REVIEW ON NIRF

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Abstract
The higher education institutions of India needed a proven quality assurance mechanism to build the confidence in the quality of higher education. The region lags at the bottom of international rankings on quality, with the exception of a handful of well-rated universities. Many non-academic media such as magazines, newspapers, career sites have measured institutional quality and provided ranking. The wide acceptance of such media rankings are questioned as mostly influenced participation by very few institutions and mainly used for admission campaign. The Ministry of Human Resource Development (MHRD), Government of India (GOI) in the year 2015 launched National Institutional Ranking Framework (NIRF) to evaluate the institutions with India centric parameter and also to minimize the impact of media ranking run by non-academic agencies. The NIRF has gained its momentum and confidence of public as it covers all kind of institutions and transparency in result announcement. The national ranking was used as one of the criteria to decide Institutes of Eminence (IOE) when there was a tie-break among institutions. The paper reviews the NIRF ranking and its impact.

Keywords: NIRF, Parameters, Weightage, QS, THE World Ranking.

INTRODUCTION
The federal government has ambition to reach at least 50 higher education institutions in top 1000 world rankings. On the other hand, the NIRF was launched to rank Indian Higher Education Institutions using country based parameters for inclusive and access education with the aim of international excellence to promote quality (Athilal et al, 2016).
The parameters used for evaluation are listed in five categories:

- Teaching Learning and Resources (TLR) where the core activity of academic is measured.
- Research and Professional Practice (RP) where the excellence in research outcome and scholarship is focused.
- Graduation Outcomes (GO) where the impact of learning outcome is measured.
- Outreach and Inclusivity (OI), the importance of economic, social and women representation.

- Perception (PR) by peer academic and employer

Both the overall and discipline specific ranks are processed. The open universities and affiliating institutions are eligible to apply only when they have teaching or research campuses. The institution must have graduands with at least 3 batches of Under Graduate and two batches of Post Graduate. The NIRF forces Indian institutions to maintain consistent data on themselves.

PARAMETERS AND WEIGHTAGE
The ranking formulae and distribution of parameters varies depend on the type of institution. The broad five categories of parameter are further distributed into several sub-categories and weightage of each will vary depends on the ranking discipline.

Table 1: NIRF 2019 Parameter Distribution & Weightage

Parameter	Overall	Engineering	Management	Pharmacy	Colleges	Architecture	Law	Medical
1. Teaching, Learning & Resources (TLR) = SS + FSR + FQE + FRU — Weight (S₁)	30	30	30	30	40	40	40	30
a.Student Strength including Doctoral students (SS)	20	20	20	20	20	20	20	20
i. UG and PG Students - (weight SS₁)	15	15	15	15	20	20	15	15
ii. Doctoral Students – (weight SS₂)	05	05	05	05	--	--	05	05
b.Faculty-student ratio with emphasis on permanent faculty (FSR)	30	30	30	30	30	30	30	30
c.Combined Metric for faculty with Ph.D and experience (FQE)	20	20	20	20	20	20	20	20
i. Faculty qualification (FQ)	10	10	10	10	10	10	10	10
ii. Faculty experience (FE)	10	10	10	10	10	10	10	10
d.Financial Resources and their utilization (FRU)	30	30	30	30	30	30	30	30
i. Average Annual Capital expenditure per student f(BC)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
ii. Average Annual Operational expenditure per student f(BO)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
2. Research and Professional Practice (RP) = PU + QP + IPR + FPP— Weight (S₂)	30	30	30	30	15	20	15	30
a.Combined Metric for publications (PU) - multiplied with weight RP₁	35	35	40	35	70	60	50	40
b.Combined metric for quality of publications (QP)	35	35	40	40	30	20	30	40
i. Citations count (CC) multiplied with weight QP₁	20	20	20	20	30	20	30	20
ii. Number of citations in top 25 percentile average (TOP25P) - weight (QP₂)	15	15	20	20	--	--	--	20
c.IPR and patents : Published and Granted (IPR)	15	15	--	15	--	--	--	10
i. Patents granted (IPG) - weight (IPR₁)	10	10	--	10	--	--	--	05
ii. Patents Published (IPP) - weight (IPR₂)	05	05	--	05	--	--	--	05
d.Footprint of Projects and Professional Practice FPP	15	10	20	10	--	20	20	10
i. Average annual research fund earnings (FPR) - weight (FPP₁)	05	7.5	05	7.5	--	10	10	05
ii. Average annual consultancy amount (FPC) - weight (FPP₂)	05	2.5	05	2.5	--	10	10	--
iii. Average annual earnings from Full time development program (EDP) - weight (FPP₃)	05	--	10	--	--	--	--	--
iv. Percentage of Bed occupancy in a day (FBD) - weight (FPP₄)	--	--	--	--	--	--	--	05
3. Graduation Outcome (GO) = GPH + GUE + GMS + GPHD — Weight (S₃)	20	20	20	20	25	20	25	20
a.Combined metric for Placement and Higher studies (GPH) - weight (GO₁)	--	40	40	40	40	40	40	30
b.Metric for University Examinations (GUE) - weight (GO₂)	60	15	20	15	40	30	15	30
c.Median salary (GMS) - multiplied with weight GO₃	--	25	40	25	20	30	25	30
d.Metric for Number of Ph.D students Graduated (GPHD) - weight (GO₄)	40	20	--	20	--	--	20	10
4. Outreach and Inclusivity (OI) = RD + WD + ESCS + PCS — Weight (S₄)	10	10	10	10	10	10	10	10
a.% of students from other states / country (RD)	30	30	30	30	30	30	30	30
b.% of Women Diversity (WD)	30	30	30	30	30	30	30	30
c.Economically and socially challenged students (ESCS)	20	20	20	20	20	20	20	20
d.Facilities for Physically challenged students (PCS)	20	20	20	20	20	20	20	20
5. Perception (PR) Employers & Academic Perception — Weight (S₅)	10	10	10	10	10	10	10	10

Though few calculations look similar across the discipline, they vary in benchmark (Chugh et al, 2018). Table 1 lists distribution of different ranking, where Table 2 describes score calculation formulae of each parameter as per 2019 ranking. The generic formula is derived by assigning variable when there is a variation in value. The process of ranking begins from pre-registration and registration. The data collection is made from institution website, further integrated with publication details, verification with stake holders and permit data correction if any. The data must be visible in the website for next 3 years. The data collection for TLR, GO, OI are collected from institution. The research productivity in terms of publications, citations, patents are directly obtained from publication databases. The perception is obtained through peer rating of academic institutions, employers and funding agencies etc. Then the scores are calculated with benchmark standards and results are announced. The mark assigned in each parameter is relative percentile score using log function. The methodology of data collection, changes in data parameters, its weightage and discipline specific rankings are continuously upgraded and improved since its inception. Also some of the parameters like public perception, commercialization of patent are dropped to ensure data integrity.

Table 2: NIRF 2019 Score Calculation

Item	Formula Description
0	NIRF Score = S_1 X TLR + S_2 X RP + S_3 X GO + S_4 X OI + S_5 * PR

1	Teaching, Learning Resources (TLR) = SS + FSR + FQE + FRU
	a. Student strength including doctoral (SS) = f(N_1, N_e) X SS_1 + f(N_p) X SS_2
	  • Where, N_1 is sanctioned intake, N_e is enrolled, N_p is doctoral enrolment
	b. Faculty student ratio (permanent faculty) (FSR) = 30 X [15 X (F/N)]
	  • Where N = N_1 + N_p, F is full time faculty with master / Ph.D
	  • If F: N is 1: 15 then assign max mark, if < 1:50 assign 0 mark
	c. Combined metric for faculty with Ph. D and equivalence (FQE) = FQ + FE
	  • Faculty qualification FQ = 10 X (F_{PA} / 95), F_{PA} < 95 %, FQ = 10, F_{PA} >= 95 %
	  • Faculty experience FE = 3 min(3F_1,1) + 3 min(3F_1,1) + 4 min(3F_1,1),
	  • Full marks for ratio 1:1:1,
	  • where F_1 is experience up to 8 years, F_2 is between 8+ to 15 years, F3 > 15 years
	d. Financial resources and their utilization (FRU) = 7.5 X f(BC) + 22.5 X f(BO)
	  • BC: Average annual capital expenditure per student for previous 3 years (excluding construction)
	  • BO: Average annual operational / recurring expenditure for the previous 3 years (excluding maintenance of hostel and allied services)

2	Research and Professional practice (RP) = PU + QP + IPR + FPPP
	a. Combined metric for publication (PU) = RP_1 X f(P/F_{RQ})
	  • Where P is weighted no of publications, FRQ is maximum of nominal number of faculty as calculated on basis of FSR of 1:15
	b. Combined metric for quality publication (QP) = QP_1 X f (CC/FRQ) + QP_2 X f(TOP25P/P)
	  • Where CC is total citation count over previous 3 years
	  • Where TOP25P is Number of citation in top 25 percentile average over 3 years
	c. IPR and Patents (published, granted) (IPR) = IPG + IPP,
	  • Where IPG = IPR_1 X f(PG), IPP = IPR_2 X f(PP)
	  • Where PG is number of patents granted over previous three years and PP is number of patents published over 3 years
	d. Footprint of projects and professional practice (FPP) = FPR + FPC + EDP + FBD
	  • FPR = FPR_1 X f(RF), FPC = FPR_2 X f(CF), EDP = FPR_3 X f(EP), FBD = FPR_4 X f(PBD)
	  • RF is average annual research funding earnings at institute level in previous 3 years
	  • CF is average annual consultancy amount received at institute level in previous 3 years
	  • EP is average annual earnings from full time executive development programs of a minimum duration of one year in previous 3 years
	  • PBD is % of Bed occupancy in a day

3	Graduation outcomes (GO) = GUE + GPHD
	a. Metric for U University examination (GUE) = GO_1 X min [N_g/80), 1]
	  • Where N_g is % of students (as a fraction of approved intake), averaged over the previous 3 years in passing respective exam within stipulated time
	b. Metric for Number of Ph.D graduated (GPHD) = GO_2 X f(N_{PhD})
	  • Where N_{PhD} is Average number of Ph.D students graduated over the previous 3 years

4	Outreach and Inclusivity (OI) = RD + WD + ESCS + PCS
	a. Region Diversity (RD) Percentage of students from other state and countries
	  • RD = 25 X fraction of total students enrolled from other states + 5 X fraction of students enrolled from other countries
	b. Percentage of women Diversity (WD) = 15 X (N_{ws}/50) + 15 X (N_{wf}/20)
	  • Where N_{ws} is % of women students, N_{wf} - % of women faculty including senior admin position, expectation is 50 % women students and 20 % women faculty
	c. Economic & socially challenged students (ESCS) = 20 X f(N_{ecs})
	  • Where N_{ecs} is % of UG or PG students being provided full tuition fee
	d. Facilities for physically challenged students (PCS) = 20 marks, if full facility is provided

5	Perception from Academic peer and Employers review (PR) — based on survey questionnaire

The metrics are modified continuously to fit the rationalization. In 2019, there are some important changes introduced to ensure quality performance (MHRD, 2019):

• Normalization applied to both publication and citations
• Quantified bed occupancy and capacity for medical institutions
• Considered the top 25 percentile of world citation of discipline
• Considered articles published in 50 journals as identified Financial times for management institutions

Four Rankings are published in each year consecutively from year 2016. The participation gets increased in 2019, as government funding are linked with ranking performance and to gain public visibility (MHRD, 2019). The number of institutions participated in the year 2019 is listed in Fig.1. With the inputs gathered, government is able to derive number of faculty members with Ph.D, faculty with experience and faculty-student ratio. The findings indicate that the teaching is done by fresh / less experienced faculty members. The scholarly publications from India are steadily improved (Rajan et al, 2018). For example, the publications of top 100 institutions account 67.84 % with the citation of 73.81 % in overall category. The select private deemed universities has remarkable presence in both overall and discipline wise ranking. The Indian Institute of Science scores consecutively high in research publication and citation.
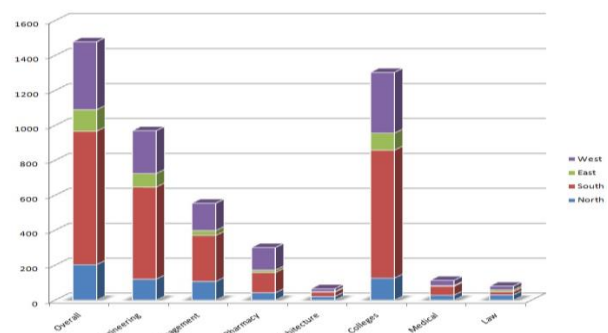
Fig. 1: Institution Participation in NIRF 2019

The key focus is increasing international reputation, post graduate and research enrollments, retain best talented faculty and produce quality & innovative research.

GLOBAL RANKING

The world class universities are considered as a crucial part of (Russell, 2012) the country's knowledge base and innovation. The top ranked universities are measured in producing quality graduates, generating economic, social impact research, taking global challenges and providing international leadership. They form high-tech innovation clusters on knowledge exchange and bridging technology, research and business. The absence of high impact world ranking will become a prime debate when media announces the world ranking.

The Academic Ranking of World Universities (ARWU) established by Shanghai Jiao Tong University, China focus on Number of alumni and staff winning nobel prizes, highly cited researchers count, publications in science & social science citation index and percentage of papers published in top 20 % journal. The Schimago Journal and Country Rank (SJR) is based on country specific scientific indicators. The Scimago Institutions ranking (SIR) focus on research, innovation and Web visibility indicators.

The Quacquarelli Symonds (QS) and Times Higher Education (THE) World University rankings are two popular World rankings, has impact in India. The ranking indicators of QS and THE World Ranking are listed in Table 3 and Table 4 respectively. Both of them making reputation survey in a global form which is not favoring to Asian and Indian University at large extend as their visibility is limited. The lack of international students and faculty in Indian institutions is also one of the major disadvantages to the Institutions. However, QS takes taking teaching dimensions into account.

Table 3: QS Ranking Indicators

Indicator	World	Asia	Latin America	BRICS
Academic Reputation	40 %	30 %	30 %	30 %
Employer Reputation	10 %	20 %	20 %	20 %
Faculty / student ratio	20 %	10 %	10 %	20 %
Citations per paper	20 %	10 %	10 %	5 %
Papers per faculty	--	5 %	5 %	10 %
International Research Network	--	10 %	10 %	--
Proportion of International students	5 %	2.5 %	--	2.5 %
Proportion of International Faculty	5 %	2.5 %	--	2.5 %
Proportion of Inbound exchange students	--	2.5 %	--	--
Proportion of Outbound exchange students	--	2.5 %	--	--
Staff with a PhD	--	5 %	10 %	10 %
Web impact	--	--	5 %	--

Table 4: THE World Ranking Indicators

Teaching Learning environment (30 %)	Citations per paper (30 %)
i. Total students / academic faculty 4.5 %	ix. Citations: Research impact
ii. PhD awards / bachelor 2.25 %	
iii. PhD / Academic faculty 6 %	Industry income: innovation (2.5 %)
iv. Reputation survey (teaching) 15 %	x. Income from industry / academic staff
v. Institutional income / Academic faculty 2.25 %	
	International outlook (7.5 %)
	xi. Ratio of international to domestic student ratio 2.5 %
Research: volume, income & reputation (30%)	xii. Ratio of International to domestic faculty ratio 2.5 %
vi. Scholarly papers / Academic faculty 6 %	xiii. International co-authorship 2.5 %
vii. Research Income / Academic faculty 6 %	
viii. Research reputation survey 18 %	

Though there are few common indicators of QS, THE and NIRF ranking such as faculty student ratio, Doctorates, citations, paper per faculty, etc.,, the world rankings vary mainly in reputation survey and international outlook. Also, attracting international student, faculty and collaborations

The general issues concerned with global University Rankings (IDFC, 2012). However, the significance and importance of these rankings cannot be neglected in the globalized era.

- Most of these rankings are based on already gained academic reputation and influence in the global market
- Some of the world rankings focus only on research (Ex. ARWU) and does not figure teaching

- Biased in favour of science streams and English speaking nations, since they consider weightage for citations
- More weightage is given to international outlook to the proportion of international students and staff. However this factor is dependent not only on university but also with the federal government's mission and goal
- The ranking system undermines the mission and objective of universities nation presence

The countries like Taiwan and China hit the world university rankings by introducing new strategies. Along with United States, Europe and other developed countries China has strived to develop world-class research universities with the list of distinguishing characteristics and efforts (Futao Huang 2015). Some of them are as follows: intensive funding to elite institutions, merge of manpower colleges to establish comprehensive universities, attract talent from abroad, encourage joint research collaboration with international renowned institutions and establish key laboratories at national level.

EXPECTED IMPROVEMENTS

The NIRF has widely accepted among public and gained its importance. The institutions started doing parameter wise comparison with their competitors (Kumaran et al, 2019). However, the ranking system is to be improved by nurturing the parameters with the following expectations.

- Create National level database and Implement the ranking by independent agency
- Introduction of state-category level ranking as the state institutions and affiliated colleges have little scope on diversified student strength.
- Improve the verification and data authentication
- Ensure and adapt dynamic changes in the parameter based on institutional profiles
- Introduction of h-index of institution
- Weightage for national level accreditation
- Extend the ranking list on each category
- Consider innovative curriculum aspects
- Extend Scholarship for women and rural enrollment
- Strategic alliance policy for international collaboration
- Quick and reliable process of recruiting foreign faculty and admitting students

In the path towards World class university rankings, the Indian institutions expect favorable governance and autonomy to compete with world institutions. The government must derive economic rationale, expected number of global rankings, government & institutional strategy, identification of potential institutions, the required governance system and performance monitoring measurements (Salmi, 2009).   The government announced Institute of Eminence (IoE) status to select public and private institutions to aim for world university rankings in the next decade.

CONCLUSION

The NIRF helped the institutions to understand their performance by each year and to know their competitors and peer performers. This has more advantages like valuing perception, attracting industry for better placement and become reliable tool for parents and students to know about the institution. The NIRF indirectly helps the top performing institution to build their brand and wide publicity without any additional expenses on marketing and branding. At present, the ranking is listed for top 100 for all categories and top 200 in engineering categories.   The scores of other participating institutions are sent individually. While the institutions matures on quality and scores high in each parameter, the list may be get expanded to cover more institutions and the government may

also expands the funding benefits on various scheme to the expanded list.

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