

## **Research Output of Top Six HEIs of West Bengal State**

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*Indian higher education system is the third largest in the world whereas several initiatives have been taken by the government to improve its ranking position. One such initiative is NIRF and all the HEIs are evaluated based on a certain stipulated performance parameters score so as to publicize their academic and research performance to the students and their prospective employers. This study aimed to describe the ranking position of the top six HEIs in NIRF based on the ranking results established in the year 2021 under the research category and to suggest suitable strategies for its improvement. This study aims to trace the impact of the top six HEIs from WB NIRF ranking on the performance of parameters and sub-parameters under the research category and evaluate the score of research publications, citation, h-index and another sub-parameter scores of the respective HEIs. The article evaluated information in the year 2021 Indian ranking to evaluate its effect on overall performance parameters and sub-parameter of better academic organization in phrases of “Metric for Quantitative Research (QNR)”, “Metric for Qualitative Research (QLR)”, “Metric for Students and Faculty Contribution (SFC)”, “Outreach and Inclusivity (OI)”, “Peer Perception (PR)” ranking. There are a few HEIs who secured relatively much less ratings below the overall performance of parameters and sub-parameter however secured pretty preferred rank and vice-versa. Further, this study suggests appropriate strategies that would aid HEIs in India to enhance performance to improve their ranking position.*

**Keywords:** National Institutional Ranking Framework; Research category; HEIs from W.B – ranking; West Bengal, India

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## 1 INTRODUCTION

The institutional rating is a high phenomenon for measuring an institution's potentiality and highbrow power in converting contexts. The ratings of universities and different academic establishments have turned out to be famous in countrywide and global scenarios. Higher academic establishments are a high section for countrywide development, and it has a full-size effect on studies productivity. The continuous rating can create a surrounding to assess the power and weaknesses of the establishments. It has an essential function in comparing, criticizing, competing, perceiving, and loose promoting a college or institution. A better function at the worldwide and countrywide ranges creates an acquainted getting-to-know surrounding for the scholarly community.

### **National Institutional Ranking Framework (NIRF)<sup>1</sup>**

The National Institutional Ranking Framework (NIRF) changed into accepted by the Minister of Human Resource Development (MHRD) and released through the Honorable MHRD on the twenty-ninth of September 2015. This framework outlines a technique to rank establishments throughout the country. The technique attracts from the general guidelines wide know-how arrived at through a Core Committee installation through MHRD to discover the wide parameters for ranking of HEIs. The parameters extensively cover “Metric for Quantitative Research (QNR)”, “Metric for Qualitative Research (QLR)”, “Metric for Students and Faculty Contribution (SFC)”, “Outreach and Inclusivity (OI)”, and “Perception (PR)”.

#### **Key Parameters of NIRF Ranking:**

There are five parameters of NIRF Ranking

- 1) Metric for Quantitative Research (QNR)
- 2) Metric for Qualitative Research (QLR)
- 3) Metric for Students and Faculty Contribution (SFC)
- 4) Outreach and Inclusivity (OI)
- 5) Peer Perception

## 2 LITERATURE REVIEW

**Nassa, et al. (2021)** This article analyses data on five years of India Rankings to assess its impact on performance parameters of institutions of higher education in terms of publications, citations, patents, highly-cited publications and research funding under the broad category of the parameter named “Research and Professional Practices”. The analysis of data on five

years of India Rankings, i.e. 2016 to 2020 on various performance parameters of HEIs provides an interesting insight and reveals that participating institutions are making a strenuous effort to improve their performance on various parameters or sub-parameters identified by the NIRF for ranking of HEIs. The ranking system allocates larger weightage to bibliometric parameters including publications, citations, HCP, patents, etc. Moreover, it is a well-accepted fact that an increase in high-quality publications by an HEI would invariably result in an improvement in its ranking. This study reflects that ranking has influenced the performance of HEIs in a positive way.

**Mukherjee (2019)** has mentioned the viability of the studies and expert practices in NIRF rating and additionally mentioned a few parameters consisting of coaching, learning & resources, studies, expert practices, etc. The look at discovered out that the best quantity of studies became posted via way of means of the chosen universities within side the fields of Science and implemented science. This look cautioned focusing on growing first-rate infrastructure within side the present universities or institutes.

**Reddy (2015)** has mentioned the cutting-edge scenario of better education, excessive-effect studies, and college ratings in India. The examination suggests that India is at the ninth rank for citable files in all challenge categories, the US is 1st and China is 2nd. This examination additionally determined that excessive effect studies are stimulated through 3 critical factors, specifically individual, college, and country-particular factors.

**Vernon et al. (2018)** have mentioned the application of rating structures and become aware of possibilities to help studies and overall performance improvement. This paper evaluates thirteen eligible rating structures. Out of the general thirteen rating machines, 6 scores machines provide 100% weightage on studies' overall performance. It became found that 76% of the whole ranks are associated with studies, except this 24% related to instructional or coaching first-rate.

**Hazelkorn (2011)** says that "Rankings are creating a social norm against which all institutions are measured". While higher education has always been competitive, 'rankings make perceptions of prestige and quality explicit'.

**Sivakumaren (2017)** shows that the IIMs (Indian Institute of Management) published publications are indexed 20.55% in Web of Science, 65.50% in Scopus and 13.95% in the Indian Citation Index. It also established a new parameter "h index" to assess the contributions of institutions, authors and departments and recommended to adopt.

**Deka and Sarmah (2021)** Tezpur University, and Gauhati University secured their function within the pinnacle fifty. Tezpur University has the best variety of guides (3243), citations (48382), common quotations in step

with paper (14.92), and h-index (77). The maximum boom became visible withininside the Sikkim University studies guides (54%) withininside the remaining ten years. After the NIRF rating, it's far discovered that there may be growth inside the variety of guides and a lower withininside the common quotation. It is likewise visible withininside the h-index, which caused a crucial effect on first-rate guides.

### 3 METHODOLOGY

To conduct the study, the HEIs from West Bengal have been selected for the list of NIRF ranking among the top 50HEIs under the research category. The data relating related to five key parameters and each sub-parameter score is derived from the website of the National Institutional Ranking Framework (<https://www.nirfindia.org>)<sup>[10]</sup> till July 2021. The data relating to five key parameters and sub-parameter scores under the research category for the year 2021 have been extracted for the study from the website of NIRF. The study has considered only the “Research” categories. There are six HEIs from West Bengal are listed in the top fifty HEIs under the research domain. Only those six HEIs alone have been taken up for this study. The data thus extracted was exported to Ms- Excel for further analysis.

### 4 SCOPE AND LIMITATION

The scope of the study is to select six HEIs among the top fifty HEIs in the NIRF system. Moreover, parameters and sub-parameters scores of six HEIs from WB under the research category in the year 2021 were considered for the present study.

### 5 OBJECTIVES OF THE STUDY

1. To identify the select six HEIs of West Bengal in the NIRF 2021 system.
2. To find out the major changes of each parameter and sub-parameters score under the research category in NIRF 2021
3. To compare the five key parameters of six HEIs from West Bengal in NIRF ranking 2021
4. To compare the overall score of selected six HEIs from West Bengal in the NIRF 2021 system.
5. To compare the NIRF rank of selected six HEIs from West Bengal in the year 2021

## 6 DATA ANALYSIS AND INTERPRETATION

### 6.1 Metric for Quantitative Research (QNR)

**Table 1: Performance of Metric for Quantitative Research (QNR)**  
**Parameter**

Top six HEIs under Research category in NIRF 2021	Performance of QNR sub-parameters in NIRF 2021				
	Rank	PU (50)	CI (25)	FPPP (25)	Total(100)
Indian Institution of Technology, Kharagpur	5	40.89	20.91	9.96	71.76
Jadavpur University, Kolkata	17	31.35	16.89	4	52.24
Calcutta University, Kolkata	33	21.46	12.93	4.01	38.4
Indian Institute of Science Education & Research, Kolkata	34	24.31	18.31	5.98	48.6
Indian Statistical Institute, Kolkata	41	27.02	14.97	3.05	45.04
Indian Institute of Engineering Science and Technology, Shibpur	48	26.65	14.69	3.50	44.84

#### 6.1.1 Combined metric for Publications (PU)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are only one HEIs (i.e., IIT-KGP) that secured the highest score 40.89 in this sub-parameter. On the other hand, it is observed that Calcutta University secured a score of 21.46 but got the rank 33rd under the research category in the year 2021 whereas 34<sup>th</sup> rank holder HEIs (i.e., Indian Institute of Science Education & Research, Kolkata secured the score of 24.31. However, under this sub-parameter, most of the universities performed far better compared to other sub-parameters.

#### 6.1.2 Combined metric for Citations Index (CI)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There is only one HEIs (i.e., IIT-KGP) that secured the score of 20.89 in this sub-parameter but secured the rank 5<sup>th</sup> in the research category of the NIRF system. On the other hand, it is observed that 33<sup>rd</sup> rank holders (i.e., C.U) secured a score of 12.93 in this sub-parameter. However, under this sub-parameter among six HEIs, only three HEIs secured a score of below 15 out of 25 except IIT-KGP and JU in the year 2021.

#### 6.1.3 Footprint of Projects and Professional Practice (FPPP)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There is only one HEIs (i.e., IIT-KGP) that secured the score of 9.96 in this sub-parameter but got the rank 5<sup>th</sup> in the research category of the NIRF system. On the other hand, it is observed that the other five HEIs secured a score of below 6. However, under this sub-

parameter, there are some HEIs who secured comparatively less scores in the year 2021.

#### 6.1.4 Total QNR parameter score

From the research it is observed that among top 50 ranked HEIs, only two HEIs (i.e., IIT-KGP and JU) secured the total QNR parameter score of 50 above out of 100 in the year 2021, whereas IIT-KGP secured the highest score (i.e., 71.76) and got the 5<sup>th</sup> rank in this category.

### 6.2 METRIC FOR QUALITATIVE RESEARCH (QLR)

**Table 2: Performance of Metric for Qualitative Research (QLR): Parameter**

Top sixHEIs under Research category in NIRF 2021	Ran k	Performance of QLR sub-parameters in NIRF 2021				
		JCRQ (30)	Top25 (30)	HI (20)	IPR (20)	Total(100)
Indian Institution of Technology, Kharagpur	5	21.91	29.78	8	15.29	74.98
Jadavpur University, Kolkata	17	9.85	19.71	2.50	11.97	44.03
Calcutta University, Kolkata	33	6.22	13.43	5	10.83	35.48
Indian Institute of Science Education & Research, Kolkata	34	16.03	8.35	1.50	11.72	37.6
Indian Statistical Institute, Kolkata	41	7.80	6.81	4	9.30	27.61
Indian Institute of Engineering Science and Technology, Shibpur	48	6.41	9.55	2	9.04	27

#### 6.2.1 Combined metric for publications in 1st Quartile (JCRQ)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There is only one HEIs (i.e., IIT-KGP) that secured the highest score of 21.91 out of 30 in this sub-parameter, whereas other HEIs secured a score of below 10 out of 30 except IISE&R, Kolkata. However, under this sub-parameter performance of most of HEIs are not well in the year 2021.

#### 6.2.2 Combined metric for Publications in the Top 25 (TOP25)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are only one HEIs (i.e., IIT-KGP) that secured the highest score of 29.78 out of 30 in this sub-parameter, whereas other HEIs secured a score of below 20 out of 30 in this category.

#### 6.2.3 IPR and Patents: Published and Granted (IPR)

From the research, it is observed that among the six HEIs, only one HEIs (i.e., IIT-KGP) secured a score of 8 out of 20 in this sub-parameter, whereas the Indian Institute of Science Education & Research, Kolkata secured the score of 1.50 with 34<sup>th</sup> rank in this category. However, under this sub-parameter,

most of the HEIs performed far better compared to other sub-parameter in the year 2021.

#### 6.2.4 H-Index (HI)

From the research, it is observed that among the six HEIs, only one HEI (i.e., IIT-KGP) secured a score of 15.29 out of 20 in this sub-parameter but got ranked 5<sup>th</sup> in this category. However, under this sub-parameter, there are some HEIs who secured comparatively less scores in the year 2021.

#### 6.2.5 Total QLR parameter score

As per results come out from the research that among the top 50 ranked HEIs, only one HEIs (i.e., IIT-KGP) secured the total QLR parameter score of 74.98 out of 100 in the year 2021, whereas other HEIs secured a score of below 50 out of 100 in this category.

### 6.3 Metric for Students and Faculty Contribution

**Table 3: Performance of Metric for Students and Faculty Contribution (SFC) Parameter**

Top six HEIs under Research category in NIRF 2021	Rank	Performance of SFC sub-parameters in NIRF 2021			
		FQE (40)	SS (30)	GPHD(30)	Total(100)
Indian Institution of Technology, Kharagpur	5	31.29	25.73	20.75	77.77
Jadavpur University, Kolkata	17	15.13	25.43	20.83	71.39
Calcutta University, Kolkata	33	32.04	25.69	23.79	81.52
Indian Institute of Science Education & Research, Kolkata	34	33.60	13.26	4.70	51.56
Indian Statistical Institute, Kolkata	41	34.49	9.47	5.35	49.31
Indian Institute of Engineering Science and Technology, Shibpur	48	27.26	16.76	8.33	32.35

#### 6.3.1 Combined Metric for Faculty with Ph.D. (or equivalent) and Experience (FQE)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are four HEIs (i.e., IIT-KGP, C.U, IISE&R and ISI) who secured the highest score of 30 above out of 40 in this sub-parameter, whereas JU secured the score of 15.13 out of 40 with a rank of 17<sup>th</sup>. However, under this sub-parameter, most of the HEIs performed far better compared to other sub-parameter in the year 2021.

#### 6.3.2 Student Strength including Doctoral Students (SS)

From the research, it is observed that among the top six HEIs from West Bengal, only three HEIs (i.e., IIT-KGP, JU, CU) secured scores of above 25 out of 30 in this sub-parameter but got the rank 5<sup>th</sup>, 17<sup>th</sup> and 33<sup>rd</sup> respectively in the year 2021. However, under this sub-parameter, most of the HEIs performed

far better compared to other sub-parameter in the year 2021.

### 6.3.3 Metric for Number of Ph.D. Students Graduated (GPHD)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are three HEIs (i.e., IIT-KGP, CU, IISE&R and ISI) secured the highest score of 20 above out of 30 in this sub-parameter, whereas the Indian Institute of Science Education & Research, Kolkata secured the score of 4.70 out of 30 with rank 34<sup>th</sup>.

### 6.3.4 Total SFC parameter score

As per results come out from the research that among the top six HEIs from West Bengal, only one HEIs (i.e.CU) secured the total SFC parameter score of 81.52 out of 100 in the year 2021, whereas IIT-KGP secured a score of 77.77 out of 100 with 5<sup>th</sup> rank in this category.

## 6.4 Outreach and Inclusivity (OI) Parameter

**Table 4: Performance of Outreach and Inclusivity (OI) Parameter**

Top six HEIs under Research category in NIRF 2021	Rank	Performance of OI sub-parameters in NIRF 2021				
		RD (30)	WD (30)	PCS(20)	SCTC(20)	Total(100)
Indian Institution of Technology, Kharagpur	5	19.1 9	10.92	20	4.45	54.56
Jadavpur University, Kolkata	17	2.52	20.28	20	7.34	50.14
Calcutta University, Kolkata	33	3.89	30	20	7	60.89
Indian Institute of Science Education & Research, Kolkata	34	14.9 3	16.23	20	1.74	52.9
Indian Statistical Institute, Kolkata	41	16.3 1	15.23	20	2.89	54.43
Indian Institute of Engineering Science and Technology, Shibpur	48	11.6 7	14.79	20	3.36	49.82

### 6.4.1 Percentage of Students from other States/ Countries (Region Diversity) (RD)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are only one HEIs (i.e., IIT-KGP) secured the highest score i.e.,19.19 out of 30 in this sub-parameter, whereas the Indian Institute of Science Education & Research, Kolkata secured a score of 14.93 out of 30 with rank 34<sup>th</sup>. However, under this sub-parameter performance of most of HEIs are not well in the year 2021.

### 6.4.2 Percentage of (Women Diversity (WD)

From the research work it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There are only one HEIs (i.e., CU) that secured a 100% score out of 30 in this sub-parameter, whereas JU secured a score of 20.28 out of 30 with ranked 17<sup>th</sup>. However, under this sub-parameter, most of the HEIs performed far better compared to other sub-parameter in the year 2021.

#### 6.4.3 Facilities for Physically Challenged Students (PCS)

From the research work, it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. It is interesting to note that six HEIs secured the 100% score (i.e., 20) in this sub-parameter. However, under this sub-parameter six HEIs performed far better compared to other sub-parameter in the year 2021.

#### 6.4.4 Percentage of SC/ST Students (SCTS)

From the research, it is observed that among six HEIs from West Bengal, only one HEI (i.e., JU) secured a score of 7.34 out of 20 with 17<sup>th</sup> rank in this category. However, under this sub-parameter performance of most universities are not well in the year 2021.

#### 6.4.5 Total OI parameter score

As per results come out from the research that among the top six HEIs from West Bengal, only one HEI (i.e. CU) secured the total SFC parameter score of 60.89 out of 100 with 33rd rank in the year 2021, whereas IIT-KGP secured the score of 54.56 with 5<sup>th</sup> rank in this category.

### 6.5 PERFORMANCE OF PERCEPTION (PR) PARAMETER

**Table 5: Performance of Perception (PR) Parameter**

Top six HEIs under Research category in NIRF 2021	Rank	Performance of PR parameter in NIRF 2021
		PR(100)
Indian Institution of Technology, Kharagpur	5	81.78
Jadavpur University, Kolkata	17	58.45
Calcutta University, Kolkata	33	31.93
Indian Institute of Science Education & Research, Kolkata	34	52.61
Indian Statistical Institute, Kolkata	41	61.43
Indian Institute of Engineering Science and Technology, Shibpur	48	24.43

#### 6.5.1 Perception (PR) Parameter

From the research work, it is observed that among the top 50 ranked HEIs, only six HEIs are from West Bengal. There is 5<sup>th</sup> rank holder HEIs (i.e., IIT-KGP) secured the score of 81.78, whereas ISI, Kolkata secured the score of 61.43 with 41<sup>st</sup> rank in the year 2021. However, under this parameter, most of the HEIs secured a score of below 50 in this category.

**Table 6: Top six HEIs rank and overall score under the Research category in NIRF 2021<sup>[12]</sup>**

Top six HEIs under Research category in NIRF 2021	Rank	Overall Score
Indian Institution of Technology, Kharagpur	5	73.21
Jadavpur University, Kolkata	17	54.02
Calcutta University, Kolkata	33	47.74
Indian Institute of Science Education & Research, Kolkata	34	46.72
Indian Statistical Institute, Kolkata	41	43.32
Indian Institute of Engineering Science and Technology, Shibpur	48	39.44

From the research work among six HEIs from West Bengal under the research category, 5<sup>th</sup> rank holder HEIs (i.e., IIT-KGP) secured the overall score of 73.21, whereas JU secured the score of 54.02 in the year 2021.

## 7 FINDINGS OF THE STUDY

- To study and identify the six HEIs in West Bengal which has secured a position in NIRF rank from 2018-2020.
- Jadavpur University is the most prolific HEIs in West Bengal, based on parameter and sub-parameter scores.
- Indian Institution of Technology, Kharagpur and Jadavpur University, Kolkata secured their position in the top fifty. Indian Institution of Technology, Kharagpur has the highest score in QNR parameter (i.e., 73.21), QLR parameter (i.e., 74.98), SFC parameter (i.e., 77.77), OI parameter (i.e., 54.56), PR parameter (i.e., 81.78) under research category.
- In the NIRF ranking, it is found that there is an increase in the number of publications and a decrease in the average citation. It is also seen in the h-index, which led to a crucial impact on quality publications.

## 8 CONCLUSION

A research publication is an essential task for securing a good position in the NIRF ranking. The study shows that the NIRF ranking has a significant impact on the selected six HEIs parameters score. Indian Institution of Technology, Kharagpur and Jadavpur University, Kolkata secured their position in the top fifty. Indian Institution of Technology, Kharagpur has the highest score in QNR parameter (i.e., 73.21), QLR parameter (i.e., 74.98), SFC parameter (i.e., 77.77), OI parameter (i.e., 54.56), PR parameter (i.e., 81.78) under research category. In the NIRF ranking, it is found that there is an

increase in the number of publications and a decrease in the average citation. It is also seen in the h-index, which led to a crucial impact on quality publications. The ranking of educational institutions is the most important in any country. The Indian government both Central and State in India should initiate the ranking process regularly. It should be mandatory for all educational institutions to participate in the program and provide quality data. It will help the institutions to bring out their activities to the world through a systematic ranking process. The student community will also know the reputation, and specialization of the institutions, departments, and also faculty members. One way of measuring any educational institution is by its performance of the parameter. Based on the results of the study, the following are recommended:

The National Institute of Ranking Frame (NIRF) has adopted a good number of parameters to rank the educational institutions in the country. This article analyses data on five years of Indian Rankingsto assess its impact on performance parameters of institutions of upper education in terms of the broad category of five key parameters named “Metric for Quantitative Research (QNR)”, “Metric for Qualitative Research (QLR)”, “Metric for Students and Faculty Contribution (SFC)”, “Outreach and Inclusivity (OI)”, “Peer Perception (PR)”. The analysis of data on the year of India Rankings, i.e. 2021 on various performance parameters of HEIs provides a stimulating insight and divulges that participating institutions are making a strenuous effort to enhance their performance on various parameters or sub-parameters identified by the NIRF for ranking of HEIs. Moreover, it's a well-accepted incontrovertible fact that a rise within the score of the parameter by HEIs would invariably end in an improvement of its ranking. This study reflects that ranking has influenced the performance parameter of HEIs positively.

The educational institutions of India are being assessed by various bodies e.g. NAAC, NBA, and NIRF to provide ranking /accreditations. The academic programs/courses accredited by these bodies have vital importance in the academic environment. The students who have completed his/her education in these institutions will get more opportunities for higher studies and also employment. Hence, the educational institutions especially higher educational institutions are much interested in getting accreditations/ranks by the various bodies.

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