A SCIENTOMETRIC MAPPING OF RESEARCH OUTPUT OF PONDICHERRY UNIVERSITY

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ABSTRACT

This paper presents a scientometric analysis of research publications in Pondicherry University. The publications published in 1990 to 2014 and also indexed in Web of Science (WoS) were considered for the analysis. Different scientometric indicators have been calculated to give better insight of the research performance measured in terms of quality as well as quantity. Moreover, collaboration at different levels such as author, institution is measured along with the status of collaboration at international level. The major research areas have been also explored. This study provides a brief but informative summary of research publications at Pondicherry University.

KEYWORDS: Scientometrics, Research Competitiveness, Research Performance

Pondicherry University is a central university in Puducherry, India. Founded in 1985 by the Government of India, the university is a collegiate university with a jurisdiction spread over the Union Territories of Puducherry, Lakshadweep and Andaman and Nicobar Islands[1].Scientometric analysis has emerged in the last few years, basically deals with the study of measuring and analyzing science, technology and innovation[2].The objective of the study is to attain an analytical view of overall research status of Pondicherry University using standard scientometric techniques in the recent past. Many other similar studies (Uddin & Singh. 2014; Banshal et al. 2014; Uddin & Singh. 2015) helped in current research design.

DATA COLLECTION

For collecting the publication metadata, the renown Web of Science (WoS)[3]was used which covers a selected group of journals and conferences. The data was collected for the period 1990-2014. The 25 years data is a quite large period for details analytical purpose. The query used for the collection of data was: [OG = "PONDICHERRY UNIVERSITY" Timespan=1990-2014, Indexes=SCI-EXPANDED, SSCI, A & HCI].The data was obtained in April 2015. There are different types of record such as article, proceedings paper, book review, note, review, meeting abstract, letter,

editorial material etc. Each record in WoS consists of 61 fields including meta-data about the records, such as paper title, author address, citation references etc.

METHODOLOGY

The standard Scientometric methodology was followed to compute various parameters like Average Citation Per Paper (ACPP), Cited Percentage (CP), proportion of Highly Cited Papers (HiCP) and Internationally Collaborated Papers (ICP), and different quality indexes (h-index, g-index, hg-index, P-index). The authorship pattern has been identified along with top collaborative authors. The top productive authors were identified and their performances were accessed based on their publications' impact. The most collaborating institutions and countries have been recognized using extraction of information from affiliation text. Finally the major research areas were explored using WoS category information and mapping them to a predefined 14 major areas of research. The parameters have been obtained by a programmatic analysis of the collected data using R.

RESULTS

Research Output and Growth Trend

Total 1,913 publications were found for the period 1990-2014. Figure 1 shows the year-wise growth of total papers (TP). An increasing trend was observed in the last 25 years.

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[1]https://en.wikipedia.org/wiki/Pondicherry_University
[2]https://en.wikipedia.org/wiki/Scientometrics
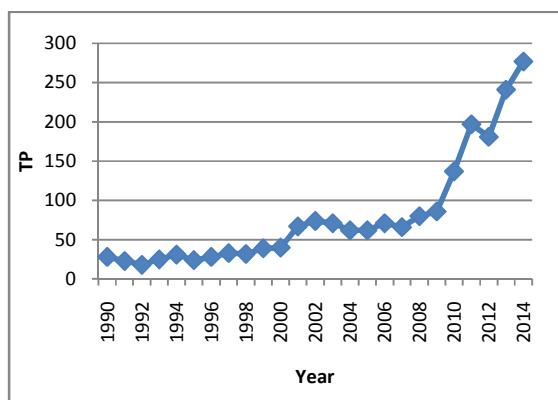[3]https://apps.webofknowledge.com

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Figure 1: Year-wise research growth in terms of TP

Authorship and Collaboration Pattern

The authorship pattern, shown in figure 2, depicts that the number of papers with more than three authors has been increasing over the years. It is a clear indication of increasing collaborative research among the researchers. Total 94.83% (1,890) papers were co-authored whereas 22.88% (456) papers were internationally co-authored.
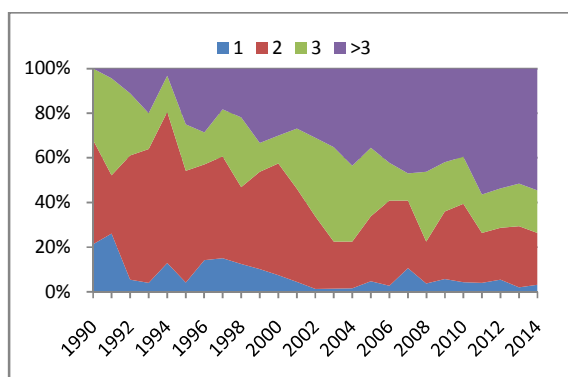

Figure 2: The co-authorship pattern observed in 1990-2014

The percentage of internationally collaborated papers (ICP) trend never followed a regular pattern (as shown in figure 30.

Figure 3: The ICP growth over the period 1990-2014

Table 1: Top participating countries in collaboration with Pondicherry University

|	Country	Papers
1	United States	100
2	France	73
3	Japan	41
4	China	38
5	Iran	34
6	South Korea	31
7	Taiwan	30
8	Canada	23
9	Germany	22
10	Italy	21

In table 1 and table 2, the most participating countries and institutions in collaboration with Pondicherry University are listed. It can be seen that United States and Anna University top in these list, respectively.

Table 2: Top participating institutions in collaboration with Pondicherry University

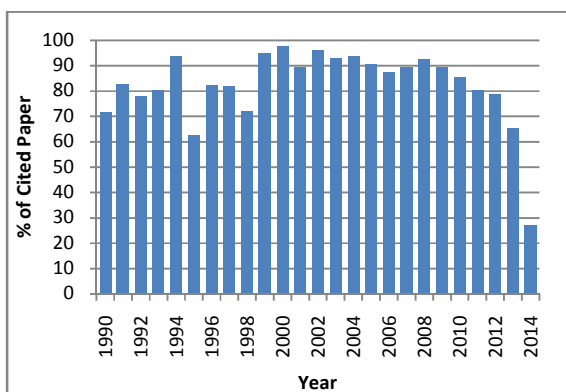|	Institution	Papers
1	Anna University	41
2	Acharya Nagarjuna University	38
3	Ecole Polytech	38
4	University of Madras	34
5	Sri VenkateswaraUniversity	28
6	Johns Hopkins University	27
7	Pondicherry Engineering College	24
8	Inst Bioinformat	22
9	University of Hyderabad	22
10	Annamalai University	21

Research Impact

The research impact can be measured as the number of citation received by the publications. Moreover, the number of highly cited papers (HiCP) is also a good indicator of quality publications. The top 5% mostly cited papers count in ICP. Both the average citation received by per paper (ACPP) and HiCP are presented in figure 4. It shows that the ACPP is highest for the year 2004 in the period whereas the HiCP values are inconsistent in the period.
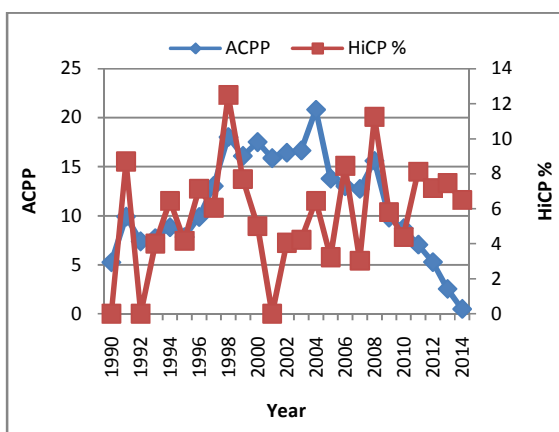

Figure 4: The ACPP and HiCP percentages over the period 1990-2014

Besides measuring the citation impact the percentage of cited papers is also calculated (shown in figure 5) and it is observed that the measure remains almost constant over the years except the two recent years. This is due to the fact that publications need a minimum time span to be spread and cited.

Figure 5: The percentage of cited papers in 1990 to 2014

The popular performance indexes such as h-index, g-index, hg-index and P-index are also calculated to see the overall performance of the institution (shown in figure 6). All the indexes follow same trends. It is also seen that the publications of 2002 to 2010 over performed in the period.
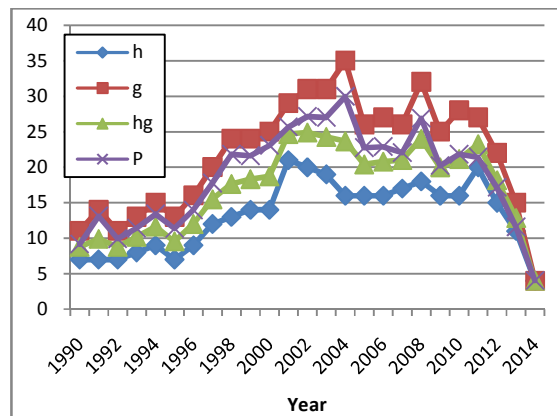
**Figure 6: Different performance indicators over the years**

Top Authors and Major Research Areas

The top performing authors in terms of total publications (TP) are found and their corresponding performances are also measured. The top 10 authors are listed in table 3.

Table 3: Top authors (in terms of TP) and their indicators

	Author	TP	TC	h-index	g-index	i10-index	Max Citation
1	Rao, PS	135	1090	17	23	40	79
2	Abbasi, SA	118	2223	28	41	66	99
3	Porsezian, K	111	749	14	20	24	42
4	Rao, HSP	84	659	11	23	16	130
5	Mathur, PP	62	1269	21	34	32	134
6	Venkatesan, R	62	560	14	18	21	29
7	Ravikumar, RVSSN	61	552	14	19	22	40
8	Satyanarayana, N	58	474	15	19	17	37
9	Venkateswarlu, M	56	446	14	18	16	37
10	Tamizhmani, KM	50	388	11	17	13	40

The major research areas are explored using the WoS categories which are grouped to 14 predefined major research areas such as Physics (PHY), Mathematics (MAT) etc. Physics and Chemistry (ENG) are the most researched areas followed by Biological Science (BIO) in Pondicherry University.
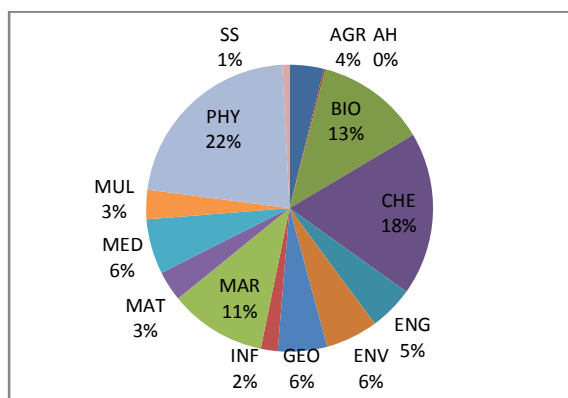
Figure 7: The proportions in different research areas

CONCLUSION

The paper presents results of a detailed scientometric analysis of Pondicherry University's research publications during the period 1990-2014. The publications indexed in WoS have been analyzed and different scientometric indicators were obtained. The indicators computed present an in-depth analysis. These results may be useful for prospective students, researchers and research policy makers in the institution and other relevant bodies.

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