

A SCIENCOMETRIC ASSESSMENT OF RESEARCH OUTPUT: A CASE STUDY OF NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

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Abstract: The paper analyze the publications by using a Scientometric analysis of National Institute of Technology Raipur (NIT Raipur) during 2012 to 2016 as reflected in Web of Science database. It attempts to analyze the growth and development of research activity of NIT Raipur reflected in publications output. Data for a total of 497 have been downloaded and analyzed according to objectives. The authorship pattern reveal that the maximum number of papers were 162 (32.60 %) from three authors, which shows that contributors of NIT Raipur have tendency to publish their work with two or more authors which indicates the multi author pattern and shows that the contributors are collaborative in nature. The Most Productive authors based on their publication it has been reveal that Londhe, Narendra D., published highest numbers of papers, i.e. 30, pattern of type of document reveal that research productivity in form of no. of article was highest i.e 315 (63.38%) which shows that contributors have a tendency to publish their papers in form of article. The subject wise distribution revel that Engineering is the most favored area of research among the contributors with 47.69%, followed by Computer Science with 20.32%, Chemistry with 11.07%, Material Science 10.66%, Physics with 9.76 %. Collaboration of papers with other countries reveal that USA is at the top with no. of publications is 22 (4.43%), followed by Japan & England 7 (1.41%) as a second position and Italy with no. of publication is 6 (1.21%) in third position, in terms of top participating institutions in collaboration with NIT Raipur. It is revel that authors/contributors are collaborating with many institutions to publish their papers, It has been found that within top 10 institutions Indian Institute of Technologies (IITS) found in top position.

Keywords: Research Productivity, Research Output ;Scientometrics analysis

1.0 Introduction

National Institute of Technology Raipur is an autonomous institute under MHRD, Government of India¹, it is located in Chattisgarh state. It provides education and research in the fields of Engineering and Technology. The institute started working as Government Engineering College, Raipur in 1956. The institute started with two departments namely Metallurgical and Mining Engineering. Later the inauguration of the Institute building was done by our Prime Minister Hon'ble Pt. Jawahar Lal Nehru in 1963. From 2005, the institute has become the National Institute of Technology⁹. The Institute is contributing to the technological, industrial and economical development of the region and the country for last five decades. The Institute has long recognized its role in engineering education, generation and dissemination of useful and relevant technologies in the service of the society.

As per a report published in National Institutional Ranking Framework, Ministry of Human Resource Development, and Government of India in 2016, NIT Raipur has been dominating the slots in top hundred engineering institutions of India. NIT Raipur 63th ranked in 2016. Research productivity is one important factor that has traditionally been used by rating agencies internationally to rank institutes of higher learning. In fact, research productivity is one such attribute that has been documented the most and somehow efficiently. The purpose of this study is to examine the research productivity of this institute of technology as evidenced by the number of research papers published during the period under investigation. In addition, this study also intends to examine the growth pattern, authorship patterns, co-authorships, etc. from the publications data of this institute.

2.0 Review of Literature

Few quantitative studies have been carried in the past analyzing the Engineering and Technology Institution of India. Vivek Kumar Singh (2015)² the scientometric analysis of research publications in Pondicherry University, period of 1990 to 2014 and also indexed in Web of Science (WoS) were considered for the

analysis. collaboration at different levels such as author, institution is measured along with the status of collaboration at international level. The major research areas wise distribution.

Asifa Jan and others (2015)³ the analysis of output from University of Kashmir has shown a promising growth expect for some years in 1990s. The highest contributing authors are from Science, Majority of papers are published in Indian sources. Articles have remained a prime document type for publishing by the authors from University of Kashmir. Future emphasis on joint research, international collaboration, and publishing in indexed journals is needed.

Sumit Kumar Banshal⁴ (at...al.) (2017) “analyzed the research performance of 16 older Indian Institutes of Technology of India, shows that there is a substantial difference in research performance levels of old IITs vis-à-vis the new IITs”.

Nabi Hasan⁵ (2015) “The paper attempts to evaluate the trend of research output of five top ranked Indian Institutes of Technology (IITs) on the basis of research papers/articles indexed in Web of Science online database for the five years’ period of 2009-13. A total of 215,019 records were retrieved for India which are 2.72% of the global records for the period 2009-13”.

Vivek Kumar Singh⁶ (2015) “analyze the Research output of Indian Institute of Technology Mandi (IIT Mandi) and focusing on the collaboration at different levels such as author, institution and status of collaboration at National/international level”.

Subhodip Bid⁷ (2016) “analysis of publications of Indian Institute of Technology Kharagpur for the period 2000 to 2015 emphasize the growth and development of research activity of this institution”. V. K. J. Jeevan¹⁰ (at...al.) (2002) “analyze the performance and impact of research produced in each department, and the comparison of the impact of research in various departments”.

Tasleem Arif⁸, (2015) “analyze the Research Productivity of Indian Institutes of Technology, faculty member of computer science Engineering departments of four IITs Study find that there are much differences in research productivity in terms number of publications, growth of literature, per capita productivity, etc. IIT Madras has outperformed in amongst of them”.

3.0 Objectives of the Study

1. To analyze year wise research productivity in terms of total paper.
2. To find out the top most productive authors and authorship pattern.
3. To know Research area -wise distribution of publications.
4. To find out the top collaborative institutions national and international levels.
5. To identify the collaboration with other countries.
6. To determine the types of documents preferred, in which maximum research findings have been published.

4.0 Data Collection

“The data included for this study are derived from Clarivate Analytics Web of Science” (2017)¹¹ a bibliographic and citation database was used which covers a selected group of journals and conferences. The data was collected for the period 2012-2016. The 5 years period is a good period to know research productivity. The search has been made for the collection of data was Organization-Enhanced: National Institute of Technology Raipur Timespan: 2012-2016. Indexes: SCI-Expanded, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-Expanded, IC, Web of Science core collection. The data was obtained in 06 Oct.2017. The full record downloaded in the excel format i.e. article, proceedings paper, editorial material, titles, author records, affiliation etc.

5.0 Methodology

For Scientometrics analysis of publication data of NIT Raipur, the standard form of methodologies were used to analysis of various parameters like year wise growth rate of papers, Highly Prolific Authors, Collaborated Papers, authorship pattern, collaborative authors. The top productive authors were find out and their performances were analysis based on their publications productivity. The most collaborating institutions and countries have been recognized using extraction of information from affiliation text. Finally the major research areas were examined and mapping them in top major areas of research.

6.0 Data Analysis and Interpretation

6.1 Growth of Literature:

The year wise research growth in terms of TP (Total papers) are given in figure 1, it is shows that no. of research paper are increasing year wise form 2012 to 2016. It reveal that highest no. papers published in 2016 i.e. No. of Papers: 205 (41.25%) and lowest in 2012 i.e. No. of papers: 24 (4.83%).

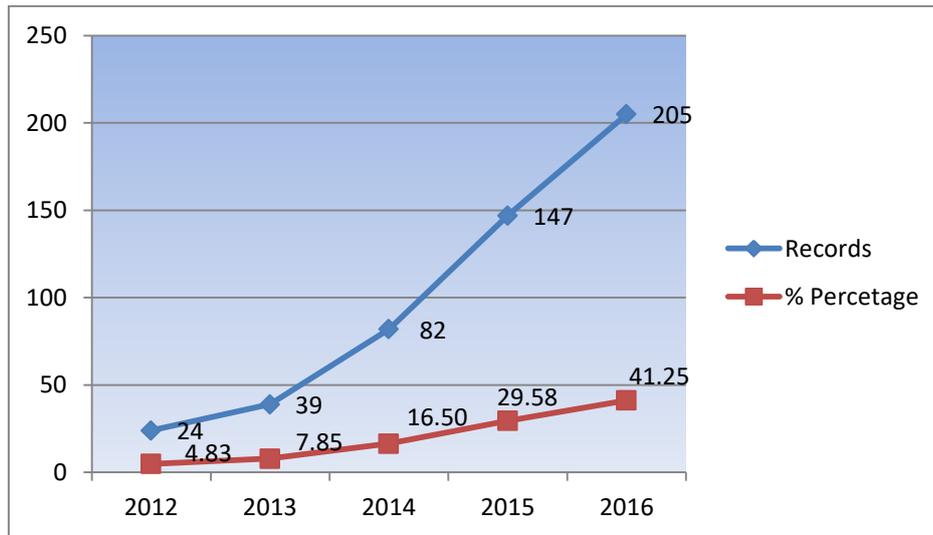


Figure 1: Year-wise research growth in terms of Total papers

6.2 Authors Pattern of Papers Published

Table-1: Authorship Pattern of Papers Published

Year	One Author	Two Author	Three Author	Four Author	Five Author	Six Author	Seven Author	Eight Author	Nine =+ Author	Total
2012	6	5	5	3	2	2	1	0	0	24
2013	1	11	19	3	4	0	0	1	0	39
2014	8	34	18	16	4	1	1	0	0	82
2015	9	44	51	27	10	4	2	0	0	147
2016	8	50	69	40	17	8	2	3	8	205
5 year total	32	144	162	89	37	15	6	4	8	497
%>	6.44	28.97	32.60	17.91	7.44	3.02	1.21	0.80	1.61	100.00

Table : 1 The authorship pattern of papers help in understanding of collaborative work of authors, the authorship pattern reveal that in out of 497 papers, the maximum number of papers were 162 (32.60 %) from three authors followed by two authors 144 (28.97 %), four authors 89 (17.91%), five authors 37 (7.44%), and so on. Data reveals that most of the authors like to publish papers in collaborations and most preferred authorship pattern is three authors.

6.3 Most Productive/Highly Prolific Authors and their Publications

Table 2: Top Highly Productive/Prolific Authors and their Publications

S.N.	Author	Records	Percentages
1	Londhe, Narendra D.	30	6.04
2	Yadav, Anamika	28	5.63
3	Sahoo, B. K.	24	4.83
4	Ghosh, Subhojit	23	4.63
5	Kumar, Awanish	22	4.43
6	Khare, Ayush	22	4.43
7	Nagwani, Naresh Kumar	17	3.42
8	Swetapadma, Aleena	16	3.22
9	Verma, Shrish	15	3.02
10	Suri, Jasjit S.	15	3.02
11	Chaudhari, Parmesh Kumar	15	3.02
12	Verma, Kesari	13	2.62
13	Gupta, Shubhrata	11	2.21
14	Keshav, Amit	11	2.21
15	Pansari, A	11	2.21

Table 2 The productive pattern of authors help us in knowing who having highly productivity Highly productive authors are given in table that shows a list of most productive/ prolific authors of NIT Raipur. it has been reveal that Londhe, Narendra D., published highest numbers of papers, i.e. 30 followed by Yadav, Anamika published 28 papers with second position, Sahoo, B. K. with 24 papers with third position others are given in table 2.

6.4 Type of Publications:

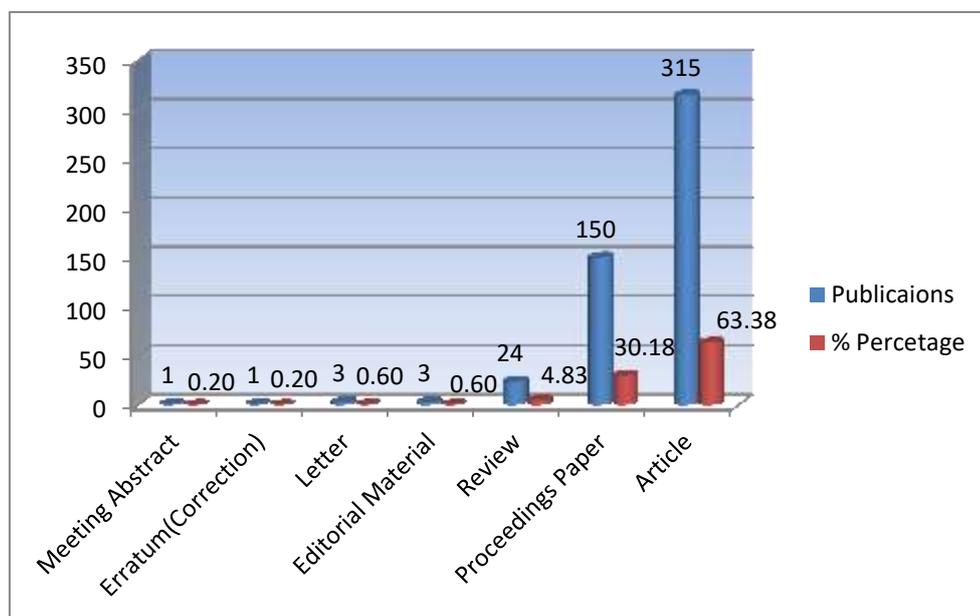


Figure 2: Distribution of publications according to type

Figure -2 shows that Distribution of publications according to type it is shows that research productivity in form of no. of article was highest i.e 315 (63.38%) followed by no. of Proceedings papers 150 (30.18%), and others form of publications are given in figure, it is reveal that research productivity in term of article find highest in NIT Raipur.

6.5 Research area -wise Distribution of Publications:

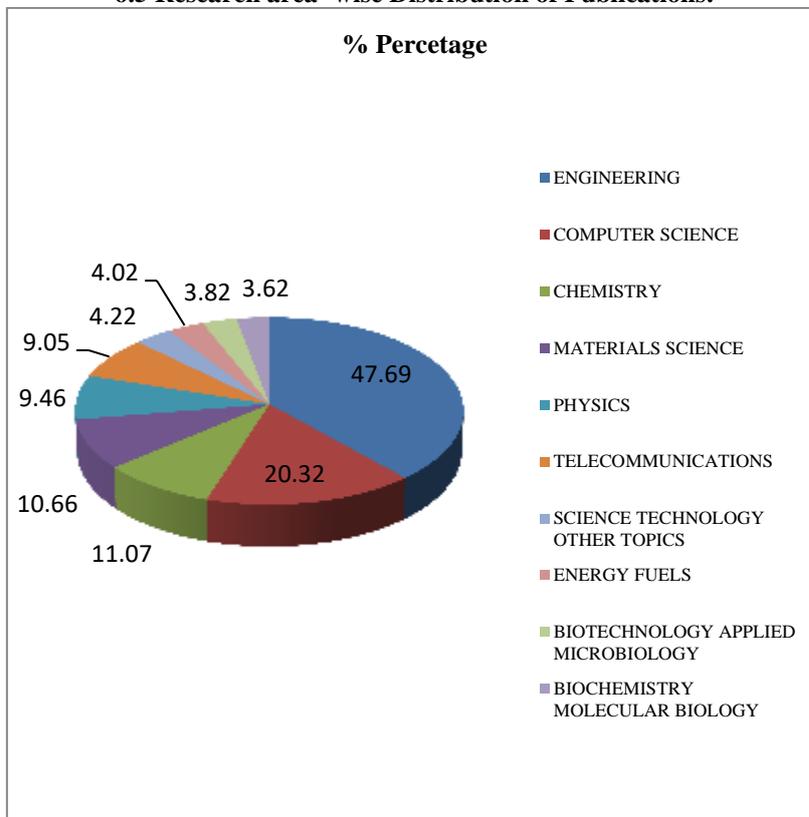


Figure 3: Research area -wise Distribution of Publications

Figure-3 shows that the research output covered in this study during 2012-2016 as various subjects as defined by WoS. The list of Top subjects for which the authors of NIT Raipur, mostly contributed papers. it is clarify that Engineering is the most favoured area of research among the contributors with 47.69%, followed by Computer Science with 20.32%, Chemistry with 11.07%, Material Science 10.66%, Physics with 9.46 % and others areas of research are given in figures 3.

6.6 Collaboration with other Countries

Table-3 Collaboration of papers with other countries

Sr.No.	Countries/Territories	Records	% age
1	India	497	100.00
2	USA	22	4.43
3	Japan	7	1.41
4	England	7	1.41
5	Italy	6	1.21
6	Cyprus	6	1.21
7	Canada	5	1.01
8	Russia	3	0.60

9	Germany	3	0.60
10	Spain	2	0.40
11	South Korea	2	0.40
12	Serbia	2	0.40
13	Peoples R China	2	0.40
14	Hungary	2	0.40
15	Brazil	2	0.40
16	Belgium	2	0.40

Table-3 shows that collaboration of papers with other countries with author of NIT Raipur. It is reveal that USA is an the top with no. of publications is 22 (4.43%), followed by Japan & England 7 (1.41%) as a second position and Italy with no. of publication is 6 (1.21%) in third position other detail of country with its publications are given in table for better understanding.

6.7 Top participating institutions in collaboration with NIT Raipur

Top participating institutions incollaboration with NIT Raipur	Records	% age
National Institute of Technology Raipur	497	100.00
Indian Institute of Technologies (IITS)	42	8.45
Council of Scientific Industrial Research CSIR India	17	3.42
Global Biomed Techno Inc.	13	2.62
Motilal Nehru National Institute of Technology	11	2.21
Ravenshaw University	9	1.81
Pt.RavishankarShukla University	9	1.81
National Institute of Technology Rourkela	9	1.81
Indian Institute of Technology (Indian School of Mines) Dhanbad	9	1.81
Indian Institute of Technology IIT Roorkee	9	1.81
Indian Institute of Technology IIT Kharagpur	9	1.81

Table- 4 :Top participating institutions in collaboration with NIT Raipur

Table -4 shows the top participating institutions in collaboration with NIT Raipur. It is reveal that authors/contributors are collaborating with many institutions to publish their papers, It has been found that within top 10 institutions Indian Institute of Technologies (IITS) found in Top position with 42 publications(8.45%), followed by Council of Scientific Industrial Research CSIR India with 17 Publications (3.42%) in second position and Global Biomed Techno Inc with publications 13 (2.62%) & found in third position.

7.0 Findings & Conclusion

The study reveal that NIT Raipur has contributed 497 papers from 2012 to 2016 The authorship pattern reveal that the maximum number of papers were 162 (32.60 %) from three authors followed by two authors 144 (28.97 %), which shows that contributors of NIT Raipur have tendency to publish their work with two or more authors which indicates the multi author pattern and shows that the contributors are collaborative in nature. The Most Productive author based on their publication it has been reveal that Londhe, Narendra D., published highest numbers of papers, i.e. 30 followed by Yadav, Anamika published 28 papers with second position, Sahoo, B. K. with 24 papers with third position. Pattern of type of document reveal that research productivity in form of no. of article was highest i.e 315 (63.38%) which shows that contributors have a tendency to publish their papers in form of article. The subject wise distribution reveal that Engineering is the most favoured area of research among the contributors with 47.69%, followed by Computer Science with 20.32%, Chemistry with 11.07%, Material Science 10.66%, Physics with 9.76 %. The distribution of collaboration of papers with other countries

with author of NIT Raipur. It is reveal that USA is at the top with no. of publications is 22 (4.43%), followed by Japan & England 7 (1.41%) as a second position and Italy with no. of publication is 6 (1.21%) in third position. In terms of top participating institutions in collaboration with NIT Raipur. It is reveal that authors/contributors are collaborating with many institutions to publish their papers, It has been found that within top 10 institutions Indian Institute of Technologies (IITS) found in top position with 42 publications(8.45%), followed by Council of Scientific Industrial Research CSIR India with 17 Publications (3.42%) in second position and Global Biomed Technol Inc with publications 13 (2.62%) & found in third position.

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