



Research Performance of Selected Higher Education Institutions in Kerala: A Scientometric Analysis

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ABSTRACT

The researcher has 20637 articles were downloaded from the database of web of knowledge (SCI, SSCI & ACHI) in various disciplines with 25977 TLCS and 147589 TGCS and these articles were 483034 times cited reference also measured during 1972 to 2012 in Kerala state's Higher Education Institution's. The study also indicates that multi-authors (92 %) productivity is dominant.

KEYWORDS: Higher Educational institutions; Scientometric; Kerala; Collaborative research, h-index

1. INTRODUCTION

This analysis is covered Kerala state institutions research productivity during 1972 to 2012. The selected higher education institutions were; 6 state owned universities; 16 research and development organizations; 12 medical institutions; 5 Marine & Agricultural universities; others institutions and 44 other state and other countries collaborated institutions (totally 2840 institutions).

2. OBJECTIVES

The major objectives are mentioned below:

- To find the year wise output of during 1972 to 2012 and reveals the h index values, cited times and contributed number of authors.
- To identify the prolific journals among the total journals
- To detain the applicability of Bradford's law of scattering journals
- To identify the nature of collaboration and authorship pattern and determine the degree of collaboration in research.

3. DATA AND METHODOLOGY

Different sources were contributing to the research output of Kerala state's selected higher educational institutions research by the scientists. In this study secondary sources are also from the Science Citation Index (SCI) and Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (ACHI) which are available on the Web of Science (WoS) 20637 records were downloaded for analysis by using the Histcite software.

4. DISCUSSION AND RESULTS

4.1 Year Wise distribution

During 1972 to 2012 and it is totally 41 (4 decades) years. The year group of 2007 to 2012 has reveals the highest number of publications and other values measured and in 1st position among the other year groups. Observing by TLCS (Total Local Citation Scores) overall period 25977, TGCS (Total Global Citation Scores) values of overall periods 147,589 were measured.

Table 4.1: Distribution of year wise H-index, CS and CR values

S.No	Year	Recs.	LCS	Mean LCS	GCS	Mean GCS	H -index	CR	Mean CR	NA	Mean NA
1	1972 -76	394	619	6.62	2154	23.98	69	5036	60.14	764	9.51
2	1977 - 81	667	572	4.18	2640	19.61	77	7002	52.25	1459	1086
3	1982 - 86	927	1141	6.13	4629	24.89	111	11041	59.75	2171	11.73
4	1987 - 91	1082	1630	7.47	6625	30.39	132	10952	50.42	2692	12.42
5	1992 - 96	1637	3471	10.11	15720	45.84	193	29407	86.21	5174	15.51
6	1997 - 01	3005	6245	10.39	35172	58.37	253	63927	106.2	9900	16.48
7	2002 - 06	4430	7216	8.23	48962	56.07	285	106654	119.72	15884	17.86
8	2007 - 12	8495	5083	3.48	31687	21.74	182	249015	176.78	35077	24.74
Total		20637	25977	56.6	147589	280.9	1302	483034	711.5	70783	119.1
Average		503.3	633.6	1.4	3599.7	6.8	31.8	11781.3	17.4	1726.4	2.9

1302 h - index values are found here for TCS (LCS and GCS) and its individual year's h - value is 31.75. 483,034 times are CR and average is 11781.3 and its mean value is 711.47 and its average value of CR is 17.35, averagely each year 17 articles were cited by other scientists. 70783 authors found and average per year is 1726.4. No. of authors mean value is 119.11 and average per year authors are just 2.9.

4.2 Prolific journals

Kerala Scientists have produced 17048 papers (totally 20637 articles) scattered over 3250 journals. Out of 3250 journals, "Current Science" has published the highest number of articles 535 with 432 TLCS, 1757 TGCS and 342 TLCS scaled.

Table 4.2: Showing Prolific journals (among 3250 journals) journals

S.No	Journal name	R. O/P	LCS	GCS	LCR	Rank
1	Current Science	535	432	1757	342	1
2	Jrl. of Applied Polymer Science	407	875	3958	908	2

3	Neurology India	189	52	417	101	3
4	Indian Jrl. of Chemistry Sec. A-Inorganic Bio-Inorganic Physical Theoretical & Analytical Chemistry	169	248	716	234	4
5	Indian Journal of Marine Sciences	166	108	364	55	5
6	Indian Veterinary Journal	160	7	79	8	6
7	Spectrochimica Acta Part A-Molecular & Biomolecular Spectroscopy	141	337	1194	421	7
8	Indian Journal of Animal Sciences	139	11	106	10	8
9	Indian Journal of Biochemistry & Biophysics	139	244	694	166	8
10	Asian Journal of Chemistry	135	77	167	182	9

The journal of "Journal of Applied Polymer Science" has published 407 with 875; 3958 CS and 908 TCLR measured highest values. Remaining journals were contributing below 200 articles and having low values of citation scores. Most of the journals covered the subjects are Physics, Chemistry and Marine Science were dominating.

4.3 Bradford's Law of Scattering

According to Bradford's law journals are to be grouped into a number of zones each producing a similar number of articles. Then the relationship between the zones is 1: n: n². This study reports 3250 journals to have published 20,637 articles. It is concluded from the analysis that 1st zone (61) journals were found on nuclear or core journals.

Table 4.3: Showing Bradford's Distribution of journals

Zone	No. of journals	No. of records	Multiplier factor
Z1	61 (1.88)	6879 (33.33)	-
Z2	337 (10.37)	7054 (34.18)	5.52
Z3	2852 (87.75)	6704 (32.49)	8.46
	3250	20637	13.98 (6.99)

The small groups of 61 journals identified the nuclear or core zone representing 1.88 percent of total journals and covered 6879 (33.33%) of articles. The 2nd larger group of 337 (10.37 %) journals provides 7054 (34.18 %) articles, and 3rd largest zone of 2852 (87.75 %) of periodicals yield the next 6704 (32.49 %) articles. The Bradford's average multiplier value is 6.99. When this analysis is done for a wider range of periods, the extent of scattering can increase. Hence the analysis of data clearly discounts Bradford's Law of scattering.

Table 4.5: Showing Authorship Patterns in the Kerala research output

Authorship pattern	1	2	3	4	5	6	7	8	9	10 & above	Total
1972 - 76	94	245	43	9	3	-	-	-	-	-	394
1977 - 81	124	366	134	32	10	-	-	-	-	-	667
1982 - 86	162	440	215	47	26	11	-	2	1	2	907
1987 - 91	127	553	253	93	33	10	-	4	0	1	1074
1992 - 96	151	584	410	233	130	66	0	12	5	13	1605
1997 - 01	299	977	729	435	274	127	82	34	17	45	3019
2002 - 06	299	1180	1047	811	569	249	161	60	24	63	4430
2007 - 12	426	1790	1894	1620	1099	726	398	182	109	269	8513
Total	1682 (8.15)	6135 (29.73)	4725 (22.9)	3280 (15.9)	2144 (10.4)	1189 (5.8)	641 (3.1)	294 (1.42)	156 (0.76)	393 (1.90)	20637

The authors are categorized according to the number of research contribution by year wise. It is noted that 2 authored output in 1st position, followed by 3 authored, 4 authored output and 5 authored output were been in the highest position and single authored output been in 5th place of the authorship pattern respectively. Remaining collaborative authors' contribution is low. It concludes, the collaborated authored articles are highest compare than solo contribution.

4.3 Degree of collaboration

Overall level the single authored papers constitute 1682 (8.15 %) of total publication reported in the study and the remaining 91.85 percentage of the publications are contributed by multi-authors. The degree of collaboration is 0.92; i.e., 92 percentages of them are published under combined venture.

Table 4.6: Degree of Collaboration

Year	Single authors		Multi authored		Total	Degrees of Collaboration
	No of output	%	No. of output	%		
1972 - 76	94	5.59	300	1.57	394 (1.91)	0.76
1977 - 81	124	7.36	543	2.86	667 (3.24)	0.81
1982 - 86	162	9.63	765	4.04	927 (4.48)	0.82
1987 - 91	127	7.56	955	5.04	1082 (5.24)	0.88
1992 - 96	151	8.98	1486	7.84	1637 (7.92)	0.91
1997 - 01	299	17.77	2706	14.28	3005 (14.57)	0.90
2002 - 06	299	17.78	4131	21.79	4430 (21.47)	0.93
2007 - 12	426	25.33	8069	42.57	8495 (41.16)	0.95
Total	1682 (8.15)	100	18955 (91.8)	100	20637	0.92

4.2 Prolific Authors and Authorship Pattern

70,783 scientists have produced 20637 articles contributions scattered over 3250 journals. The first 10 authors are identified as the most productive contributors from the Kerala state institutions research.

Table 4.4: Showing Prolific Authors according to highest research productivity

S.No	Author name	R. O/P	Rank	% of 70783	TLCS	TGCS	TLCR
1	Thomas S	554	1	2.7	1868	8668	1699
2	Nair V	240	2	1.2	1125	5491	1076
3	Rao GV	240	2	1.2	329	1177	329
4	Kurup PA	237	3	1.1	578	1227	491
5	Pandey A	234	4	1.1	595	4798	545
6	Rao BN	221	5	1.1	223	917	250
7	Nampoori VPN	201	6	1.0	342	1823	325
8	Sebastian MT	194	7	0.9	768	2238	613
9	Nair MK	186	8	0.9	263	2303	167
10	Ninan KN	170	9	0.8	430	1984	409

Among the 70783 authors, "Thomas S" has published 554 (2.7%) of articles and it is the highest publications with first rank position and 1868 TLCS; 8668 TGCS and 1699 TCLR scores measured. Remaining authors were contributing below 250 articles and low numbers of citation scores measured. The table mentioned authors were identified the most productive authors and specifically identified the Active Author is Thomas S.

4.4 Highly Cited Articles

Table 4.7 reveals the highly cited article from the sample 327595 times cited reference selected articles from the sample data.

Table 4.7: Highly Cited Articles on Kerala State Institutions Research Publications

S.No	Cited articles	No. of citation
1	LOWRY OH, 1951, J Biol Chem, V193, P265	544
2	COATS AW, 1964, Nature, V201, P68	168
3	MURASHIGE T, 1962, Physiol Plantarum, V15, P473	148
4	OHKAWA H, 1979, Anal Biochem, V95, P351	133
5	GEARY WJ, 1971, Coordin Chem Rev, V7, P81	128

544 times has referred by other scientist article of 'Lowry OH' (1951) published in the journal of 'Biol Chem'; 168 times has cited by the author of 'Coats AW' in the journal of 'Nature' at 1964; remaining articles were scored below 150 times cited references.

5. Conclusion

The researcher has found; during 2007 to 2012 has highest contribution; It is found "Current Science" journal has most productive journal; The scattering of journals can increase, 61 journals were core or nuclear journals and its discounts the Bradford's law of scattering; It is identified the "Thomas S" is active author; The collaborated authored publications are high; 92 percent of articles were published under combined (collaborative) venture and it is found highly cited the author is 'Lowry OH'.

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