

Impact of NIRF's Performance of Research and Professional Practice Parameters on the Top 25 Indian Universities: A Study

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Abstract

The National Institutional Ranking Framework (NIRF) is a system adopted by the Ministry of Education (formerly referred to as the Ministry of Human Resource Development (MHRD) to rank all educational institutions. This study is meant to analyse the contributions made by the top 25 universities from 2018-2020 as ranked by NIRF, within the aspects of various sub-parameters' score under 'Research and Professional Practices' key parameter, to find out the strength and weaknesses of the participating Indian educational institutions. The institutions will benefit from this study, as they can focus on the performance of the key parameters to gain a better position in the NIRF ranking; the students will also benefit as this will help them make a right decision to join an institution. The present study is analytical in nature and the data was collected from the official website of the NIRF.

Keywords: National Institutional Ranking Framework, NIRF, Ranking Parameters, Top 25 Universities Ranking, Research and Professional Practice (RP)

Introduction

University ranking is a prime phenomenon for measuring a university's potential and intellectual strength. The rankings of universities and other educational institutions has become popular in national and international scenarios. The continuous ranking creates the strengths and weaknesses of the institutions. It has a significant role in comparing, criticising, competing, creating a perception, and free promotion of higher educational

institutes or universities. A higher ranking (global and national level) creates a familiar learning environment for the scholarly community and attracts students. Media houses and a few non-commercial organisations started publishing ranking tables-supported indicators that are believed to represent the quality of HEIs. The primary aim of ranking is to facilitate stakeholders, including students and their parents, policy makers, funding agencies, and universities to make informed decisions about the quality of the HEIs and their performances on various indicators. The HEIs themselves can use these indicators to reinforce their own standing on various indicators. With the introduction of Educational Ranking of World University by Shanghai Jiao Tong Institute in 2003 and QS Times Education (THE) Rankings in 2004, the phrase "world-class university" caught the attention of academicians, policy makers, and political leaders around the world, which does not only represent excellence in teaching and research, but also signifies the capacity of a university to compete in the worldwide education marketplace. As a consequence, governments of several countries have developed policies, regulations, and framework, and have taken special initiatives to plug and support the creation of world-class universities and upgrading the prevailing universities. An increasingly large number of universities have included "world-class" as a target to understand in their mission statements and have begun implementing various measures. The Indian education system needs a whole overhauling, in terms of quality and clarity, to prepare HEIs in India to compete in terms of quality of education. The Government of India has taken several

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initiatives to assess and evaluate the institutes' performance in a periodic manner. The Ministry of Education (formerly the Ministry of Human Resource Development) set up accreditation agencies for assessment of institutes and accreditation of technical courses two decades ago. The National Assessment and Accreditation Council (NAAC) was established for accreditation of the non-technical colleges and universities in 1994. The NAAC and NBA have used a peer-reviewed accreditation framework based on data submitted by institutions. The accreditation score is measured based on absolute measurement for each predefined criteria of framework.

The reason behind the establishment of NIRF by the government was to place the Indian higher educational institutions among the top world universities. The idea of NIRF was driven from the concept of QS world ranking, though it was modified based on the environment of Indian educational institutions. The ranking of the institutions is determined based on the authentic data given by the institutions; unlike an accreditation score, the NIRF score is a relative score and not an ultimate score. Every year, all the institutions are invited to participate in the NIRF ranking by registration through the NIRF portals. Though all the institutions are invited, accreditations are not given to all and the evaluation process is arranged every five years. Participating institutions are always alert, to know the yearly performance of an institution, and whether it has improved or not.

National Institutional Ranking Framework (NIRF)

The NIRF was set up by the Ministry of Education (formerly known as the Ministry of Human Resource Development – MHRD), Government of India, and launched by the Honourable Minister of MHRD on 29 September 2015. The aim of India Ranking is to identify the institutes' capabilities as a world-class university, among 900+ universities and 50,000+ standalone institutions. The NIRF outlines a methodology to rank higher educational institutions across the country. A core committee was set up by the MHRD to identify the broad parameters for ranking various universities and institutions. The methodology arises from the overall recommendations and broad understanding arrived at by the core committee. The parameters broadly are: teaching, learning, and resources; research and professional

practices; graduation outcomes; outreach and inclusivity; and perception. India Rankings 2016 was released on 4 April 2016. The categories of education institutions ranked under the NIRF based on this framework are as follows.

Categories of the Higher Educational Institutions as NIRF

- Engineering
- Universities
- Management
- Pharmacy
- Medical
- Architecture
- Law
- Overall
- Colleges
- Dental

NIRF Ranking – Key Parameters

The higher education institutions are ranked under NIRF as per the following five different parameters.

- *Teaching, Learning, and Resources* – To check the key activities in the higher education institutions.
- *Research and Professional Practice* – High quality in teaching and learning is firmly related to scholarships.
- *Graduation Outcome* – To find out the effectiveness of learning and teaching.
- *Outreach and Inclusivity* – Settle special importance on the representation of women.
- *Perception* – Emphasise the importance of perception of an institution.

Objectives of the Study

- To identify the top 25 universities and their rank from 2018-2020 in the NIRF system.
- To identify the score from 2018-2020 for the top 25 universities in the NIRF system.

- To measure the performance of 'research and professional practices' parameter and sub-parameter scores from 2018-2020 in the NIRF system.

Literature Review

Nassa et al. (2021) analysed data of five years of India Rankings to assess its impact on performance parameters of institutions of higher education, in terms of publications, citations, patents, highly-cited publications, and research funding, under the broad category of a parameter named research and professional practices. It revealed that participating institutions are making strenuous efforts to improve their performance on various parameters or sub-parameters identified by the NIRF for ranking of HEIs. Most ranking systems allocate larger weightage to bibliometric parameters, including publications, citations, HCP, patents, and so on. Moreover, it is a well-accepted fact that increase in high-quality publications by an HEI would invariably result in improvement of its ranking. This study reflects that ranking has influenced the performance of HEIs in a positive way.

Vijayakumar et al. (2018) examined the research trends in 13 central universities which were established in 2009. The study analysed collaborative research as affiliations and major subject research within the central universities as per published publications. During the nine-year period (2009 to 2017), the publications were increasing steadily in central universities. Science, engineering, and social science were the main subject areas of publications. The study also found that the research collaboration among the peers was not only with Indian institutes, but also with institutions in foreign countries.

Mukherjee (2019) discussed the viability of the research and professional practices in the NIRF ranking system, and the NIRF parameters such as teaching, learning and resources, research, professional practices, and so on. This study found that only selected universities in the fields of science and applied science published a good amount of research. This study suggested that developing quality infrastructure in the existing universities or institutes is required to generate more research works.

Reddy (2015) has discussed the current situation of higher education, high-impact research, and university rankings in India. The study showed that India holds the 9th rank

for citable documents in all subject categories, the United States is 1st, and China is 2nd. This study also found that high-impact research is influenced by three important factors, namely individual, university-, and country-specific factors.

Hazelkorn (2011) found 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".

Sivakumaren (2017) showed that the IIMs' (Indian Institute of Management) publications are indexed as follows: 20.55% in Web of Science, 65.50% in Scopus, and 13.95% in Indian Citation Index. It has also established a new parameter, H-index, to assess the contributions of institutions, authors, and departments, and recommends its adoption.

Walia and Gupta (2012) conducted a study of select national libraries' websites on Web impact factor; their study revealed that websites of national libraries of the USA, Australia, and Britain were more visible among the selected national libraries and hosted more content, compared to the websites of India, Namibia, and South Africa.

Vernon et al. (2018) have discussed the utility of ranking systems and identified opportunities to support research and performance improvement by evaluating 13 eligible ranking systems. It found that 100% weightage to research performance is given by most of the ranking systems. It was observed that 76% of the total ranks are associated with research, and 24% associated with academic or teaching quality.

Verma and Brahma (2017) have discussed the Ranking of National Institutes of Technology (NITs) of northeast vicinity of India on the idea of net effect aspect. The result found was that the NIT Silchar from Assam leads with the highest number of Web pages and highest number of internal and external links. It is found that according to the simple Web impact factor, external Web impact factor, and internal Web impact factor, NIT, Silchar, was ranked the 1st, while the website of NIT Sikkim was 2nd, NIT Mizoram the 3rd, and NIT Nagaland the 4th rank; NIT Meghalaya and NIT Arunachal ranked last.

Sivakumaren (2018) compared the publications of the Indian academic institutions in the top NIRF ranking in 2018 and found that 49,623 and 55,640 publications of engineering institutions were published in the Web of Science and Scopus databases, respectively.

Methodology

To conduct the study, the universities have been selected from the list of NIRF rankings of the top 25 universities. The data concerning five key parameters and their sub-parameters of selected universities from 2018 to 2020 have been derived for the study from the website of the National Institutional Ranking Framework (<https://www.nirfindia.org>). The institutions have been categorised into ten groups based on domains or categories, e.g., overall, universities, engineering, management, pharmacy, college, medical, law, architecture, and dental. There are 100 universities listed under the university domain. The study considered the top 25 universities in the top 25 ranked university category in Indian Ranking (NIRF) 2018, 2019, and 2020. The data thus extracted were exported to Ms Excel for further analysis.

Scope and Limitation

The scope of the study is limited to the top 25 universities in the NIRF system. Moreover, only the sub-parameters of research and professional practices score from 2018-2020 were considered for the present study.

Table 1: Weightage of Parameters

Categories	Key Parameters				
	TLR	RP	GO	OI	PR
Overall	0.3	0.3	0.2	0.1	0.1
Engineering	0.3	0.3	0.2	0.1	0.1
Management	0.3	0.3	0.2	0.1	0.1
Pharmacy	0.3	0.3	0.2	0.1	0.1
College	0.4	0.15	0.25	0.1	0.1
Medical	0.3	0.3	0.2	0.1	0.1
Architecture	0.4	0.2	0.2	0.1	0.1
Law	0.4	0.15	0.25	0.1	0.1
Dental	0.3	0.3	0.2	0.1	0.1
Agriculture	0.3	0.3	0.2	0.1	0.1

*However, for universities in the PR parameter, 70% weightage was given to peer perception and 30% to accreditation.

Table 1 shows the weightage of each of the five key parameters, such as teaching, learning, and resources (TLR); research and professional practice (RP); graduation outcomes (GO); outreach and inclusivity (OI); and perception (PR). The teaching, learning, and resources (TLR) parameters have more weightage in the colleges, architecture institutes, and law institutes category in the NIRF system, whereas the research and professional practice (RP) parameter has more weightage in overall, engineering institutes, management institutes, pharmacy institutes, medical institutes, dental institutes, and agriculture colleges. On the other hand, the results show more weightage in the college and law category for the GO (graduation outcomes) parameter. However, weightages for outreach and inclusivity (OI) and perception (PR) are the same for all kinds of institutes.

Table 2: Weightage of Sub-Parameters

Key Parameter	Sub-Parameter	Overall	Engineering	Management	Pharmacy	College	Medical	Architecture	Law	Dental
TLR	SS	20	20	20	20	20	20	20	20	15
	FSR	30	30	30	30	30	30	30	30	30
	FQE	20	20	20	20	20	20	20	20	20
	FRU	30	30	30	30	30	30	30	30	35
RP	PU	35	35	40	35	70	40	60	50	40
	QP	35	40	40	40	30	40	20	30	40
	IPR	15	15	NA	15	NA	10	NA	NA	NA
	FPPP	15	10	20	10	NA	10	20	20	20

Key Parameter	Sub-Parameter	Overall	Engineering	Management	Pharmacy	College	Medical	Architecture	Law	Dental
GO	GPH	NA	40	40	40	40	30	40	40	35
	GUE	60	15	20	15	40	30	30	15	30
	GMS	NA	25	40	25	20	NA	30	25	NA
	GPHD	40	20	NA	20	NA	30	NA	20	NA
	GSS	NA	NA	NA	NA	NA	10	NA	NA	NA
	GPG	NA	NA	NA	NA	NA	NA	NA	NA	35
OI	RD	30	30	30	30	30	30	30	30	30
	WD	30	30	30	30	30	30	30	30	30
	ESCS	20	20	20	20	20	20	20	20	20
	PCS	20	20	20	20	20	20	20	20	20
PR	PR	100	100	100	100	100	100	100	100	100

*However, for universities in the PR parameter, 70% weightage was given to peer perception and 30% to accreditation.

Table 2 shows the weightages of each of the five key parameters, such as teaching, learning, and resources (TLR); research and professional practice (RP); graduation outcomes (GO); outreach and inclusivity (OI); and perception (PR); and the weightages of the sub-parameters in the NIRF system.

The vital changes are seen in TLR and RP parameters. In the NIRF system, the structure for colleges, law institutes, and architecture colleges have more TLR weightage and less RP weightage. Likewise, weightage of graduate outcomes is more in colleges and law disciplines.

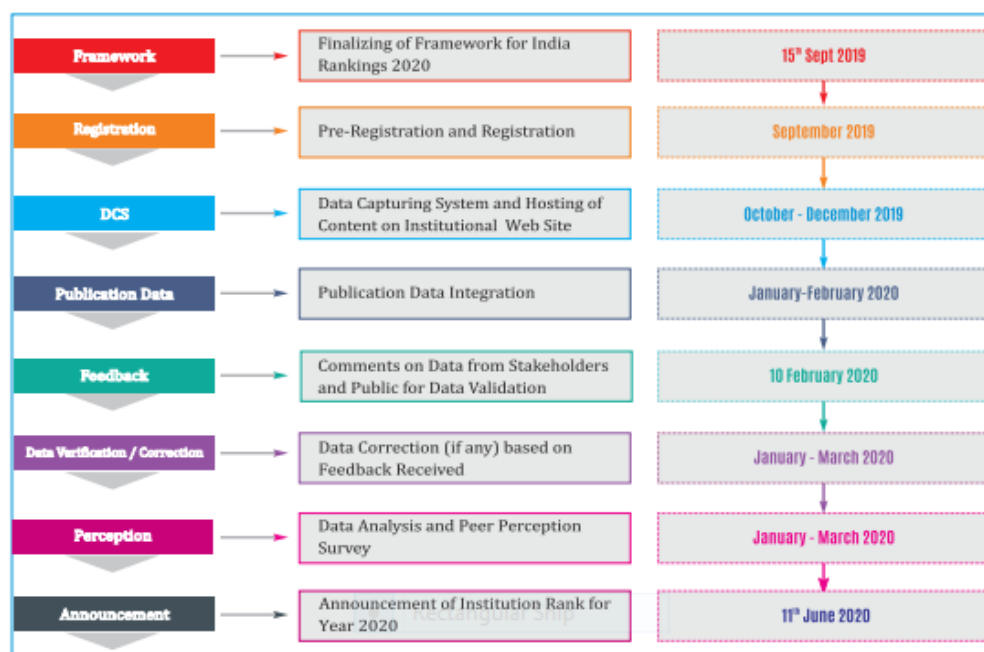


Fig. 1: NIRF Event Calendar

Fig. 1 shows that in the NIRF system, after registration, the data capturing process starts. In the next phase, comments on the data comes from the stakeholders and the public for data confirmation. Soon the data capturing process closes when the correction of data is completed. After completion of the above four

steps, data analysis starts for the announcement of ranking of the institutions. The NIRF also opens the platform to collect feedback on data entered by the institution. As per the framework, every institute has to upload their entered data in the PDF format on their website.

Table 3: NIRF Years

NIRF Years	HEIs Academic Activities Data Considered for Number of Years
NIRF 2016	2012, 2013, and 2014
NIRF 2017	2013, 2014, and 2015
NIRF 2018	2014, 2015, and 2016
NIRF 2019	2015, 2016, and 2017
NIRF 2020	2016, 2017, and 2018

Table 3 shows the retrieved data for analysis on five years' Indian ranking, to evaluate the effect of ranking on combining performance of the higher educational institutions on major key parameters, namely research and professional practice parameter, over a period of five years. In the NIRF system, three years of data are examined for each sub-parameter.

**Fig. 2: NIRF Higher Educational Institutions' Participation**

Fig. 2 shows that the 2017 participation of the higher educational institutions during the Indian ranking was fewer, with respect to the Indian ranking in 2016; this was due to a change in the structure. From Indian ranking 2017 onwards, participation has increased.

Table 4: NIRF Ranked Category

NIRF Rankings	Categories
NIRF 2016	University Engineering Management Pharmacy
NIRF 2017	Newly added category with NIRF 2016 Overall College

NIRF Rankings	Categories
NIRF 2018, 2019	Newly added category with NIRF 2016 Law Medical Architecture
NIRF 2020	Newly added category with NIRF 2016 Dental

The NIRF is one of the chief initiatives of the Government of India. The participation in NIRF is increased year by year. From 2016, the Indian ranking system started ranking the HEIs in the form of categories, that is, university, engineering, management, and pharmacy. After Indian ranking 2016, new categories were added, as listed in Table 4.

Data Analysis and Discussion

Methodology of Research and Professional Practice (RP) parameters in the NIRF system: 100 marks

- Ranking weight: 0.30
- Overall Assessment Metric: $RP = PU(35) + QP(35) + IPR(15) + FPPP(15)$
- The component metrics explained on following pages.
 - Combined Metric for Publications: PU
 - Combined Metric for Quality of Publications: QP
 - IPR and Patents: Published and Granted: IPR
 - Footprint of Projects, Professional Practice, and Executive Development Programmes: FPPP
- Combined Metric for Publications (PU): 35 Marks
 - $PU = 35 \times f(P/FRQ)$.
 - P is weighted number of publications as ascertained from suitable third-party sources.
 - FRQ is the maximum nominal number of faculty members calculated on the basis of a required FSR of 1:15, or the available faculty in the institution.
- Combined Metric for Quality of Publications (QP): 35 Marks
 - $QP = 20 \times f(CC/FRQ) + 15 \times f(TOP25P/P)$.
 - Here CC is Total Citation Count over previous three years.

- P is as computed for PU.
- TOP25P: Number of citations in top 25 percentile averaged over the previous three years.
- FRQ is the maximum nominal number of faculty members calculated on the basis of a required FSR of 1:15, or the available faculty in the institution.
- *IPR and Patents: Patents Published and Granted (IPR): 15 Marks*
 - $IPR = IPG + IPP$ $IPG = 10 \times f(PG)$.
 - PG is the number of patents granted over the previous three years.
 - $IPP = 5 \times f(PP)$
 - PP: Number of patents published over the previous three years.
- *Footprint of Projects, Professional Practice, and Executive Development Programmes/Management Development Programmes (FPPP): 15 Marks*
 - $FPPP = FPR + FPC + EDP/MDP$ • $FPR = 5 \times f(RF)$.
 - RF is the average annual research funding earnings (amount received in rupees) at institute level in previous three years.
 - $FPC = 5 \times f(CF)$ • CF is the average annual consultancy amount (amount actually received in rupees) at institute level in previous three years.
 - $EDP/MDP = 5 \times f(EP)$
 - EP = Average annual earnings from Executive Development Programmes/Management Development Programmes in previous three years.

Table 5: NIRF Rank of Top 25 Universities under University Category from 2018-2020

Top 25 Universities under University Category in NIRF 2020	Rank in NIRF		
	NIRF 2018	NIRF 2019	NIRF 2020
Indian Institute of Science, Bengaluru	1	1	1
Jawaharlal Nehru University, New Delhi	2	2	2
Banaras Hindu University, Varanasi	3	3	3
Amrita Vishwa Vidyapeetham, Coimbatore	8	8	4
Jadavpur University, Kolkata	6	6	5
University of Hyderabad, Hyderabad	5	4	6
Calcutta University, Kolkata	14	5	7
Manipal Academy of Higher Education, Manipal	11	9	8
Savitribai Phule Pune University, Pune	9	10	9
Jamia Millia Islamia, New Delhi	12	12	10
University of Delhi, Delhi	7	13	11
Anna University, Chennai	4	7	12
Bharathiar University, Coimbatore	13	14	13
Homi Bhabha National Institute, Mumbai	26	17	14
Birla Institute of Technology & Science, Pilani	17	23	15
Vellore Institute of Technology, Vellore	16	19	16
Aligarh Muslim University, Aligarh	10	11	17
Institute of Chemical Technology, Mumbai	19	15	18
Andhra University, Visakhapatnam	22	16	19
Siksha 'O' Anusandhan, Bhubaneswar	24	24	20
Jamia Hamdard, New Delhi	23	18	21
University of Madras, Tamil Nadu	18	20	22
Kerala University, Kerala	30	22	23
Kalinga Institute of Industrial Technology, Odisha	42	31	24
Shanmugha Arts Science Technology & Research Academy, Tamil Nadu	36	40	25

The educational institutes of India, particularly the higher educational institutes, are more interested in gaining the highest rank, grade, and scores. The NIRF evaluates every parameter systematically for the Indian educational institutes and universities that participated; there is a separate ranking category for universities that are under the general category of NIRF. Table 5 shows selected top 25 universities' ranking status within the Indian ranking system within the last three years; they continuously ranked within the top 25 universities in the last three years.

Table 5 shows the respective ranks of the Indian universities in the NIRF ranking from 2018-2020. Indian Institute of Science, Jawaharlal Nehru University, and Banaras Hindu University ranked 1st, 2nd, and 3rd, respectively, consecutively. The main changes are seen in Amrita Vishwa Vidyapeetham, which ranked 8th in 2018 and 2019, but 4th in 2020. The Calcutta University was ranked 14th in 2018, 5th in 2019, and 7th in 2020. The Manipal Academy of Higher Education ranked 11th in 2018, 9th in 2019, and 8th in 2020. The University of Delhi ranked 7th in 2018, 13th in 2019, and 11th in 2020. Anna University ranked 4th in 2018, 7th in 2019, and 12th in 2020. The Homi Bhabha National Institute ranked 26th in 2018, 17th in 2019, and 14th in 2020. The Birla Institute of Technology & Science, Pilani, ranked 17th in 2018, 23rd in 2019, and 15th in 2020. Andhra University ranked 22nd in 2018, 16th in 2019, and 19th in 2020. Kerala University ranked 30th in 2018, 22nd in 2019, and 23rd in 2020. The Shanmugha Arts Science Technology & Research Academy ranked 36th in 2018, 40th in 2019, and 25th in 2020.

Table 6: NIRF Score of the Top 25 Universities under University Category from 2018-2020

Top 25 Universities under University Category in NIRF 2020	Overall Score in NIRF		
	NIRF 2018	NIRF 2019	NIRF 2020
Indian Institute of Science, Bengaluru	91.81	82.28	84.18
Jawaharlal Nehru University, New Delhi	65.57	68.68	70.16
Banaras Hindu University, Varanasi	63.52	64.55	63.15
Amrita Vishwa Vidyapeetham, Coimbatore	58.46	59.22	62.27
Jadavpur University, Kolkata	59.68	60.53	61.99

Top 25 Universities under University Category in NIRF 2020	Overall Score in NIRF		
	NIRF 2018	NIRF 2019	NIRF 2020
University of Hyderabad, Hyderabad	60.54	61.85	61.70
Calcutta University, Kolkata	53.38	60.87	61.53
Manipal Academy of Higher Education, Manipal	57.37	58.50	61.51
Savitribai Phule Pune University, Pune	58.24	58.40	61.13
Jamia Millia Islamia, New Delhi	56.18	58.07	61.07
University of Delhi, Delhi	58.69	57.59	60.10
Anna University, Chennai	62.82	60.35	58.71
Bharathiar University, Coimbatore	55.08	57.23	58.30
Homi Bhabha National Institute, Mumbai	48.98	51.95	56.04
Birla Institute of Technology & Science, Pilani	52.15	50.53	55.79
Vellore Institute of Technology, Vellore	52.68	51.44	55.22
Aligarh Muslim University, Aligarh	57.78	58.36	54.30
Institute of Chemical Technology, Mumbai	51.39	52.62	54.10
Andhra University, Visakhapatnam	50.39	52.11	53.82
Siksha 'O' Anusandhan, Bhubaneswar	49.59	50.31	53.10
Jamia Hamdard, New Delhi	50.31	51.73	52.60
University of Madras, Tamil Nadu	51.52	51.34	52.55
Kerala University, Kerala	47.72	51.21	52.35
Kalinga Institute of Industrial Technology, Odisha	44.81	47.97	52.33
Shanmugha Arts Science Technology & Research Academy, Tamil Nadu	46.33	45.80	52.22

Table 6 shows the respective scores of the Indian universities in the NIRF ranking from 2018-2020. Indian Institute of Science scored 91.81 in 2018, 82.28 in 2019, and 84.18 in 2020. Jawaharlal Nehru University scored 65.57 in 2018, 68.68 in 2019, and 70.16 in 2020. Amrita Vishwa Vidyapeetham scored 58.46 in 2018, 59.22 in 2019, and 62.27 in 2020. Calcutta University scored

53.38 in 2018, 60.87 in 2019, and 61.53 in 2020. Anna University scored 62.82 in 2018, 60.35 in 2019, and 58.71 in 2020. Kerala University scored 47.72 in 2018, 51.21

in 2019, and 52.35 in 2020. Shanmugha Arts Science Technology & Research Academy scored 46.33 in 2018, 45.80 in 2019, and 52.22 in 2020.

Table 7: Performances of Research and Professional Practice (RP) Parameter, Sub-Parameters of the Top 25 Universities under University Category from 2018-2020

Top 25 Universities under University Category in NIRF 2020	Performances of Parameter, Sub-Parameter of Research and Professional Practice (RP)											
	Combined Metric for Publications – PU (35)			Combined Metric for Quality of Publication – QP (35)			IPR and Patents: Published and Granted – IPR (15)			Footprint of Projects, Professional Practice, and Executive Development Programmes – FPPP (15)		
	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020
Indian Institute of Science, Bengaluru	35	35	35	35	35	12	14	12	10.16	7.08	7.24	10.16
Jawaharlal Nehru University, Delhi	17.50	19.11	20.06	19.96	18.68	19.72	3	3	4	2.14	1.06	1.02
Banaras Hindu University, Varanasi	17.45	18.21	18.13	27.19	23.26	22.92	1.50	1.50	1	4.62	3.51	2.83
Amrita Vishwa Vidyapeetham, Coimbatore	15.10	16.68	18.88	18.47	15.17	17.16	3	6	9	6.99	5.92	7.07
Jadavpur University, Kolkata	23.33	23.70	23.56	27.39	24.43	24.51	2.50	3	1	3.85	3.76	3.89
University of Hyderabad, Hyderabad	21.09	20.38	19.15	20.68	19.94	18.86	1.50	1.50	3	2.08	1.95	1.92
Calcutta University, Kolkata	17.80	17.66	16.76	22.14	19.41	18.54	8	8	9	2.32	2.03	4.28
Manipal Academy of Higher Education, Manipal	16.03	16.69	17.91	19.05	16.29	17.64	5	1	3	4.08	4.34	4.07
Savitribai Phule University, Pune	18.57	19.56	19.28	20.86	20.04	20.29	1	2	2	3.21	2.82	3.91
Jamia Millia Islamia, New Delhi	12.56	13.25	14.76	17.13	15.81	17.99	1	1	3	2.52	1.98	2.54
University of Delhi, Delhi	20.94	21.35	21.44	30.01	26.35	26.62	3	3	3	4.21	3.10	4.33
Anna University, Chennai	24.79	24.02	17.91	25.88	23.59	21.50	5	2	5	5.09	4.48	4.21
Bharathiar University, Coimbatore	21.88	22.41	23.13	18.51	20.89	21.56	0.50	0.50	1	0.81	1.24	0.78
Homi Bhabha National Institute, Mumbai	2.15	9.10	12.06	9.42	12.67	14.49	0	0	0	2.60	3.48	3.89
Birla Institute of Technology & Science, Pilani	14.70	15.20	16.45	19.11	17.03	17.57	1	1	4	0.74	0.92	2.70
Vellore Institute of Technology, Vellore	19.89	21.80	22.73	26.19	24	26.32	0.50	1	5	0.84	0.83	0.78
Aligarh Muslim University, Aligarh	13.82	14.53	15.40	22.02	19.08	19.97	0.50	0.50	3	0.53	1.27	2.41

Top 25 Universities under University Category in NIRF 2020	Performances of Parameter, Sub-Parameter of Research and Professional Practice (RP)											
	Combined Metric for Publications – PU (35)			Combined Metric for Quality of Publication – QP (35)			IPR and Patents: Published and Granted – IPR (15)			Footprint of Projects, Professional Practice, and Executive Development Programmes – FPPP (15)		
	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020	NIRF 2018	NIRF 2019	NIRF 2020
Institute of Chemical Technology, Mumbai	17.97	19.36	19.36	17.22	19.69	19.50	11	7	7	2.33	2.36	2.16
Andhra University, Visakhapatnam	9.43	10	10.15	9.97	8.94	9.10	0.50	0	1	5.22	4.23	5.74
Siksha 'O' Anusandhan, Bhubaneswar	9.30	9	9.68	12.62	10.04	11.92	0.50	1	3	0.98	1.13	1.13
Jamia Hamdard, New Delhi	12.69	12.11	11.29	15.87	13.46	13.32	2	3	1	1.73	1.35	2.97
University of Madras, Tamil Nadu	15.30	15.01	14.83	15.19	15.35	15.05	2	2	2	0.91	0.91	1.27
Kerala University, Kerala	9.07	8.72	8.76	9.13	9.04	9.50	1	0.50	0	0.59	0.58	0.77
Kalinga Institute of Industrial Technology, Odisha	5.33	6.62	7.51	11.92	8.67	10.31	0.50	0.50	2.50	4.77	2.31	2.26
Shanmugha Arts Science Technology & Research Academy, Tamil Nadu	14.11	13.93	14.96	17.12	14.50	15.48	1	2	1	2.34	1.94	4.47

Combined Metric for Publications (PU)

As stated in Table 7, in 2018, under the performance of combined metric for publications (PU), the Indian Institute of Science secured the highest score of 35.00, Anna University scored 24.79, and Jadavpur University scored 23.33.

In 2019, under the performance of combined metric for publications (PU), the Indian Institute of Science secured the highest score of 35.00, Anna University scored 24.02, and Jadavpur University scored 23.70, as per Table 7.

In 2020, under the performance of combined metric for publications (PU), the Indian Institute of Science secured the highest score of 35.00, Jadavpur University scored 23.56, and Bharathiar University scored 23.13, as per Table 7.

Combined Metric for Quality of Publication (QP)

In 2018, under the performance of combined metric for quality of publication (QP), the Indian Institute of Science

secured the highest score of 35.00, University of Delhi scored 30.01, and Jadavpur University scored 27.39, as per Table 7.

In 2019, under the performance of combined metric for quality of publication (QP), the Indian Institute of Science secured the highest score of 35.00, University of Delhi scored 26.35, and Jadavpur University scored 24.43, as per Table 7.

In 2020, under the performance of combined metric for quality of publication (QP), University of Delhi secured the highest score of 26.62, Vellore Institute of Technology scored 26.32, and Jadavpur University scored 24.51, as per Table 7.

IPR and Patents: Published and Granted (IPR)

In 2018, under the performance of IPR and Patents: Published and Granted (IPR), the Indian Institute of Science secured the highest score of 14.00, Institute of Chemical Technology scored 11.00, and Calcutta University scored 8.00, as per Table 7.

In 2019, under the performance of IPR and Patents: Published and Granted (IPR), the Indian Institute of Science secured the highest score of 12.00, Calcutta University scored 8.00, and the Institute of Chemical Technology scored 7.00, as per Table 7.

In 2020, under the performance of IPR and Patents: Published and Granted (IPR), the Indian Institute of Science secured the highest score of 10.16, Calcutta University and Amrita Vishwa Vidyapeetham scored 9.00, and the Institute of Chemical Technology scored 7.00, as per Table 7.

Footprint of Projects, Professional Practice, and Executive Development Programmes (FPPP)

In 2018, under the performance of footprint of projects, professional practice, and executive development programmes (FPPP), the Indian Institute of Science secured the highest score of 7.08, Amrita Vishwa Vidyapeetham scored 6.99, and Andhra University scored 5.22, as per Table 7.

In 2019, under the performance of footprint of projects, professional practice, and executive development programmes (FPPP), the Indian Institute of Science secured the highest score of 7.24, Amrita Vishwa Vidyapeetham scored 5.92, and Anna University scored 4.48, as per Table 7.

In 2020, under the performance of footprint of projects, professional practice, and executive development programmes (FPPP), the Indian Institute of Science secured the highest score of 10.16, Amrita Vishwa Vidyapeetham scored 7.07, and University of Delhi scored 4.33, as per Table 7.

As per Table 7, under all the sub-parameters, the Indian Institute of Science – Bengaluru scored the highest in 2018, 2019, and 2020. Under the sub-parameter of combined metric for publications (PU), IIS-B secured the highest score in each sub-parameter in 2018-2020, whereas JU scored the 2nd highest in 2018-2020, although according to the NIRF ranking it is 5th in the university category. On the other hand, VIT scored the 3rd highest in the university category, but is 16th in NIRF ranking.

In combined metric for quality of publication (QP) sub-parameter secured a good score compared to other universities, but is 5th in NIRF ranking. On the other hand, University of Delhi scored the 2nd highest in the sub-parameter, but is 11th in NIRF ranking.

In the NIRF system, four sub-parameters under the research and professional practice, the second broad category of parameters used for India rankings, are given a weightage of 0.30. These four sub-parameters are publications (35 marks), citations (40 marks), IPR and patents: Published and granted (15 marks), and projects and professional practice (10 marks). Therefore, some universities that scored comparatively less under the actual sub-parameter, secured quite a standard rank, and vice-versa, as per Table 7.

Findings

The study shows that research publications are key for ranking the university and better educational institutions. NIRF reveals 70 weightage of publications and quality of publications. The study shows that only the top 25 universities among the top 100 universities under the university category were ranked in the NIRF ranking system. IISc-B is the most efficient university among the top 25. The rank of universities is in a state of variation year after year. Therefore, some universities that scored comparatively less under the actual sub-parameter, secured quite a standard rank, and vice-versa.

Conclusion

Ranking of educational institutions is quite important in any country. The Indian government, both the central and state, should initiate the ranking process regularly. It should be mandatory for all the educational institutions to participate in the programme. It will help the institutions to bring out its activities to the world through a systematic ranking process. The student community will also know the reputation, specialisation of the institutions, departments, and faculty members. The one way of measuring any educational institution is by its publications in peer-reviewed national and international journals. This study has considered the measures of performance of the parameters and sub-parameters of the university. Based on the results of the study, the following are recommended:

- The National Institute of Ranking Frame (NIRF) has adopted a good number of parameters to rank the educational institutions in the country.
- Similarly, the authorities of the institutes should give equal publishing opportunities for teaching and non-teaching staff members, and also encourage them to produce more number of publications in reputed national and international journals.

This article analyses data of three years of India rankings to assess its impact on performance parameters of institutions of higher education, in terms of publications, citations, patents, highly-cited publications, and research funding, under the broad category of a parameter named research and professional practices. The analysis of data of five years of India rankings, i.e., 2018 to 2020, on various performance parameters of the universities provides an interesting insight and reveals that participating institutions are making strenuous efforts to improve their performance on various parameters or sub-parameters identified by the NIRF for ranking of a university. Moreover, it is a well-accepted fact that increase in high-quality publications by a university would invariably result in improvement in its ranking. This study reflects that ranking has influenced the performance of universities in a positive way.

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