India Rankings 2018

National Institutional Ranking Framework

nirf

Teaching Learning
& Resources

Research and
Professional Practice

Graduation
Outcome

Outreach &
Inclusivity

Perception

ENGINEERING

OVERALL

UNIVERSITIES

MEDICAL

COLLEGES

ARCHITECTURE

PHARMACY

LAW

MANAGEMENT
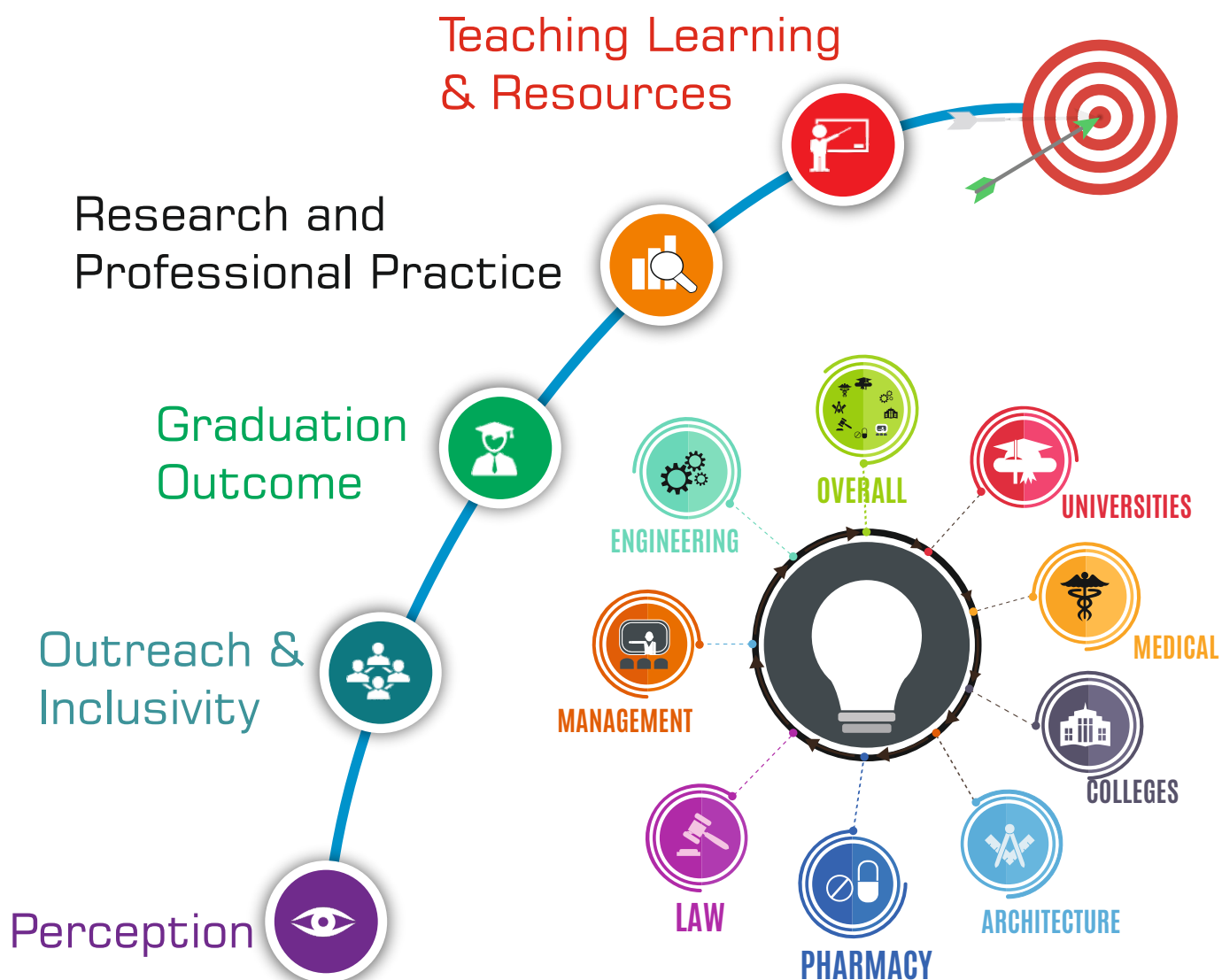
Department of Higher Education
Ministry of Human Resource Development
Government of India

सत्यमेव जयते

प्रकाश जावडेकर
Prakash Javadekar

मंत्री
मानव संसाधन विकास
भारत सरकार
MINISTER
HUMAN RESOURCE DEVELOPMENT
GOVERNMENT OF INDIA

<u>MESSAGE</u>

I am extremely pleased to see the completion of India Rankings 2018 under the National Institutional Ranking Framework (NIRF). I am also happy to see this report, which highlights some of the important features of this year's Rankings.

The main purpose of India Rankings introduced by MHRD is to create an opportunity for Indian Academic Institutions to introspect on a regular basis. I strongly believe that such introspection is the only way for institutions to identify deficiencies and effect improvements as needed. While a comparison with others may not always be the best way to do this, it does help to identify areas of strength and weakness with respect to your peers, if done with a constructive attitude.

There are many systems of Rankings in the World today, each devised from a different perspective. Many of these are not suitable for use in India – a country having one of the largest and most diverse higher education systems in the World. The unique thing about NIRF is that it has been designed to take this diversity into account. I believe that the parameters used here are strong pointers and indicators of scholarship and the student-caring culture of institutions.

Ranking and Accreditation are two important vehicles for a movement towards quality, and with this third edition of India Rankings, we are taking a strong step in the direction of quality.

I am confident that this year's report with its important findings and insights will add value to the understanding of the Higher Education Scenario in the country.

(PRAKASH JAVADEKAR)

R. Subrahmanyam
Secretary (HE), MHRD

Department of Higher Education
Ministry of Human Resource Development
Government of India

Message

I am pleased to see the successful completion of the ranking exercise for India Rankings 2018.

India Rankings reflect the new spirit of a movement for the Higher Education System towards quality across the Board. I see these rankings acquiring increasing importance in the years to come. Already higher education institutions in the country have started to realize that objective basis of these rankings have a different flavor than the commercial media rankings or even the international rankings based significantly on perception. India rankings on the other hand give a lot of importance to facts as they can be objectively gathered.

While participation in these rankings will benefit all institutions, participation of public funded institutions is especially important. The nation has a right to know of their progress, both in absolute terms as also their standing with respect to their peers.

I also would like to express my sincere appreciation for the hard work of the entire team of NIRF (both at NBA and the INFLIBNET Centre) that has worked so meticulously under difficult circumstances to complete the work in time for the third consecutive year.

R. Subramanyam

Content

Preamble, Acknowledgements and Credits

MHRD is happy to present this report of India Rankings 2018 based on the National Institutional Ranking Framework (NIRF). This third edition of India Rankings attempts further consolidation together with some improvements over the last two exercises undertaken in 2016 and 2017.

Secretary Higher Education convened the first meeting of Implementation Core Committee for India Rankings 2018 on 23rd November 2017. The Committee reviewed the feedback sought from the participating institutions of India Rankings 2016 and 2017. The committee then discussed strategies for ranking of institutions for the year 2018 and deliberated on possible improvements. It was felt that a few minor changes would help bring about further improvements over the previous years. These were discussed and approved by the committee.

This year's rankings continues with the practise of providing a common overall rank and in addition, a separate rank for Universities, and discipline-specific ranks in the disciplines of Engineering, Management and Pharmacy as well as three new discipline-specific ranks in Law, Medical and Architecture. General degree colleges are also being ranked for the second consecutive year with much larger participation of colleges.

It has been a large and a very challenging project, and any exercise of this magnitude requires champions with commitment. MHRD is happy to put on record its appreciation to the National Board of Accreditation (NBA) for having once again taken up the leadership position in executing the task, under the guidance of the Implementation Core Committee (Appendix II). NBA's team (Appendix III), together with the team of its partner institute the INFLIBNET Centre at Gandhinagar have jointly played a stellar role in the execution of this task.

Preface

India Rankings 2018: Consolidation Process Continues

MHRD is happy to announce India Rankings 2018. We are grateful to the Hon'ble HRD Minister Shri Prakash Javadekar Ji to have kindly agreed to release the Rankings this year.

We are celebrating third consecutive edition of the annual India Rankings of the Indian Higher Education Institutions. The National Institutional Ranking Framework (NIRF) created for this purpose, has previously announced the first two rankings in April 2016 and April 2017, respectively. Unlike other rankings in the popular media, NIRF India Rankings use objective criteria and metrics and are based on extensive factual data gathered from third party sources and from the institutions themselves. Several improvements were effected in data collection formats and the metrics and comparison methodology in India Rankings 2017.

India Rankings2018 continues with the consolidation process, and establishes the NIRF parameters as effective benchmarks of performance for the Indian academic institutions in the Higher Education space. India Rankings have been playing a vital role in identifying top universities and institutions in areas like Engineering, Management, Pharmacy and General Degree Colleges. This year, for the first time, we take these efforts further to include new disciplines including Law, Medicine and Architecture.

Like in the previous year, the consolidation process has tried to tie the loose ends further by tweaking metrics and parameters without making drastic changes. The results are largely consistent with the previous years' results, although individual ranks might change by a few spots in some cases due to performance variations across institutions in some parameters. It has also been noted that several institutions have now a much better appreciation of the information required, and that has led to upward movements in their ranks.

One of the major outcomes of India rankings is that institutions are getting into the good habit of compiling vital statistics of their institutions - about their faculty, staff and infrastructure - more carefully and meticulously. This can only bode well for the institutions, especially for assessing themselves against internal benchmarks. At the national level, the data can serve as very useful as basis for analysis of the status of Higher Education Institutions in the country.

We are constrained to limit the number of clear ranks in relatively smaller ranges (up to about 200 institutions in the best scenarios and only a few tens in some of the disciplines), largely because of the challenge of ensuring data reliability for declaring lower ranks. Even this task required a patient and painstaking effort on the part of NIRF staff to educate individual institutions on the quality requirements on the data. It also required a patient and thorough investigation into the data supplied by the institutions with a view to identify inconsistencies and outliers. For this, we have made extensive use of triangulation methods for detecting inconsistencies, and effecting corrections as needed by consulting with the concerned institutions. We are very clear that the credibility of the rankings can be marred by a less than careful attention to details. Equally, we feel that our insistence on accuracy of data is bringing about a positive change in the cultural tendency of institutions to present inflated numbers. Our experience shows that while we cannot relax our vigilance on this issue just yet, there are encouraging pointers in the positive direction. Further, as data reliability improves, it would be possible to bring a larger number of institutions into the folds of rankings and ratings – with the ultimate goal of having a rank or rating for every deserving institution. While a bit distant at this point, our experience of these three years projects this to be a plausible objective.

For the first time this year, we used the AISHE data (through a screening process) to pre-register 1456 institutions for NIRF rankings and invited them to participate. Others were invited to participate through an open advertisement. Some 4000 institutions responded, and we hope that in the years to come, NIRF and AISHE platforms can hope to produce a seamless system to capture important data relating to the Higher Education System of the country. This also has the potentially desirable effect of saving institutions from repeated efforts to provide different kinds of data in different formats to diverse bodies like the UGC, AICTE, NIRF, etc.

For research and patents data (where applicable), we have taken extensive help of third party sources like Elsevier (Scopus) and Clarivate Analytics (Web of Science). Data so compiled has been shared with the institutions for transparency. Special attention has been given to obtaining meaningful data for quality of research, rather than quantity alone. In fact since research forms a very important part of our rankings for institutions (other than general degree colleges), our ranking interface provides for ranking of institutions based on Research alone. Of course this can be done for any of the five parameters including Research and Professional Practice (RP).

While details of our analysis of the data are given in the report, a few important observations may be of interest here.

First, it may be noted that the NIRF system actually produces a panoramic view of institutions – as the rank is based on 5 major parameters and some 20 sub-parameters. So one can look at the results at various levels of granularity. A 5-dimensional view across the 5 main parameters gives a good feel for the relative strengths of the institution in teaching and learning ambience, research and industry linkages, graduation outcomes, outreach and inclusivity and perception by peers.

A further simplification that is useful is to look at the performance in terms of correlation across parameters. More specifically, at least for the topmost institutions, there is a strong correlation between its discipline rank and the research rank. In particular, all ten institutions with ranks between 1 and 10 also have a research rank between 1 and 10, not necessarily in the same order, though.

Like in previous years, most of the topmost ranks go to the public funded institutions – almost in all disciplines. CFTI's and a few centrally funded universities in fact hog most of the top-level space. However, there are a significant number of state and privately funded universities and institutions that have deservedly won positions in the top 100 ranks.

Finally, the wide diversity of institutions throws up some interesting anomalies in such an attempt of rankings. One such anomaly comes up in the context of a few renowned research institutions that have also been given the status of 'deemed-to-be-universities" by the University Grants Commission. Their extremely high research budgets, relatively much lower number of students (largely doctoral students) and smaller number of faculty members, distort calculations of rankings scores on a few parameters for the educational institutions at large, making a fair comparison very difficult. At the same time, their perception in the general mind space of peers as educational institutions is negligibly small (in fact all of them are seen to have a perception score of zero). For this reason, the implementation committee decided this time to exclude them from the general ranking, but make an honourable mention of their research excellence for those research institutions that were found to have strong credentials on a few parameters.

Terminology, Abbreviations and Acronyms

Abbreviation Used	Full Form	Abbreviation Used	Full Form
A&HCI	Arts & Humanities Citation Index	ICC	Implementation Core Committee
AICTE	All India Council for Technical Education	INFLIBNET	Information and Library Network
AISHE	All India Survey of Higher Education	IPR	Intellectual Property Right
BKCI-S	Book Citation Index– Science	ISRO	Indian Space Research Organisation
BKCI-SSH	Book Citation Index– Social Sciences & Humanities	MHRD	Ministry of Human Resource Development
CFIs	Centrally Funded Institutes	MS	Median Salary
CFTIs	Centrally Funded Technical Institutes	NBA	National Board of Accreditation
CPCI-S	Conference Proceedings Citation Index-Science	NIRF	National Institutional Ranking Framework
CPCI-SSH	Conference Proceedings Citation Index-Social Sciences & Humanities	OI	Outreach and Inclusivity
CSIR	Council of Scientific & Industrial Research	PCS	Facilities for Physically Challenged Students
DAE	Department of Atomic Energy	PR	Perception
DCS	Data Capturing System	PRACD	Peer Perception: Academic Peers
ESCS	Economically and Socially Challenged Students	PREMP	Peer Perception: Employers and Research Investors
FPPP	Footprint of Projects, Professional Practice and Executive Development Programs	PU	Combined Metric for Publications
FQE	Faculty's Qualification and Experience	QP	Quality of Publications
FRU	Financial Resources and their Utilisation	RD	Region Diversity: Percent of Students from other States/ Countries
FSR	Faculty-Student Ratio	RP	Research and Professional Practice
GO	Graduation Outcome	SCI-Expanded	Science Citation Index Expanded
GPHD	Metric for Number of Ph.D. Students Graduated	SS	Student Strength
GPHE	Combined Metric for Placement, Higher Education and Entrepreneurship	SSCI	Social Sciences Citation Index
		TLR	Teaching, Learning & Resources
HCP	Highly Cited Papers	UE	Metric for University Examinations
HE	Higher Education	UGC	University Grants Commission
		WD	Women Diversity: Percentage of Women

Abbreviations Used for States and Union Territories of India

State	Abbreviation
Andhra Pradesh	AP
Arunachal Pradesh	AR
Assam	AS
Bihar	BR
Chhattisgarh	CG
Goa	GA
Gujarat	GJ
Haryana	HR
Himachal Pradesh	HP
Jammu and Kashmir	JK
Jharkhand	JH
Karnataka	KA
Kerala	KL
Madhya Pradesh	MP
Maharashtra	MH
Manipur	MN
Meghalaya	ML
Mizoram	MZ
Nagaland	NL
Odisha	OR
Punjab	PB
Rajasthan	RJ
Sikkim	SK
Tamil Nadu	TN
Telangana	TS
Tripura	TR
Uttarakhand	UK
Uttar Pradesh	UP
West Bengal	WB
Tripura	TR
Andaman and Nicobar Islands	AN
Chandigarh	CH
Dadra and Nagar Haveli	DH
Daman and Diu	DD
Delhi	DL
Lakshadweep	LD
Puducherry	PY

> *"The educational institutions performing well in the India Rankings will be awarded with more funding or grants, enhanced autonomy and freedom of functioning and various other benefits"*
>
> ***Prakash Javadekar, HRD Minister***

1.   Background

The National Institutional Ranking Framework (NIRF) was evolved during 2014-15 by a 16-member Core Committee, appointed by the Ministry of Human Resource Development, under the chairmanship of Secretary (HE).There were intense discussions and deliberations in a series of meetings of the Committee and exchanges with peers and stakeholders through several online discussions. The Committee proposed a robust National Framework for measuring performance and ranking of institutes of higher education and recommended institutional mechanisms, processes and time lines for implementation of the Ranking Framework. Considering the complex landscape of higher education scenario in the country, NIRF envisaged separate rankings for different categories of institutes in their own respective peer groups. As such, discipline specific frame works were drafted for engineering, management, pharmacy, architecture as well as for colleges and universities based on the broad features of the National Institutional Ranking Framework. The Ministry also appointed an Implementation Core Committee (ICC) to oversee and recommend the rankings. A Review Committee reviewed the learning from the first rankings of 2016. For the 2017 edition, it was decided to introduce a common overall ranking, in addition to the discipline-based rankings subject to a minimum of 1000 students enrolled in the institution. The idea was to provide a common view of comparable institutions across disciplines. This found enthusiastic support and is being continued this year.

In 2016, rankings were announced for Universities and for the specific disciplines of Engineering, Management and Pharmacy. In 2017, in addition to these, the common overall ranking, and ranking of General Degree Colleges was introduced for the first time. While continuing with these themes this year, NIRF is pleased to add rankings in the fields of law, medicine and architecture from this year.

The final framework identified between 15-18 parameters organised in five major groups. Naturally many of these are similar to those employed globally and serve as pointers to ambience for teaching, learning and research. However, there are a few India-centric parameters, reflecting aspirations of the rising numbers of our young people enrolled into higher education institutes. Country-specific parameters relevant to the Indian situation include regional diversity, outreach, gender equity and inclusion of disadvantaged sections of society.

The spirit of the Ranking Framework and parameters originally identified by the Core Committee and used for India Rankings 2016 and 2017 has been retained for 2018.A few changes have been made based on the experience gained in the process of ranking of institutes in previous two years and further tweaking of a few parameters and metrics based on the feedback sought from institute heads.

2. NIRF Parameters for Ranking of Institutes

The NIRF provides for ranking of institutes in five broad generic groups of parameters, namely: i) Teaching, Learning and Resources; ii) Research and Professional Practice; iii) Graduation Outcomes; iv) Outreach and Inclusivity; and v) Perception. Fig. 1 provides an outline of the various sub-parameters for each of the five generic groups. Some of the sub-parameters (such as public perception, earnings from patents, etc.) have been dropped due to serious questions of reliability or consistency of data provided by the participating institutes. Details of other changes are given in Section
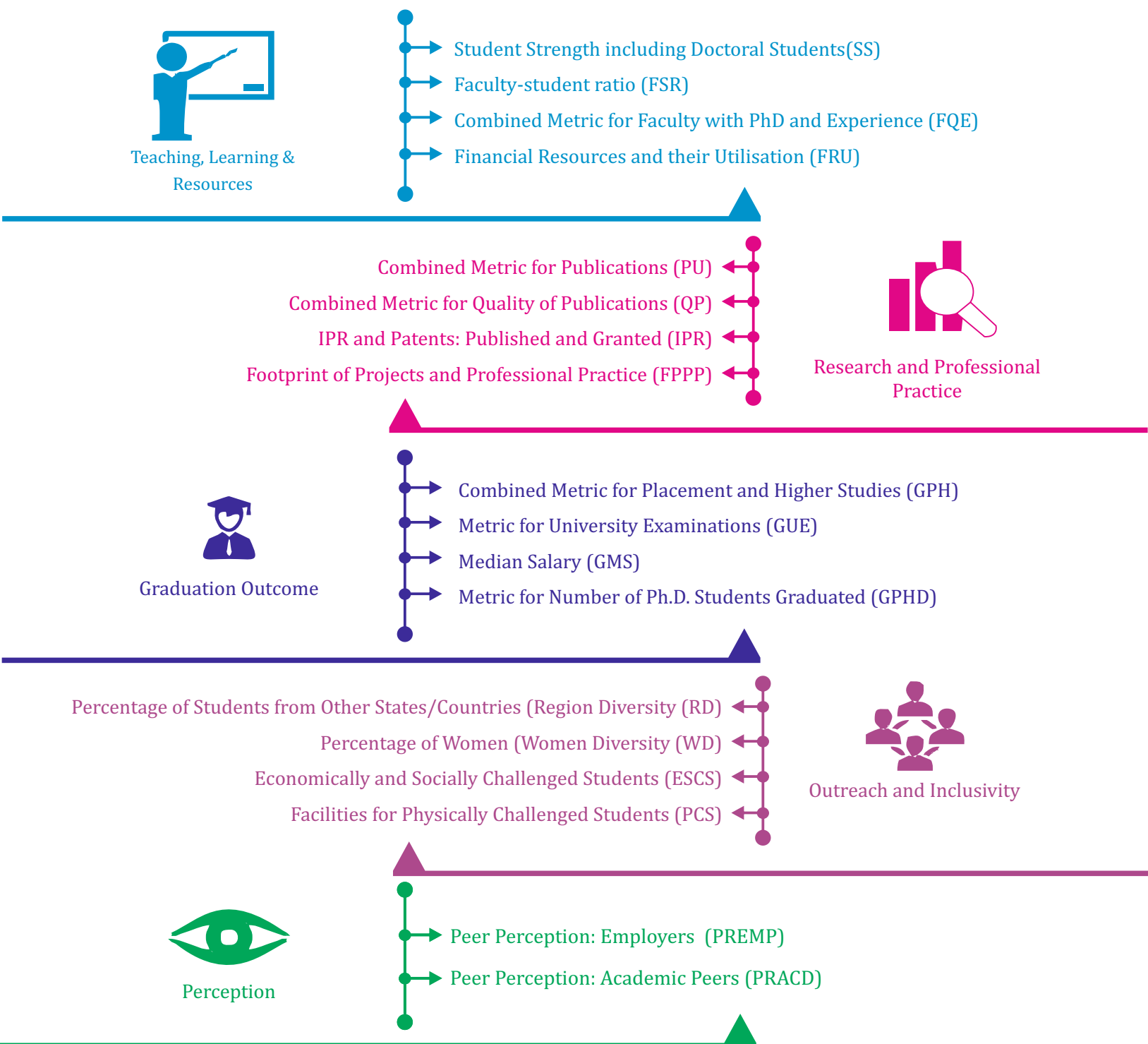

Teaching, Learning & Resources
- Student Strength including Doctoral Students(SS)
- Faculty-student ratio (FSR)
- Combined Metric for Faculty with PhD and Experience (FQE)
- Financial Resources and their Utilisation (FRU)

Research and Professional Practice
- Combined Metric for Publications (PU)
- Combined Metric for Quality of Publications (QP)
- IPR and Patents: Published and Granted (IPR)
- Footprint of Projects and Professional Practice (FPPP)

Graduation Outcome
- Combined Metric for Placement and Higher Studies (GPH)
- Metric for University Examinations (GUE)
- Median Salary (GMS)
- Metric for Number of Ph.D. Students Graduated (GPHD)

Outreach and Inclusivity
- Percentage of Students from Other States/Countries (Region Diversity (RD)
- Percentage of Women (Women Diversity (WD)
- Economically and Socially Challenged Students (ESCS)
- Facilities for Physically Challenged Students (PCS)

Perception
- Peer Perception: Employers (PREMP)
- Peer Perception: Academic Peers (PRACD)

Fig. 1: NIRF Parameters for Ranking of Institutes

By and large, our approach continues to give a lot of emphasis to collection and use of factual data, unlike several foreign rankings that put a large weight to perception – even in such matters as research. We believe that a data based approach is more objective, especially in a large higher education system like India, where perception data alone can be quite misleading. As we shall see later, the resulting task is challenging, since a large amount of data needs to be collected, and also authenticated.

3.   Metrics to Compute Ranking Scores

The framework for ranking of institutes is available on the NIRF Web site (https://www.nirfindia.org/) in the Ranking Documents for various disciplines. These documents identify the relevant data required to suitably measure the performance score under each sub-parameter mentioned above and enunciate a suitable metric that is used to compute a score for the sub-parameter. The sub-parameter scores are then added to obtain scores for each individual parameter. The overall score is computed based on the weights allotted to different parameters.

4.   Major Changes Introduced in India Rankings 2018

Taking cue from our experience in ranking of institutes in the previous two years, the following changes have been introduced in India Rankings 2018:

- ✍   First attempt to link the AISHE database with the ranking effort.
- ✍   Data on Patents applied for and earnings from patents discontinued as parameters.
- ✍   Perception from academic and industrial peers continued and made more broad-based.
- ✍   Public perception discontinued.
- ✍   Score computation methodologies and the parameters similar across domains and categories.
- ✍   Weights somewhat different on a few parameters, to take into account the discipline-specific /category-specific issues. Example: weight for research very small for general degree colleges.
- ✍   Indian Citation Index (ICI) discontinued as a source data for publications and citations.

5.   Participation: A New Initiative using AISHE Database

In order to encourage larger participation in India Rankings, all institutions that had applied in the previous years as well those who fulfilled pre-defined thresholds in terms of number of studentsenrolled in the AISHE database, were pre-registered for India Rankings 2018 and invited to participate in the ranking exercise. In addition, other institutes

desirous of participating in the India Rankings 2018 were invited to register on the NIRF Web portal through a public advertisement. All institutions wererequested to submit their applications online for overall ranking as well as for ranking in one or more disciplines along with relevant data in a prescribed format by 22nd November 2017. Institutions were also given opportunity to edit the data and upload supporting documents in the prescribed format upto 30th January 2018 after seeking clarifications as necessary. Table 1 provides numbers of institutionsthat were pre-registered from AISHE and NIRF databases as well as those who registered themselves voluntarily.

Description	Applied	Submitted
Pre-registration from AISHE Database	1456	1040
Pre-registration from NIRF (previous year)	1476	1369
Additional Volunteer Registrations	653	400

**Table 1: Participation Numbers for Pre-registration and New Registration**

The final picture of participation under different subjects / categories of institutions is summarised in Tables 2 and 3.

Category / Discipline	Total No. of Institutes	CFTIs & CFUs
Overall	957	89
Engineering	906	61
Management	487	28
Pharmacy	286	5
Architecture	59	9
College	1087	1
Medical	101	2
Law	71	4
Total	3954	199

Table 2: Participation Numbers for Overall, Disciplines and Category-specific Rankings

Discipline / Region	Overall	Engg	Management	Pharmacy	Architecture	Colleges	Medical	Law
North	180	121	101	45	17	113	29	21
North-east	24	17	7	3	0	50	1	3
South	276	285	130	51	17	308	37	9
South-east	190	226	119	80	6	326	6	11
East	74	69	27	17	6	49	4	8
West	213	188	103	90	13	241	24	19
Total	957	906	487	286	59	1087	101	71

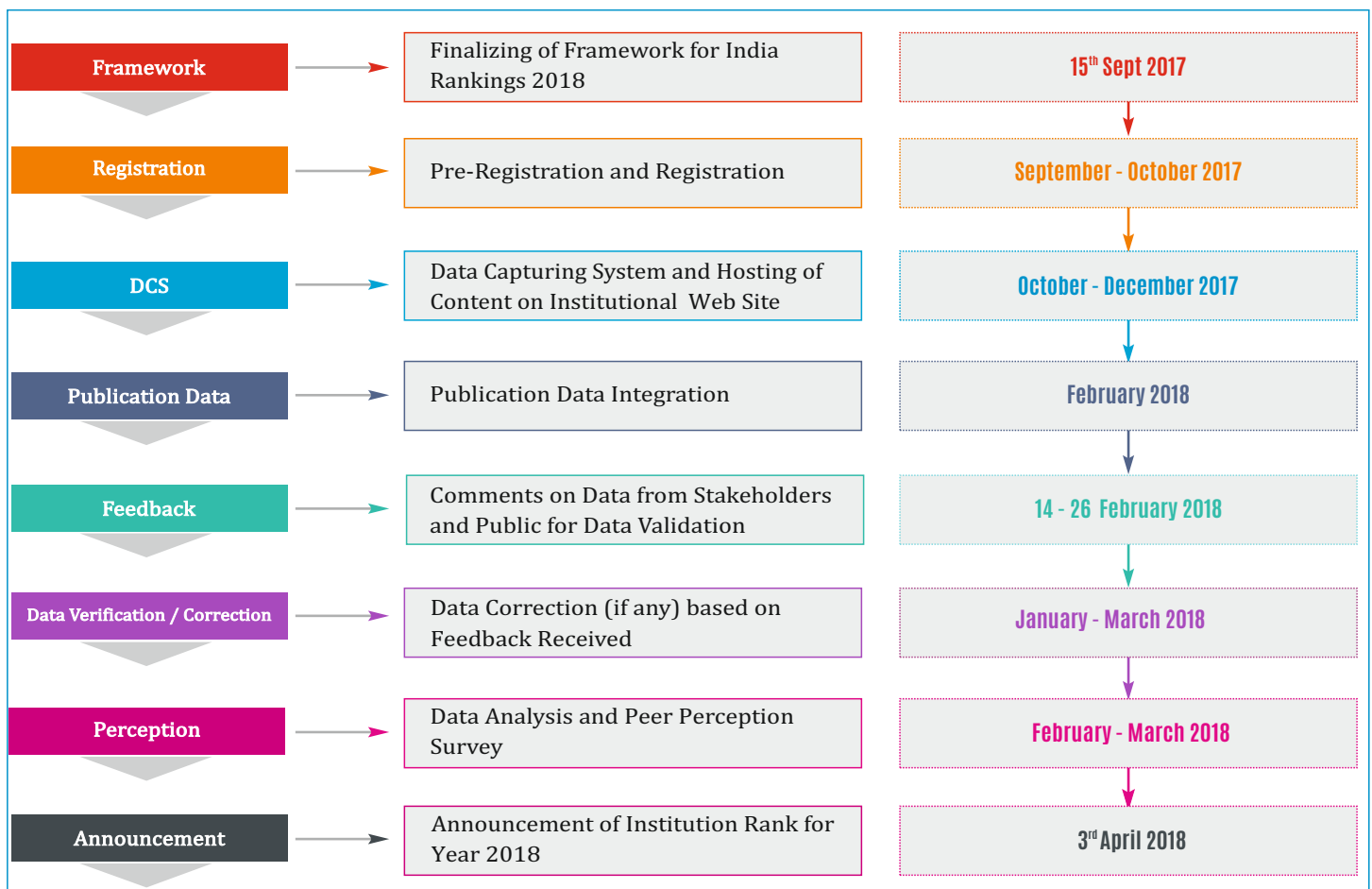**Table 3: Region-wise Distribution of Institutes Registered for India Rankings 2018**
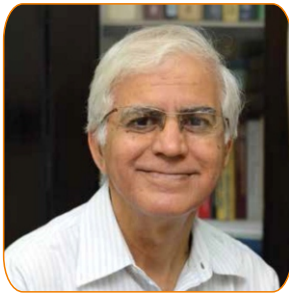
The pre-registration of eligible institutes through AISHE database resulted in increased participation in the ranking exercise as depicted in Table 1. There has been, however, more enthusiastic participation from some important new segments of higher education, viz., Law, Architecture, Medicalthan previous years. We are happy to rank institutions in these categories for the first time. Clearly, participation is still small and there is a good scope for increased participation in these disciplines, the ranking does provide a preliminary insight into these segments. We hope that the rankings this year will motivate many others from these disciplines to participate in future years.

6. Methodology

6.1 India Rankings 2018: Activity Calendar

Framework	Finalizing of Framework for India Rankings 2018	**15ᵗʰ Sept 2017**
Registration	Pre-Registration and Registration	**September - October 2017**
DCS	Data Capturing System and Hosting of Content on Institutional Web Site	**October - December 2017**
Publication Data	Publication Data Integration	**February 2018**
Feedback	Comments on Data from Stakeholders and Public for Data Validation	**14 - 26 February 2018**
Data Verification / Correction	Data Correction (if any) based on Feedback Received	**January - March 2018**
Perception	Data Analysis and Peer Perception Survey	**February - March 2018**
Announcement	Announcement of Institution Rank for Year 2018	**3ʳᵈ April 2018**

Fig. 2. India Rankings 2018: Activity Calendar

6.2. Source of Data: Institutions and Third Party Sources

In the absence of a reliable and comprehensive database that could supply all relevant data required for computing the scores for ranking, registered institutions were invited to submit the required data through an Online Data Capturing System (DCS). Publications and Citations data pertaining to research output of applicant institutions were taken from Scopus (Elsevier Science) and Web of Science (Clarivate Analytics, Formerly Thomson Reuters). Moreover, the research evaluation process was enriched by considering number of papers that appeared in the top 25 percentile of cited papers from India (a measure of highly cited papers) in their respective domains of work.

6.3. Data Collection and Data Capturing

Data Capturing System (DCS), Feedback System and the Perception Capturing System were developed for online capturing of data from applicant institutions, feedback from public and institutional perception (fromPeers and Employers). As mentioned earlier, the data on publications, citations and highly cited papers were retrieved directly from third-party sources. A brief description on data collection and data capturing is given below.

6.3.1. Online Data Capturing System (DCS)

Data capturing system sought the detailed data in a format that would be useful for both computing the ranking metrics for each parameter, and also to check on data consistencies. Detailed notes were provided to explain even the simplest of data entries to make it easily comprehensible and user friendly. Attempt was made to keep the data entry to a minimum. In fact all data pertaining to the previous two years was pre-populated in the DCS, with provisioning for change with suitable remarks/reasons for the changes where needed.

Two help desks were deployed to resolve general and technical issues faced by the applicant institutions during the entire execution process of India Rankings 2018.

6.3.2. Publications, Citations and Highly Cited Papers (HCP): Web of Science(WoS) and Scopus

Two sets of citation databases were used as sources for retrieving data on the number of publications, citations and highly cited papers for the registered institutions. These citation databases comprise: i) Science Citation Index Expanded (SCI-Expanded), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Conference Proceedings Citation Index - Science (CPCI-S), Conference Proceedings Citation Index - Social Sciences & Humanities (CPCI-SSH), Book Citation Index– Science (BKCI-S), Book Citation Index– Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI) and Current Chemical Reactions (CCR-EXPANDED) hosted on the Web of Science platform; and ii) Scopus. Between them, these sources of publications and citations cover all disciplines quite well.

These databases were searched to determine the quantitative productivity of all 3954 applicant institutions that registered themselves for ranking. The search included number of research articles published and citations received by them in a span of three calendar years, i.e. 2014, 2015 and 2016.A common time window was used to obtain this data covering a short span of two weeks in the month of February to ensure fairness.

6.3.2.1 Search Strategy for Retrieving Research Publications, Citations and Highly Cited Papers from WoS and Scopus

All permutations, combinations and changes in the names of institutions were used while searching for articles published by faculty and researchers in the databases mentioned above. Since searches were conducted using names

of institutions, articles that did not have institutional affiliations of their faculty and researchers were not retrieved.

Several universities host other research institutions within their physical premises. Care was taken to ensure that credit for publications and citations are given to the deserving units. Manual checking of retrieved data was done in cases i) where two institutions with same (or similar) names share the same physical premise; ii) multiple institutes having the same name in the same city, for example Government Colleges, DAV Colleges, etc.

Someprivate universities have several constituent colleges, institutions and hospitals (either in the same city or in different cities) that are their integral part. Information was sought from the applicant institutes and universities about such constituent entities. Publications and citations received by such constituent entities were credited to the applicant university after due verification.

Universities Handbook 2014 (Association of Indian universities, 2014) and websites of institutions were used to verify changes in the names of institutions. Many variations in the names of universities, their physical locations and their spellings were discovered during the searches in the databases. The task was challenging. The NIRF has taken every care to be accurate on this count. MoUs were signed with Elsevier (Scopus) and Clarivate Analytics (Formerly Thomson Reuters) for verification and validation of search results on a sample basis. Moreover, the data on highly cited papers were either obtained directly from these two publishers or they were asked to verify the data retrieved by our collaborators. Data on patents granted and published for each institution in the last three years was retrieved by our collaborators (INFLIBNET Centre) and was duly verified by Clarivate Analytics.

6.3.2.2   Restricting Retrieval of Articles to a Given Discipline

Searches for publications and citations were done in the two databases mentioned above for applicant institutions without any subject-wise and discipline-wise restrictions for the overall ranking of institutions. However, subject/discipline-specific searches were made for all other discipline-wise rankings in the interest of uniformity and fairness. Care was taken to design the restriction so as to get the widest possible coverage of sub-disciplines within each broad discipline.

6.3.2.3   Online Perception Capturing System

An online platform was developed to capture the perception inputs from peers and employers. A large number of peers (subject experts) were invited to submit their perception feedback on applicant institutions in a prescribed format.

6.4   Online Feedback System

Stakeholders (that included public or other individuals or entities having an interest in one or more institutions) were invited to give their feedback through "Online Feedback System" from 14th to 26th February 2018 on the data submitted

"NIRF has created an environment of healthy competition and has generated   the buzz of excitement among the educational institutions including the elite ones. The Indian Rankings exercise has given us the insight of the functioning of these institutions. It is a matter of pride for NBA to execute the India Ranking exercise since its launch."

Anil Kumar Nassa, Member Secretary, NBA

by the institutions, through a public advertisement in the newspapers and other media. The comments / feedback so received were auto-transmitted through an email without disclosing the identity of the stakeholder to the concerned institution(s) for taking necessary action at their end.

6.5   Data Verification

6.5.1.   Scouting for Outliers: Committees of Domain Experts

Issues and pit-falls in the process of data collection, verification, authentication and interpretation were addressed by the Implementation Core Committee (ICC) set-up by the MHRD to oversee the implementation of ranking work for the year 2018. This Committee also reviewed the parameters and formulas that were finally used for ranking in various disciplines. Besides, committees consisting of academic experts examined the data submitted by institutions under each of the five broad generic groups of parameters, for each discipline. These Committees examined the data on various parameters minutely and identified outliers and anomalies for further scrutiny. Institutions whose data seemed exaggerated or had anomalies were contacted telephonically and via e-mail to confirm or correct the data. Where it was felt necessary, they were asked to support their data with documentary evidence. Several e-mailswere sent and telephonic calls were made to various institutes for verification of data on different parameters and sub-parameters.

6.5.2.   Communication with Nodal Officers

Each institution was asked to nominate one of their senior functionaries as a nodal officer for dealing with NIRF matters. These nodal officers were contacted to clear doubts or to attend to the feedback and anomalies pointed out by the expert committees. Nodal officers were also called in person (where necessary) to interact with members of the committee and verify their data. For increased transparency, an advisory was sent to each institution to upload this data on their own website for dissemination to the public. For all the top-ranked institutions, the latest version of the corrected data based on further inputs from the institutions was made visible on the NIRF portal.

While significant efforts were made to authenticate the data, the final responsibility for the accuracy of the submitted data lies with the concerned institutions.

6.5.3.   Verification of Data on Publications, Citations and Highly Cited Papers

The data on publications, citations and highly cited papers were shared with each applicant institution in the first week of March, 2018. Applicants were informed that the data was captured between 2nd February to 15th February, 2018 for all institutions.

6.6   Minor Deviations

Top 25% Field-Weighted Citation Impact (FWCI) and 25% Highly-Cited Papers (HCP) from within India was considered for ranking of institutions this year.

6.7   Inclusions and Exclusions

The NIRF website and NIRF guidelines provides basic qualifiers for an institute to participate in India Rankings 2018 for overall ranking as well as for domain-specific and category-specific ranking. For example, an institution should have at least 1,000 students enrolled for various courses to participate in common overall ranking. Institutions are also required to have graduated a minimum of three batches.

NIRF has adhered to these guidelines. An exception has been made in the case of IISERs. These institutions have been included in the Rankings for the overall category despite falling short in the required number of enrolled students, since otherwise it would not be possible to include them in any other category. The ICC considered it only fair that an applicant institution be included at least in one category.

On the other hand, a few institutions widely perceived as research institutions of a parent Government Department have been empowered in recent years with a deemed to be university status to enable them to grant degrees to their doctoral students. The ICC was of the view that these could not be included in the NIRF rankings due to their very special character. They have very few (much less than a thousand, and mainly doctoral) students, and very large budgets due to the very nature of their mandate. After due deliberations, these were left out of the reckoning for rankings. However, a few of these have excellent performance on a few parameters. They have found a separate, special mention in India Rankings 2018.

7. Visualizing Data Beyond Rankings: Additional Insights

Institutions registered for India Rankings 2018 provided data pertaining to five broad generic parameters and around several sub-parameters. Moreover, data on publications, citations and patents was taken from Scopus (Elsevier Science), Web of Science (Clarivate Analytics, Formerly Thomson Reuters) and Derwent Innovation. Besides use of this data for ranking of institutions, the combined collection of data for nearly 4,000 institutions and disciplines offers a unique opportunity to develop interesting and useful insights. Some of the important observations based on a simple data analysis are given below.

7.1 Teaching, Learning and Resources

In order to gain a top-level picture of the faculty issues in our higher education institutions, we have selected the discipline of engineering for analysis. We do this for two reasons. This discipline has seen a major growth of in the last two decades or so – mainly through the private sector, but also significantly in the Government sector. It is also undergoing a major challenge in terms of quality and employability of its graduates.

Fig. 3, 4 and 5 below show some interesting statistics. Only 31% engineering faculty have doctoral qualifications as depicted in Fig. 3. If you take away the top 50 institutions, this percentage becomes really small for the remaining. While it is true that in a few disciplines that may not be a serious handicap, in many cases the mentorship received during the doctoral training can play a vital role in preparing the faculty for a teaching career in higher education, and the diffusion of this trend needs clearly to be speeded up.
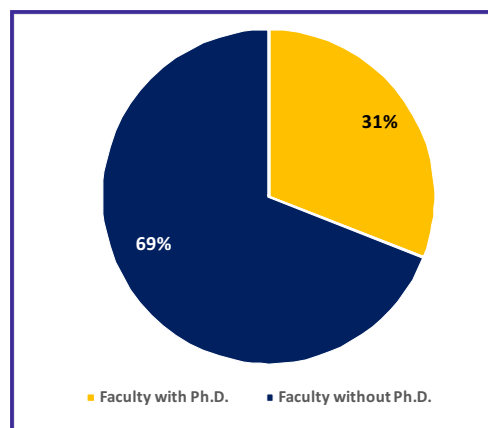

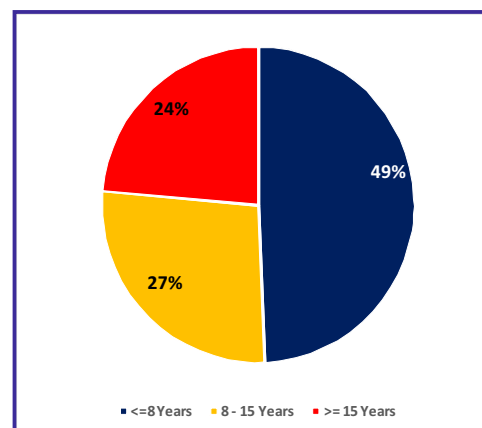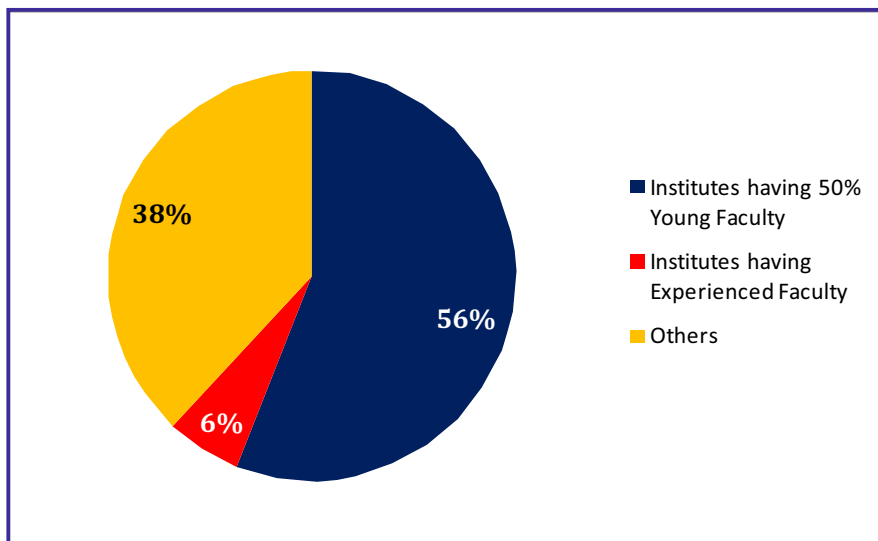Fig. 3: Engineering Faculty with / without PhD

Fig. 4: Young v/s Experienced Faculty in Engineereing

Figs. 4 and 5 depict some pictures about the experience profile of the engineering faculty. They clearly support the common perception that many institutions are starved of senior and experienced faculty.

**Fig.5: Experience Profiles of Eligible Institutes in Engineering**

In other words, the burden of the teaching is largely in the hands of relatively inexperienced faculty, which puts another serious question mark on its impact on the quality of education.
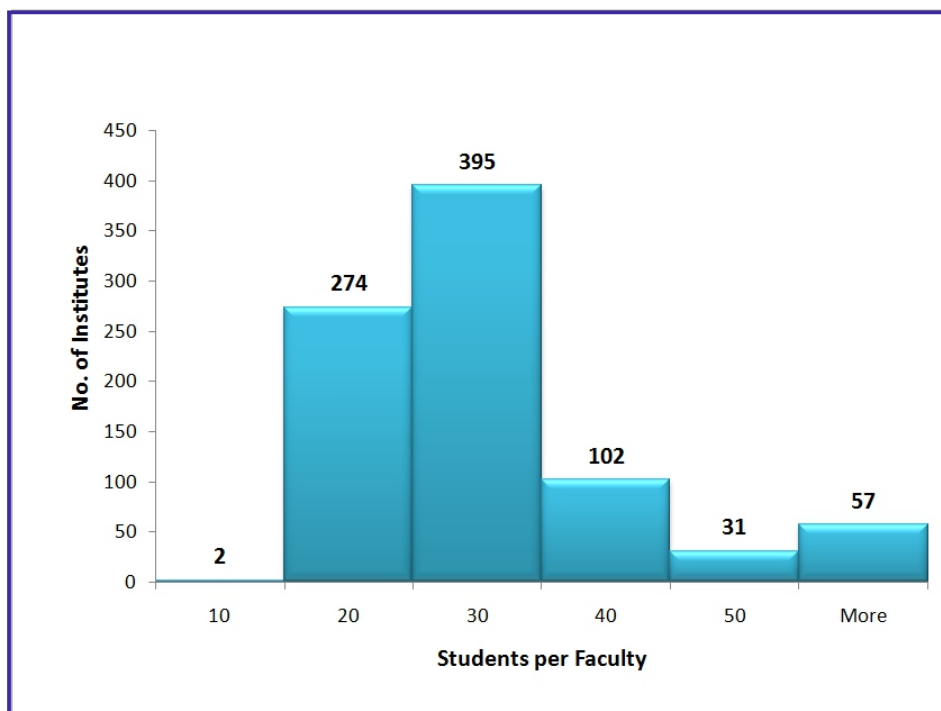
Fig.6: Faculty Student Ratio in Applicant Engineering Institutes

Next, a look at the FSR across the Overall and Engineering categories shows that amongst the participant institutes, which represent amongst the most as pirational 861 in the country, a significant number have a long way to go to have reasonable numbers here. Some are working with less than a teacher for 50 students or more (Fig. 6). In a field like engineering, this greatly limits the quality, since it implies that a faculty member is expected to teach heavily, and perhaps spread their teaching across a variety of courses.
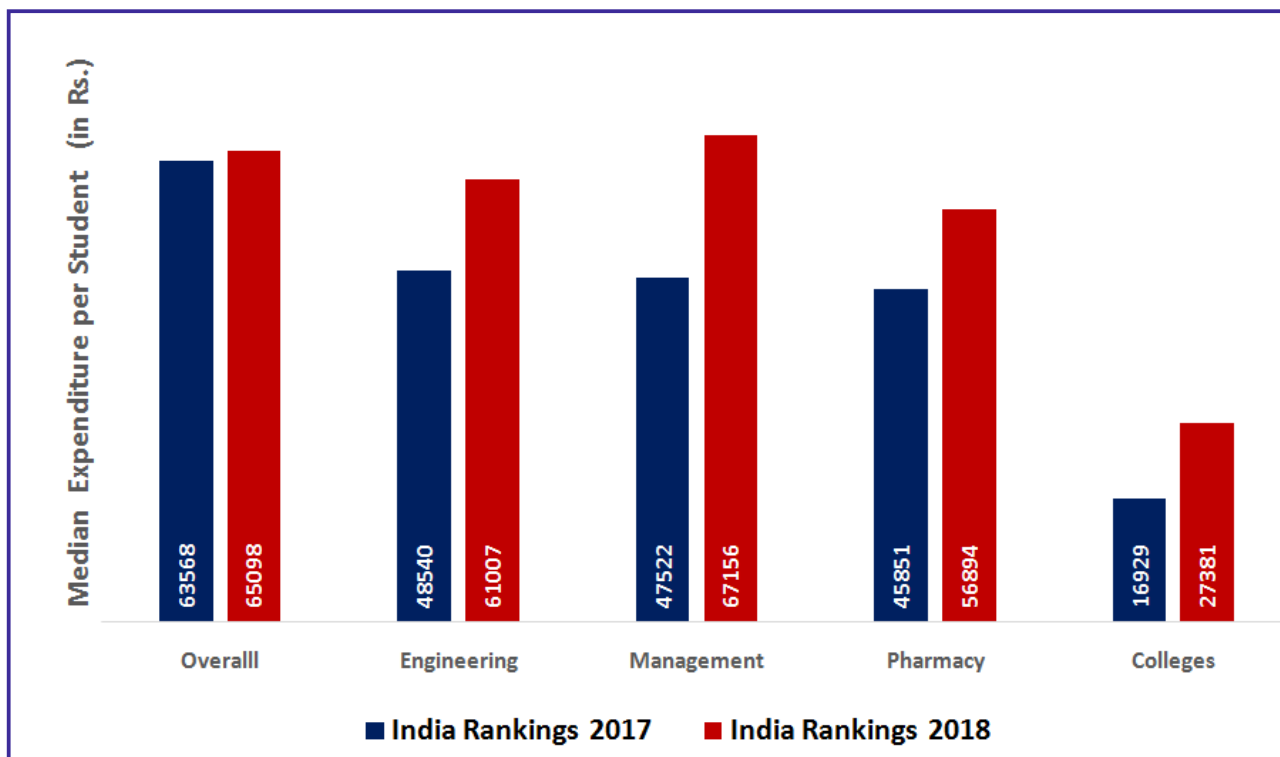
Fig. 7: Comparison of FRU between Applicants of India Rankings 2017 and India Rankings 2018

Finally, moving away from the Engineering discipline, we take a panoramic view of the expenditure per student profile across the disciplines for the current and the previous Ranking Years. Fig 7 presents the median values of the comparative expenditures for the two years. There are interesting surprises here.

First, the amount spent per student per year seems to be uniformly low across disciplines. Comparing these values with that spent in some of the CFTI's and the Central Universities presents a picture of huge contrasts. Needless to say that this lower expenditure is related to lower revenues, and would have a substantial impact on the quality of education on offer.

Second, between the two consecutive years, significant increase can be noted in all major disciplines including colleges., except in case of overall category where the increase is marginal. While the reasons for this are not very clear, several factors may be at play here: increased funding to HE institutions through schemes like RUSA, Institutes of Excellence, Universities with Potential for Excellence, etc, compliance to directives of accreditation agencies like NAAC, NBA or stricter enforcement of regulations, or even maintaining a competitive edge for participation in various rankings (national & international).

7.2 Research and Professional Practice

As mentioned earlier, NIRF has used third party sources to extract information on scholarly output from the institutes. For the brief analysis presented here, we have restricted use of data from only one source, i.e., Web of Science, in the interest of simplicity. Data quoted here refer to the three-year period, i.e. 2014 to 2016.

Table 4 summarises the total number of publications for various disciplines and categories of India Rankings 2018. The Table provides a comparison of research publications of top 100 institutes (by publications) with the rest of the eligible institutes in the same discipline / category. It is interesting to note from the second row that 76.36% of the research publications come from the top 100 engineering institutions with the remaining 196 participating and

eligible engineeringinstitutions contributing only 23.64% of research publications. A similar conclusion can be drawn for all other categories except for Colleges. The data seems to follow the famous Pareto's principle, in the sense that most of the research is being conducted within the top 100 list in each case. On the positive side, there seem to be a good number of general degree colleges (last row), which have some publications signature. However, there is a significant overlap amongst various categories/disciplines since most of the institutes are applicant for ranking in multiple categories / disciplines.

No. of Eligible Inst.	Discipline / Categories	Total number of Publications	Publications of Top 100 Inst.	Publications of Remaining Institutes	<=100 (%)	100> (%)
780	Overall	245777	154757	69820	68.91	31.09
296	Universities	153715	117373	36342	76.36	23.64
861	Engineering	112848	79729	33119	70.65	29.35
460	Management	1450	1339	111	92.34	7.66
275	Pharmacy	3947	3261	686	82.62	17.38

Table 3: Table 4: Research Publications of Top 100 Institutes (by publications) with Rest of the Eligible Institutes in Various Disciplines / Categories

Table 4also conveys that the share of research publications in Management, Pharmacy and general degree colleges is at a much smaller scale. In fact in the Management category, the average publication count comes to just a little more than one paper per institute each year – a rather low figure and requires further reflection. Of course, since the top 100 publish 92.34% of publications, the average count for the top 100 is, in fact, fairly good. As a further caution, we would like to add that this data pertains to only publications belonging to the Management discipline categorized by the Web of Science. Clearly, many of the best management schools also publish in allied areas like Economics, Social Sciences, Information Technology and Psychology – which may not belong to mainstream Management discipline, and therefore, excluded from consideration here.

Table 5 summarise the total number of highly cited publications (HCP) for various disciplines and categories of India Rankings 2018. The Table provides a comparison of HCP of top 100 institutes with the rest of the eligible institutes in the same discipline / category. As in case of publications, 78.42% of the HCP come from the top 100 universities with remaining 196 participating and eligible universities contributing only 21.58% of HCP (row 2). Similar observations can be made in the Engineering category. However, in case of Management and Pharmacy 94.65% and 90.44% HCP is attributable to the first 100 institutes respectively.

| No. of Eligible Inst.	Discipline / Categories	Total number of Highly Cited Publications	Highly Cited Publications of Top 100 Inst.	Highly Cited Publications of Remaining Institutes	<=100 (%)	100> (%)
780	Overall	63807	46753	17054	73.27	26.73
296	Universities	42004	32941	9063	78.42	21.58
861	Engineering	31466	24553	6913	78.03	21.97
460	Management	579	548	31	94.65	5.35
275	Pharmacy	1172	1060	112	90.44	9.56

Table 5: Highly Cited Publications of Top 100 Institutes with Rest of the Eligible Institutes in Various Disciplines / Categories

As a useful point of reference, Table 6 and Fig. 8 show the relative numbers of publications from India compared to the global figures on the one hand, and those of the NIRF participants in the respective categories relative to the total publications from India. The following facts are apparent:

i) Indian share of the overall world publications is about 4.06%. In the Management discipline, the share falls to about 2.43%.

ii) Nearly 67% of the scholarly output from India is represented in the NIRF evaluation. In fact, it can be safely concluded that this would be close to (if not equal to) the total scholarly output from the academic world from India.

Discipline / Category	No. of Research Publications		
	World (1)	India (2)	NIRF Eligible Institutes
Overall(All)	8309449	336978 4.06% of (1)	224577 66.64% of (2)
Engineering	2469455	151884 6.15% of (1)	112848 74.30% of (2)
Management	111111	2701 2.43% of (1)	1450 53.68% of (2)
Pharmacy	203997	10766 5.28% of (1)	3947 36.66% of (2)

Table 6: Research Publications of Eligible Institutes (NIRF Applicants) in Comparison to Total Research Publications of the World and India
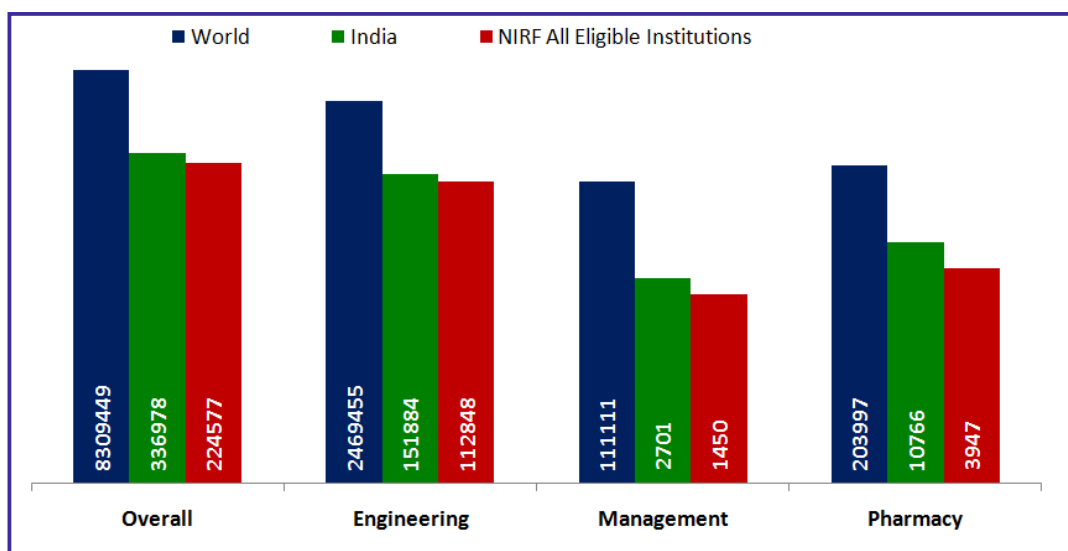

Fig. 8 (On a Logarithmic Scale): Research Publications of Eligible Institutes (NIRF Applicants) in Comparison to Total Research Publications of the World and India

At the other end of the picture, it is to be noted that a significant number of applicant institutes have no publication records. As a matter of record, their category-wise details are shown in Table 7. The maximum fraction is seen in general degree and management colleges. This is not surprising since many of these see their primary role in undergraduate education(colleges) and to a lesser extent, the focus on case studies rather than research publications in management institutes.

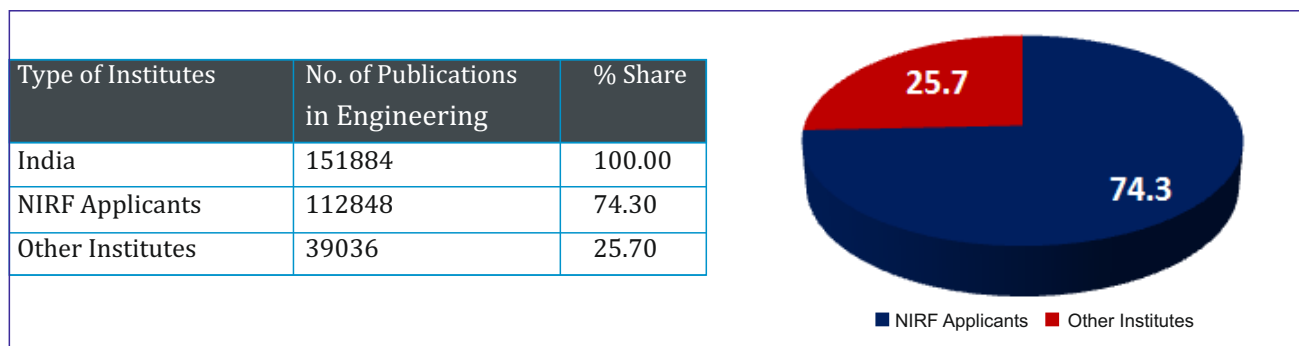| No. of Applicant Inst.	Discipline / Category	No. of Institute having "0" Publications	%
296	Universities	006	2.03%
861	Engineering	84	9.76%
460	Management	321	69.78%
275	Pharmacy	57	20.73%
666	Colleges	265	39.79%

Table 7: Number and % of Applicant institutes having "0" Publications

As another matter of interest, we next take up a somewhat deeper look at one of the larger disciplines, viz., Engineering. Fig. 9 shows percentage share of publications of different types of institutes amongst the top 100 ranked in terms of research articles published in this domain. Unsurprisingly, IIT's take the lion's share with nearly 38% of the Engineering publications to their credit followed by 16% by deemed-to-be-universities and 13% by NITs. There is, at the same time, a good sprinkling in all categories of participating institutes. This clearly augurs well for the research productivity in the engineering domain.
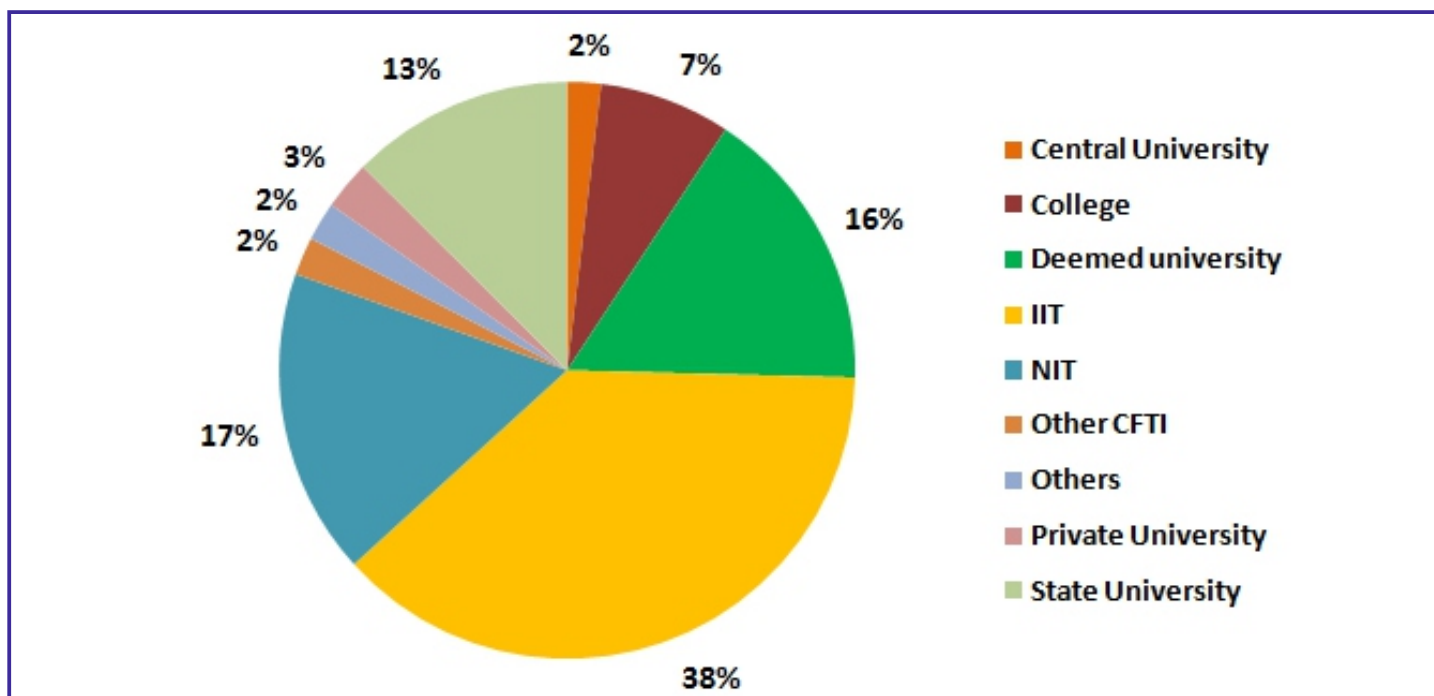
Fig. 9: Share of Publications from top 100 Highly Publishing Engineering Institutes

Table 8 and Figure 10 indicate that a major part of the productive engineering institutes are a part of the India Rankings 2018. This demonstrates the high-quality participation and aspiration of quality institutes for the NIRF ranks,which is very gratifying. It seems from this Figure, though, that a significant part of research fraternity (~ 26%) may be unrepresented. That conclusion, however, is likely to be faulty, since there are a good number of Research Labs, belonging to the CSIR System, the DAE system, ISRO and Private Research Labs who also publish significantly in Engineering, and do not form part of the mainstream academic system of interest in NIRF.

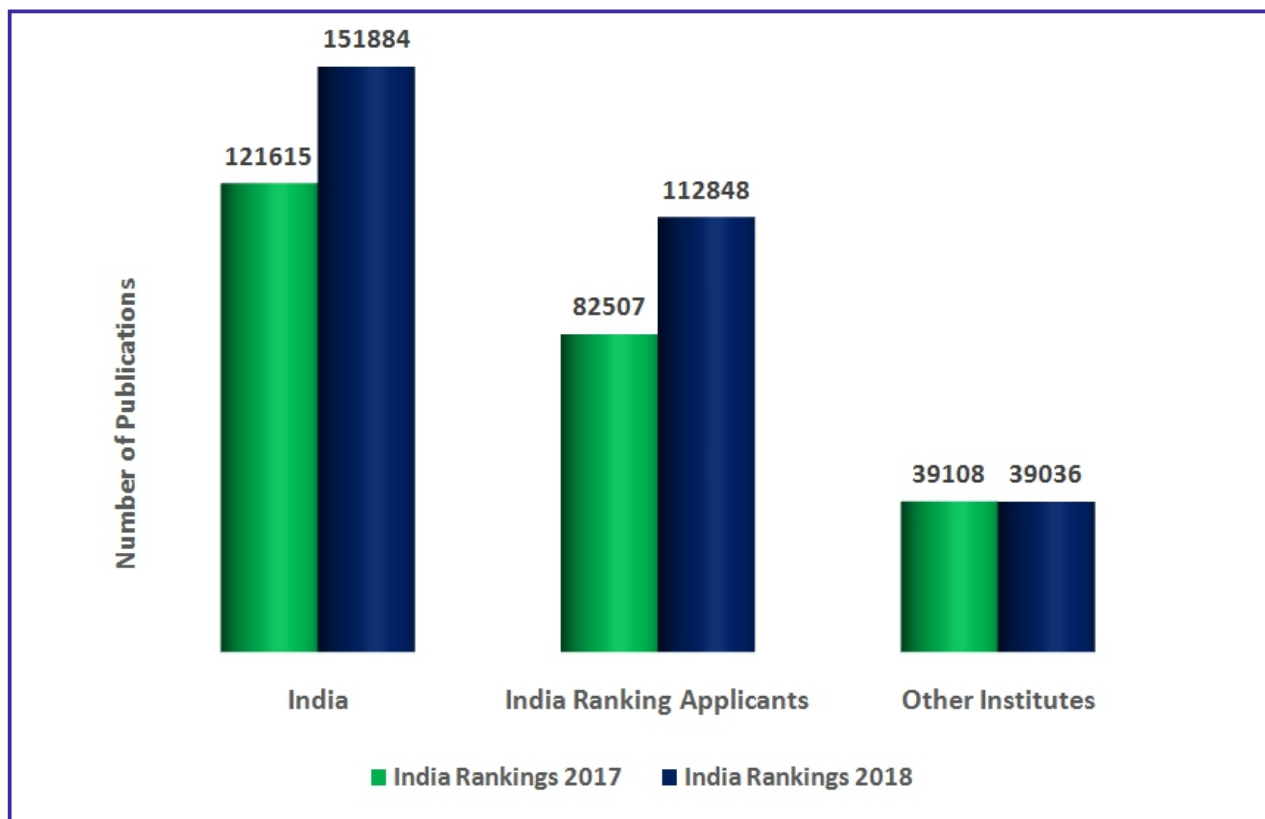| Type of Institutes	No. of Publications in Engineering	% Share
India	151884	100.00
NIRF Applicants	112848	74.30
Other Institutes	39036	25.70

Table 8 and Fig. 10: % Share in India's Total Publications vs. Publications of NIRF Applicants in Engineering

Fig. 11 compares number of research publications in world (up by 10.92%), India (up by 28.07%) and NIRF institutes (up by 25.68%) in Overall category for the years 2017 and 2018.


Fig. 11: Comparison of No. of Research Publications from India and Applicants of India Rankings during 2017 and 2018 in Overall Category

Fig. 12 presents similar comparison for the Engineering category: India (up by 24.89%), NIRF applicants (up by 36.77%) and other institutions (non-NIRF applicants) (down by 0.18%). Decrease in contributions from NIRF non-applicants is an indirect indication of greater participation in the NIRF exercise by productive institutes. This trend may continue in coming years as new disciplines / categories are added to the India Rankings. On other hand, increase in publications from India as well as from NIRF applicants can also be attributed to increased emphasis on publications in quality journals.

Fig. 12: Comparative Research Publications of India, NIRF Applicants and Other Institutes in Engineering for 2017 and 2018
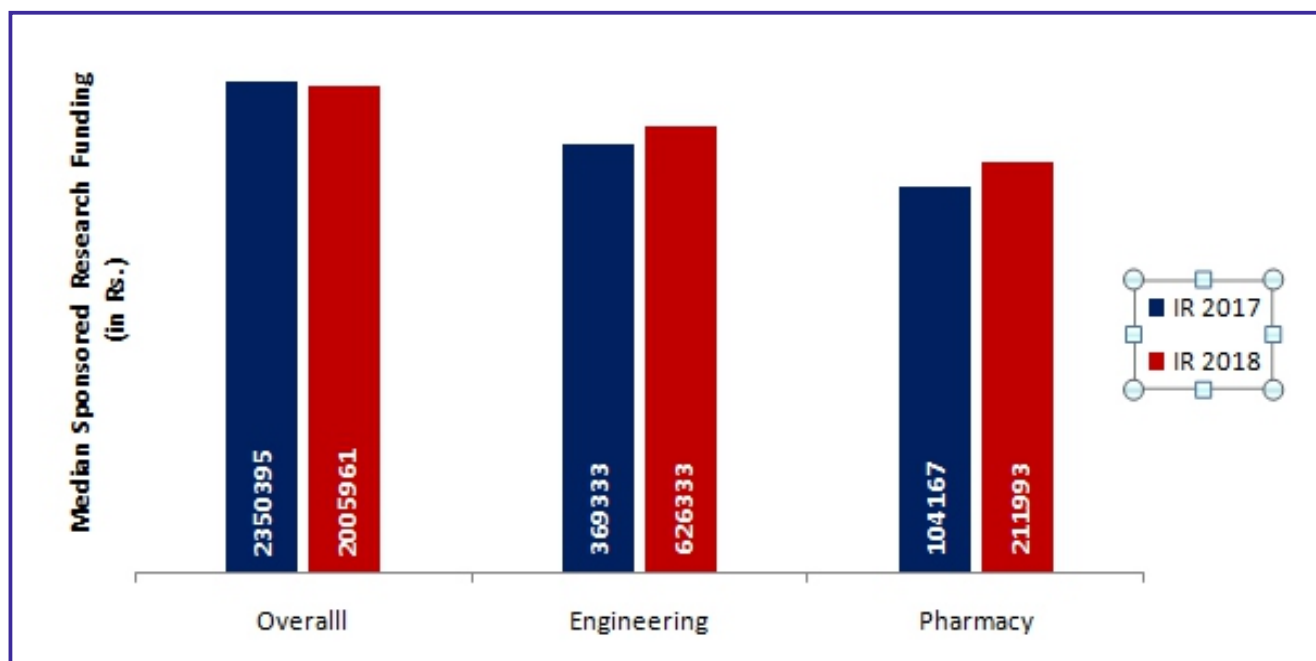

Fig 13: Comparison of Sponsored Research Funding

Finally, we have a brief look at the sponsored research funding availed by the NIRF participants in three categories as shown in Fig. 13. The figure presents median values of sponsored research funding for the years 2017 and 2018 in these categories. While substantial increase can be noticed in disciplines like engineering and pharmacy, the trend

does not seem to carry over to other disciplines, as noticed from lower earnings in the Overall category. Perhaps, this may have to do with the limited opportunities for research funding in several disciplines.

7.3 Rank Order Correlations across Parameters

It was thought to evaluate the correlation of the general rank of an institute based on its total score, with that of its standing in the main parameter whose data is largely obtained from independent third-party sources (viz., that based on its Research score). The Spearman's Rank Order correlation so obtained for different disciplines is indicated in the caption of Fig. 14, which itself depicts the mean of the scatter plots of corresponding scores along the two axes. A strong and positive correlation can be noticed for each discipline except for colleges. This gives us reason to feel confident that the final authenticated data from institutions is good and well-grounded.
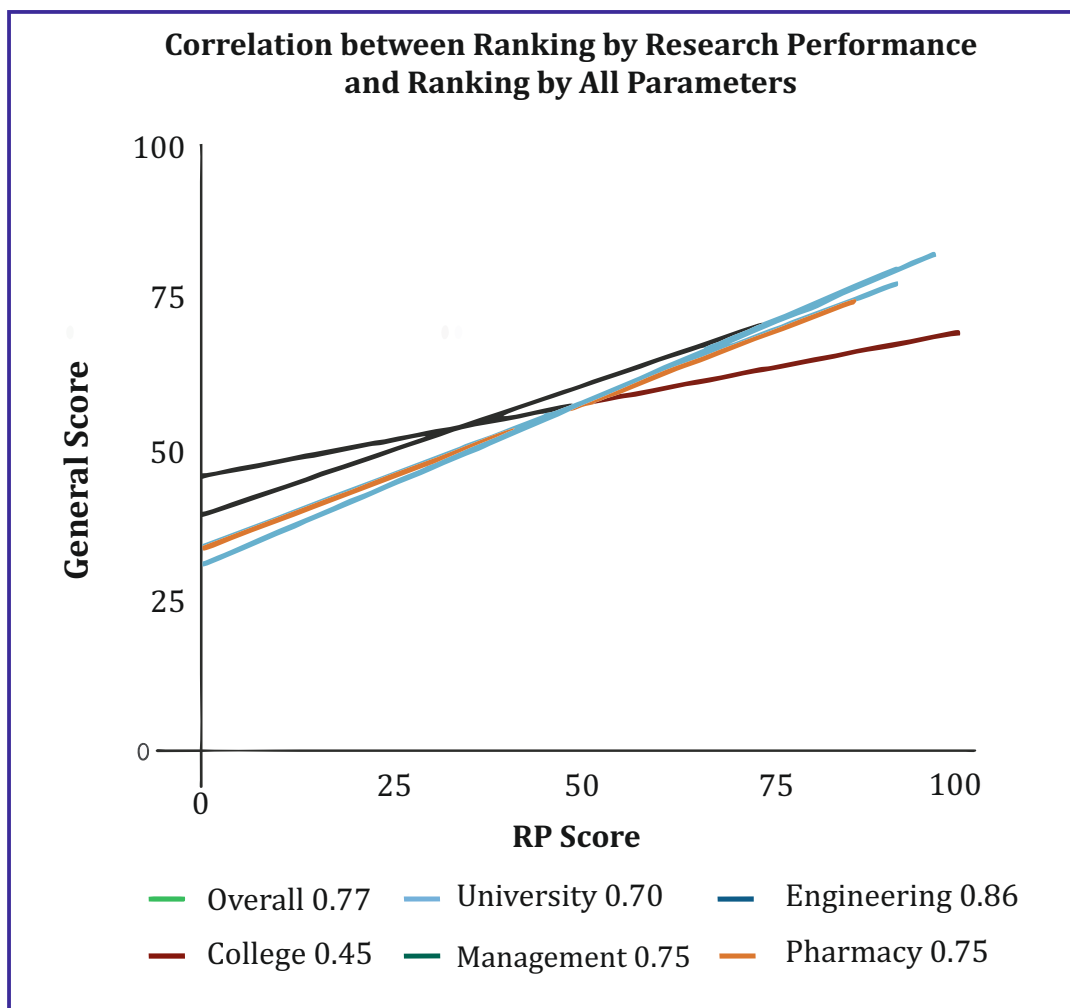
Fig.14: Correlation between Ranks by Research Performance and All Parameters

7.4 Regional Outlook

Fig.15 depicts that there is a good regional balance of institutes, although this picture can change with redefinition of the regions.
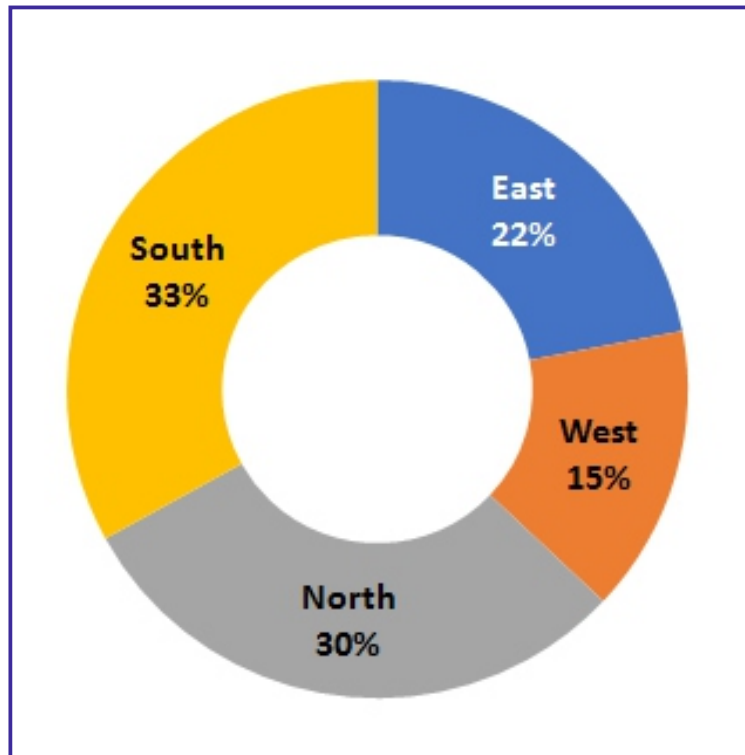
Fig. 15: Region-wise Participation of Ranked Institutions in Top 100 in Overall Category

7.5 Perception

Fig. 16 and 17depict the vote shares of peer and employer's perception for various categories of Institutions. It is interesting to note that maximum vote is picked up by the overall, engineering and college categories. On the other extreme, the first-time ranked fields of Law, Medical and Architecture drew a weak interest from the peers. This perhaps indicates the need for further broad-basing of the Peer and Employer database to have a good number of stakeholders in these fields.
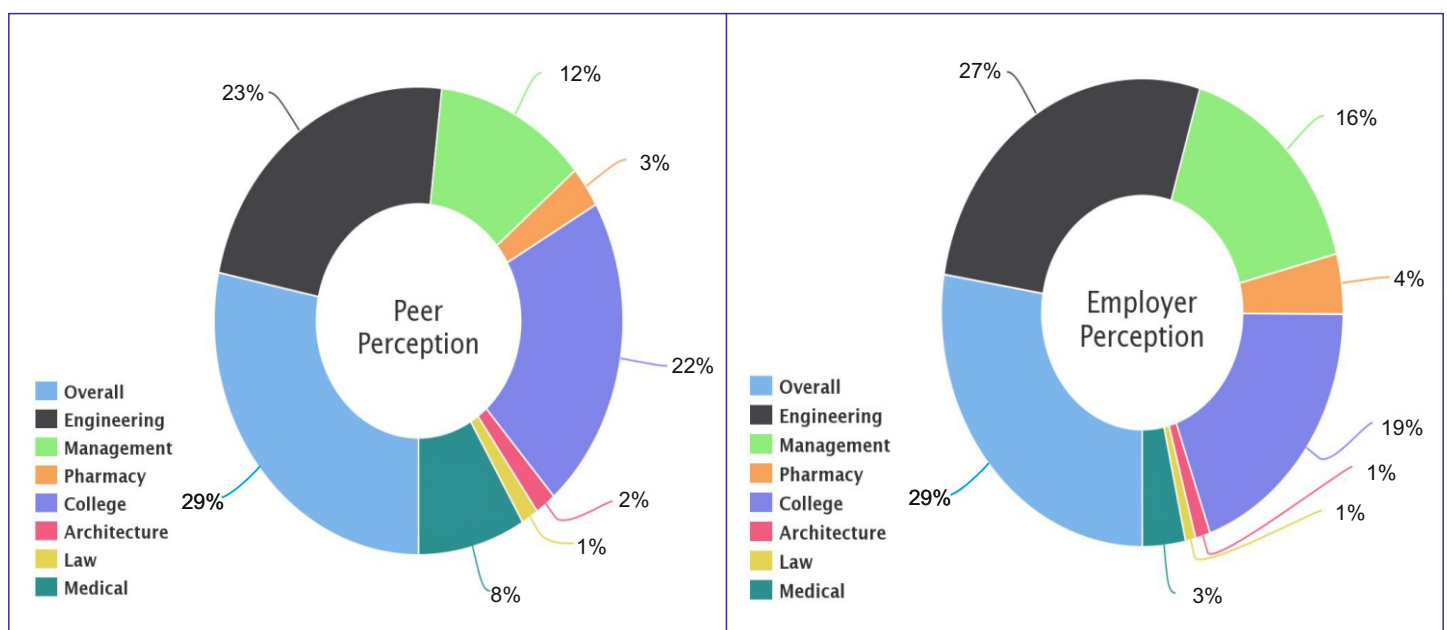
Fig.16 & 17: Peer and Employer's Perception

8.   Computation of Scores and Rankings

Rankings are based on the information and data provided by the institutions. Data on publications and citations have been taken from standard indexing and citation sources, viz., Scopus (Elsevier Science) and Web of Science (Clarivate Analytics, formerly Thomson Reuters). Perception data has been compiled from inputs from employers and peers.

NIRF Team has done limited validation of data. NIRF also provided an opportunity to the general public through press advertisement and through our web-portal, to give feedback on the quality and accuracy of data submitted by different institutes. Queries and comments received from the public were passed on to the concerned institutes for suitable action. However, responsibility for the accuracy and authenticity of the data lies with the institutes supplying it. Final data are available on the NIRF portal.

At the outset I would like to congratulate NIRF and NBA Teams for successfully completing the ranking of Indian institutions for the third time. AICTE has been striving to inculcate quality in all the technical institutes in India. One of the measures undertaken for over three years is to insist on accreditation of programmes without which institute is not allowed to expand in terms of seats in existing courses or starting new programmes.

The initiation of national institutional ranking framework has further accentuated the quality processes in technical institutes, developed a spirit of competition amongst institutions, aspiration of higher levels of vision and benchmarking have come to stay.

The number of institutions participating in ranking has increased year after year which shows the importance institutions are attaching to NIRF ranking thanks to a very credible system evolved with the support of MHRD.

In the years to come, this can pave way for some of our institutions to start appearing in the global top hundred institutions.

Anil D Sahasrabudhe, Chairman, AICTE

9.   Scores and Rankings

Overall weighted scores and ranks of institutions in different subjects / categories as well as their weighted scores and ranks on five broad generic parameters are available on the NIRF Website at the URLs mentioned below:

Category / Discipline	No. of Ranked Institutes and Rank Bands*	URL
OVERALL	Ranks: Top 100 Rank bands: 101-150 & 151-200	https://www.nirfindia.org/2018/OverallRanking.html
UNIVERSITIES	Ranks: Top 100 Rank bands: 101-150 & 151-200	https://www.nirfindia.org/2018/UniversityRanking.html
ENGINEERING	Ranks: Top 100 Rank bands: 101-150 & 151-200	https://www.nirfindia.org/2018/EngineeringRanking.html
COLLEGES	Ranks: Top 100 Rank bands: 101-150 & 151-200	https://www.nirfindia.org/2018/CollegeRanking.html
MANAGEMENT	Ranks: Top 50 Rank bands: 51-75 & 76-100	https://www.nirfindia.org/2018/ManagementRanking.html
PHARMACY	Ranks: Top 50 Rank bands: 51-75 & 76-100	https://www.nirfindia.org/2018/PharmacyRanking.html
MEDICAL	Ranks: Top 25	https://www.nirfindia.org/2018/MedicalRanking.html
ARCHITECTURE	Ranks: Top 10	https://www.nirfindia.org/2018/ArchitectureRanking.html
LAW	Ranks: Top 10	https://www.nirfindia.org/2018/LawRanking.html
SPECIAL MENTION		https://www.nirfindia.org/2018/SMRanking.html

* Institutes in rank bands are listed in alphabetical order.

10.   Execution

10.1   National Board of Accreditation (NBA)

The National Board of Accreditation (NBA) was the primary agency that was given the overall responsibility of co-ordinating and executing the Ranking work in consultation with the Implementation Core Committee, constituted by the MHRD. NBA invited applications for registration of institutions for ranking in various disciplines and the overall ranking. It coordinated with its collaborators to execute all aspects of the ranking work.

10.2.   Information and Library Network (INFLIBNET) Centre

The INFLIBNET Centre was responsible for development of NIRF Web Portal including data capturing system, perception module, the feedback mechanism and the ranking platform. The Centre provided and verified data on publications, citations, patents and highly cited papers within India. The Centre also deployed technical help desk at its premises.

10.3   Other Acknowledgements

We acknowledge with gratitude the help and advice from UGC and AICTE from time to time. We especially acknowledge the help and advice from our industrial partners, Elsevier and Clarivate Analytics.

Constitution of Expert Committee under the National Institutional Ranking Framework (NIRF)

The Ministry of Human Resource Development (MHRD) constituted an Expert Committee consisting of the following members to further strengthen and expand the ranking framework for the year 2017-18:

1. Secretary (HE), MHRD, New Delhi (Chairman)

2. Prof. Surendra Prasad, Chairman, NBA, New Delhi

3. Chairman, UGC, New Delhi

4. Prof. Anil Sahasrabudhe, Chairman, AICTE, New Delhi

5. Dr. Anil Kumar Nassa, Member Secretary, NBA, New Delhi

6. Dr. Jagdish Arora, Director, INFLIBNET Centre, Gandhinagar

7. Shri B.N. Tiwari, DDG, MHRD, New Delhi

8. Shri Anshul Kumar Aggarwal, Sr. Technical Director, NIC, New Delhi

Constitution of the Implementation Core Committee, NIRF

The mandate of this Committee, consisting of the following members, was to deal with issues that may arise during the execution of the ranking strategy and resolve them for successful implementation of the rankings.

1. Prof. Surendra Prasad (Chairman NBA), Chairman

2. Shri. R. Subrahmanyam, Secretary (HE), MHRD

3. Prof. Anil Sahasrabudhe (Chairman, AICTE)

4. Prof. V. S. Chauhan (Chairman, NAAC)

5. Prof. S. C. Sahasrabudhe, Former Director, IIT Bombay and DA-IICT, Gandhinagar

6. Ms. Shalini Sharma, CII

7. Dr. Jagdish Arora, Director, INFLIBNET Centre, Gandhinagar

8. Mrs. Malathi Narayanan, Dy. Secretary (TC), MHRD

9. Dr. Anil Kumar Nassa, (Member Secretary NBA), Member Secretary

Team @ NBA

Sl. No.	Name	Team Member
1.	Dr. Anil Kumar Nassa	Member Secretary
2.	Dr. Priyanka Singh	Core
3.	Ms. Shilpa Saini	Core
4.	Ms. Renuka Thadani	Core
5.	Ms. Kanchan Madhwal	Core
6.	Mr. Aman	Core
7.	Ms. Nidhi Dhawan	Helpdesk
8.	Ms. Simran	Helpdesk
9.	Ms. Devika	Helpdesk

Team @ INFLIBNET Centre

Sl. No.	Name	Team Member
1.	Dr. Jagdish Arora	Director
2.	Mr. Abhishek Kumar	Core
3.	Mr. Hitesh Solanki	Core
4.	Mr. Raja V	Core
5.	Mr. Dharmesh Shah	Core
6.	Dr. Kruti J. Trivedi	Bibliometrics-Lead
7.	Mr. Pallab Pradhan	Bibliometrics
8.	Mr. Mohit Kumar	Print and Publishing
9.	Ms. Maheshwari G Rathod	System Development
10.	Ms. Vinothine K.	System Development
11.	Ms. Khusboo Patel	System Development
12.	Mr. Mihirkumar R Prajapati	System Development
13.	Mrs. Deepti Sandeep Pandey	Bibliometrics
14.	Ms. Anita Kushwaha	Bibliometrics
15.	Ms. Shivani Thakur	Bibliometrics
16.	Ms. Vichitra V Adidravida	Bibliometrics
17.	Mr. Sudam C Sahoo	Bibliometrics
18.	Mrs. Pallavi	Helpdesk
19.	Mr. Ramswaroop Ahirwar	Helpdesk
20.	Ms. Kinjal R. Solanki	Helpdesk
21.	Mr. Piyush Priy	Helpdesk
22.	Ms. Ishita Patel	Helpdesk
23.	Ms. Miral Mehta	Helpdesk
24	Ms. Jinal Jakasaniya	Helpdesk

nirf

National Institutional Ranking Framework

NBA
NATIONAL BOARD
OF ACCREDITATION