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An Analysis of NIRF ranked Indian Institute of Technology (IITs) Profiles: with Special Reference to Indian Research Information Network System (IRINS)

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Abstract

Indian Research Information Network System (IRINS) which is developed by the Information and Library Network Centre (INFLIBNET) in collaboration with Central University of Punjab, Bathinda for higher learning and research institutions to showcase their research activities to the scholarly community in worldwide. The data were retrieved from National Institutional Ranking Framework (<https://www.nirfindia.org/Home>) home page and Indian Research Information Network System (<http://irins.org/irins/>) of 17 NIRF ranked Indian Institute of Technology (IIT's) instances for this study. The objectives of the article is to analyze the NIRF ranked IIT's, faculty members and their publications, department and its publications with citations and impact. It is found that "Indian Institute of Technology Madras" has highest 85.31 score received from NIRF. The "Indian Institute of Technology Bombay" has highest 690 (12.48%) number of faculty members. The "Indian Institute of Technology Bombay" has received 452743 (14.18%) highest citations from Scopus and 381731 (13.70%) citations from Cross Ref. It is further found that "Prof Prafulla Kumar Behera", Professor (Indian Institute of Technology Madras) has published 1255 (16.58%) articles with 104 h-index and he has received 40931 (18.96%) citations from Crossref and 56029 (20.04%) citations from Scopus.

Keywords: Ranking Institutions, National Institutional Ranking Framework (NIRF), NIRF ranked Indian Institute of Technology (IIT's), Profile Management System, Indian Research Information Network System (IRINS).

1. Introduction

The National Institutional Ranking Framework (NIRF) was approved by the MHRD and launched by Honorable Minister of Human Resource Development on 29th September 2015. The NIRF has five parameters and broadly it covers Teaching, Learning and Resources, Research and Professional Practices, Graduation Outcomes, Outreach and Inclusivity, and Perception.⁽¹⁾ IRINS is web-based Research Information Management (RIM) service developed by the Information and Library Network (INFLIBNET) Centre in collaboration with the Central University of Punjab. The portal facilitates the academic, R&D organizations and faculty members, scientists to collect, curate and showcase the scholarly communication activities and provide an opportunity to create the scholarly network. The IRINS is available as free software-as-service to the academic and R&D organizations in India.⁽²⁾

2. Review of Literature

Kumaren, Siva (2019)⁽³⁾ examined the publications of Universities in NIRF. The study has considered the publications of top 10 Universities in Scopus, Web of Science (WoS) & Indian Citation Index (ICI), patent publications and citations. Further, the Citation Rate (CR) for the publications of the Universities have also been found using simple calculation method ($NC/NP=CR$). It is found in the study that the top 10 Universities were contributed more number of publications in Scopus(53.86%) database, followed by WoS (41.13%) and ICI(5%). The University of Delhi has received more number of citations (50434) for the publications of (8131), whereas, IISC has produced more publications (12623) and citations (63632). The Citation Rate is also high for the University of Delhi than other Universities. The study has also recommends to incorporate additional parameters such h-index of Universities, Departments and Contributors in assessing Universities for awarding Ranks. Balasubramani, Jeyapragash and Thangavel, Rajkumar, (2019)⁽⁴⁾ described the publications of IITs, which have been available and indexed in ResearchGate, Web of Science, Scopus and Indian Citation Index databases. The data for the study have been taken out from two websites there are National Institutional Ranking Framework (NIRF) and ResearchGate. A total number of 47,380 publications have been indexed in Web of Science, Scopus and Indian Citation Index databases and 46,729 publications are available in the ResearchGate. The study found that more number of publication are available in ResearchGate. Sivakumaren, K. S. (2017)⁽⁵⁾ examined the publications of Indian Institute of

Management (IIMs), which have been indexed in Web of Science, Scopus and Indian Citation Index databases. The data for the study have been extracted from the website of National Institutional Ranking Framework (NIRF) under publications. A total of 939 publications have been indexed in these databases and over all 1996 citations have been received for its publications. Among 939 publications, 203 papers have been highly cited by others. It is found from the results that more number of publications have indexed in Scopus (65.50%), it is followed by Web of Science(20.55%) and Indian Citation Index(13.95%).Generally, it is observed that old institutes have been produced a good number of publications than the institutes established in recent years. In Indian Citation Index (ICI), the publications of recently established institutes have been received a good number of citations even though the publications are found less compare to other Institutes. The study has also recommended to adopt a new parameter namely h-index to find out the h-index of the institutions, departments and also authors. Cherkodan Surendran, Sheeja, N. K and Susan Mathew, K (2017)⁽⁶⁾ The purpose of this study is to find out the link between scholarly communication and institutional ranking. The study covers National Institutional Ranking Framework (NIRF) of 2017 in relation to the scholarly productivity of top ranked institutions. The study analyses the parameters of two international ranking agencies and NIRF.The data for the study were collected through web content analysis. The study found that there is a significant correlation between scholarly communication and institutional ranking. Arora, Jagdish and Trivedi Kruti (2014)⁽⁷⁾ described the importance of university ranking systems along with indicators and methodology deployed by them for ranking universities. The shortcomings of these ranking systems are highlighted. The article describes I-UGR system of ranking developed for ranking universities in Spain and elaborates on its formula. Finally, the article describes why I-UGR system of ranking universities could also be used for ranking universities in India.

3. Research Methodology

The data were collected from National Institutional Ranking Framework (NIRF) home page (<https://www.nirfindia.org/Home>) and Indian Research Information Network System (IRINS) website (<https://irins.org/irins/index.php>) as on 3rd October 2020. It is found that 17 Indian Institute of Technology institutes have got score in NIRF 2020. The study is also aimed to analyze NIRF ranked IIT institutes faculty members publications, patents, Resource Impacts

from various databases, top departments and top faculty publication & citations of individual institution. The Data were analyzed using simple calculations.

4. Objectives of the Study

The following are the major objectives of the study.

1. To identify the NIRF ranked Indian Institute of Technology (IIT's) institutions
2. To find out the faculty members profiles of IIT's.
3. To analyze the faculty members, Publications and patents.
4. To find out the Resource Impact from various databases.
5. To identify the contributions of top department of individual institution and its h-index.
6. To find out the top faculty of individual institution and their publications.

5. Data Analysis and Interpretation

5.1. NIRF Ranked Indian Institute of Technology (IIT's) Institutions

Table. 1

NIRF Ranked IIT's

S. No	Name of the Institute	NIRF Score	Rank
1	Indian Institute of Technology Madras	85.31	1
2	Indian Institute of Technology Delhi	81.33	3
3	Indian Institute of Technology Bombay	80.75	4
4	Indian Institute of Technology Kharagpur	75.85	5
5	Indian Institute of Technology Kanpur	74.99	6
6	Indian Institute of Technology Guwahati	68.81	7
7	Indian Institute of Technology Roorkee	68.48	9
8	Indian Institute of Technology Hyderabad	59.59	17
9	Indian Institute of Technology (ISM), Dhanbad	56.05	22
10	Indian Institute of Technology Indore	55.94	23
11	Indian Institute of Technology BHU, Varanasi	54.82	26
12	Indian Institute of Technology Gandhinagar	51.49	35

13	Indian Institute of Technology Ropar	50.92	39
14	Indian Institute of Technology Patna	48.09	54
15	Indian Institute of Technology Bhubaneswar	47.96	56
16	Indian Institute of Technology Mandi	46.56	67
17	Indian Institute of Technology Jodhpur	46.13	53

Table 1 shows that NIRF ranked Indian Institute of Technology institutions. It is found that “Indian Institute of Technology Madras” has highest 85.31 score received from NIRF and placed 1st rank in NIRF list followed by “Indian Institute of Technology Delhi” has received 81.33 score have placed 3rd rank. It is further found that “Indian Institute of Technology Mandi” has received 46.56 score have placed 67th rank.

5.2. IIT’s faculty profiles and Scopus Publications

Table.2

IIT’s faculty profiles and Scopus Publications

S. No	Name of the Institute	Faculty members	%	Patents	%	Scopus Publications	%	Rank
1	Indian Institute of Technology Madras	623	11.27	12	0.37	27332	13.74	3
2	Indian Institute of Technology Delhi	590	10.67	739	22.61	29152	14.66	4
3	Indian Institute of Technology Bombay	690	12.48	1297	39.68	28379	14.27	1
4	Indian Institute of Technology Kharagpur	681	12.31	300	9.18	26198	13.17	2
5	Indian Institute of Technology Kanpur	437	7.90	541	16.55	18077	9.09	6
6	Indian Institute of Technology Guwahati	412	7.45	219	6.70	14906	7.49	7

7	Indian Institute of Technology Roorkee	449	8.12	51	1.56	16789	8.44	5
8	Indian Institute of Technology Hyderabad	219	3.96	1	0.03	5103	2.57	9
9	Indian Institute of Technology (ISM), Dhanbad	294	5.32	42	1.28	9129	4.59	8
10	Indian Institute of Technology Indore	152	2.75	10	0.31	4443	2.23	12
11	Indian Institute of Technology BHU, Varanasi	163	2.95	3	0.09	5752	2.89	10
12	Indian Institute of Technology Gandhinagar	128	2.31	22	0.67	2104	1.06	15
13	Indian Institute of Technology Ropar	163	2.95	-	0.00	2360	1.19	10
14	Indian Institute of Technology Patna	123	2.22	12	0.37	1763	0.89	16
15	Indian Institute of Technology Bhubaneswar	140	2.53	8	0.24	3284	1.65	14
16	Indian Institute of Technology Mandi	123	2.22	6	0.18	2293	1.15	16
17	Indian Institute of Technology Jodhpur	143	2.59	6	0.18	1848	0.93	13
	Total	5530	100	3269	100	198912	100	

Table 2 indicates that IIT's faculty profiles and Scopus publications. It is found that "Indian Institute of Technology Bombay" has highest (690 and 12.48%) faculty members having published 28379 (14.27%) articles in Scopus Database and it is placed first rank. It is followed by "Indian Institute of Technology Kharagpur" with 681 (12.31%) faculty members having

published 26198 (13.17%) publications and it is placed in second rank. A good number of (590 and 10.67%) faculty members of “Indian Institute of Technology Delhi” have published highest (29152 and 14.66%) publications have been placed fourth. It is further found that “Indian Institute of Technology Patna” and “Indian Institute of Technology Mandi” the least number of faculty members and published few articles stands last.

5.3. Resource Impact of Various Databases

Table.3

Resource Impact of Various Databases

S. No	Name of the Institute	Scopus Citations	%	Crossref Citations	%
1	Indian Institute of Technology Madras	401225	15.35	325149	14.18
2	Indian Institute of Technology Delhi	413318	15.81	326433	14.24
3	Indian Institute of Technology Bombay	452743	17.32	381731	16.65
4	Indian Institute of Technology Kharagpur	386622	14.79	330187	14.40
5	Indian Institute of Technology Kanpur	245827	9.40	215081	9.38
6	Indian Institute of Technology Guwahati	153713	5.88	179589	7.83
7	Indian Institute of Technology Roorkee	157423	6.02	200373	8.74
8	Indian Institute of Technology Hyderabad	63539	2.43	59386	2.59
9	Indian Institute of Technology (ISM), Dhanbad	66408	2.54	56941	2.48
10	Indian Institute of Technology Indore	55038	2.11	45112	1.97
11	Indian Institute of Technology BHU, Varanasi	84662	3.24	52924	2.31
12	Indian Institute of Technology Gandhinagar	17033	0.65	15909	0.69
13	Indian Institute of Technology Ropar	26127	1.00	24413	1.06
14	Indian Institute of Technology Patna	11146	0.43	6972	0.30
15	Indian Institute of Technology Bhubaneswar	53544	2.05	43802	1.91

16	Indian Institute of Technology Mandi	14897	0.57	16786	0.73
17	Indian Institute of Technology Jodhpur	10654	0.41	12099	0.53
	Total	2613919	100	2292887	100

Table 3 shows that Resource Impacts of various databases. The “Indian Institute of Technology Bombay” has received 452743 (14.18%) highest citations from Scopus and 381731 (13.70%) citations from Cross Ref and it’s followed by “Indian Institute of Technology Delhi” which has 413318 (12.94%) citations from Scopus and 326433 (11.72%) citations from Cross Ref. The “Indian Institute of Technology Madras” has received 401225 (15.35%) citations from Scopus and 325149 (14.18%) citations from Crossref. It is further found that “Indian Institute of Technology Jodhpur” has received less number of citations from Scopus and Crossref.

5.4. Contribution of top departments of individual institution and h-index

Table.4

Contribution of top departments of individual institution and h-index

S. No	Department	Publications	h-Index	Scopus Citations	Crossref Citations	Rank
1	Department of Physics, (IIT Madras)	3686	114	103087	91867	1
2	Department of Physics (IIT Delhi)	3209	81	48531	42194	3
3	Department of Chemistry (IIT Bombay)	3286	97	83227	73859	2
4	Department of Computer Science and Engineering (IIT Kharagpur)	2903	54	27349	19938	5
5	Department of Electrical Engineering (IIT Kanpur)	3116	62	27115	21746	4
6	Department of Physics (IIT Guwahati)	2168	85	39434	31074	7
7	Department of Mechanical	2345	66	39248	29043	6

	and Industrial Engineering (IIT Roorkee)					
8	Department of Electrical Engineering (IIT Hyderabad)	1270	44	8453	7224	9
9	Department of Electronics Engineering (IIT (ISM), Dhanbad)	1301	31	5951	4493	8
10	Department of Electrical Engineering (IIT Indore)	1030	42	9928	7397	12
11	Department of Chemistry (IIT BHU, Varanasi)	963	71	22782	14179	13
12	Department of Electrical Engineering (IIT Gandhinagar)	438	21	1979	1614	17
13	Department of Mechanical Engineering (IIT Ropar)	761	38	12391	11340	14
14	Department of Computer Science and Engineering (IIT Patna)	573	22	3756	1544	15
15	School of Basic Science (IIT Bhubaneswar)	1264	75	38875	25396	10
16	School of Basic Science (IIT Mandi)	1048	42	10349	9610	11
17	Department of Electrical Engineering (IIT Jodhpur)	508	29	3623	3037	16

Table 4 shows the Contributions of top departments of individual institution and h-index. The “Department of Physics (IIT, Madras)” has published 3686 articles with 114 h-index tops the list and ranked first. “Department of Chemistry (IIT Bombay)” has published 3286 articles with 97 h-index and ranked second. It is further found that “Department of Electrical Engineering (IIT Gandhinagar)” has published 438 articles with 21 h-index and ranked last.

5.5. Top faculty members of individual institution and publications & Citations

Table.5

Top faculty members of individual institution and publications & Citations

S. No	Name of the Faculty	Name of the Institute	Publications and %	H-index	Crossref Citations and %	Scopus Citations and %	Rank
1	Prof Prafulla Kumar Behera, Professor	Indian Institute of Technology Madras	1255 (16.58%)	104	40931 (18.96%)	56029 (20.04%)	1
2	Prof Bhim Singh, Professor	Indian Institute of Technology Delhi	659 (8.71%)	64	16898 (7.83%)	22990 (8.22%)	4
3	Dr Basanta Kumar Nandi, Professor	Indian Institute of Technology Bombay	574 (7.58%)	112	40090 (18.57%)	48064 (17.19%)	5
4	Prof Pratim Kumar Chattaraj, Professor	Indian Institute of Technology Kharagpur	332 (4.39%)	56	10502 (4.86%)	13175 (4.71%)	10
5	Prof Ashok Kumar, Professor	Indian Institute of Technology Kanpur	348 (4.60%)	46	7701 (3.57%)	8838 (3.16%)	9
6	Prof Bipul Bhuyan, Professor	Indian Institute of Technology Guwahati	661 (8.73%)	85	19090 (8.84%)	26939 (9.64%)	3
7	Dr Anil Kumar, Associate Professor	Indian Institute of Technology Roorkee	558 (7.37%)	33	1407 (0.65%)	6171 (2.21%)	6
8	Prof Budaraju Srinivasa Murty, Professor and Director	Indian Institute of Technology Hyderabad	339 (4.48%)	53	10357 (4.80%)	11464 (4.10%)	8
9	Prof Shishir Gupta, Professor	Indian Institute of Technology (ISM), Dhanbad	153 (2.02%)	21	963 (0.45%)	1239 (0.44%)	16
10	Dr Shaikh M. Mobin, Associate Professor	Indian Institute of Technology Indore	442 (5.84%)	49	8668 (4.01%)	9618 (3.44%)	7
11	Prof Mumtaz Quraishi, Professor	Indian Institute of Technology BHU, Varanasi	312 (4.12%)	57	7217 (3.34%)	10693 (3.82%)	12
12	Dr Anand Sengupta,	Indian Institute of Technology	210 (2.77%)	55	10375 (4.80%)	10303	15

	Associate Professor	Gandhinagar				(3.68%)	
13	Prof R.P. Chhabra, Professor	Indian Institute of Technology Ropar	322 (4.25%)	47	6751 (3.13%)	8395 (3.00%)	11
14	Dr Sriparna Saha, Associate Professor	Indian Institute of Technology Patna	110 (1.45%)	20	1764 (0.82%)	2380 (0.85%)	17
15	Dr Seema Bahinipati, Assistant Professor	Indian Institute of Technology Bhubaneswar	798 (10.54%)	80	24834 (11.50%)	34040 (12.17%)	2
16	Dr Rahul Vaish, Associate Professor	Indian Institute of Technology Mandi	213 (2.81%)	26	2352 (1.09%)	2608 (0.93%)	14
17	Dr Surajit Ghosh, Professor	Indian Institute of Technology Jodhpur	283 (3.74%)	45	6028 (2.79%)	6648 (2.38%)	13
	Total		7569 (100%)		215928 (100%)	279594 (100%)	

Table 5 indicates the Top faculty of individual institution and publications & citations. “Prof Prafulla Kumar Behera”, Professor (Indian Institute of Technology Madras) has published 1255 (16.58%) articles with 104 h-index has received 40931 (18.96%) citations from Crossref and 56029 (20.04%) citations from Scopus have placed first rank. Dr Seema Bahinipati, Assistant Professor (Indian Institute of Technology Bhubaneswar) has published 798 (10.54%) articles with 80 h-index and received 24834 (11.50%) citations from Crossref and 34040 (12.17%) citations from Scopus takes second position. It is further found that “Dr Sriparna Saha”, Associate Professor (Indian Institute of Technology Patna) has published 110 (1.45%) articles with 20 h-index have received 1764 (0.82%) citations from Crossref and 2380 (0.85%) citations from Scopus have placed in last position.

6. Conclusion

Now-a-days Institutional Ranking plays the major role in higher learning educational institutions to showcase their teaching and research activities, graduation productivity and other professional activities. In present scenario many higher learning institutions are facing the problem in collecting the research activities and faculty profiles for the ranking and accreditation purpose. The IRINS helps to solve this problem and it gives exact information which is required by the ranking and accreditation organizations by national and international. IRINS helps to

update the research and faculty details in a simple manner by themselves. Hence this will help the institutions to know about their faculty personal information, publications, awards, honors, educational background, identity and such up-to-dates. This study recommends that all higher learning institutions should implement IRINS for their institution's research visibility by the outside world.

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