

May 2019

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kumaren, siva, "Publications of Indian Universities in National Institutional Ranking FrameWork (NIRF) System: A Study" (2019). *Library Philosophy and Practice (e-journal)*. 2553.
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Publications of Indian Universities in National Institutional Ranking Framework (NIRF) System: A Study

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Abstract

This paper examines 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 recommended to incorporate additional parameters such h-index of Universities, Departments and Contributors in assessing Universities for awarding Ranks.

Keyword: NIRF, Ranking, Citations, Citation Rates, Scopus, Web of Science and Indian Citation Index

1. Introduction

“University Ranking” is an invention of US. The first invention was undertaken in the beginning of the 20th century. The first published in the USA was by US News and World Report in 1983. In Higher Education System, the use of rankings makes a lot discussion about the benefits and the cost of their use (Marginson; Van der Wende, 2007)⁷. Generally, the academic institutions do not like to be ranked or compared with others, however, rankings are unavoidable. It is very interesting to observe that despite the criticism that academic rankings face, the main goal of several universities is to be at the top of an academic ranking. It happens because the world class rankings are very popular in this sector, give good reputation and free publicity to the institutions. A good example of this situation is the Victoria University of Wellington. When it went down several positions in the Asia week ranking, one of the top goals for the coming years of this university was to improve its position in the ranking (Stella; Woodhouse, 2006)¹¹. As rankings are gaining increasing attention and popularity, the stakeholders should seriously discuss two major related-issues on this subject “who should perform the higher education rankings?”, and “is the information provided by academic rankings

reliable?" "The patents our universities produce represent important processes, products and treatments which provide significant societal benefit as well as generate job creation that sustains and helps grow our local, regional and global economy," (Paul R. Sanberg,2017).⁴

The Educational institutions are assessed by NAAC, NBA and NIRF. The main objective of assessment and accreditation of the institutions is "Quality" in learning, teaching and research. This bodies/organization is evaluating the institutions based on various parameters adopted by each body. National Institutional Ranking Framework The National Institutional Ranking Framework (NIRF) was approved by the MHRD and launched by Honourable Minister of Human Resource Development on 29th September 2015. This framework outlines a methodology to rank institutions across the country. The methodology draws from the overall recommendations broad understanding arrived at by a Core Committee set up by MHRD, to identify the broad parameters for ranking various universities and institutions. The parameters broadly cover "Teaching, Learning and Resources," "Research and Professional Practices," "Graduation Outcomes," "Outreach and Inclusivity," and "Perception".

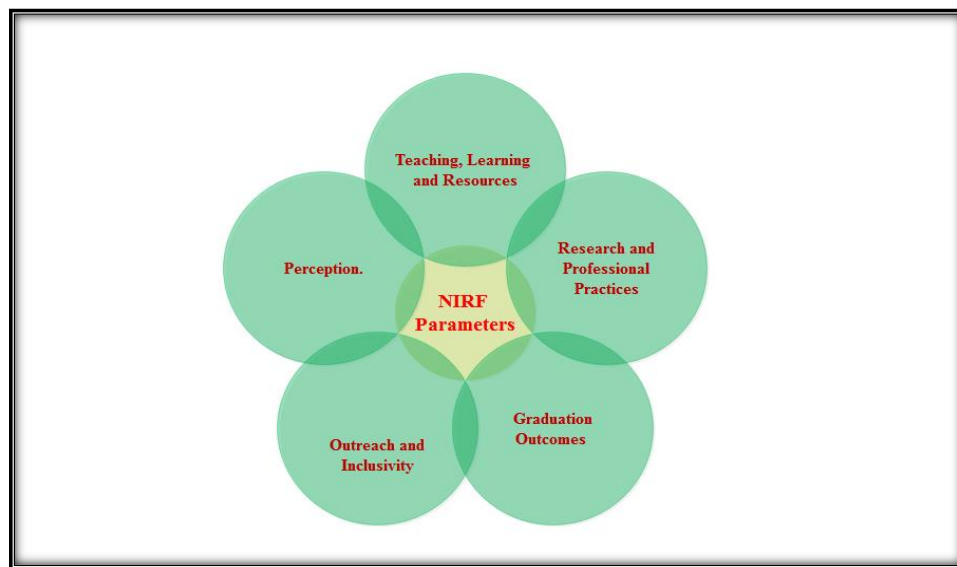


Figure 1. NIRF parameters

Rankings can encourage institutions to move beyond their internal conversations to participate in broader national and international discussions about new ways of capturing and reporting indicators of success. The participation of individual institutions in these discussions will become an increasingly important way for articulating how rankings can be used to measure and improve institutional practices

2. Review of Literature

The global expansion of access to higher education has increased demand for information on academic quality and has led to the development of university ranking systems or league tables in many countries of the world (Dill and Soo, 2005)⁴. Kehm and Stensaker (2009)⁶ say that 'If university rankings are considered as consumer information, then everyone should have an interest in basing such guidance on valid and reliable data and methodology. Higher education

ranking is present in all regions of the world, including those in which universities are striving to ameliorate their position in the global rankings, such as those in sub-Saharan Africa (Sall et al, 2009)¹¹ and Muslim countries (Billal, 2007)². Hazelkorn (2011)⁵ says that “Rankings are creating a social norm against which all institutions are measured’. While higher education has always been competitive, ‘rankings make perceptions of prestige and quality explicit’. Askling (2007)⁹ argues that the international concept of reviewing and assessing the quality of research within a specific academic discipline has gained legitimacy through the model of peer assessments. However, the complexity of education and multidisciplinary education programmes requires complementary assessment models and methods of measurement. Sivakumaren (2017)⁹ found that the IIM has published 20.55% publications in Web of Science, 65.50% in Scopus and 13.95% in Indian Citation Index databases. It is also recommended to adopt a new parameter “h-index” to assess the contributions of institutions, authors and departments. Sivakumaren (2018)¹⁰ compared the Indian Academic institutions in top NIRF ranking 2018. It is found that 49623 and 55640 publications of engineering institutions were published in Web of Science and Scopus databases respectively.

3. Objective of the Study

The major objectives of the study are given below

1. To investigate the publications of top 10 Universities in Scopus, Web of Science (WoS) and Indian Citation Index (ICI) databases during 2012-15.
2. To find out the citations received for the publications of the Universities.
3. To study the patent publications of the Universities and
4. To analysis the Citation Rates (CR) for the publications of the Universities

4. Research Methodology

The data pertaining to the Universities during 2012 -15 were extracted from NIRF website (<https://www.nirfindia.org/2018/Ranking2018.html>). The study has considered only the top 10 Universities of 2016 Ranking. The study has also attempted to find out the Citation Rate (CR) for the publications of the Universities by adopting simple calculations as stated below. The data were exported to Ms-Excel for further analysis.

5. Publications of the Universities

The NIRF is assessing the educational institutions based on the data uploaded by the participating Universities under various parameters. The contributions of the Universities under each parameter are evaluated by NIRF systematically. The publications of the Universities are considered. Table 1 and Figure 2 show the publications of the top 10 Universities in the databases e.g. Scopus, Web of Science (WoS) and Indian Citation Index (ICI). Among the top 10 Universities, IISC has produced more number of publications in Scopus (7145) Web of Science (5117) and Indian Citation Index (361). It has been placed in the First rank based on overall contributions by NIRF. In this study also, it is found that IISc has published more number of publications (12633, 26.43%) and placed in the First Rank.

Table 1
Publications of the Universities

NIRF Rank	Universities	Publications in Databases			Total	%	Rank
		Scopus	WoS	ICI			
1	Indian Institute of Science	7145	5117	361	12623	26.43	1
2	Institute of Chemical Technology	2170	930	146	3246	6.80	7
3	Jawaharlal Nehru University	1858	1181	242	3281	6.87	6
4	University of Hyderabad	2103	1639	172	3914	8.20	5
5	Tezpur University	1032	788	88	1908	4.00	9
6	University of Delhi	3994	3679	458	8131	17.03	2
7	Banaras Hindu University	3379	3496	481	7356	15.40	3
8	Indian Institute of Space Science and Technology	256	176	13	445	0.93	10
9	Birla Institute of Technology & Science	1256	804	77	2137	4.48	8
10	Aligarh Muslim University	2528	1832	352	4712	9.87	4
	Total	25721	19642	2390	47753	100	
	%	53.86	41.13	5			

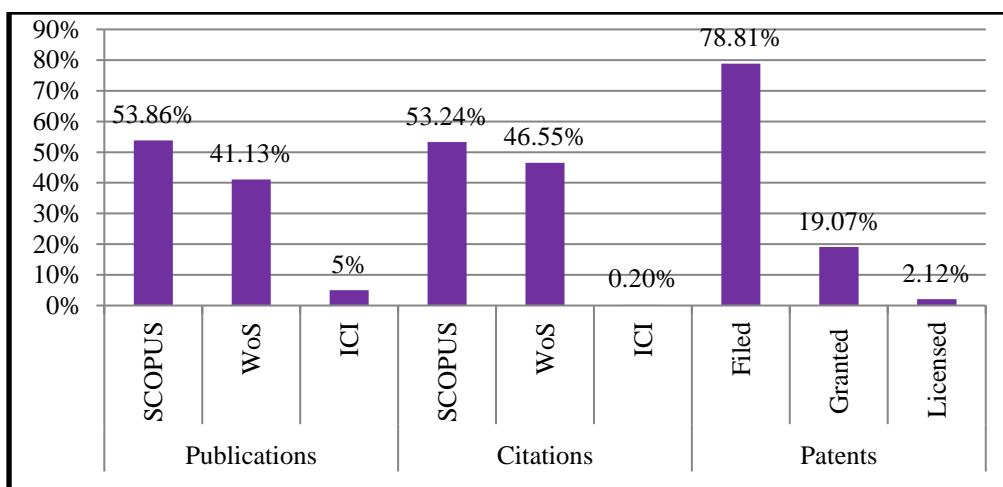


Figure 2. Publications of the Universities

University of Delhi has produced a good number of publications in Scopus (3994), 3679 publications in WoS and 458 publications in Indian Citation Index. Totally, 8131(17.03%) publications were produced in the above three databases and placed in the second rank in this study, whereas it has been placed in the sixth rank by NIRF. Even though, it has been ranked in

the sixth position by NIRF in the overall category, it has been found in the second position in this study considering its publications in the above databases. BHU has been found in the third rank by producing 3379 publication in SCOPUS, 3496 publications in WoS and 481 publications in ICI. Overall, it has produced 7356(15.40%) publications. The result further shows that BHU has produced more number of publications in ICI (481) than other Universities).NIRF has placed it in the seventh position. In the publication category, Aligarh Muslim University has produced a good number of publications in Scopus (2528), WoS (1832) and ICI (352) and it has been placed in the fourth rank in this study with overall publications (4712, 9.87%) and tenth rank by NIRF. It is inferred that the publications of Aligarh Muslim University is found more even though it was placed in the tenth position by NIRF. Further it is found that University of Hyderabad has published 2103 publications in Scopus, 1639 publications in WoS and 172 publications in Indian Citation Index. Overall, its contributions were 3914 (8.20%) publications. The publications of other Universities range from 0.93% to 6.87%. It is inferred that more number publications of top 10 Universities were found in Scopus (53.86%).

6. Citations of the Universities

Citation is considered as one of the important factors for evaluating the publications. The impact factor of the publications is being calculated based on the number of citations received for the particular publications. In this aspect, the NIRF is also given importance for the citations. In this study, the citations received for the publications of the top 10 Universities were analyzed and shown in Table 2.

Table 2
Citations of the Universities

NIRF Rank	Universities	No. of Citations			Total	%	Rank
		Scopus	WoS	ISI			
1	Indian Institute of Science	34322	29213	97	63632	26.39	1
2	Institute of Chemical Technology	14052	5401	34	19487	8.08	6
3	Jawaharlal Nehru University	7952	6409	58	14419	5.98	7
4	University of Hyderabad	10187	9456	24	19667	8.16	5
5	Tezpur University	4996	4298	32	9326	3.87	8
6	University of Delhi	24681	25673	80	50434	20.92	2
7	Banaras Hindu University	14953	17177	95	32225	13.37	3
8	Indian Institute of Space Science and Technology	812	689	0	1501	0.62	10
9	Birla Institute of Technology & Science	4120	3417	12	7549	3.13	9
10	Aligarh Muslim University	12284	10502	60	22846	9.48	4
	Total	128359	112235	492	241086	100	

	%	53.24	46.55	0.20			
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The result shows that the publications of IISC were received more number of citations e.g. 34322 in Scopus, 29213 citations in WoS and 97 citations in ICI. Overall, 63632 (26.39%) citations were received. Based on the citations, it has been ranked in the first position in this study, whereas NIRF has ranked in the first place based on overall contributions among the top 10 Universities. It is found that 24681 citations were received for the publications of University of Delhi in Scopus, 25673 citations in WoS and 80 citations in ICI. Totally, 50434(20.92%) citations were received and placed in the second rank in this study and sixth rank in NIRF ranking. A good number of citations were also received for the publications of BHU in Scopus (14953), WoS (17177) and ICI (95). Aligarh Muslim University has also received a considerable number of citations for its publication in Scopus (12284), WoS (10502) and ICI (60). NIRF has provided tenth rank for this University, whereas it is found in the fourth rank based on the citations (22846, 9.48%). In case of University of Hyderabad, there is no major difference in respect of ranking. However, it has received 10187 citations for its publications in Scopus and 9456 in WoS and 24 in ICI. It is followed by ICT with 14052 citations in Scopus, 5401 citations in WoS and 34 in ICI and it has been placed in the second and sixth ranks by NIRF and in this study respectively.

7. Citation Rate (CR) of the Universities

The study has also analyzed the (Citation Rates) publications of the top 10 Universities. Citation is one of the major credits to the authors. The contributions (or) articles published by the authors are accessed by others at larger members at national and international levels. The publications available in Open Access (OA) domain will be accessed by more number of users. Obviously, it will increase the citations rates. The Citation Rates (CR) of the Universities are given in Table 3.

Table 3
Citation Rate (CR) of the Universities

S.No.	Universities	No. of Publications	No. of Citations	Citation Rate %	Rank
1	Indian Institute of Science	12623	63632	5.04	3
2	Institute of Chemical Technology	3246	19487	6.00	2
3	Jawaharlal Nehru University	3281	14419	4.39	7
4	University of Hyderabad	3914	19667	5.02	4
5	Tezpur University	1908	9326	4.89	5
6	University of Delhi	8131	50434	6.20	1
7	Banaras Hindu University	7356	32225	4.38	8
8	Indian Institute of Space Science and Technology	445	1501	3.38	10
9	Birla Institute of Technology & Science	2137	7549	3.53	9
10	Aligarh Muslim University	4712	22846	4.85	6

	Total	47753	241086		
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The Citation Rate (CR) has been calculated as given below.

$$\frac{\text{NC/NP}=\text{CR}}{\text{No. of Citations (NC)}} = \text{Citations Rate (CR)}$$

$$\text{No. of Publications (NP)}$$

Example:
$$\frac{63632 \text{ (NC)}}{12623 \text{ (NP)}} = 5.04 \text{ (CR)}$$

Therefore, the Citation Rate is 5.04%

It is found from Table 3 that the publications of University of Delhi were cited more number of times by others. It has produced 8131 publications in three databases namely Scopus, WoS and ICI , received 50434 citations and placed in the first rank, because the citation rate is found high (6.20%) than other University publications. It is followed by ICT, it has received 7549 citations for the publications of 2137 and placed in the second rank with citation rate 6%.The publications of IISC (12623) have got 63632 citations with 5.04% citation rates. Further, University of Hyderabad has received 19667 citations for the publications of 3914 and placed in the fourth rank with 5.02%. It is further reveals that Tezpur University has been placed in the fifth rank for 19667 citations, 3281 publications and citation rate is 4.89%.

8. Patents of the Universities

Patent is considered as one of the most important contributions of any educational institutions at national and international level. It is an invention of the institution. It can be seen in large numbers at engineering and medical institutions. The NIRF has given more importance for the patent publications in assessing the institutions. In this study also, the patent produced by the top 10 Universities were ascertained and shown in Table 4.

Table 4
Patents of the Universities

NIRF Rank	Universities	No. of Patents			Total	%	Rank
		Filed	Granted	Licensed			
1	Indian Institute of Science	86	22	7	115	24.36	2
2	Institute of Chemical Technology	161	25	2	188	39.83	1
3	Jawaharlal Nehru University	9	1	0	10	2.12	9
4	University of Hyderabad	7	7	0	14	2.97	8
5	Tezpur University	5	2	1	8	1.69	10
6	University of Delhi Banaras Hindu University	29	7	0	36	7.63	4
7	Indian Institute of Space Science and Technology	15	13	0	28	5.93	5
8	Indian Institute of Space Science and Technology	7	7	0	14	2.97	7
9	Birla Institute of Technology & Science	18	1	0	19	4.03	6
10	Aligarh Muslim University	35	5	0	40	8.47	3
	Total	372	90	10	472	100	
	%	78.81	19.07	2.12			

It is observed from Table 4 that Institute of Chemical Technology (ICT) has produced more number of patents among other Universities. It has filed 161 patents, Granted 25 patents and Licensed 2 patents. Totally, it has produced 188 (39.83%) patents and placed in first rank in this study and second rank by NIRF. It is followed by IISC (Filed 86, Granted 22 and Licensed 7) with overall 115 patents (24.36%). Aligarh Muslim University had also involved in producing a good number of patents e.g. Filed 35, Granted 5 and totally 40 (8.47%) patents. The patent produced by other Universities were found less in number e.g. 28 patents to 8 patents. The result further reveals that more number of institutions were filed more number of patents (78.81%) rather than Granted (19.07%) and Licensed (2.12%).

9. Ranking System (RS)

The study has also attempted to find out the ranks occupied in terms of NIRF Ranking system, Publication Ranking and Citation Ranking. The NIRF Ranking was assigned by NIRF and other ranks mentioned below were assigned based on the data extracted from the NIRF Website and the same is shown in Table 5.

Table 5
Ranking System (RS)

S.No.	Universities	Ranking System(RS)			
		NIRF	Publications	Citations	Patents
1	Indian Institute of Science	1	1	1	2
2	Institute of Chemical Technology	2	7	6	1
3	Jawaharlal Nehru University	3	6	7	9
4	University of Hyderabad	4	5	5	8
5	Tezpur University	5	9	8	10
6	University of Delhi	6	2	2	4
7	Banaras Hindu University	7	3	3	5
8	Indian Institute of Space Science And Technology	8	10	10	7
9	Birla Institute of Technology & Science	9	8	9	6
10	Aligarh Muslim University	10	4	4	3

It is found from Table 5 that IISc has provided first rank in NIRF Ranking, Publication Ranking and Citation Ranking and placed in the second rank in patent publications. ICT has been placed in the second rank by NIRF based on its overall contributions, seventh rank in publication, sixth rank in citations and first rank in patent publications. JNU has been found in the third place in respect of NIRF rank, and sixth in publication, seventh in citations and ninth in patent publications. University of Hyderabad has been placed in the fourth rank by NIRF and fifth rank in publication and citations and eighth rank in patent publications.

10. Conclusion and Recommendations

The educational institutions of India are being assessed by various bodies e.g. NAAC, NBA, and NIRF in order to provide ranking /accreditations. The academic programmes/courses accredited by these bodies have a vital importance in the academic environment. The students who have completed his/her education in these institutions will get more opportunities for higher studies and also employment. Hence, the educational institutions especially higher educational institutions are much interested in getting accreditations/ranks by the various bodies. NIRF is one of the most important ranking agencies approved by the Ministry of Human Resource Department, Government of India to assess various infrastructures, publications, projects, patents etc of the institutions in order to rank the institutions in India. It awards ranks to educational institutions in various domains like engineering, management, medical etc. based on the data uploaded in the NIRF websites. The study recommends the following

- Presently, the NIRF has introduced five major parameters to collect the data from the participating institutions to assess and award the ranks.
- It is recommended to incorporate additional parameters such as h-index of the institutions, departments and the faculty members to evaluate the institutions.
- The NIRF shall consider the courses /institutions accredited by other agencies e.g. NBA and NAAC in ranking the institutions.

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