



Research Output of IEEE Transactions on Industrial Electronics during 1996-2002: A Scientometric Study

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ABSTRACT

Scientometrics analysis of IEEE transactions on Industrial Electronics is the source journal for analyses during the period of 1996-2002. Seven volumes of the Journal had 42 issues from 1996-2002. The researcher identifies the number of contributions, Authorship pattern and author productivity, average citation during the study period and length of articles, Collaboration Pattern. Out of 914 articles 165 articles published with 8 pages. Two authors are dominated in this series.

KEYWORDS : Scientometrics, IEEE Transactions, Industrial Electronics, Collaboration Pattern,

Introduction

The subject of Bibliometrics was first coined by Pritchard (1996) as “the application of mathematical and Statistical methods to books and other media” Bibliometrics is unique type of research method in the library and information science field The methods of bibliometrics are used to investigate the growth of literature, author productivity, obsolescence of documents, country wise, subject-wise distribution of documents etc., In the recent years, bibliometrics is used as a standard tool of science policy and research management. Bibliometrics is one of the interdisciplinary researches and it is used not only in the library and information science, but also in other fields of science like computer science, Telecommunication, Agriculture, Biology, Education, Mathematics, Political Science, Religion etc., Bibliometrics is also used to identify the emerging research areas. Various statistical techniques are used to measure the authorship pattern, Citation Analysis and Publication pattern. One common way of conducting bibliometric research is to use the Social Science Citation Index, the Science Citation Index or the Arts and Humanities Citation Index to trace Citations.

Pritchard (1969) described the Bibliometrics as the application of Mathematics and statistical methods to books and other media.

Thanuskodi (2010), that bibliometrics analysis serves as useful tool in evaluation the quality of a journal and its contents.

IEEE Transactions on Industrial Electronics

This journal was published from 1982. In the starting it was published as a quarterly journal. But after 1989, from 1990 it was published as a bi-monthly. After that from 2008 it was published as a monthly journal. This Journal publishes articles related to industrial electronics, letters surveys and case studies on the recent trends in Industrial Electronics.

IEEE Transactions on Industrial Electronics is published monthly. Its scope encompasses the applications of electronics, controls and communications, instrumentation and computational intelligence for the enhancement of industrial and manufacturing systems and processes. Included are power electronics and drive control techniques, system control and signal processing, fault detection and diagnosis, power systems, instrumentation.

Review of Literature

Scientometrics study was already done in earlier years by different authors on different journals publications on particular subject areas. The following are the some of the literature review.

Maheswari.S & Murugesapandian (2015) has done the research on the journal of Webology. They identified Indian authors contributed more than other countries of authors. Most of the

authors prefer Journal for publishing their articles rather than other sources.

Rajendran.P et. al (2011) analyses the journal of Scientific and Industrial Research for the period of 2005 – 2009. Totally 633 articles were published with 3968 pages during the study period. Maximum number of paper published in 2009. 72.99% of the Indian authors contributing papers.

Joicy A.J and Rekha Rani (2011) analyses the Websites of R&D Institutions in India. 246 R&D Institutions are taken for the study. Only 77 websites are working very good condition and some the R&D institutions gave option for interaction for their users.

Akhtar Hussain and Nishat Fatima (2011) analyses the journal of IFLA during the period of 2006-2010. They identified, in the 2006 maximum number of articles are contributed by various authors. Maximum number of articles was contributed by single author and most of the authors are Faculty members and research scholars. USA contributed more number of articles rather than other countries.

Dilip K Swain et., al (2014) analyses the journal of Business Economics from 2008 -2013. Maximum number of articles was contributed by single author only and most of the articles are published with 9 pages. Most of the articles are contributed by 12 different countries.

Objectives

The following are objectives of the present study

1. To study the papers published during the study period.
2. To identify the authorship pattern & productivity.
3. To find the average length of papers.
4. To identify the citations of during the study period.
5. To examine the pattern of co-authorship.
6. To find the degree of collaboration.

Methodology

A total of 42 issues of the IEEE Transactions on Industrial Electronics from 1996-2002 have been taken for the research. The required data were downloaded from IEEE Transaction website. Each and every article was analyzed and the required were recorded. Finally collected data were compiled and tabulated in excel sheet for preparing the tables for easy understanding. After the data compilation the following tables were generated from the tabulated data. Publication trend, authorship pattern, length of articles, Citation pattern etc.

Data Analysis

Distribution of contributions

Table 1 reveals the distribution of research articles published by various authors in IEEE Transactions on Industrial Electronics during the period of 1996-2002. Totally 914 articles was published. In the year 2000 maximum number of articles were published with 144 articles (17.2%) followed by the year 2001 with 152 articles, (16.6%).

Table.1 Distribution of Contributions

Sl. No	Year	Vol. No	No.of Issues	No. of Articles							Total	%
				Iss.1	Iss.2	Iss.3	Iss.4	Iss.5	Iss.6			
1	1996	43	6	28	11	12	10	9	8	78	8.5	
2	1997	44	6	19	19	20	19	19	13	109	11.9	
3	1998	45	6	24	23	21	23	17	16	124	13.6	
4	1999	46	6	27	29	27	23	23	21	150	16.4	
5	2000	47	6	29	29	24	30	26	19	157	17.2	
6	2001	48	6	26	27	25	20	20	34	152	16.6	
7	2002	49	6	29	25	25	25	26	14	144	15.8	
			42	182	163	154	150	140	125	914	100	

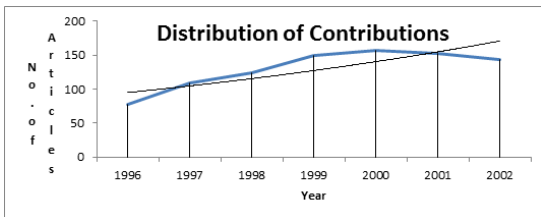


Fig.1 Distribution of contributions Authorship Pattern Year wise

Table 2 shows that Authorship pattern Year-wise. Totally 914 articles were published during the study period. Out of 914 articles, 353 articles were published by double authors. Double authors are dominated in this series. In the year 1998, and 1999 sharing first place in double authors contributions with 65 articles followed by the year 2000 with 53 articles. In the single author contribution again the year 1999 got the first place followed by the year 2001 with 13 articles.

Table.2 Authorship Pattern Year-wise								
Sl.No	Year	Single	Double	Three	Four	Five	Five & above	Total
1	1996	9	29	26	12	1	1	78
2	1997	5	47	30	16	8	3	109
3	1998	10	65	29	16	3	1	124
4	1999	20	65	42	19	3	1	150
5	2000	9	53	56	28	9	2	157
6	2001	13	49	52	24	9	5	152
7	2002	8	45	47	27	12	5	144
	Total	74	353	282	142	45	18	914
	%	8.096	38.62	30.853	15.536	4.9234	1.969	
			39	11		37		

Author Productivity

Table .3 shows that Productivity of Authors. Productivity calculated by following formula.

Average authors per paper = No.of Authors / No.of Articles
 Productivity per Author = No. of Articles / No.of Authors

Average authors per paper for study period is 3.12 When compared to the total average number of authors per article, the year 2002 closely equal to the number of authors per articles.

The average per productivity per author is 0.32. When compared to the average productivity the year 2002 has equal average productivity and the year 1998 has closely related to the

productivity per author.

Table.3 Productivity of Authors

Sl.No	Year	Total No.of articles	No.of Authors	Average Authors per paper	Productivity per Author
1	1996	78	311	3.98	0.25
2	1997	109	314	2.88	0.34
3	1998	124	394	3.18	0.31
4	1999	150	452	3.01	0.33
5	2000	157	443	2.82	0.35
6	2001	152	440	2.89	0.34
7	2002	144	448	3.11	0.32
	Total	914	2802	3.12	0.32

Authorship Pattern

Table.4 shows that Authorship pattern of contributions during the study period. Out of 914 articles only 74 articles were contributed by single authors. 92% of the Articles are contributed by Multi Authors with 840 articles. In the multiple author contributions the year 2000 stands first with 148 articles, 17.6% followed by the year 2001 with 139 articles, 16.5%.

Table.4 Authorship Pattern

Sl.No	Year	Total Article s	Single Author	Multi Authors		
			No. of Contributions	Percentag e	No. of Contributio ns	Percentag e
1	1996	78	9	12.162162	69	8.2142857
2	1997	109	5	6.7567568	104	12.380952
3	1998	124	10	13.513514	114	13.571429
4	1999	150	20	27.027027	130	15.47619
5	2000	157	9	12.162162	148	17.619048
6	2001	152	13	17.567568	139	16.547619
7	2002	144	8	10.810811	136	16.190476
	Total	914	74		840	

Degree of Collaboration

Subramaniya has suggested the formula for Degree of Collaboration

$$\frac{Nm}{Nm + Ns}$$

Where DC= Degree of Collaboration
 Nm= Number of Multiple Authored Papers
 Ns= Number of Single Authored Papers

Table.5 Degree of Collaboration

Sl.No	Year	Total Articles	Single authors Contribution	Multiple authors Contribution	Degree of Collaboration
1	1996	78	9	69	0.88
2	1997	109	5	104	0.95
3	1998	124	10	114	0.92
4	1999	150	20	130	0.87
5	2000	157	9	148	0.94
6	2001	152	13	139	0.91
7	2002	144	8	136	0.94
	Total	914	74	840	0.92

The above table expresses the Degree of collaboration. During the

study period of 1996 – 2002 Degree of collaboration is 0.92 and range of Degree of Collaboration from 0.87 to 0.94.

Distribution of Pages

Table.6 shows that distribution of pages during the study period of 1996-2002. 914 papers published with 7793 pages. Average length of pages for the study period is 11.8. It is noted that average length of articles differs from a minimum of 10.5 to a maximum of 12.7. The year 2002 has minimum of average number of pages 10.5 and maximum of average number of pages is 12.7 and it was sharing by two years 1997 & 1998.

Table.6 Distribution of Pages

Sl.No	Year	Quantum of contributions	Quantum of pages	Average length of Pages
1	1996	78	660	11.8
2	1997	109	860	12.7
3	1998	124	975	12.7
4	1999	150	1232	12.2
5	2000	157	1375	11.4
6	2001	152	1320	11.5
7	2002	144	1371	10.5
		914	7793	11.8

Year-wise Distribution of Citations

It is found that from Table.7 papers published in IEEE Transactions on Industrial Electronics during the study period and the year 1999 has more citations and the year 1996 has minimum number of citations.

Table.7 Distribution of Citations

Sl.No	Year	Total No.of articles	No.of References
1	1996	78	1398
2	1997	109	1454
3	1998	124	1852
4	1999	150	2462
5	2000	157	2257
6	2001	152	2430
7	2002	144	2050
		914	13903

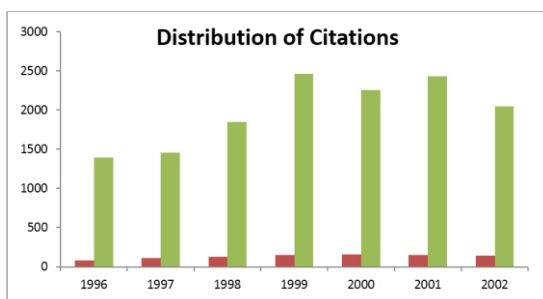


Fig.2 Distribution of Citations

Table.8. Total Number of Citations Vs.No.of JI. Citations

The following table expresses the Number of Citations Vs. Number of Journals Citations. The Year 1999 has maximum number of citations but the year 2001 has maximum number journal citations. Compare with the total citations, Journals citations has 46.5 % other sources are followed the next positions.

Sl.No	Year	Total No.of articles	No.of Citations	No.of JI. Citations
1	1996	78	1398	596
2	1997	109	1454	654
3	1998	124	1852	901

4	1999	150	2462	1128
5	2000	157	2257	1138
6	2001	152	2430	1182
7	2002	144	2050	869
		914	13903	6468

Findings:

The following are findings of the present study

1. The year 2002 maximum number of articles are published
2. Maximum number of articles is published by doubled authors.
3. Average authors per paper is 3.12
4. During the study period Productivity per author is 0.32
5. Degree of collaboration for the present research period is 0.92
6. Average length of pages is 11.8 during the present study.
7. The year 1999 has Maximum number of citations.
8. Out of 13903 references, above 6400 (46.5%) references are Journal references.

Conclusion:

From the above research study, we conclude that maximum number of authors prefers journals for publish their research articles. The researcher wants to do the research in a collaborative manner than solo. Maximum number of articles is published with 8 pages.

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