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Research in the University of Calicut, India

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Abstract: This paper examines the growth of scholarly articles produced by the University of Calicut over a period of fifty one years to identify the growth and trend of research. Data was collected from Scopus database. As of 30th September 2018, a total number of 2158 scholarly articles have been published by the university. The study found that more papers were published on Agricultural and Biological Sciences (30%) followed by Chemistry (23%) and Physics and Astronomy combination (21%). The publications of scholarly articles in Social Sciences, Business, Management and Accounting, Arts and Humanities, Psychology, Economics, Econometrics and Finance were found to be very less (3.7%). The majority of articles (58%) were published during the last ten years (58%).

Key Words: Research Productivity, Research Output, University of Calicut,

1. Introduction

The number of scholarly articles a university has produced is one of the important parameters of institutional ranking. The National Institutional Ranking Framework (NIRF) of India examines the number of documents of an institutions for the last three years to assign marks under Research and Professional Practice (RPC). The RPC parameter comprises 100 marks and out of it 70 marks are given for combined metric for publications and combined metric for quality of publications. The world university ranking agencies also give weightage to the number of papers published and the citations received for the papers. Global ranking agencies as well as NIRF take data on publication and citation either from Scopus database and Web of Science or from both. Hence, examination of the growth of scholarly publications of a university based on data from Scopus database assumes significance. This study attempts to understand the growth of scholarly articles produced by the University of Calicut, a state university in the state of Kerala, India.

As of 6-2-2018, India has 842 universities that include 381 state universities, 123 deemed universities, 47 central universities and 291 private universities. Out of this the state of Kerala has thirteen state universities, one central university and three deemed to be universities. There were only four universities in Kerala before 1975 and the majority of universities were established after 2005. Though Kerala has fourteen revenue districts, universities exist only in eight districts. Ernakulum district has more number of universities (five) followed by Thiruvananthapuram and Trissur (three each).

2. University of Calicut

The University of Calicut was established in 1968. Currently the university has 30 post graduate departments and 427 colleges affiliated to it. The main campus at Tenhipalam, accommodates the departments of Arabic, Botany, Biotechnology, Centre for Women Studies, Chemistry, Commerce and Management Studies, Computer Science, Education, English, Hindi, History, West Asian Studies, Mass Communication and Journalism, Life Science, Library and Information Science, Life Long Learning and Extension, Malayalam and Kerala Studies, Mathematics, Nano Science and Technology, Philosophy, Physics,

Physical Education, Psychology, Russian and Centre for Comparative Literature, Sanskrit, School of Folklore Studies, Statistics, and Zoology. Two of its post graduate departments are located at Trissur. Apart from offering graduate and postgraduate courses, the University has introduced integrated M.Phil/Ph.D programmes from 2004-05 academic year onwards. It has also launched new programmes in computer application and information technology, health sciences, fashion design, social work, printing technology, computer hardware and automobile engineering to meet the demand for the trained persons in emerging areas. The University Institute of Engineering Technology on the main campus offers B.Tech courses in five branches.

The 427 colleges affiliated to the University are spreading across five revenue districts of Kozhikode, Thrissur, Malappuram, Palakkad and Wayanad. Among them, 39 are government colleges 70 are aided colleges and 318 are unaided colleges. The aided colleges receive the salary of teaching and non-teaching staff from the government in addition to other grants where unaided colleges meet the expenses from students' fee. The affiliated colleges comprise various types like arts and science, teachers training, engineering/technical, medical, para medical Ayurveda, law, Arabic/oriental title, management, music, fine arts, physical education, nursing, dental, pharmacy, homoeopathy, and hotel management. Together, affiliated colleges accommodate around one lakh students.

The University of Calicut has won the sixth position among Indian universities in the 2017 BRICS (Brazil, Russia, India, China, and South Africa) University Rankings. The university has won the 18th position among the country's higher education institutions that included Indian Institutes of Technology (IITs). The University stood at 57th position in NIRF 2017 and its position fell into 73rd in 2018. The university has 145 regular teachers who comprise of 56 professors, 31 associate professors and 58 assistant professors. The male female ratio is 105:40 (72%:27%) among teachers.

3. Objectives of the Study

The major objective of the study is to examine the growth of scholarly articles produced by the University of Calicut over a period of fifty one years. The study tries to identify the following issues;

1. The total research output and the total citation with h-index
2. The major area of research and the areas where less articles were produced
3. The most productive authors with number of papers and citations and the area of research
4. The top publications in which majority of papers were published
5. The position of the university among the universities in Kerala and in India in terms of number of papers and citations.

4. Review of Literature

Scholars have attempted studies to identify the research productivity of various institutions to assess the growth and trend of research. Chakravarty and Madaan (2016) conducted a Scopus reflected study of seven research and higher education institutions in Chandigarh city, India to identify the growth of scholarly publications and patents for around a period of six decades. The authors concluded that together the seven institutes produced research papers in twenty different subject fields. The Post Graduate Institute of Medical Education and Research has produced more research papers followed by the Panjab University.

Sheeja, Surendran and Muhammed Sageer (2015) analyzed the growth of scholarly literature produced by six Universities in Kerala to identify the top ranking university, major research area, prolific authors, top publications, most productive year based on data collected from Scopus. The authors found that the six universities together produced a total number of 11764 documents in 2015. The Cochin University came on top with a share of 4416 (37.53%) documents followed by the University of Kerala with 3222 (27.81%) Mahatma Gandhi University with 1980 (16.83%) University of Calicut with 1293 (10.99%), Kerala Agricultural University with 581 (4.93%) and Kannur University with 272 (2.31%) documents.

Amsaveni and Mohamed Haneefa (2015) conducted a scientometric study of the research output of University of Calicut based on sample record from Web of Science databases. The study examined the assessment of pattern of publication, authorship, growth rate of publications and journals coverage of researchers in University of Calicut. It was found that during 1989 to 2014 there were 940 scholarly articles by the university. The more number of articles were produced on chemistry followed by physics and botany.

Deepika Lakshman (2017) carried out a study to find out the research productivity of the 58 government and 164 aided Arts and Science colleges in the State of Kerala for the period of 1989 to 2015. A total of 1969 articles were published by the study population with more articles on chemistry, materials science, physics, and spectroscopy. The number of articles from arts and humanities were very less. The aided colleges were found to be more productive compared to government colleges.

Chauhan and Preethi Mahajan (2017) measured the quality and quantity of Indian Library and Information Science research output from 1951 to 2010 extracting data from the Science Citation Index (SCI). The study also covered the volume of Ph.Ds. in library and information science. It was found that Information centres contributed 6% of total LIS research output whereas highest contribution (34%) was made by LIS professionals working in technical institutions. The authors identified the low productivity and quality of research output in library and information science in India.

Satpathi and Sa (2015) attempted a bibliometric analysis of research productivity of Odisha's state universities during 2010 to 2014. Data was collected from the Scopus database. The study found that Utkal University is the most productive institution in the state. Physics and Astronomy is the major area of research and Optics Communications and Indian Journal of Physics are the most preferred journals. The majority of documents belonged to journal articles and multiple authors contributed more compared to single authors.

Singh and Babbar, (2015) examined the trends and issues of doctoral research in the field of Library and Information Science in India. They collected data on theses from multiple sources. They identified 81 universities in 22 states of India that awarded 1754 theses under 99 subject headings. The majority of theses were submitted to universities in Karnataka followed by Maharashtra, Madhya Pradesh and Tamil Nadu. The majority were submitted on Bibliometrics/ Scientometrics/ Webometrics.

Aswathy and Gopikuttan (2014) examined the publication productivity of University of Kerala during 2000 to 2012. Data was collected from the Web of Science. A total number of 1068 papers were identified with biology as the most productive area of research followed by chemistry. Majority of the articles were published in Current Science, a journal from India.

Review of literature shows that there are no study on the research productivity of University of Calicut based on data from Scopus. Moreover, studies have not attempted to find out the position of a university among the universities in the state and country based on number of documents and number of citations. This study offers the latest data on the growth and trend of research in the University of Calicut.

5. Methodology

The data for the study was collected from Scopus Database of Elsevier publisher. Scopus is the largest abstract and citation database of peer-reviewed literature in scientific journals,

books and conference proceedings covering science, technology, medicine, social sciences, arts and humanities. Scopus indexes over 22,800 journals and 150000 books from more than 5,000 international publishers. Scopus provides 70000 institutional profiles, 12 million author profiles and 1.4 billion cited references dating back to 1970. Data are presented in the form of tables and graphs. The data for the study was collected in September 2018. The study covers a period from 1968 to 2018. A Scopus user can download all data of an institution in a CSV file which can be utilized for gathering tabulated data. Simple statistics was used to generate results and charts and figures were used to augment narration.

6. Results

6.1 Total Research Output and Citation

As of September 2018, the University of Calicut has published 2158 documents in publications indexed by Scopus database during a span of fifty one years. On the basis of the number of documents in Scopus, the university stands at 220th position among Indian institutions and the university has 4th position among the 17 universities in the state. The majority of the works were published in journals (93%) as articles and the rest were created as conference papers and book chapters. While majority of the works were published in paid platforms (97%), only few were (3%) published in open access mode. The university has received a total of 15228 citations for the documents with an h-index of 46 which denotes 46 of the 2158 documents have been cited at least 46 times. Figure 1 shows the pattern of growth of scholarly documents during 1968-2018.

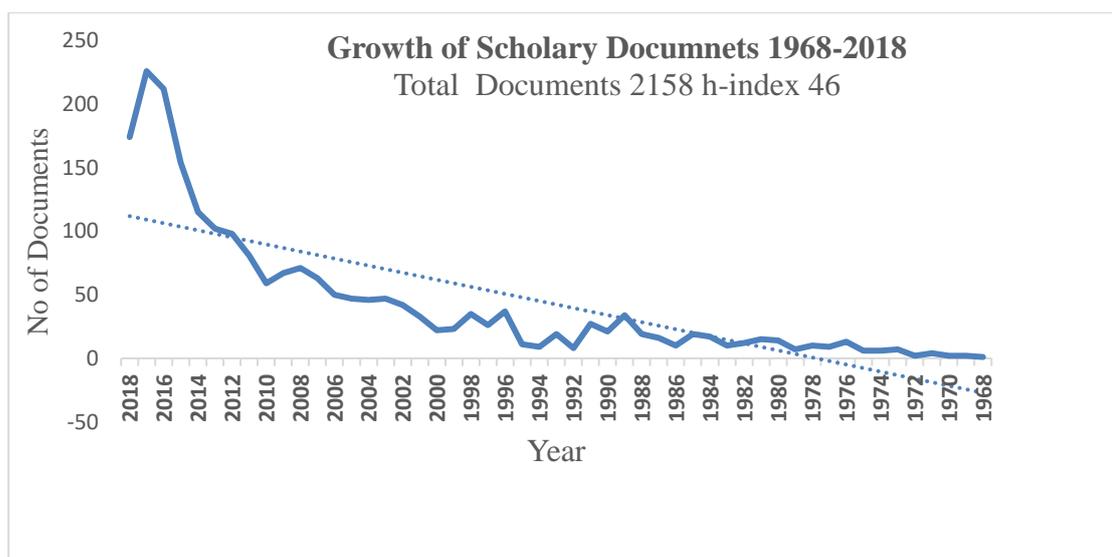


Figure 1. Growth of Scholarly Documents in the University of Calicut

The majority (60%) of documents were published during the last ten years. The trend line shows that from 2013 onwards there was a hike in the publication productivity. For the last two years the university published around 200 documents annually.

6.2 Major Areas of Research

It is noted that many science papers published by the University community simultaneously belong to multiple subjects and being counted under more than one area of research. The University has produced more articles on Agricultural and Biological sciences (30%) followed by Chemistry (23%), Physics and Astronomy (21%) Biochemistry (13%) and Materials Science (13%). The Science subjects constitute the major part of scholarly output

in the University of Calicut. Figure 2 shows the top ten areas of research in the University. The disciplines of Engineering, Environmental Science, Pharmacology, Toxicology and Pharmaceutics have contributed 7% each. Chemical Engineering represents 6% and Medicine and Mathematics do 5% and 4 % respectively.

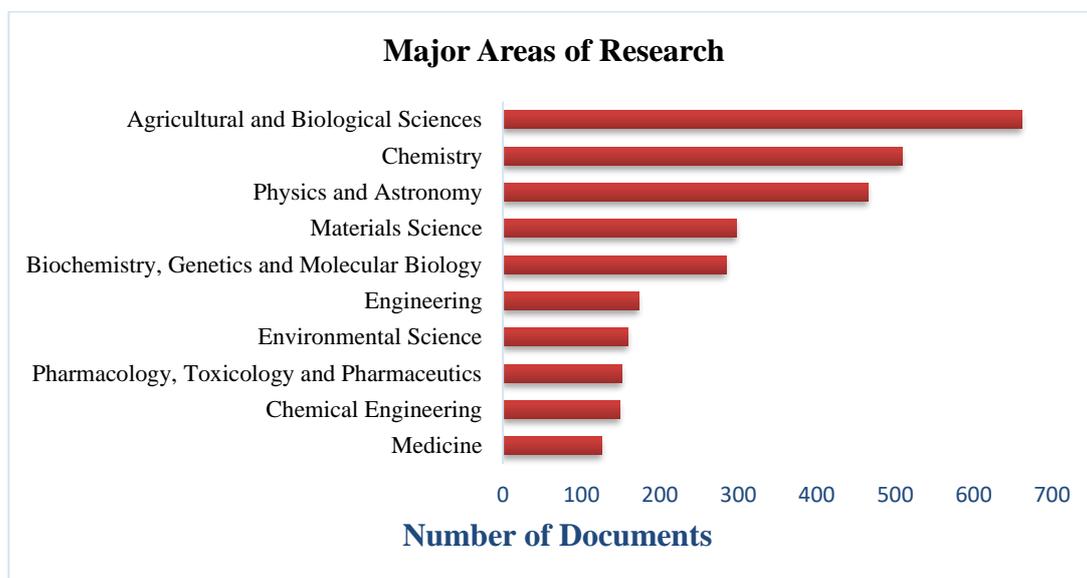


Figure 2. Major Areas of Research in the University of Calicut

Another important factor that was visible from the study is the small volume of scholarly articles produced by Social Sciences, Business, Management and Accounting, Psychology and Arts and Humanities. Together these disciplines contributed only 82 documents. The Department of Library and Information Science has produced 17 documents.

6.2.1 Prolific Authors

The examination of the most prolific authors revealed that Dr. Ramesan, M T of the Department of Chemistry has published more scholarly articles. The author has published 83 articles with 14 of them single authored and received 751 citations. The author published 62% of his articles during 2016-2018. Dr.Sabu M of the Department of Botany stands second with 74 articles and 313 citations followed by Dr.K Muraleedharan of Department of Chemistry with 72 articles and 393 citations. Table 1 shows the list of top ten authors in the University of Calicut with number of papers, number of citations and h-index.

Name	Department	Number of Papers	Number of Citations	h-index
Ramesan, M.T.	Chemistry	83	751	15
Sabu, M.	Botany	74	313	9
Muraleedharan, K.	Chemistry	72	393	11
Narendran, T.C.	Zoology	70	138	6
Joseph, A.	Chemistry	63	519	12
Manimohan, P.	Botany	61	544	12
Pradyumnan, P.P.	Physics	56	263	10
Purushothaman, E.	Chemistry	51	301	10
Krishnankutty, K.	Chemistry	49	535	12
Aravindakshan, K.K.	Chemistry	44	397	11

Table.1 Prolific Authors in University of Calicut

Table 1 reveals that six out of top ten authors belong to the Department of Chemistry. They have published 355 papers and out of this 338 papers were produced without any collaboration among themselves.

6.2.2 Major Sources of Publication

The analysis of data for the identification of top publication revealed that the 2158 documents were spread across 725 sources which include both Indian and foreign journals, conference proceedings, books and other sources. Fig 3 shows the major twenty publications in which the academic community published 544 (25%) research work. All are journals except one conference proceeding.



Figure 3. Major Sources of publications of the University of Calicut
Further analysis of the major sources revealed that 9 out of 20 sources are published from India. Four sources belong to USA and three belong to Netherlands and one each belongs to UK, Netherlands, Switzerland, and Sweden.

6.2.3 Collaboration with other institutions

The scholars and teachers of a university publish articles along with those from other universities and institutions. The University of Calicut has collaborated with 160 institutions inside and outside the country to produce the 2158 documents. Figure 4 shows the top twenty institutions with whom the university has produced 507 articles (23%).

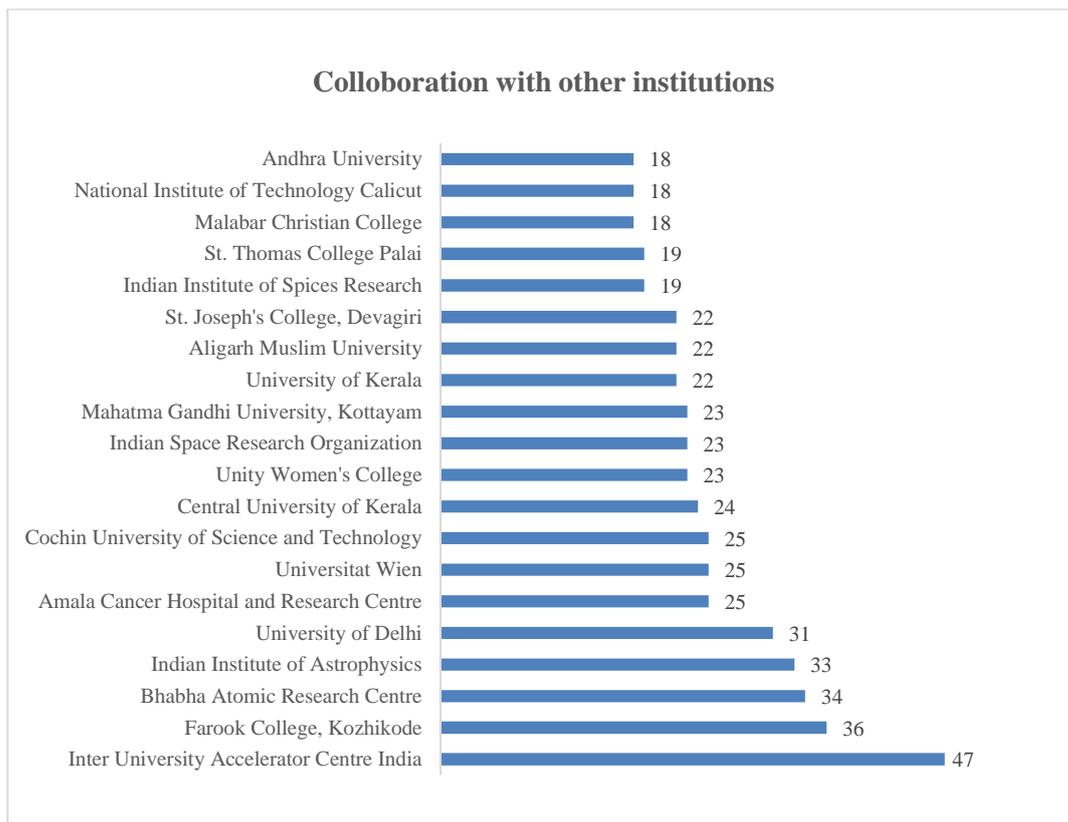


Figure 4. Collaboration of University of Calicut with other institutions

Out of 427 affiliated colleges, only 26 (6%) have produced documents along with the university. Together they contributed 235 (10%) documents. Among the affiliated colleges, Farook College stands first with 36 documents followed by Unity Women's college with 23, St. Joseph College with 22 and Malabar Christian College with 18. Among the universities within the state, the university has produced more documents with Cochin University of Science and Technology (25), Central University of Kerala (24), MG University (23) and University of Kerala (22). The University has also published documents with premier institutions in India like Indian Institute of Science, Baba Atomic Research Centre, Indian Institute of Astrophysics and major universities like University of Delhi, Aligarh Muslim University and Punjab University. The university has collaborated with many institutions abroad to produce scholarly articles. There are 59 institutions from outside India with whom the university published documents. A total of 323 articles (15%) were produced along institutions spread across 66 countries.

6.2.4 Position of the University in India

As of September 2018, Scopus database lists 2805 institutions for India retrievable by affiliation search. On the basis of number of documents, the Indian Institute of Science Bangalore comes on top with 52000 documents followed by IIT Kharagpur with 35500 and by IIT Delhi with 34900. On this line the University of Calicut occupies 217th position in India among all types of Institutions. Among the Universities in the state of Kerala, the Cochin University of Science and Technology occupies first position with 6100 documents followed by the University of Kerala with 4392 and M.G University with 3067. The University of Calicut has the 4th position with 2158 documents.

6.2.5 Summary and Conclusion

The study examined the growth and trend of publications by the academic community of University of Calicut over a period of fifty one years from data available on Scopus database. It is a fact that majority of works by scholars and teachers belonging to the disciplines of languages, history, psychology and management are invisible as they publish their work in sources not indexed by Scopus. The global as well as national ranking schemes collect data from Scopus as well as Web of Science. Considering the number of departments and affiliated colleges, the number of total publications of the university seems fewer. In NIRF ranking 2018, the university received 73rd position among the universities in the country. The University's RPC score was 12.73 which was related to the 488 articles and 1591 citations found on Scopus database during 2014-2016. The RPC rank of Cochin University was 24.36, University of Kerala was 19.80 and MG University was 22.89. The three universities received a better position in the NIRF 2018 ranking compared to the University of Calicut. By increasing the number of publications in journals indexed by Scopus as well as Web of Science the University of Calicut can improve its position in global and national rankings.

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