A Scientometric study of Research papers of IISER Bhopal (India) during 2009-2014

Sandeep Kumar Pathak
Deputy Librarian, Indian Institute of Science Education and Research Bhopal
Email: skpathak@iiserb.ac.in

Abstract:

Indian Institute of Science Education and Research (IISER) Bhopal was established in 2008 by the Ministry of Human Resource Development (MHRD), Government of India. The mission of the institute is to aim for a seamless integration of teaching and education with state of the art research motivating entry of bright students and world class faculty into the institute. IISER Bhopal is dedicated to imparting high quality science education in a research oriented environment to young and academically motivated undergraduate and postgraduate students.

This paper is an informetric analysis of research papers published and indexed in Scopus citation bibliographic database by the researchers and faculty of Institute of Science Education and Research (IISER) Bhopal during 2009-14 by focusing on its publication growth characteristics, format and media of communication, research impact and quality, patterns of research collaboration, broad and narrow areas of research and contribution and citation impact of its more productive authors.

The main objectives of the present study are to analyze the broad characteristic features of the publication output of IISER Bhopal during 2009-14, using quantitative and qualitative indicators. In particular the study focuses on aspects such as To study the growth and citation impact of its research output; To study the research output and citation impact under broad and narrow broad subject areas; To analyse its national and international collaboration; To analyse the contribution and impact of its leading authors; and To study the media of communication.

The study is based on publication data, derived from international multidisciplinary Scopus database for 6 years from 2009 to 2014. The Scopus is one the world’s largest abstract and citation database of peer-reviewed literature. An advanced search with the defined search strategy was used, which resulted in downloading of no. of records of the institute during 2009-141.

Keywords: IISER, Bhopal, Basic Science, Research Institution, India, Publication productivity, Citation impact, Research collaboration, h-index, Scientometrics
Introduction

Scientific performance of any research organization can be evaluated in the form of quality and quantity of “Research Publications” produced by the organization. If only quantitative measures are required, it is a simple matter to add the number of publications by the number of contributors. However, when the quality angle is to be factored in, the number of citations each publication has earned was taken as a proxy. The evaluation of research output of an organization helps to frame a research policy and develop strategies for future course of research. It also helps to obtain funding for its research programs, fix priorities in research and recognize and reward the eminent researchers².

Indian Institutes of Science Education and Research (IISER)

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Review of Literature

Few evaluation studies of different types of organizations, based on their publication output are undertaken in the past, both in India (including that of Indian Institute of Technology, Kharagpur³⁴, Indian Institute of Technology, Roorkee⁵, University of Mysore⁶, Karnataka University⁷, University of Jammu⁸, BARC⁹, CSIR-NPL¹⁰, CSIR-IMTECH¹¹ and Rajiv Gandhi Centre for Biotechnology¹² and abroad¹³. These studies concentrate mostly on publication growth characteristics, citation impact, national and international collaboration, contribution and impact of leading authors and high cited papers, etc. Studies had also been conducted at the broader level, which includes evaluation of research at the group of institutes level¹⁴. Still broader studies are available which deals with evaluation of scientific activity, including institutional activities.¹⁵

Objective of the Study

The main objectives of the present study are to analyze the broad characteristic features of the publication output of IISER Bhopal during 2009-14, using quantitative and qualitative indicators. In particular the study focuses on the following aspects:

- To study the growth and citation impact of its research output;
- To study the research output and citation impact under broad and narrow broad subject
areas;

- To analyse its national and international collaboration;
- To analyse the contribution and impact of its leading authors; and

**Methods and Methodology**

The study is based on publication data, derived from international multidisciplinary Scopus database ([http://www.scopus.com](http://www.scopus.com)) for 6 years from 2009 to 2014. The Scopus is one the world’s largest abstract and citation database of peer-reviewed literature. An advanced search with the following search strategy was used, which resulted in downloading of 377 records of the institute during 2009-15.

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For collecting data on national and international collaboration, subject-wise distribution, individual authors and media of communication, separate search strategies were developed. The author, however, considered the data from 2009 onwards, as the institute was established in 2008.

**Analysis**

**Growth of Research Papers and Authors**

The total output of IISER Bhopal consists of 328 papers during 2009-14, of which 290 are published as articles, 9 as article in press, 11 as conference papers, 11 as reviews, 3 as erratum, 2 as note, 1 as book chapter and 1 as short survey. The number of papers of the institute has increased from 15 papers in 2009 to 123 papers in 2014.
Graph 1

Graph 1 shows that during 2009-2014, the total output of IISER Bhopal consists of 328 papers during 2009-14, of which 290 are published as articles, 9 as article in press, 11 as conference papers, 11 as reviews, 3 as erratum, 2 as note, 1 as book chapter and 1 as short survey. The number of papers of the institute has increased from 15 papers in 2009 to 123 papers in 2014.

(A) Documents per year by source

Comparing the document counts for up to 12 sources

Graph 2

Graph 2 states that during 2009-2014, most no. of paper were published in Organic Letters (16) followed by RSC Advances (13), Crystengcomm (11). Organic Letter is published by ACS.

(C) Documents by author (2009-2014)

Comparing the document counts for up to 14 authors
Graph 3 states that during 2009-2014 in IISER Bhopal, D Chopra has highest no. of publications (34) followed by V K Singh (26), D S Rana (20). Among Students, R Rana has highest no. of publications (16) followed by U Anand (14).

**D) Documents by affiliation (2009-2014)**

Comparing the document counts for up to 10 affiliations

![Graph 4](image)

Graph 4 indicated that during 2009-2014, published publications have highest affiliation from IIT Kanpur after IISERB followed by IISc Bangalore (19) and Osaka University (13).

**E) Documents by country/territory (2009-2014)**

Compare the document counts for up to 10 countries/territories

![Graph 5](image)
Graph 5 indicated that during 2009-2014, published publications have highest affiliated country from USA (36) after India (322) followed by Japan (20) and South Africa (12).

(F) Documents by type (2009-2014)

Graph 6

Graph 6 indicates that during 2009-2014, total research output of IISER Bhopal consists of 328 papers, of which 290 are published as articles, 9 as article in press, 11 as conference papers, 11 as reviews, 3 as erratum, 2 as note, 1 as book chapter and 1 as short survey. The number of papers of the institute has increased from 15 papers in 2009 to 123 papers in 2014.

(G) Documents by subject area (2009-2014)

Graph 7
It is clear from Graph 7 that during 2009-2014, out of total published research publications, highest publications from Chemistry subject (169) followed by Physics (104), Biochemistry, Genetics and Molecular Biology (85). Lowest publications were in the subject of Energy (2).

(H) Citation overview (2009-2014)

Graph 8

Graph 7 shows that citation graph has consistently increased from 2009 (2) to 2014 (1059). Publications published in year 2014 has received the highest citations (1059) followed by year 2013 (716).

(I) h-index

h-index =25 (Of the 328 documents considered for the h-index, 25 have been cited at least 25 times.)

Graph 9
Summary and Conclusion:

The total output of IISER Bhopal consists of 328 papers during 2009-14, of which 290 are published as articles, 9 as article in press, 11 as conference papers, 11 as reviews, 3 as erratum, 2 as note, 1 as book chapter and 1 as short survey. The number of papers of the institute has increased from 15 papers in 2009 to 123 papers in 2014.

During 2009-2014 years, the faculty and scholars of IISER Bhopal have together published 328 papers, of which 290 were published as articles. The institute has published 15 papers during 2009 which increased to 123 papers by 2014, witnessing a huge annual average publication growth rate. It was found that most no. of paper were published at IISERB in Organic Letters (16) followed by RSC Advances (13), Crystengcomm (11). It was also indicated in analysis that D Chopra has highest no. of publications (34) followed by V K Singh (26), D S Rana (20). Among Students, R Rana has highest no. of publications (16) followed by U Anand (14). During 2009-2014, published publications have highest affiliation from IIT Kanpur after IISERB followed by IISc Bangalore (19) and Osaka University (13).

Publications produced by IISER Bhopal during 2009-2014 have highest affiliation from USA (36) after India (322) followed by Japan (20) and South Africa (12). It was noticed that highest publications are from Chemistry subject (169) followed by Physics (104), Biochemistry, Genetics and Molecular Biology (85). Lowest publications were in the subject of Energy (2). Result shows that citation graph has consistently increased from 2009 to 2014. Publications published in year 2014 have received the highest citations (1059) followed by year 2013 (716). h-index is 25 for total publications published during 2009-2014 which is commendable. Research productivity of IISER Bhopal is more interdisciplinary and need to explore new opportunities for collaborative research with industrial enterprises. The institute may also explore new models of collaborative research, such as going in for Institute-private partnership in research. Such measures have the potential to catalyze publications activity, improve publication productivity of authors as well as help in improving the quality of research output.

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