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Research Output of Indian Institute of Science Education and Research Pune (IISER Pune) During 2006-2020: A Bibliometric Study

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Abstract

This study analyses the research outputs of IISER Pune during 2006 to 2020 revealed in Web of Science (WoS) database (06.03.2021). Its goal is to look at how IISER Pune's research activity has grown and developed as evidenced by its publications output. A total of 3613 records have been obtained and studied in accordance with the goals. This study analyses the features of these research outputs such as year-wise, subject-wise, document types, country-wise collaboration, authorship trends, and types of language. Research outputs 546 in 2018, 1328 records in physics, 3308 in the form of articles, 959 with USA collaboration, 735 by joint authors are highest.

Keywords: IISER, IISER Pune, Research Output, Institutional Productivity, Bibliometrics, Research Productivity, Research Collaboration, Web of Science

1. Introduction

The Indian Institute of Science Education and Research in Pune is a prestigious institute dedicated to basic science research and education. The Ministry of Human Resource Development founded it in 2006. (renamed Ministry of Education in August 2020). An Act of Parliament designated it as an Institute of National Importance in 2012. As a one-of-a-kind initiative in Indian science education, IISER aspires to be a world-class science university dedicated to both teaching and study in a fully integrated manner, with cutting-edge research and high-quality education, cultivating both curiosity and imagination.

Several studies have been published before that show the research output of different institutions/universities around the world as reflected in international databases like Web of Science and Scopus. The purpose of this study is to look at how IISER Pune's research productivity has developed and grown as evidenced by the number of publications it has produced.

2. Objectives of the Study

- a) To examine the research out of IISER Pune year-wise 2007-2020
- b) Types of documents published of IISER Pune.
- c) Authorship pattern of IISER Pune.
- d) Subject-wise research output of IISER Pune.
- e) Country-wise collaboration of IISER Pune

3. Literature Review

A review of applicable literature is a significant part of any research study. It shows the researcher how to proceed and what has already been done on a particular topic of interest, as well as what types of research are significant concerns. Individual scientists, organizations, regions, nations, continents, subjects, journals, and other aspects of research productivity have all been studied. The current research focuses on an institution's research effectiveness.

Banshal et al. (2017) examined the research output of the 16 oldest Indian Institutes of Technology (IITs) and found a large difference in research performance rate between old and new IITs.

Bid S (2016) used Scopus as a source database, assessed the research performance of IIT Kharagpur from 2000 to 2015. The paper shows that the rate of publication growth is stable, with articles doubling in 9 years and tripling in the next three. The analysis also indicates that the researcher's favourite medium for publishing their paper is in a journal. The most frequently researched fields are engineering, material science, computer science, physics, and astronomy.

Sab et al. (2017) examined the progress and performance of research carried out by the faculty members and research scholar of Tumkur University. From 2011 to 2016, there was a steady rise

in the number of publications, according to the report. Tumkur University's annual average research output was 261 records, and the scientists' research output is fairly collaborative.

Singh (2015) looked at the research performance of the Indian Institute of Technology Mandi (IIT Mandi) and focusing on collaboration at various levels, including author, organisation, and national/international collaboration status.

4. Methodology

This study makes use of the Web of Science scientific citation indexing (WoS) database. The Web of Science (WoS) is the first multidiscipline bibliographic index of journal publications. For bibliometrics, it is regarded as a standard data source. The records for this study has been collected from WoS database published between 2006 and 2020. The query " Organization-Enhanced = Indian Institute of Science Education and Research Pune" and "Timespan = 2006-2020". As a result, 13613 records have saved in text files and imported into Microsoft Excel for analysis year-wise, subject-wise, document types, country collaboration, authorship trends, language of publication.

5. Data Analysis and Interpretation

5.1 Year-wise

In the year 2006, IISER Pune began publishing their research output. With ups and downs, the rate of publication is gradually rising. The year 2018 has the most publications. Table 1 displays the year-by-year research productivity of each year.

Sl. No.	Publication Years	Record Count	% of 3,613
1	2006	1	0.028
2	2007	2	0.055
3	2008	23	0.637
4	2009	39	1.079
5	2010	57	1.578
6	2011	107	2.962
7	2012	157	4.345
8	2013	195	5.397
9	2014	228	6.311
10	2015	296	8.193
11	2016	413	11.431
12	2017	501	13.867
13	2018	546	15.112

14	2019	545	15.084
15	2020	503	13.922

Table 1 : Year-wise research output

5.2 Subject-wise

Table 2 and Diagram 2 display the research trend subject-wise. Physics is the most active research field at IISER Pune, accounting for 36.756 % of all research production. Chemistry and Materials Science are second and third in research output, with 31.691 % and 12.317 %, respectively.

Sl no.	Subject Areas	Record Count	% of 3,613
1	Physics	1328	36.756
2	Chemistry	1145	31.691
3	Materials Science	445	12.317
4	Science Technology other Topics	380	10.518
5	Astronomy Astrophysics	325	8.995
6	Biochemistry Molecular Biology	223	6.172
7	Mathematics	191	5.286
8	Cell Biology	82	2.27
9	Optics	80	2.214
10	Polymer Science	69	1.91
11	Neurosciences Neurology	66	1.827
12	Pharmacology Pharmacy	66	1.827
13	Life Sciences Biomedicine other Topics	62	1.716
14	Genetics Heredity	60	1.661
15	Environmental Sciences Ecology	54	1.495
16	Zoology	52	1.439
17	Energy Fuels	47	1.301
18	Engineering	45	1.246
19	Developmental Biology	43	1.19
20	Crystallography	42	1.162
21	Biophysics	37	1.024
22	Instruments Instrumentation	37	1.024

23	Geology	36	0.996
24	Electrochemistry	33	0.913
25	Education Educational Research	29	0.803

Table 2 : Subject-wise research output

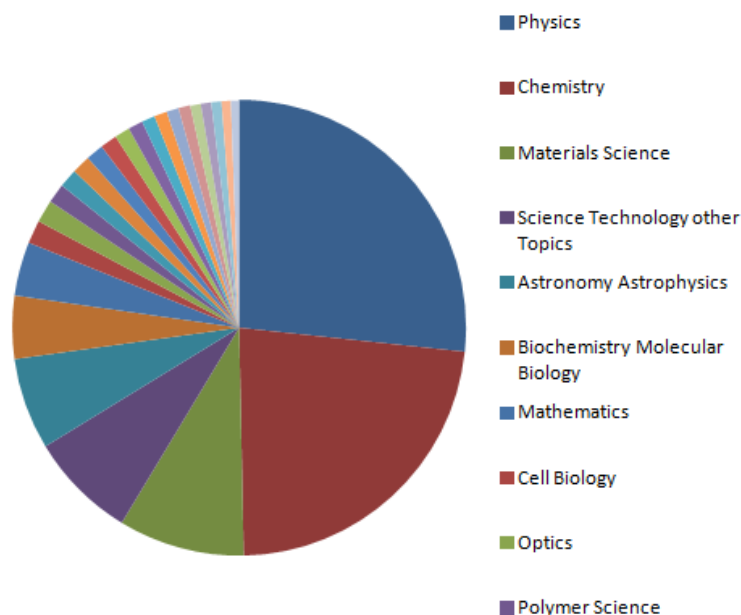


Diagram 2 : Subject-wise research output

5.3 Document Types

Table 3 present types of document published by IISER Pune. Articles published highest 3308 records, followed by review articles 88, meeting abstracts 76 and proceedings papers 67. Therefore, articles 91.558%, review articles 2.436%, meeting abstracts 2.104% and proceedings papers 1.854%.

Sl no.	Document Types	Record Count	% of 3,613
1	Articles	3308	91.558
2	Review Articles	88	2.436
3	Meeting Abstracts	76	2.104
4	Proceedings Papers	67	1.854
5	Editorial	53	1.467

	Materials		
6	Book Chapters	30	0.83
7	Corrections	19	0.526
8	Letters	11	0.304
9	News Items	8	0.221
10	Early Access	6	0.166
11	Book Reviews	3	0.083
12	Data Papers	3	0.083
13	Biographical-Items	2	0.055

Table 3 : Document types

5.4 Country-wise Collaboration

Table 4 show country-wise collaboration. Within India published 100% followed by USA 26.543%, Germany 21.201% and England 21.035%. It can say within India has produced 3613 records then collaboration with USA 959, Germany 766 and England 760 research outputs.

Sl no.	Countries	Record Count	% of 3,613
1	India	3613	100
2	USA	959	26.543
3	Germany	766	21.201
4	England	760	21.035
5	France	714	19.762
6	Italy	674	18.655
7	Peoples R China	665	18.406
8	Switzerland	663	18.35
9	South Korea	653	18.074
10	Spain	645	17.852
11	Russia	641	17.741
12	Austria	636	17.603
13	Taiwan	629	17.409
14	Belgium	627	17.354
15	Brazil	627	17.354
16	Czech Republic	627	17.354

17	Mexico	624	17.271
18	Poland	623	17.243
19	New Zealand	622	17.216
20	Turkey	622	17.216
21	Malaysia	620	17.16
22	Finland	619	17.133
23	Greece	619	17.133
24	Iran	619	17.133
25	Ireland	619	17.133

Table 4 : Country-wise collaboration

5.5 Authorship Trends

Table 5 and present authorship trends. Single authors produced 215 research outputs. Two authors have published highest 735 research outputs, then three authors 717 records. It is clear that 5.951% by single authors, 20.343% by joint authors, 19.845% by three authors and 16.358% by four authors.

Sl no.	No. of Author(s)	No. of Record (s)	% of 3613
1	Single	215	5.951
2	Joint	735	20.343
3	Three	717	19.845
4	Four	591	16.358
5	Five	495	13.701
6	Six	298	8.248
7	Seven	181	5.010
8	Eight	121	3.349
9	Nine	70	1.937
10	Ten	55	1.522
11	More than Ten	135	3.737

Table 5 : Authorship Trends

5.6 Language wise research output

Table 6 presents language of the publication. All publications of IISER Pune have published in English language. English language is now recognized as language of the world.

Sl no.	Language	Record	% of 3613
1	English	3613	100

Table 6 : Language of Publication

Conclusion

The study presents that IISER Pune has 3613 research outputs from 2006 to 2020. The research outputs increased year by year started with 1 research output in 2006. In 2018, number of research output was 546 highest. The subject physics has produced 1328 records/ research outputs, followed by 1145 in chemistry, 445 in material science and 380 in science and technology other topics. In the form of document, articles 3308 records followed by 88 research outputs in review articles and 76 in meeting abstracts. Within India, IISER Pune has published 3613 research outputs and 959 records with USA collaboration, followed by 766 with Germany and 760 with England. Joint authors have published 735 research outputs, followed by three and four authors, 717 and 591 research outputs. All research outputs have published in English language.

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