Review

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Impact of Institutional Research Dynamics and Faculty Credentials on NIRF Engineering Ranking Performance

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Abstract

This study analyzes the relationship between research output characteristics, faculty credentials, and institutional ranking performance in the National Institutional Ranking Framework (NIRF) 2025 under the Engineering category. Data comparisons across ranking bands (99, 100–150, 150–200, 201–300) reveal that pure institutional publications and higher ratios of full-time Ph.D. faculty contribute significantly to higher research and faculty-related scores. Conversely, excessive external collaboration correlates with reduced ranking performance despite higher publication counts. The findings emphasize the strategic importance of enhancing institutional research capacity, retaining experienced Ph.D. faculty, and fostering balanced internal collaborations.

Keywords: NIRF engineering; research performance; pure institutional publication; faculty quality; Ph.D. ratio; collaboration; ranking analysis

1. Introduction

The NIRF Engineering ranking emphasizes research and faculty quality as major contributors to institutional excellence [1]. Among all parameters, quality publications and quality faculty (FSR and FQU) collectively account for nearly half of the total weightage [2]. The weightage is represented in Table 1. This study aims to identify key determinants that elevate institutional ranking performance using NIRF 2025 data.

The quality publication contributes approximately 40.5 – 45.5% of the total score. Sub-components include: FQU, PU, QP, FPPP, GPHD and PP. This indicates that institutional research strength remains the largest contributor to ranking performance. To compare among institutions, I randomly selected institutions in 101-150 band, 151-200 band, 201-300 band and 99 Rank. The institution name was not mentioned throughout the article.

Table 1. Weightage of NIRF Engineering Category.

Parameter	Actual Score	Weightage
Student Strength (SS)	20	6
Faculty-student ratio (FSR)	30	9
Combined metric for Faculty with PhD (FQU)	20	6
Financial Resources and their Utilisation (FRU)	30	9
Publications (PU)	35	10.5
Quality of Publications (QP)	40	12
Patent (IPR)	15	4.5
Projects and Professional Practice (FPPP)	10	3
Placement and Higher Studies (GPH)	40	8
University Examinations (GUE)	15	3
Median Salary (GMS)	25	5

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Ph.D. Students Graduated (GPHD)	20	4
Region Diversity (RD)	30	3
Women Diversity (WD)	30	3
Economically and Socially Challenged Students (ESCS)	20	2
Facilities for Physically Challenged Students (PCS)	20	2
Peer Perception (PP)	100	10

2. Research Output and Pure Institution Outcome

Table 2 show that pure institutional publications (papers authored solely by internal faculty and students) contribute more effectively to NIRF Research scores. As per Scopus database for the calendar year 2021-2023.

Table 2. Publication Count with only home affiliation. Publication Count as per Scopus database for the calendar year 2021-2023. Faculty Count and Ph.D. is w.r.to DCS 2025.

Rank	Faculty	Ph.D.	%	Article and Others	Conference Paper
100-150	278	175	62.95%	52	169
150-200	358	162	45.25%	81	300
201-300	225	121	53.78%	23	147
99	76	76	100.00%	185	99

The Rank 99 institution demonstrates a strong correlation between institutional-only publications (185 articles) and higher research marks. In contrast, lower-ranked bands (100–300) show higher collaboration percentages (over 150 – 270%) but lower research performance, highlighting that external collaborations, while increasing quantity, may dilute institutional credit.

3. Faculty Quality and Ph.D. Ratios (FSR and FQU)

Faculty Student Ratio (FSR) and Faculty Qualification (FQU) account for 15% of NIRF weightage combined. Institutions in the top 100 band maintain 100% Ph.D. faculty, outperforming bands with only 45–63% Ph.D. faculty. Experienced faculty distribution in 1:1:1 ratio across less than 8 : 8 to 15 : 15+ years correlates with higher Faculty Quality Unit (FQU) scores. Recognition as Ph.D. Supervisors increases institutional visibility and research capacity by attracting more scholars.

Table 3. FSR and Scholars details. Data as per DCS 2025.

Rank	Faculty	Ph.D.	%	Students	Full-time Scholars	Part-time Scholars
100-150	278	175	62.95%	3726	71	188
150-200	358	162	45.25%	4308	27	84
201-300	225	121	53.78%	3150	18	95
99	76	76	100.00%	1130	176	81

4. Collaboration and Ranking Performance

While collaborations expand academic networks, excessive external dependence reduces institutional ownership of research outcomes. The Rank 99 institution shows 87.23% document collaboration, whereas others exceed 150–260%, correlating with lower research marks.

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Table 4. Publication Count as per Scopus Database for entire period of the institution. % with Doc. = Collaboration/ Documents; % with Authors = Collaboration/ Authors.

Rank	Documents	Authors	Collaboration	% with Doc.	% with Authors
100-150	3719	1958	5648	151.87%	288.46%
150-200	3010	1940	2997	99.57%	154.48%
201-300	2730	1688	4517	165.46%	267.59%
99	1691	670	1475	87.23%	220.15%

Thus, maintaining optimal collaboration—focused on institutional authorship—is key to maximizing NIRF credit.

5. Strategic Implications for Institutions

Institutions should focus on fostering a strong internal research ecosystem by encouraging in-house research projects and effectively utilizing existing infrastructure to generate pure institutional outputs. Retaining and rewarding Ph.D.-qualified faculty with balanced experience profiles will further strengthen academic and research capabilities. Additionally, promoting Ph.D. supervisor recognition can attract more research scholars, thereby enhancing the Ph.D. Graduated (GPHD) metrics. Finally, it is essential to monitor collaboration ratios to ensure that the institution's contribution remains predominant in Web of Science-indexed publications, thereby maximizing research visibility and ranking performance [3,4].

6. Conclusions

NIRF Engineering rankings are influenced not just by publication quantity but by the institutional quality and ownership of research. Institutions aiming for top-band recognition should focus on sustainable internal research ecosystems, experienced Ph.D. faculty retention, and balanced collaboration policies. Pure institutional research emerges as a more reliable indicator of research excellence than collaborative volume.

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Abbreviations

The following abbreviations are used in this manuscript:

NIRF	National Institutional Ranking Framework

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