Research Output of Thiagarajar College of Engineering, Madurai during 2014-2018: A Scientometric Analysis using Excel Sheet

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Abstract

This study examined the research publications of the faculty of Thiagarajar College of Engineering (TCE), Madurai, Tamilnadu, India. Data for this study have been collected from the Scopus and web of science databases for 2014-2018. Among 1270 papers published and indexed in the Scopus for five years and 437 papers published and indexed in the web of science. This paper shows how to use an excel sheet for calculating the h-index, i-10 index, average citation per year, cited rate, percentage of cited and non-cited paper, real average citation, etc.. Apart from the above analysis, this paper finds the overlap publications of Scopus and Web of Science.

Keywords: Research Publication, Publication Output, Thiagarajar College of Engineering, Scientometric, Scopus and Web of Science

Introduction

Scientometric is an analysis of scientific publication on various authorship patterns, document type, number of citations, top-cited paper, average citation per year, subject area, research growth of any Topic or institutions, etc. This study attempted to know the research output of the faculty of Thiagarajar College of Engineering (TCE), Madurai, using Bibliometric / scientometric techniques. The data for this study is retrieved from Scopus and web of science indexing database. Also, this paper shows the easy method of analyzing the research data by using MS Excel. This paper provides you the formula used for this study with a simple example.

About Thiagarajar College of Engineering

Thiagarajar College of Engineering (TCE), Madurai is a 61 years old Government aided autonomous Institution, affiliated to Anna University, Chennai and is accredited by the National Board of Accreditation (NBA), New Delhi. TCE is one of the several educational institutions founded by Philanthropist and Industrialist late Shri. Karumuttu Thiagarajan Chettiar. It was established in the year 1957. TCE is funded by central & state governments and management. The courses offered in TCE are approved by the AICTE. It was granted Autonomy in 1987. TCE offers Eight Undergraduate programs, Eight Post-graduate programs, and Doctoral programs in Engineering, Science, and Architecture. TCE secured 56th rank in the National Institutional Ranking Framework (NIRF) 2019 of MHRD, Govt. of India, including all IITs, IISc, and NITs.

Review of literatures

Mandhirasalam analyzed the publication output of Thiagarajar College of Engineering (TCE), Madurai, India, and reported 1497 papers published in the span of 43 years from 1972 to 2014. Among the total output, 1231 papers (82.23%) were published during the last seven years, i.e., from 2008 to 2014. The findings show that TCE has notably contributed to the research in science, engineering, and technology.

Sivakumar analyzed the publication output of PSG College of Arts & Science (PSGCAS), Coimbatore, India, and reported that 430 papers were published in the span of 15 years, i.e., from 2001 to 2015. The finding of the overall growth rate of publications has shown an increasing trend during the study period. It shows that the publication of research is high in 2015. Also, there is a minimum of single-author papers published by the above college during that period.

Scientometric Analysis of Seaweed Research concerning Web of Science Ramasamy Kumaresan et. al., analysed that total of 5814 publications were published in seaweed research globally during the study period 2005-2014. The highest number of publications was published in 2014, with 883 (15.19%). The highest Total Local Citation Scores (TLCS) and Total Global Citation Scores (TGCS) were recorded in 2008, 2460 (14.99%), and 9724 (15.50%), respectively.

Objectives

- To find out the year-wise research publication output of TCE
- To compare the research output of TCE with Scopus and Web of Science
- To know the research pattern and growth of TCE for the last five years
- To know the types of publication
- To calculate h-index, i10 index year wise
- To calculate the year-wise cited, non-cited papers with real-time average
- To know is there any overlap in between Scopus and Web of Science publication coverage

Scope and Limitation of the Study

The scope of the present study is limited to the papers published by Thiagarajar College of Engineering, Madurai in Scopus and WoS database. It is observed that to know the research growth; it is to analyze a minimum of five-year data. It takes for the last five years to know the growth of research publication of TCE, Madurai. The data collected in the excel separately for both Scopus and WoS and used relevant formulas for analysis.

Methodology

Data retrieved on 10.09.2019 from the Scopus database by using affiliation id "60033058" and affiliation name "Thiagarajar College of Engineering" and also filter further the year from 2014-2018 using advance searches. Web of Science data is retrieved on 11.10.2019 by using the advance search option "OG=Thiagarajar College of Engineering" and "Timespan=2014-2018". OG stands for Organisation enhanced in Web of Science search..

Data Analysis and Interpretation

Table 1

Details	Scopus	WoS
Publication count	1270	437
Citation count	4902	3335
Average citation per item	3.85984252	7.631578947
h-index	30	27
i10 index	136	101
Overlap publications in both Database	390	

The above table shows the publication count of Scopus indexed is more than Web of Science indexed. Also it observed that fewer than 437 publications of Web of Science 390 publications are available in Scopus also. So it is observed that Scopus has indexing wide range of publications than the Web of Science. At the same time Web of Science has restricted with Journals also it seems the quality of the database.

Type of Document Published

Table 2

Type of Document published	Scopus	WoS
Conference papers	386	7
Articles (include in press)	841	430
Editorial	1	

Review	13	
Book chapter	29	
Total papers	1270	437

The above table shows that the coverage of conference proceedings is more in Scopus than the Web of Science; also Scopus covers book chapters, review, editorial etc. Also it is observed that most of IET, IEEE, NPEC, i-PACT conferences are not indexed in Web of Science whereas it is indexed in Scopus database.

Five years report of Scopus and Web of Science

Table 3: Scopus

Year	Publications	Citations	i10 index	h-index	Average citation per year	Cited paper count	Non cited paper count	% of Cited rate	% of non cited paper	Real average citation
2014	274	1690	41	21	6.17	193	81	70.4379562	29.5620438	8.756476684
2015	323	1091	28	16	3.38	179	144	55.41795666	44.58204334	6.094972067
2016	210	1057	33	16	5.03	137	73	65.23809524	34.76190476	7.715328467
2017	195	665	22	13	3.41	75	120	38.46153846	61.53846154	8.866666667
2018	268	399	12	11	1.49	98	170	36.56716418	63.43283582	4.071428571
Total	1270	4902	136							

Table 4: Web of Science

Year	Publications	Citations	i10 index	h index	Average citation per year	Cited paper count	Non cited paper count	% of Cited rate	% of non-cited paper	Real average citation
2014	91	1152	33	20	12.66	81	10	89.01098901	10.98901099	14.22222222
2015	84	680	21	15	8.10	68	16	80.95238095	19.04761905	10
2016	82	772	23	15	9.41	74	8	90.24390244	9.756097561	10.43243243
2017	91	432	15	11	4.75	68	23	74.72527473	25.27472527	6.352941176
2018	89	299	9	9	3.36	50	39	56.17977528	43.82022472	5.98
Total	437	3335	101							

The above results are analyzed with a simple excel sheet using the formula below given. This formula is provided with an example of Web of Science data during 2014 given in the above table 4.

H-index: Sort the data of each year from higher citation to lower in one row. In another row from one to number of papers. **Eg.** In 2014 91 paper in WOS for us, here our h-index is 20. it shows that our 20th paper got 20 citation and more.

I-10 index: Sort the data of each year from higher citation to lower in one row. And found how many of the paper have 10 and above citation is called i10 index. **Eg.** In 2014 we have more than 33 papers out of 91 have received 10 and above citation.

Average citation per year: Total no. Citations / total no. Publications of that year. **Eg.** For 2014, 1152/91

% of cited rate: How many paper really citied in that year divided by total publications of the year in to 100. **Eg.** In 2014 we have 81 cited paper out of 91. so (81/91) *100 is the cited rate.

% of non-cited paper: How many paper not citied in that year divided by total publications of the year in to 100. **Eg.** In 2014 we

have 10 non-cited paper out of 91. so (10/91) *100 is the non-cited rate.

Real Average citation

Total citation divided by total real cited paper count. **Eg.** In 2014 we have total citation of 1152 divided by 81 which is no. of cited paper per year.

Cited and not cited paper can be easily found by sorting the list of each year publications with citations row. So that it is easy to find how many papers are having citation and how many or not having citations in each year.

Comparison of Scopus and Web of Science

Table 5

Year	Scopus				Web of Science			
	Publications	Citations	i10 index	h-index	Publications	Citations	i10 index	h-index
2014	274	1690	41	21	91	1152	33	20
2015	323	1091	28	16	84	680	21	15
2016	210	1057	33	16	82	772	23	15
2017	195	665	22	13	91	432	15	11
2018	268	399	12	11	89	299	9	9

The above table shows that the Scopus has more publications than the Web of Science, but if we consider the citation count, h-index, and i10 index of both Scopus and Web of Science, it is found that Web of Science is more visible than the Scopus. E.g., In 2014, for Scopus, we have 274 publications with 1690 citations. But For Web of Science, in the same year, we have 1152 citations for only 91 publications. The average citation rate is higher in Web of Science than the scopus. E.g., In 2014, we have 6.17 average citation rates in Scopus and 12.66 in Web of Science (refer to Table 3 and 4).

Figure 1: Year wise Publication of Scopus and Web of Science of TCE
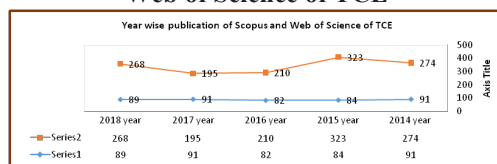
Here in the above figure, series 1 is Web of Science publications, and Series 2 is Scopus publications. The above figure interrupts that the publications in the Web of Science are more or less the same every year, but publications in Scopus has more variations. Also, it shows that the TCE faculty is continuously publishing the papers and concentrating on the research.

Table 6: Top Cited Paper of this Study

Title of the paper	Author	Journal name	Published year	DOI	Citation (Web of Science) as on 11.10.2019	Citations (Scopus) as on 10.09.2019	Citations (in Google Scholar) as on 24.10.2019
A review on preparation, characterization, properties and applications of nanofluids	Devendiran, Dhinesh Kumar; Amirtham, Valan Arasu	Renewable & Sustainable Energy Reviews	JULY 2016	10.1016/j.rser.2016.01.055	149	156	190

The above table 6 shows that publishing any journal in both indexing database can get more citations for an author. It also shows that Google Scholar is also helping to get more citations through an open-source platform.

Figure 2: **Country wise Collaboration**

The above figure 2 shows that the faculty of TCE is collaborating Globally for the research. The above figure is retrieved from Web of Science on 11.10.2019 for TCE with a limit to 2014-2018 publications.

Conclusion

Here it is to conclude that Scopus is covering more Journals and conference papers than the web of science. But Web of Science is restricted mostly to Journals and covers only a few Conferences. Scopus is focusing on the researchers in the engineering stream, whereas the Web of Science is focusing on the arts and science stream. The researcher can publish papers in both Scopus and Web of Science indexing Journals based on the subject area. Both Scopus and Web of Science indexing Journals are taken by UGC approved journal list. Also, this paper provides simple techniques of scientometric study for future research. There is no special tool required for analysis of the research data of our institution. This simple approach also provides you the insight into the research pattern of any organization. The paper shows how to analyze the simple research data of any organization without much investment of tools or technical knowledge.

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