

PUBLICATION RESEARCH TRENDS ON TECHNICAL REVIEW JOURNAL: A SCIENTOMETRIC STUDY

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Abstract

The present paper explores the scientometric analysis of the 'IETE Technical Review Journal' during six years from 2007 to 2012. This journal is an Indian journal of highly reputed in the filed of education and technology and research & development. The study was undertaken to examine the year wise distribution of contributions, authorship pattern, degree of collaboration, relative growth rate and doubling time, country – wise distribution of articles and institution-wise distribution of contributions. The study revealed that the Degree of Collaboration was high i.e. 211 (0.827) in terms of collaborators contribution. The study analyzed the relative growth rates (RGR) has increased from 2007 (0.76) to 2012 (1.96) in the span of six years. The doubling time (DT) has slightly decreased while calculated year wise.

Keywords: Scientometrics, RGR, DC, DT, Global Contribution, SIRO, IETE Technical Review, IETE, India.

INTRODUCTION

Scientometrics is a branch of Science of measuring and analyzing the science which studies the quantitative aspects of science. Scientometric research is devoted to quantitative studies of science and technology. According to Sengupta⁷ (1990), viewed that scientometric as “organization, classification and quantitative evaluation of publications patterns of all macro and micro communications along with their authorship by mathematical and statistical

calculus”. This study aims to apply the scientometric analysis to describe pattern of publication within a given field or body of literature.

SOURCE JOURNAL

The IETE (The Institution of Electronics and Telecommunication Engineers) is the National Apex Professional body of Electronics and Telecommunication, Computer and IT Professionals, focusing on advancements in Science and Technology. Towards this end the Institution promotes professional development and conducts basic engineering and continuing technical education programmes for human resource development. Today, it has more than 69,000 members of individuals and industries / organizations through its 55 regional centres spread all over India including one in Kathmandu. The IETE is recognized as a Scientific and Industrial Research Organization (SIRO) by Dept of Science & Industrial Research, Ministry of Science and Technology, Government of India. Its activities span from education to technology and research & development. Journal is published bimonthly.

The journal is indexed with Caspur, CNKI (China National Knowledge Infrastructure), Compendex, DOAJ, EBSCO Publishing's Electronic Databases, Expanded Academic ASAP, Genamics Journal Seek, Google Scholar, Hinari, Index Copernicus, Journal Citation Reports, National Science Library, Open JGate, PrimoCentral, ProQuest, Science Citation Index Expanded, Scimago Journal Ranking, SCOLOAR, SCOPUS, SIIC databases, Summon by Serial Solutions, TechXtra, Ulrich's International Periodical Directory, Web of Science

In this paper, an attempt has been made to analyze the contributions to *IETE Technical Review Journal* published during the year 2007 – 2012, in order to explore the authorship pattern, collaborative research, keywords and citation of the papers among the contributions. This study covers the 255 articles of 33 issues published.

LITERATURE WORK

Scientometric studies have done earlier by different authors on the different individual journal publications and literature on specific subject areas. The following studies related to the objectives of this study have been reviewed. An attempt was made by Tilak Hazarika, Kusuma Goswami & Pritimoni Das¹¹ to analyze the contributions of Indian Forester which found Degree of Collaboration was 0.64 among the authors. A Scientimetric Analysis on Indian Journal of Physics was made by Nattar S₄ during 2004 – 2008 which revealed that the year 2004 records the highest % of contributions regarding single, two and three authored. Srimurugan A & Nattar S₈ analyzed the D-LIB magazine published during 2000 – 2007 which revealed that highest number of paper was published in 2005 and the lowest in 2007.

Vijay K R & Raghavan I₁₂ analyzed the Journal of Food Science & Technology published during 2000 – 2004 and found that above 93% of contributions were by multiple authors. Kannappanavar B U, Swamy C & Vijay Kumar M₃ analyzed the publishing trends of Indian Chemical Scientists during 1996 – 2000, which revealed average number of authors per paper has increased from 7.52 to 8.39. Guan & Ma₂ examined the China's Semiconductor Literature and found mega authored papers records the higher value for Co-Authorship Index. Sanni S A and Zainab A N₆ examined the contributions published in Medical Journal of Malaysia during 2004 – 2008 and found 4.82% (28) of contributions were published by Malaysian authors with foreign collaboration.

Patra, Bhattacharya and Verma₅ (2006) investigated the growth pattern, core journals and authors' distribution in the field of bibliometric using data from *Library and Information Science Abstract* (LISA) and found that the growth of literature does not show any definite pattern. Hussain, Akhtar; & Fatima, Nishat₁ (2011) revealed that the majority of the articles were contributed by single authors. And most authors were librarians, faculty members or researchers affiliated with academic or research institutions. Yeoh and Kaur₁₃ (2008) analysed the publication output of Research in Higher Education for subject support in collection development in the light of growing interest in diversified domains of research in higher education. Consequently, analysis of 40 issues of publications revealed a diversified usage pattern of bibliographic reference sources by contributing researchers, with a cumulative total of citations being 8,374.

Velmurugan₁₄ (2013), analyzed the research output of 203 articles appearing in *Annals of Library and Information Studies* journal selected six years for a period between 2007 and 2012. It was found that the most of the contributions are by two authored i.e., 88 (43.35 %). The degree of collaboration ranges from 0.57 to 0.82 and the average degree of collaboration is 0.64. The total average number of authors per paper is 1.87 and the average productivity per author is 0.53. Thanuskodi₁₀ (2010) discussed the research output performance of social scientists on social science subjects. The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of cited journals etc. In this paper examines year-wise, institution-wise, country-wise, authorship pattern, range of references cited of the articles.

Kaur₁₅ (2008) analyzed the publication output of Research in Higher Education for subject support in collection development in the light of growing interest in diversified domains of research in higher education. Consequently, analysis of 40 issues of publications revealed a diversified usage pattern of bibliographic reference sources by contributing researchers, with a cumulative total of citations being 8,374.

METHODOLOGY

The bibliographic records for the analysis are limited to the articles of IETE Technical Review published during the period of 2007- 2012. The data related to IETE

Technical Review regarding 255 contributions made from volume 24 in 2007 to volume 29 in 2012. The analysis covers year –wise distribution, authorship pattern, and year-wise authorship pattern, geographical distribution in national and international and citation of publication of IETE Technical Review. The authorship pattern has been analyzed by using K. Subramanyam’s degree of collaboration in quantitative terms. All data were subsequently examined, observed, analysed and tabulated for making observations.

OBJECTIVES:

- To determine the year-wise distribution of articles.
- To examine the authorship pattern of the contribution.
- To study the Authorship collaboration towards the subject and its authorship pattern in terms of Degree of collaboration.
- To find out the Relative Growth Rate (RGR) and Doubling Time (DT) of the subject and
- To identify the global contribution towards the subject

LIMITATIONS

- This study is limited to the results yielded by research outputs published between January 2007 and December 2012 only.

ANALYSIS AND DISCUSSION

1. Distribution of Contributions (Volume- wise)

Year	Vol. No	Issue. No	# of Articles	% age
2007	24	3	30	11.76
2008	25	6	38	14.91
2009	26	6	42	16.47
2010	27	6	47	18.44
2011	28	6	45	17.64
2012	29	6	53	20.78
Grand Total		33	255	100

Table.1: Distribution of contributions (volume wise)

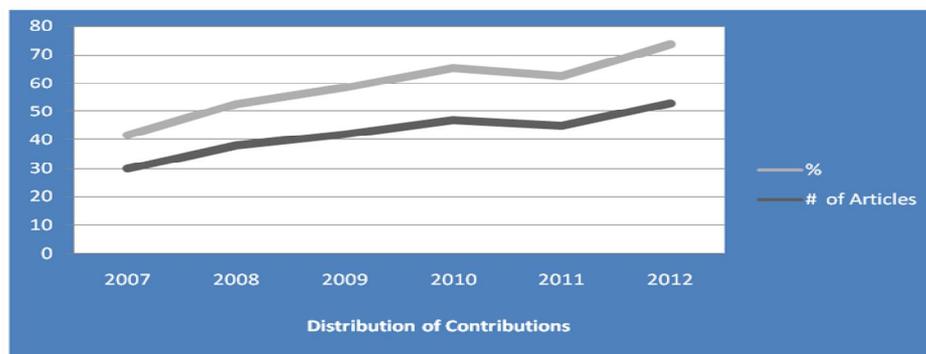


Chart.1: Distribution of contributions (volume wise)

Table 1 Chart 1 shows that the total number of articles published from 2007 to 2012. It indicates that out of 255 contributions, the maximum 53 number of contributions in the year 2012 (20.78 %). It depicts that the year wise contributions are increased year by year.

2. Distribution of Contributions (Issue - wise)

Month	24	25	26	27	28	29	Total
Jan- Feb	0	6	6	8	7	7	34
Mar- Apr	0	5	5	9	8	8	35
May - Jun	0	4	6	8	8	9	35
July- Aug	14	11	7	7	8	9	56
Sep - Oct	9	6	10	7	7	10	49
Nov - Dec	7	6	8	8	7	10	46
Grand Total	30	38	42	47	45	53	255

Table.2: Distribution of contributions (Issue wise)

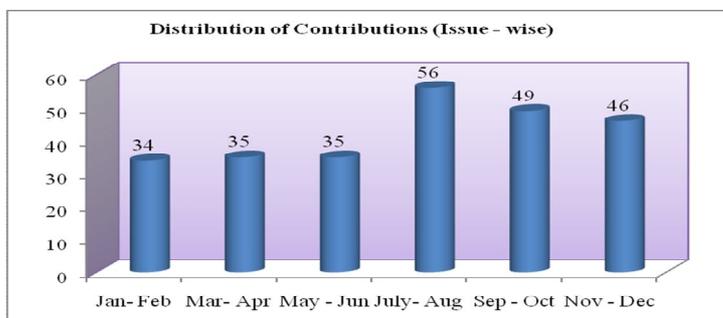


Chart.2: Distribution of contributions (Issue wise)

Table 2 Chart 2 indicates the distribution of contributions (issue –wise). It exhibits bi-monthly wise contributions of journals in which July – August month is the highest number (56 issues) of total contributions whereas the month of Jan – Feb shows that the less issues (34 issues) of contributions.

3. Authorship pattern of Single & Joint contributions

Authorship	Year						Total	% age
	2007	2008	2009	2010	2011	2012		
Single	7	6	4	7	10	10	44	17.26
Joint	23	32	38	40	36	42	211	82.74
Grand Total	30	38	42	47	46	52	255	100

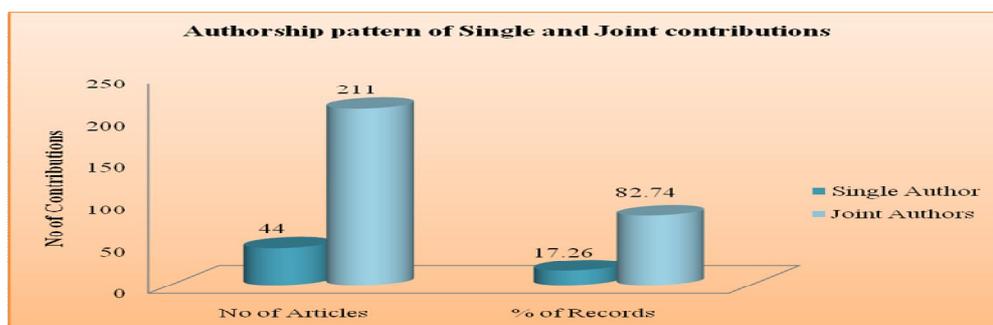


Chart.3: Authorship pattern of Single & Joint contributions

Table 3 Chart 3 represents that out of 255 articles single author contributed only 44 (17.26 %) articles while the rest 211 (82.74 %) articles were contributed by joint authors.

4. Authorship pattern with Degree of Collaboration

Year	Volume	No of Authors		Total	Degree of Collaboration
		Single	Multiple		
2007	24	7	23	30	0.766
2008	25	5	32	38	0.84
2009	26	4	38	42	0.90
2010	27	7	40	47	0.85
2011	28	10	36	46	0.782
2012	29	10	42	52	0.807
Grand Total		44	211	255	

Table.4: Authorship pattern with Degree of Collaboration

5. Degree of Collaboration in the IETE Technical Review Journal

In order to determine the strength of Degree of Collaboration (DC), the following formula suggested by Subramanyam K₉ has been employed.

The formula is Where

C= Degree of Collaboration

N_m = Number of multiple authors

N_s = Number of single authors

$$C = \frac{N_m}{N_m + N_s}$$

$$C = \frac{211}{211 + 44}$$

In the present study the value of C is

$$C = 0.827$$

It has been observed that the Degree of Collaboration was high i.e. 211 (0.827) in terms of collaborators contribution and the individual authorship contribution responsible was very less (i.e. 44).

6. Country – wise Distribution of Contribution

Country	2007	2008	2009	2010	2011	2012	Total	%age	Rank
India	31	31	8	13	12	20	115	45.09	1
China		1	2	8	7	10	28	10.99	2
Korea		2	4	6	9	4	25	9.8	3
USA			5	2	3	5	15	5.88	4
Malaysia	2	2	2	1	3	4	14	5.49	5
UK		1	5	1	1	3	11	4.33	6
Saudi Arabia			1	1	1	3	6	2.37	7
Taiwan			2	2	1		5	1.97	8
Turkey				2	2		4	1.57	9
Poland			1	1	1		3	1.18	10
Spain			1	1		1	3	1.18	10
Thailand				2	1		3	1.18	10
Bangladesh				1		1	2	0.78	11
Germany			2				2	0.78	11
Greece				1		1	2	0.78	11
Pakistan						2	2	0.78	11

Portugal		1	1				2	0.78	11
Switcher land		1				1	2	0.78	11
Tunisia					2		2	0.78	11
Australia					1		1	0.39	12
Bulgaria			1				1	0.39	12
Canada			1				1	0.39	12
Europe		1					1	0.39	12
Israel					1		1	0.39	12
Jordan						1	1	0.39	12
Romania			1				1	0.39	12
South Africa						1	1	0.39	12
Virginia					1		1	0.39	12
Grand Total	33	40	37	42	46	57	255	100	

Table.6: Country – wise Distribution of Contribution

Table 6 represents that the majority of 45.09 % of contributions came from India and it placed the first rank and followed by china 10.99 % contributions and got the second place of contributions and 9.8 % contributions came from Korea; 5.88 % contributions came from USA; 5.49 % contributions came from Malaysia. However, it is inferred that out of the above mentioned twenty six countries, India gives precedence for doing research while compared with other countries

7. Contributors (Institution- wise)

Vol. No.	Year	University	Institution	College	Others	Total	%age
24	2007	6	19	9	2	36	14.11
25	2008	12	19	7	3	41	16.09
26	2009	25	9	4	1	39	15.29
27	2010	31	22	1	2	56	21.96
28	2011	19	19	7	2	47	18.44
29	2012	17	13	2	4	36	14.11
Grand Total		110	101	30	14	255	100

Table.7: Contributors (Institution- wise)

Table 7 shows the Geographical distribution of contributions of this IETE Technical Review. Out of 255 contributions, the highest number i.e. 110 (43.14 %) has been contributed by university and followed by Research Institutions 101 and Colleges (30) and the lowest number i.e. 14 (5.49 %) has been contributed by other institutions.

8. Relative Growth Rate and Doubling Time

Year	Volume	No of Issues	Total no of output	Cumulative Total	RGR			DT
					w1	w2	a1-y2	
2007	24	3	36		3.58			
2008	25	6	41	77	3.71	4.34	0.76	0.91
2009	26	6	39	116	3.66	4.75	1.09	0.63
2010	27	6	56	172	4.02	5.14	1.12	0.61
2011	28	6	47	219	3.85	5.38	1.53	0.45
2012	29	6	36	255	3.58	5.54	1.96	0.35

Table.8: Relative Growth Rate and Doubling Time

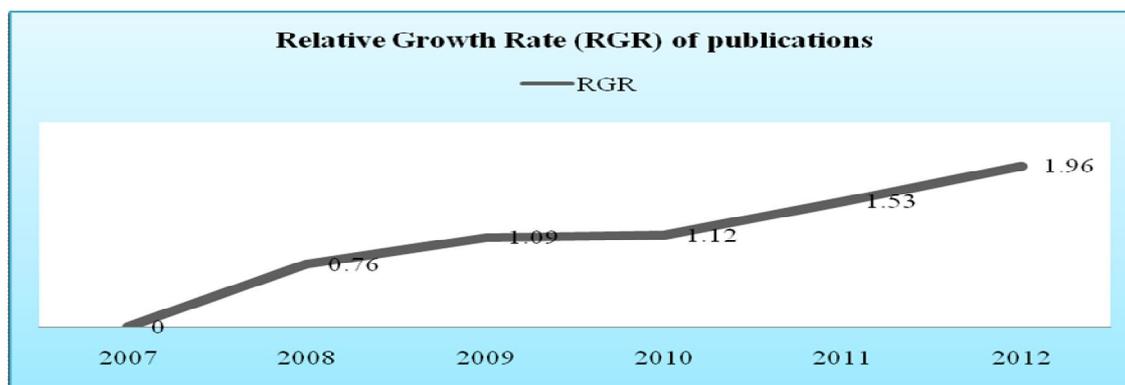


Chart. 4. Relative Growth Rate (RGR) of publications

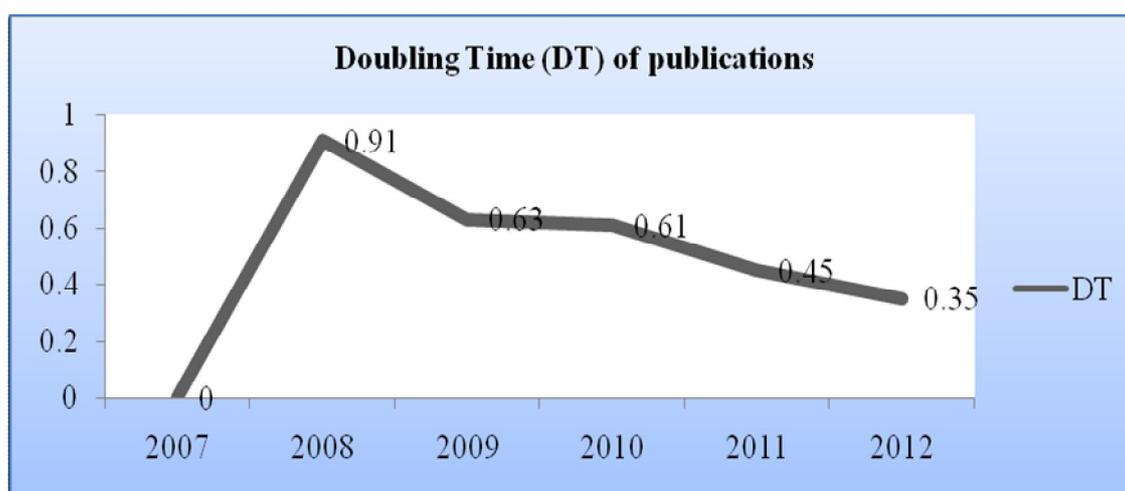


Chart. 5. Doubling Time (DT) of publications

Table 8 and Chart 4 & 5 have been observed that the literature growth based on relative growth rate (RGR) and Doubling Time (DT). Based on the study the relative growth rates (RGR) has increased from 2007 (0.76) to 2012 (1.96) in the span of six years. The doubling time (DT) has slightly decreased while calculated year wise. The Doubling Time increases from 0.91 in 2007 to 0.35 in 2012. It was found that the relative growth rate has been increased and the doubling time has decreased gradually compared with RGR.

9. Year -wise distribution of citation

Year	Volume	Rank * B/A	# of Papers	# of Citation	Average no of Citation / Paper	Cumulative	
						Citation	%age
2007	24	6	30	445	14.83	445	5.59
2008	25	5	38	798	21.0	1243	15.62
2009	26	4	42	1231	29.31	2474	31.09
2010	27	3	47	1501	31.93	3975	49.96
2011	28	2	45	1983	44.07	5958	74.88
2012	29	1	53	1998	37.69	7956	100
Grand Total			255	7956	31.2		

* Note: A= No. of papers, B= No. of citation.

Table 9 provides a detailed summary of citations published in IETE Technical Review Journal during 2007-12, which shows that maximum number of citations have been published in volume 29, 2012 (1998 nos.) and placed at 1st rank, and volume 28, 2011 (1983) got placed at 2nd position as the compared with number of citations and its average citations per paper and followed by volume 27, 26, 25, and 24 respectively. It was found that very interesting that the rank position were from bottom to top level as per year i.e. 2012-2007.

FINDINGS AND CONCLUSION

IETE Technical Review Journal is a research publication in the field of education and technology and published bimonthly. The Institution of Electronics and Telecommunication Engineers (IETE) is India's leading recognized professional society devoted to the advancement of science, technology, electronics, telecommunication and information technology. The IETE is recognized as a Scientific and Industrial Research Organization (SIRO) by Dept of Science & Industrial Research, Ministry of Science and Technology, Government of India. The following major findings are furnished as a conclusion below.

- Out of 255 contributions, the maximum 53 number of contributions in the year 2012 (20.78 %) and also it depicts that the year wise contributions are increased year by year.
- The Degree of Collaboration was high i.e. 211 (0.827) in terms of collaborators contribution and the individual authorship contribution responsible was very less (i.e. 44).
- Out of 255 articles single author contributed only 44 (17.26 %) articles while the rest 211 (82.74 %) articles were contributed by joint authors.
- The majority of 45.09 % of contributions came from India and it placed the first rank and followed by china 10.99 % contributions and got the second place of contributions and 9.8 % contributions came from Korea.
- Out of 255 contributions, the highest number i.e. 110 (43.14 %) has been contributed by university as per the geographical distribution of contributions.
- The study analyzed the relative growth rates (RGR) has increased from 2007 (0.76) to 2012 (1.96) in the span of six years. The doubling time (DT) has slightly decreased while calculated year wise.
- The maximum number of citations have been published in volume 29, 2012 (1998 nos.) and placed at 1st rank, and volume 28, 2011 (1983) got placed at 2nd position as the compared with number of citations and its average citations per paper.

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