Journal of Engineering Education Transformations ,
Volume 34 , No. 1, July 2020, ISSN 2349-2473, eISSN 2394-1707

Impact of Research Performance and Perception on Ranking of Universities-A study based on NIRF 2019

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Abstract : Research performance in university is an important criterion in ranking. The study aims to understand the significance of research performance in university rankings based on the National Institutional Ranking Framework (NIRF) of India 2019. The study analyses Indian rankings 2019 of universities with respect to Research and Professional Practices (RPP) score and evaluates the relationship between RPP and Perception (PR) for top-ranked 100 universities. This study has established interdependency between RPP and PR and it is found that both are highly significant in university ranking process.

Keywords: NIRF 2019, University rank, Research and Professional Practices, Perception.

1. Introduction

The Ministry of Human Resource Development (MHRD) is responsible for the development of human resources in India and the enhancement of basic infrastructure both in terms of policy and planning and in specific tends to expand access and quality improvement in higher education. According to University Grants Commission (UGC), as on 31st March 2019, the total number of universities in India is about 907; among which there are 399 state universities, 126 Deemed to be universities, 48 central universities, and 334 private universities. In this connection on 29th September 2015, NIRF was approved by MHRD to rank higher educational institutions in the country to promote competitive excellence based on objective criteria. It covers broad parameters viz., Teaching, Learning, and Resources (TLR), RPP, Graduate Outcomes (GO), Outreach, and Inclusivity (OI) and PR. From the inception of NIRF, there are changes in parameters and subparameters to strengthen the ranking system to make it robust and effective. Ranking parameters, sub-parameters, relative score, weightage, and weighted score are as depicted in the following table.

2. Review of Literature

Several studies have evaluated the main indicators of the ranking system in the field of higher education. Some of the following studies have proved the role of research performance in the ranking process. Buelaet. al., 2007 in a research article on comparative study on international academic ranking of universities indicated that four selected international rankings included an indicator for quality of research which was the most significant indicator of international university ranking. Gagan Pratap and Gupta 2009 used a new performance index to discuss how the ranking of Indian universities is based on their

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Table 1: Parameters and Sub parameters of University Ranking (NIRF 2018)

Parameters / Sub-Parameters	Score	Weightage	Weighted Score
1. Teaching-Learning and Resources (TLR) - Students Strength including Doctoral Students - Faculty-Student Ratio - Combined Metric for Faculty with PhD and Experience - Financial Resources and their Utilization	100	0.30	30
2. Research and Professional Practice (RPP) - Combined Metric for Publications - Combined Metric for Quality of Publications - IPR and Patents: Published and Granted - Footprint of Projects and Professional Practice	100	0.30	30
3. Graduation Outcome (GO) - Metric for University Examinations - Metric for Number of PhD Students Graduated	100	0.20	20
4. Outreach and Inclusivity (OI) - Percentage of Students from Other States / Countries (Region Diversity) - Percentage of Women (Women Diversity) - Economically and Socially Challenged Students - Facilities for Physically Challenged Students	100	0.10	10
5. Perception (PR) - Peer Perception: Academic Peers and Employers	100	0.10	10
Total Weighted Score (TWS)			**100**

research output and quality. In 2010, analysis was made by Gupta on Indian universities ranking and highlighted the importance of publications and citations in ranking. 2012 studies of Huang calculated the ranking of universities all over the world using their h-index scores to measure research performance. Bagalkoti and Sangam, 2012 studied ranking of Indian universities accredited by NAAC with respect to research publication data. Comparison of India and China based on academic and research metrics was carried out by K.S. Reddy (2016) and emphasized upon various citation criteria's. Sheeja et al. 2018 stressed the importance of scholarly communication and institutional ranking; a study based on NIRF and established a significant correlation between scholarly communication and institutional ranking. Analytical results of research publication data by Sumitet et al. 2017 provided useful account of research performance of IITs. According to India Rankings report 2019, the top-rated 100 universities accounted for 69.63 % research publications & 79.74% of Highly Cited Publications (HCP) out of the 303 participating & eligible universities. Moreover, the faculty with doctoral qualification isconcentrated in top-rated 50/100 engineering institutions; remaining institutions have very few faculty members with doctoral degrees. In this context, our study is aiming to analyze the relationship between research and professional practice&perception and their influence on the overall ranking based on NIRF-2019 of India.

3. Objectives of the Study

1. To understand the parameters and sub-parameters of Indian Rankings 2019 for universities.
2. To study universities in Indian Rankings 2019 with respect to its RPP & PR score.
3. To analyze the relationship between RPP and PR score with reference to university ranking.
4. To suggest methods to improve the Research & Professional Practice score.

4. Methodology

The data for the study on the impact of research performance and perception on the ranking of universities by Indian ranking 2019 is primary and the data for the study was collected from the NIRF portal for 100 ranked universities which included both public and private universities. Dependence and inter-relations was studied through correlation and regression analysis. These analyses were carried out with the help of statistical software R programming. All the tests are tested at a 5% level of significance. P-values less than 0.05 indicated that the test values were significant. Whenever these testing values were very highly significant the corresponding p-values became negligibly small and sometimes it was zero.

Table 2: Study on Universities in Indian Ranking 2019 with RPP rank and PR score (NIRF 2019)

University	State	NIRF Rank	RPP Rank	RPP Score	PR Score
Indian Institute of Science Bengaluru	Karnataka	1	1	89.24	100
Jadavpur University	West Bengal	6	2	54.89	51.83
Anna University	Tamil Nadu	7	3	54.1	62.72
University of Delhi	Delhi	13	4	53.79	41.11

Institute of Chemical Technology	Maharashtra	15	5	48.4	20.28
Vellore Institute of Technology	Tamil Nadu	19	6	47.63	35.31
Calcutta University	West Bengal	5	7	47.1	37.39
Banaras Hindu University	Uttar Pradesh	3	8	46.48	47.28
Bharathiar University	Tamil Nadu	14	9	45.04	31.2
Panjab University	Chandigarh	21	10	44.82	27.09
Savitribai Phule Pune University	Maharashtra	10	11	44.42	16.55
University of Hyderabad	Telangana	4	12	43.78	36.71
Amrita VishwaVidyapeetham	Tamil Nadu	8	13	43.77	31.01
Jawaharlal Nehru University	Delhi	2	14	41.85	55.27
Manipal Academy of Higher Education	Karnataka	9	15	38.31	30.21
Thapar Institute of Engineering and Technology	Punjab	27	16	36.3	10.24
Aligarh Muslim University	Uttar Pradesh	11	17	35.38	18.46
Birla Institute of Technology & Science	Rajasthan	23	18	34.14	34.41
University of Madras	Tamil Nadu	20	19	33.28	30.01
Shanmugha Arts Science Technology & Research Academy	Tamil Nadu	40	20	32.38	6.86
JamiaMilliaIslamia	Delhi	12	21	32.04	14.26
Tezpur University	Assam	29	22	30.1	15.71
JamiaHamdard	Delhi	18	23	29.92	6.86
Birla Institute of Technology	Jharkhand	59	24	29.47	23.47
Guru Nanak Dev University	Punjab	55	25	29.38	5.8
Bharathidasan University	Tamil Nadu	60	26	29.05	24.17
Amity University	Uttar Pradesh	58	27	28.3	7.22
Madurai Kamaraj University	Tamil Nadu	45	28	28.11	20.28
Sathyabama Institute of Science and Technology	Tamil Nadu	41	29	27.15	2.41
Mahatma Gandhi University	Kerala	30	30	26.97	3.58
Cochin University of Science and Technology	Kerala	65	31	26.88	14.84
Pondicherry University	Pondicherry	48	32	26.63	19.25
International Institute of Information Technology	Telangana	82	33	26.62	15.99
SRM Institute of Science and Technology	Tamil Nadu	32	34	26.51	14.26

VisvaBharati	West Bengal	37	35	26.07	11.52
King George`s Medical University	Uttar Pradesh	25	36	25.85	5.8
HomiBhabha National Institute	Maharashtra	17	37	25.24	4.33
Osmania University	Telangana	26	38	24.95	9.26
Delhi Technological University	Delhi	47	39	24.33	19.51
Sri Venkateswara University	Andhra Pradesh	48	40	23.6	6.51
Andhra University	Andhra Pradesh	16	41	23.16	14.55
Alagappa University	Tamil Nadu	28	42	22.18	26.65
Siksha `O` Anusandhan	Odisha	24	43	21.17	20.02
The University of Burdwan	West Bengal	89	44	20.96	2.41
Periyar University	Tamil Nadu	68	45	20.74	19.25
Kalyani University	West Bengal	91	46	20.64	4.7
Punjab Agricultural University	Punjab	51	47	19.74	3.19
KoneruLakshmaiah Education Foundation University	Andhra Pradesh	50	48	19.07	3.58
Guru Gobind Singh Indraprastha University	Delhi	66	49	18.96	3.58
Kerala University	Kerala	22	50	18.84	8.59
University of Kashmir	Jammu&Kashmir	53	51	18.33	1.63
The Gandhigram Rural Institute	Tamil Nadu	75	52	18.2	6.15
Mysore University	Karnataka	54	53	18.15	4.7
Kalinga Institute of Industrial Technology	Odisha	31	54	18.1	14.55
Gauhati University	Assam	42	55	18.08	9.59
Bharath Institute of Higher Education & Research	Tamil Nadu	36	56	17.76	3.19
Saveetha Institute of Medical and Technical Sciences	Tamil Nadu	43	57	17.64	0
Mumbai University	Maharashtra	81	58	17.1	7.91
Sri Ramachandra Inst. of Higher Education and Research	Tamil Nadu	33	59	16.57	6.15
University of Jammu	Jammu&Kashmir	74	60	16.51	2.02

Calicut University	Kerala	64	61	16.46	7.22
JSS Academy of Higher Education and Research	Karnataka	34	62	15.74	10.24
G. B. Pant Universtiy of Agriculture and Technology	Uttarakhand	38	63	15.49	5.44
Karunya Institute of Technology and Sciences	Tamil Nadu	92	64	15.1	12.76
ManonmaniamSundaranar University	Tamil Nadu	93	65	14.89	8.25
North Eastern Hill University	Meghalaya	39	66	14.53	6.51
Goa University	Goa	93	67	14.46	1.63
Shiv Nadar University	Uttar Pradesh	52	68	14.05	6.15
MaharshiDayanand University	Haryana	90	69	13.91	2.41
Central University of Punjab	Punjab	95	70	13.62	7.91
Alagappa University	Tamil Nadu	28	42	22.18	26.65
Siksha `O` Anusandhan	Odisha	24	43	21.17	20.02
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MaharshiDayanand University	Haryana	90	69	13.91	2.41
Central University of Punjab	Punjab	95	70	13.62	7.91
Professor JayashankarTelangana State Agricultural University	Telangana	79	99	1.71	1.63
Meenakshi Academy of Higher Education and Research	Tamil Nadu	100	100	1.62	0

5. Data analysis and findings

The RPP rank or RPP score are very influential component in the NIRF ranking of Universities. The strong correlation of 0.7702 between NIRF ranking and RPP ranking indicates a strong relationship between them. Alternatively, if we consider the correlation between NIRF ranking and RPP score, it is also of similar strength, with correlation of -0.76072. The negative sign is because ranking are given in the opposite order. Hence, it can be concluded that concentrating on RPP score is very important, as its influence on NIRF ranking is very strong.

Next, it is interesting to study how PR scores are influenced by RPP score. The important part of the study here is to examine the relationship between these two scores. From the study, it can be concluded that if RPP scores are improved then it automatically improves PR score. It is empirically established that the relationship between RPP and PR is strong. In case of public sector Universities the correlation between them is 0.88 which is very strong and its p- value of significance of the correlation is measured as 0 for the corresponding Z statistic value 14.5798. Since a strong relation is clear, an empirical linear relationship is established to emphasize this. Hence, the trend of PR based on RPP is established using regression analysis and it is PR = -8.296 + 0.981, RPP the strength of the relationship can be seen through the p-value of the significance of regression which is less than 2×10-16. This indicates that the regression coefficient is very highly significant. The Figure 1 gives the chart of PR and RPP and the trend line of PR based on RPP in public sector universities.

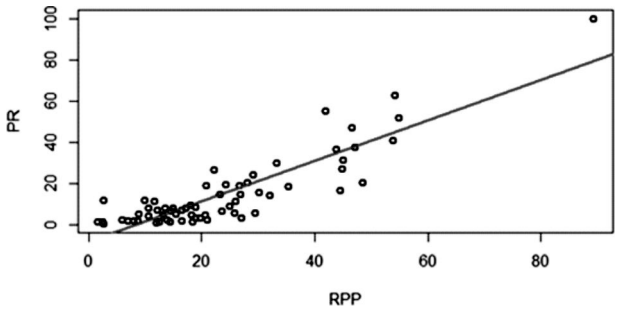

Fig.1: Relationship between PR and RPP for public sector

The same type of analysis is carried out for the private sector universities. The correlation between RPP and PR is 0.7527304 and its significance is measured through the p-value of 2.61× 10-11 and the Z statistic value is 6.667086. Since PR is very much dependent on RPP ifRPP score increases then PR score is also likely to increase. The linear relationship relation exhibited through regression is found to be PR= -2.7337 + 0.6403 RPP. Its significance measured through a p-value of 1.19 ×10-7. Figure 2 presents the trend of PR based on RPP is private universities.

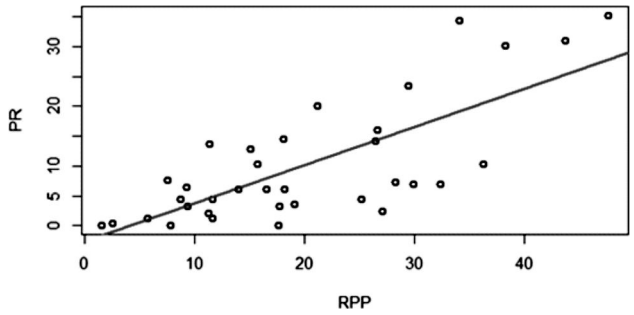

Fig. 2: Relationship between PRand RPP for the private sector.

The important findings are 1) RPP score has greater influence on NIRF ranking 2) Strong correlation exists between RPP score and PR score. The above findings clearly show the universities have to concentrate on RPP which calls for a culture shift among faculty members from core teaching to research and to establish an exclusive directorate for research to improve the number research publications per faculty & the quality of publications, number of patents, consultancy, and funded research projects.

Suggestions to improve the Research & Professional Practice Score:

The improvement in RPP score can be done through supportive research policies & strategies with short term, midterm, and long term goals.

The focus can be on the suggested five steps approach:

(i) development of human resource for research and consultancy by encouraging the existing PG holders to pursue Doctoral Programme and restructuring the recruitment policy to recruit quality doctoral fellows, (ii) training of HR for research and consultancy,

(iii) launching HR for research and consultancy,

(iv) monitoring HR for research and consultancy and

(v) special encouragement for achievers.

As the performance in RPP is equally important for the Affiliating institutions and Autonomous institutions the institutions can conduct regular workshops and seminars on research tools and research paper writing & can arrange author workshops with the publishers. Moreover to introduce the electronic resources the workshops on databases and e-journals can be organized.

6. Conclusion

The study evaluated the role of RPP and PR in institutional ranking. It was found that both are very important factors that influence the overall ranking of any university. Statistically very strong correlation exists between university rank and RPP ranks. Hence RPP influences NIRF ranking. It is also found that RPP is also influencing perception. Therefore if the RPP increases, university ranking also increases as research also influences the perception of the university. Hence it can be concluded that concentrating on the RPP score is very important, as its influence on the NIRF ranking is very strong and if RPP scores are improved then it automatically improves PR score.

As RPP is the most complex factor and requires a dedicated research group to improve ranking in universities, the directorate of research in coordination with library and information science professionals has to increase the quality research output among faculty members and to implement the suggested five steps approach.

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