity of publications output (12.54%) from single authors contribution.

DEGREE OF COLLABORATION

In order to identify the degree of collaboration, the research or has adopted K. Subramanyam's formula3.

The formula is C = Nm/(Nm+Ns)

Where,

C = Degree of collaboration in a discipline

Nm = Number of multiple authored papers

Ns = Number of the single authored papers

Further, the researcher has applied various statistical tools to analyze the various empirical data such as "t" test percentage and averages.

C=NM/(NM + NS)

5.6. Year wise Distribution of Degree of Collaboration

Table 16 Showing Year wise Distribution of Degree of Collaboration

Year	Single Authors		Multiple Authors		Total	Degree of Collaboration
	No. of Output	%	No. of Output	%		
1989	5	0.10	15	0.29	20 (0.39)	0.75
1990	5	0.10	10	0.20	15 (0.29)	0.67
1991	17	0.33	33	0.65	50 (0.98)	0.66
1992	20	0.39	53	1.04	73 (1.43)	0.73
1993	15	0.29	42	0.82	57 (1.12)	0.74
1994	14	0.27	39	0.76	53 (1.04)	0.74
1995	17	0.33	36	0.70	53 (1.04)	0.68
1996	22	0.43	38	0.74	60 (1.17)	0.63
1997	22	0.43	39	0.76	61 (1.19)	0.64
1998	20	0.39	54	1.06	74 (1.45)	0.73
1999	13	0.25	64	1.25	77 (1.51)	0.83
2000	26	0.51	74	1.45	100 (1.96)	0.74
2001	21	0.41	90	1.76	111 (2.17)	0.81
2002	12	0.23	56	1.10	68 (1.33)	0.82
2003	13	0.25	90	1.76	103 (2.02)	0.87
2004	15	0.29	90	1.76	105 (2.05)	0.86
2005	20	0.39	86	1.68	106 (2.07)	0.81
2006	22	0.43	117	2.29	139 (2.72)	0.84
2007	14	0.27	141	2.76	155 (3.03)	0.91
2008	13	0.25	215	4.21	228 (4.46)	0.94
2009	25	0.49	227	4.44	252 (4.93)	0.90
2010	23	0.45	252	4.93	275 (5.38)	0.92

2011	28	0.55	279	5.46	307 (6.01)	0.91
2012	21	0.41	309	6.05	330 (6.46)	0.94
2013	20	0.39	282	5.52	302 (5.91)	0.93
2014	27	0.53	263	5.15	290 (5.67)	0.91
2015	49	0.96	325	6.36	374 (7.32)	0.87
2016	38	0.74	356	6.97	394 (7.71)	0.90
2017	51	1.00	453	8.86	504 (9.86)	0.90
2018	33	0.65	342	6.69	375 (7.34)	0.91
Total	641	12.54	4470	87.46	**5111 (100)**	0.87

It is inferred from the table -16 that at the aggregate level, the degree of collaboration is of 0.87 during the study period 1989 to 2018 i.e, that is out of total 5111 records of published, 87% of them or published under the joint author of publications in "Agricultural Universities in South India" research output. This brings out clearly the high level of prevalence of collaborative research in Agricultural Universities in South India.

CO-AUTHORSHIP INDEX (CAI)

To study how the patterns of co-authorship have changed during a period use of Co-authorship index has been applied in this study. For calculating CAI the entire data set was divided into four blocks.

CAI={(Nij/Nio)/(Noj/Noo)}*100

Nij : Number of papers having j authors in block I

Nio : Total Output of Block I

Noj :Number of papers having j authors for all blocks;

Noo **:** Total number of papers for all authors and all blocks

J=1, 2, 3, > 4

CAI = 100 implies that co-authorship in a particular block for a particular types of authorship corresponds to the world average, CAI>100 reflects higher than average co-authorship effort and CAI<100 lower than average co-authorship effort in a particular block for a particular type of authorship.

5.7. Pattern of Co-Authorship index

Table 17 Pattern of Co-Authorship index

Year	Single Authors		Multiple Authors		Total
	No. of Output	CAI	No. of Output	CAI	
1989	5	199.34	15	85.76	20 (0.39)
1990	5	265.78	10	76.23	15 (0.29)

1991	17	271.10	33	75.46	50 (0.98)
1992	20	218.45	53	83.01	73 (1.43)
1993	15	209.83	42	84.25	57 (1.12)
1994	14	210.62	39	84.14	53 (1.04)
1995	17	255.75	36	77.66	53 (1.04)
1996	22	292.36	38	72.42	60 (1.17)
1997	22	287.57	39	73.10	61 (1.19)
1998	20	215.50	54	83.44	74 (1.45)
1999	13	134.62	64	95.04	77 (1.51)
2000	26	207.31	74	84.61	100 (1.96)
2001	21	150.85	90	92.71	111 (2.17)
2002	12	140.71	56	94.16	68 (1.33)
2003	13	100.64	90	99.91	103 (2.02)
2004	15	113.91	90	98.01	105 (2.05)
2005	20	150.44	86	92.77	106 (2.07)
2006	22	126.20	117	96.24	139 (2.72)
2007	14	72.02	141	104.01	155 (3.03)
2008	13	45.46	215	107.82	228 (4.46)
2009	25	79.10	227	103.00	252 (4.93)
2010	23	66.69	252	104.78	275 (5.38)
2011	28	72.72	279	103.91	307 (6.01)
2012	21	50.74	309	107.06	330 (6.46)
2013	20	52.80	282	106.77	302 (5.91)
2014	27	74.24	263	103.69	290 (5.67)
2015	49	104.47	325	99.36	374 (7.32)
2016	38	76.90	356	103.31	394 (7.71)
2017	51	80.68	453	102.77	504 (9.86)
2018	33	70.17	342	104.28	375 (7.34)
Total	641	100.00	4470	100.00	**5111 (100)**

It is observed from the Table 17, the CAI for single authors is declined from 292.36 in the year 1996, 287.57 in the year 1997, 271.10 in the year 1991, 265.78 in the year 1990, 255.75 in the year 1995, 218.45 in the year, 215.50 in the year 1998 and 210.62 in the year 1994. On the other hand, the CAI for Multiple authors is enhanced from 107.82 in the year 2008, 107.06 in the year 2012, 106.77 in the year 2013, 104.78 in the year 2010, 104.28 in the year 2018 and 1045.01 in the year 2007, which indicates the pattern of co-authorship is increasing among the contributions of the journal.

6. CONCLUSION

The present study is Research Productivity of Agricultural Universities in South India: Authorship Pattern and Degree of Collaborationresearch published in the sources of data indexed by Web of Science. It is found that there are 5111 total number of articles during the thirty years' time span publication is significantly increased. The study has analysed various aspects such as year wise distribution of articles, authorship pattern, degree of collaboration among the authors and geographical distribution of papers, Co-Authorship Index have been contributed. The collaborative work has been recognized compare to individual contribution; particularly two authors team has produced highest number of articles in Agricultural Universities in South India research.

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