

A Study of NIRF (National Institute of Ranking Framework) in the Context of IIT'S and NIT'S

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Abstract – India has a population of over a billion people, second only to china has one of the largest educational system after china. Experts are of the belief that approximately 32% people are young therefore India has an advantage of demographic dividend.

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INTRODUCTION

Indian education system has always been favoring the elite sections of the society right from prehistoric days. Hindu education was designed to cater the Brahmin boy's education. They were taught by the teacher of same caste.

Under the British colonial era the educational policies reinforced the elites, right from advancement in government sectors to academic institutions. Indian education system under the British rule created a legacy of providing education only to the privileged classes. Education worked as a gatekeeper for moving upwards only to those people who have the resources.

Traditionally primary education was designed such as to always fulfill the interests of the upper section of the society. In the 19th century post primary education students mostly consisted of Brahmins which gave them an advantage of benefitting from the educational policies of the British government.

As the time passed the other castes existing in the society understood the importance of education as a means to achieve political power and started learning formally. But majority of the people who made it to middle and high school were mostly from the privileged section of the society living in the urban areas.

The colonial rule of the British government had a very deep impact on the education of the citizens, the historical barrier coupled itself with the increased focus on tertiary education also had a very negative impact on the primary education and contributed to the fact that India had a large chunk of illiterate people in the world.

As per 2001 census, 1 out of every 3 citizens (42% of the adults are illiterate). The male and female literacy gap is decreasing at a very fast rate but still significant. There is 25% illiteracy for males and 46% illiteracy for females which is an alarming figure. There is a wide difference in the literacy rates of various states. At the one end Kerala has a high literacy rate of 90% while on the other hand Bihar has abysmally low which is only 39%. Though the government has increased focus in the primary education but the delivery of the public service becomes inefficient because of the absence of the teachers, teaching activity is low even if the teachers are present also contributes to it.

English is certainly an important language in the higher education system. In 1997 a survey conducted by India Today clearly mentioned that only one third of the population can carry out conversation in English, compared the data of 1980's there has been a significant rise in the number of people communicating in English (back then only four to five percent people used the language). The figure has gradually improved over a period of time, now increased to 350 million people speaking the language. India has been able to make a full use of the large pool of well- educated English speaking population to become a major player in software exports and service provider to software companies in the U.S.

The pervasive low quality education that has been available to the masses has led the government to shift the funding's in the five year plans from higher education to the primary and middle stage education in an effort to boost the literacy rates.

The Indian constitution has made a concrete effort to make primary and middle grade education (students with 6-14 years of age) free and universal.

It is also a fundamental right. There are two National policy statements in 1968 and 1986.

There has been a considerable increase in the spreading of the educational institutes in India since the independence. During the period 1950-51 and 2001-02, the number of primary schools grew three fold, while the number of upper (middle schools) grew 16 times.

Today India had over six hundred thousand schools serving approximately 115 million students (the teacher to student ratio is 1:43) and the upper schools has increased to over two million serving approximately 45 million students (teacher to student ratio being 1:38).

The Indian schools follow the British structure. Primary grades start with grade 1-5 (ages 6-11) and the middle schools start with grades 6-8 (ages 8-14). According to a research conducted approximately 70% of the children between the ages 6-14 actually attend the school.

Emphasis has always been on compulsory attendance in the school rather than on learning. Though the private schools are comparatively better but they usually charge high fees by making them accessible only to middle and upper class families. A recent trend has been opening up of low –cost private schools in rural areas with very poor facilities and infrastructure than government schools but the teachers are usually hired at very low salaries.

The secondary stage consists of the grades 9-12 with ages ranging from 9 to 14 years. India has over one hundred thousand secondary and senior secondary schools serving approximately 30 million students (the teacher to student ratio is 1:34).

According to a report published by the UNESCO out of the total enrolled students only 20% actually attend secondary school.

THE CURRICULUM OF SECONDARY STAGE:

- Languages: Hindi (regional language), English, (Sanskrit, Chinese, French, German, Arabic, Persian, Spanish).
- Mathematics
- Science
- Social sciences
- Physical education
- Fine arts

Secondary boards are usually associated with central or state boards which conduct examination at the

end of class 10th to award the Secondary school certificate (SSC), the All India Secondary School Certificate. There are basically three national boards of examination the central board of secondary education, the council for the Indian School Certificate Examination (CISCE) and the National Open Schooling for the purpose of distant education.

The content and the marks given by CBSE and CISCE are equivalent in nature, with English as exception. CBSE has a pattern of examining functional English and don't focus on the study of literature, while the CISCE focus on the study of classics of English literature, dramas and poetries as a part of their curriculum.

After completing the upper secondary grades i.e. (Class 12th), students have to give another set of examination called Higher secondary certificate examinations which help them to choose professional careers.

The most sought after colleges have usually the cut-off criteria for admission in their courses which can sometimes be extremely high (DU Above 98%). The universities and colleges which are in high demand are very competitive to get in. In some colleges the admission is based on some prerequisite coursework.

The top students wanting to pursue professional courses like (Medicine, Engineering, Law) have to appear for additional exams conducted by the respective schools for getting admission into the specific programs.

Vocational and technical education is also a choice for students after passing secondary grade. The primary purpose is having broadened knowledge about occupations not subjects.

A three- tier system was presented by Kothari commission report on Education in 1964, it brought an in-depth study of primary and secondary education. The commission came down heavily on the differentiated schooling system that promotes social disparity and it also promotes different grading systems.

GOVERNANCE

After India got independence in 1947, department of education was established under the aegis of Ministry of Human Resource Development.

The department basically has three important components namely:

- Secondary education and Higher education.
- Primary education and Literacy rate.

- Women and child development.

The department usually co-ordinates with all the planning with the state education departments for the implementation of various developmental programs. It acts through University Grants Commission (UGC).

NCERT (National Council of Educational Research and Training) is responsible for developing operating standards, designing of materials of courses according to different curriculum and designing of textbooks at various levels.

On the recommendation of Education commission formed in 1966, it pledged to spend around 6% of GNP on the education but this has been dream so far. It has usually varied from as low as 1.2% in 1950's to around 4% in early 2000's.

After Independence India severely lacked strong network of good universities at national level for improving the prevalent educational structure at that point of time. But with the advent of the First five-year plan and Second Five-year plans, lot of IIT's and IIM's were opened at national level to improve the existing situation. The greatest advantage these institutes offered was unbiased admission to the courses and it also produced skilled manpower which was required at that point of time to contribute to the process of nation building.

GOVERNANCE BODIES

UGC

University Grants Commission was established in 1952 and was given statutory status in 1956. It usually concerns itself with development in the higher education sector and also provides grants to various central and state universities by identifying their requirement. It has been established by an act of parliament, therefore it usually grants developmental and maintenance grants to various universities, approximately 6000 colleges in India qualify themselves for the grant.

UGC itself established an organization named **NAAC: NATIONAL ACCREDITATION AND ASSESSMENT COUNCIL** for conducting regular assessment of various colleges and universities who volunteer for it. The process followed by NAAC involves preparation of a report by the college/ University itself, then this report is assessed by the peers and the decision finally is made by the council. There are various parameters on which the college/ university is assessed: Aspects of curriculum, teaching and learning methods followed, research, consultancy, infrastructure, support provided to students and the management.

AICTE

All India Council of Technical education was established in 1948 was given a statutory status in 1988. It is responsible for planning and development of technical institutions like engineering and technology, management, architecture and pharmacy. It reviews the curriculum and the facilities provided in the engineering colleges. It also keeps a check on the establishment of new private colleges.

NBA

AICTE paved the way for the establishment of National Board of Accreditation to start the assessment and accreditation of technical institutions similar to NAAC. It was established by AICTE in 1994 and operates as a body that is autonomous in nature. It usually accredits programs not the institutes.

NIRF

National institutional Ranking Framework is a procedure adopted by the HRD ministry to rank the higher education institutes in India. The basic idea behind the NIRF is to promote a feeling of competition among the universities/ colleges to continuously improve their output and performance to match the global standards. The framework was launched in the year 2015.

The higher education in India can be categorized into following categories namely:

- Central and the state universities.
- Deemed universities.
- Private universities.
- Institute of National Importance.
- Premier Institutes of management.

In the developing countries like India higher education plays a very important role in transforming society from traditional to modern society filled with information, they also contribute towards developing scientific temper.

The NIRF uses large number of parameters to determine the ranking of the institutes namely:

Teaching and Learning Resources

- Faculty student ratio, emphasis on permanent faculty.
- Metric for faculty with PhD and experience.

- Metric for teaching and innovation.
- Metric for library and laboratory.

Research, Professional Practice and Collaborative Performance

- Combined metric for publications.
- Combine metric for citations.
- IPR.
- % of collaborative publications and patents.

Outreach and Inclusivity

- Outreach footprint.
- Percentage of students from other states.
- Percentage of women students.
- Percentage of economically backward and socially disadvantaged.

Graduation Outcome

- Performance in university examination.
- Performance in placement and higher studies.
- Mean salary for employment.

Perception

- Process for peer rating in category.
- Application to seat ratio.

RANKING FRAMEWORK FOR ENGINEERING INSTITUTIONS

Parameters and metrics for Research and Teaching (Category-A Institutions)

S.NO	Parameters	Marks	Weightage
1.	Teaching, Learning and Resources	100	0.30
2.	Research, professional practice and collaborative performance	100	0.30
3.	Graduation outcome	100	0.15
4.	Outreach and Inclusivity	100	0.15
5.	Perception(PR)	100	0.10

Parameters and metrics for Teaching (Category-B Institutions)

S.NO	Parameters	Marks	Weightage
1.	Teaching, Learning and Resources	100	0.30
2.	Research, professional practice and collaborative performance	100	0.20
3.	Graduation outcome	100	0.25
4.	Outreach and Inclusivity	100	0.15
5.	Perception(PR)	100	0.10

IIT Rank 2016

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPTION(100)	SCORE	RANK
IIT MADRAS	88.26	94.02	81.81	86.11		98	89.41
IIT BOMBAY	85.93	94.14	84.97	74.84		99	87.66
IIT KHARAGPUR	76.23	92.68	83.95	78.05		97	83.91
IIT DELHI	80.27	91.62	74.72	66.17		98	82.02
IIT KANPUR	66.08	93.52	85.62	70.59		98	81.07
IIT ROORKEE	67.83	83.5	81.61	76.59		96	78.68
IIT HYDERABAD	76.76	76.83	80.89	63.76		95	77.22
IIT GANDHINAGAR	80.36	72.09	64.91	71.94		96	75.2
IIT ROPAR	89.96	73.56	86.42	60.67		38	74.88
IIT PATNA	79.8	68.29	74.13	68.78		93	74.68

IIT Rank 2017

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPTION(100)	SCORE	RANK
Indian Institute of Technology Madras	91.85	92.6	83.78	77.19		81.46	87.96
Indian Institute of Technology Bombay	91.15	94.68	83.64	69.7		84.24	87.87
Indian Institute of Technology Kharagpur	76.03	89.23	88.02	74.11		73.43	81.93
Indian Institute of Technology Delhi	79.63	89.47	77.45	71.41		77.24	81.08
Indian Institute of Technology Kanpur	84.28	77.28	74.29	61.35		73.59	76.83
Indian Institute of Technology Roorkee	72.3	74.36	88.31	70.95		43.47	73.1
Indian Institute of Technology Guwahati	89.29	59.98	77.08	80.11		40.95	72.3
Indian Institute of Technology Hyderabad	82.6	36.21	71.26	73.75		29.72	60.24
Indian Institute of Technology Indore	83.73	32.72	70.72	75.64		10.64	57.7
Indian Institute of Technology Bhubaneswar	79.66	28.87	63.69	76.69		13.5	54.32

IIT Rank 2018

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPTION(100)	SCORE	RANK
Indian Institute of Technology Madras	93.83	91.44	84.91	63.88		100	88.95
Indian Institute of Technology Bombay	89.61	96.04	76.53	44.71		93.48	84.82
Indian Institute of Technology Delhi	80.83	89.35	81.47	59.72		88.6	82.18
Indian Institute of Technology Kharagpur	73.73	84.26	85.65	53.99		78.51	77.78
Indian Institute of Technology Kanpur	78.51	77.15	78.99	41.46		85.89	75.24
Indian Institute of Technology Roorkee	72.8	72.08	88.9	56.66		56.63	72.57
Indian Institute of Technology Guwahati	86.29	61.54	76.51	50.46		45.49	69.25
Indian Institute of Technology Hyderabad	80.63	44.22	71.03	55.11		36.94	60.87
Indian Institute of Technology (Indian School of Mines) Dhanbad	64.7	53.04	74.73	59.99		29.73	59.24
Indian Institute of Technology Indore	81.42	40.8	69.67	56.16		17.28	57.95

NIT Rank 2016

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPTIC SCORE	RANK
National Institute Of Technology, Tiruchirappalli	56.99	80.37	81.5	79.5	92	74.45
Sardar Vallabhbhai National Institute Of Technology	59.02	85.24	78.43	68.81	83	73.13
Visvesvaraya National Institute Of Technology, Nagpur	59.98	73.64	69.05	82.7	85	71.29
National Institute Of Technology, Rourkela-Rourkela	60.78	75.69	81.49	73.21	74	70.8
National Institute Of Technology, Karnataka-Mangalore	60.26	67.86	77.29	70.22	88	68.95
Motilal Nehru National Institute Of Technology	54.63	72.07	74.08	75.04	82	67.94
National Institute Of Technology, Warangal	58.2	71.82	75.41	61.2	82	67.12
National Institute Of Technology, Durgapur	49.24	79.62	65.86	66.15	78	65.4
National Institute Of Technology, Calicut	56.09	71.53	72.03	64.42	40	62.26
Malaviya National Institute Of Technology, Jaipur	55.13	71.63	74.32	62.16	41	62.14

NIT Rank 2017

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPT(C SCORE)	RANK	
National Institute of Technology Tiruchirappalli	62	46.27	74.38	75.81	45.04	59.44	11
National Institute of Technology Rourkela	64.21	49.22	80.12	68.07	19.23	58.78	12
National Institute of Technology Surathkal	62.53	32.6	73.71	64.28	31.56	52.87	22
National Institute of Technology Warangal	66.94	25.44	68.92	65.85	14.01	49.47	34
Motilal Nehru National Institute of Technology	56	30.32	66.14	56.74	8.82	45.68	41
Viveksaraya National Institute of Technology, Nagpur	60.59	21.88	61.04	69.96	15.72	45.52	42
National Institute of Technology Calicut	53.28	21.15	60.77	73.98	26.25	44.5	44
Sardar Vallabhbhai National Institute of Technology	50.43	28.91	61.07	62.28	10.65	43.3	50
National Institute of Technology Silchar	61.17	18.43	59.99	58.3	10.17	42.73	53
National Institute of Technology Durgapur	48.09	34.95	50.88	57.93	16.69	42.56	55

NIT Rank 2018

Institute Name	TLR(100)	RPC(100)	GO(100)	OI(100)	PERCEPTION(100)	SCORE	RANK
National Institute of Technology Tiruchirappalli	66.49	46.44	72.02	60.96	59.69	60.35	11
National Institute of Technology Rourkela	61.82	52.36	78.74	45.76	24.71	57.05	15
National Institute of Technology Surathkal	60.34	38.36	71.27	51.1	41.93	53.16	21
National Institute of Technology Warangal	67.25	31.43	72.38	54.79	22.59	51.82	25
Viveksaraya National Institute of Technology	63.78	35.85	64.68	56.13	11.2	49.55	31
National Institute of Technology Kurukshetra	59.2	37.89	60.94	42.36	7.35	46.29	43
National Institute of Technology Durgapur	52.84	36.28	64.9	43.94	12.41	45.34	47
National Institute of Technology Calicut	55.17	26.58	60.6	41.85	34.67	44.3	50
Malaviya National Institute of Technology	55.37	33.17	58.95	46.61	8.67	43.88	52

Ranking Framework Parameters

NIRF 2016 MARKS DISTRIBUTION		
Sno.	Parameter	Weightage/Marks
1	TLR	Ranking weightage=0.3
	Faculty Student Ratio with Emphasis on Permanent Faculty	30
	Metric for Faculty with Ph.D and Experience	30
	Metric for Library Facilities	15
	Metric for Teaching and Innovation	15
2	Research, Professional Practice & Collaborative Performance (RPC)	0.3
	Combined Metric for Publications	35
	Combined Metric for Citations	35
	Percentage of Collaborative Publications	10
	Footprint of Executive Education and Professional Practice	20
3	Graduation Outcome(GO)	0.15
	Combined Percentage for Placement, Higher Studies and Entrepreneurship	70
	Mean Salary for Employment	30
4	Outreach and Inclusivity(OI)	0.15
	Outreach Footprint (Continuing Education, Service)	20
	percentage of Students from Other States/Countries-Region Diversity	20
	Percentage of Women Students and Faculty	30
	Percentage of Economically and Socially Disadvantaged Students	20
	Percentage of Physically Challenged Students	10
5	Perception(PR)	0.1
	Process for Peer Rating in Category	100

REVIEW OF LITERATURE

Hazelkorn et al. (2008) This article explains that rankings affect national and international collaboration and partnership. Leaders of various institute say that they consider a potential partner's rank before they enter into any kind of understanding about sharing details of research and academic programmes. Moreover, rankings affect the willingness of other institutes to partner with them or to garner support for their membership of academic or professional associations.

Sadlak et al. (2007) In this article it is explained that rankings are a representation of global competition. It is used as a policy instrument. Most of the governments across the globe claims the desire to establish at least one, world class' university. But at what cost? Rankings accelerate the academic 'arms race' forcing institutions and governments into quest for ever increasing resources. A world-class university on an average has \$1.5b-a-year operational expense. It cost additional \$500m if medical school is there. This compels many Higher Educational Institution to increase their overall funding by at least forty-percent. In developing

countries very few (public) institutions can afford this kind investment. It will come with sacrificing other social and economic goals and objectives. Evidence indicates rankings are widening and increasing gap between elite class and mass higher education. It is increasing greater institutional stratification. It also increases research concentration. Higher Educational Institution which are unable to meet the criteria or have low 'brand recognition' will be de-valued and receives less importance.

Bhushan et. al (2017) In this article it is discussed about the issue of ranking and accreditation which has got momentum in the discourse of Indian academics. After trying with voluntary accreditation government has decided to move for compulsory accreditation. This is compulsory in the sense that accreditation is necessary to get central funding. This issue came into the light because hardly any Indian University can find its place in world ranking. This has forced government to launch National Institutional Ranking Framework (NIRF) in September 2015 in order to rank Indian universities and Institutions. This serves as a tool in order to make these institutions accountable.

This scheme envisaged to improve the quality of higher education through increased competitiveness. Another objective to solve is making these institutions transparent in the eyes of general public and students and their parents in particular.

But here question arises whether accreditation will alone be able to upgrade the quality of these institutions. There is a need to understand the inherent weakness and limit present in this system. High ranking of an institution should be supplemented with proper resources for institution to move towards excellence and acquiring an eminent position at world level. Without proper funding this will simply lead to privatization which will defeat the purpose of inclusiveness and equality of higher education. The duality of regime i.e., regulatory and accreditation seems to contradict each other.

Stella et. al (2003) This article explains that ministry and its functionaries has overlooked the fact that our universities are over regulated and underfunded. It stresses the fact that there is a prime need for National System of (higher) Education to increase the General Enrolment Ratio (GER) and increase the literacy level of masses. It says that government focus should be on to improve the per capita input (of students) and free the institutions from the over regulation.

Chaudhari et. al. (2015) this article in a magazine emphasized upon the fact that the higher education system has always attached itself with the status. There have been people who are concerned about their current position in the rankings, sometimes

about the total number of faculties or the total strength of the students.

The author is of the belief that the improving the quality in education will somewhat lead towards higher ranking.

The author is of the view that institutions participate in the race by devising new strategies to make the institute more popular among the students, employers and prospective donors. He is also of the view that we should focus on the marketing and branding of the various institutional programs so as to have a positive perception.

(McPherson, 2011) is of the view that sorting, selecting and ranking has become an important part of the institutional framework. The author also supports the fact that pursuing prestige through the method of competitive ranking is a Zero-Sum Game, i.e. at the expense of other.

The author also discusses about various other ranking framework prevalent throughout the world namely: ARWU, The Quackwa Delli Symonds World's University rankings, Times Higher education world university rankings and Thomas Reutor's Global Reputation Survey. He also clearly mentions that none of the programs from India in disciplines like art, humanities and social sciences featured in top 200 list, same is the case with engineering, medicine, economics and finance."

The author explains that lack of investment/funding, scarcity of world class infrastructure and few citations per teacher are some of the determining factor. Novelty in the teaching methodology of the faculties is also one of the most significant factor.

The author also mentions that the academic ranking of the colleges depends upon various factors which can't be amended subjected to objective measurement, therefore the indicators should be chosen appropriately and the weights assigned to them should be decided logically.

The race to achieve a higher ranking in the list of colleges have given birth to various brokerage firms and status lobbies and consultants in the ranking area. This has led to unethical practices in the area of the higher education.

The author also mentions the fact that the ranking of various universities and colleges are different on different frameworks so there is inconsistency in the rankings, this can be attributes to the fact that the various parameters adopted are not uniform in nature, even some of the non-contributing factors have also been taken into account, whereas some of the most significant parameters in deciding ranks have been excluded.

The author also mentions that transparency in the ranking system framework is required so that the system becomes robust.

Duraisamy et al. (2015) This paper tells about the massive expansion in the Higher education system in the recent years.

The author mentions that the best criteria to judge the institutions is to check whether they satisfy the guidelines laid done by the UGC or not. The UGC act laid down certain criteria under 2(f) and 12(b) for a university or a college to be recognized. The author clearly mentions that only 40 percent satisfied the guidelines laid down by the UGC (2005), the figure has become worse in 2014 it has significantly decreased down to 20 percent.

The author suggests another way to judge the quality of universities and colleges i.e. through" assessment and accreditation. For this purpose, NAAC has been established under UGC in the year 1994 and many institutions have volunteered to get itself accredited by NAAC."

The author also defines the criteria to judge quality in the higher education, they are categorized as: assessment and accreditation by national and international agencies and ranking at national and international level.

The author identifies accreditation as one of the major factors contributing to the quality of higher education, but ranking is an important factor which we cannot ignore. The author mentions that NAAC identifies the strength and weaknesses of the higher education institutes and suggest the improvement areas. The assessment is based on several factors like course content, delivery, availability of faculties, infrastructure and others.

The author also underlines the important role played by the AICTE, established for assessing the quality of the technical institutions in India. Further NBA has been established as a separate body by the AICTE to evaluate and accredit programmes, the organisations is autonomous in nature.

The author clearly mentions that the assessment of the NAAC is based on the Self-study reports given by the colleges and an expert committees visit to the institution.

Committee assesses on 7 criteria's and institutes are therefore classified under four categories namely: A- very good; B- Good; C- Satisfactory; D- unsatisfactory levels using weighted CGPA, it ranges from 0-4.

RESEARCH DESIGN

This project was basically based on secondary data. The source of the data is from NIRF websites. The

data of Engineering group (only IIT and NIT) was taken for three years i.e., 2016,2017,2018.

The data is arranged in proper format in excel sheet. Analysis technique like correlation is then applied to understand the data in R

DATA ANALYSIS

The analysis of IIT is done on the following parameters:

1. High Overall Score

As the output of the spearman correlation between rank and the score of the institutes is [-1], this implies that there is very high correlation between the rank of the institutes and the overall score. So, all the IIT's should try to improve their score constantly and try to maintain it so as to improve their ranking in the long run.

2. Total Number of Faculty

Year	2016	2017	2018
R	-0.76	-0.83	-0.96

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the total number of faculty members in the institutes. So, all the IIT's should try to improve the total number of faculty members or maintain it as it has a significant impact on the ranking of all the IIT's under study in the long run.

3. Total Number of Women Faculty

Year	2016	2017	2018
R	-0.44	-0.79	-0.88

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the total number of women faculty members in the institutes.

So, all the IIT's should try to improve the gender diversity or maintain it as it has a significant impact on the ranking of all the IIT's under study in the long run.

4. Total number of faculty with Ph.D.

Year	2016	2017	2018
R	-0.51	-0.83	-0.96

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the total number of faculty members with Ph.D. in the institutes.

So, more priority should be given to admit faculties with Ph.D. as it has a significant impact on the ranking of all the IIT's under study in the long run.

5. outside Student

Year	2016	2017	2018
R	-0.66	-0.74	-0.68

The trend has varied over the year. But as evident from the graph it may not be as important to improve the rank. So this factor is not an important contributor to improve the rank.

6. Female Student

Year	2016	2017	2018
R	-0.70	-0.80	-0.81

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the total number of women faculty members in the institutes.

So, all the IIT's should try to improve the gender diversity or maintain it as it has a significant impact on the ranking of all the IIT's under study in the long run.

7. Socially Challenged Student

Year	2017	2018
R	-0.66	-0.55

As evident from the graph this factor does not contribute much to the improvement of rank. So this factor is not an important contributor to improve the rank.

8. Placement Number

Year	2016	2017	2018
R	-0.69	-0.49	-0.59

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the total number of placed student in the institutes.

So, all the IIT's should try to improve the placement record or maintain it as it has a significant impact on the ranking of all the IIT's under study in the long run.

9. Annual Salary

Year	2016	2017	2018
R	-0.45	-0.62	-0.64

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the annual salary of the placed students.

So, we can say that all the IIT's should try to improve upon the placement package as it has a significant impact on the ranking of the institutes.

Thus, improving the placement package would definitely improve upon the ranking of all the IIT's under study in the long run.

10. Publication of Web of Sciences

Year	2016	2017	2018
R	-0.78	-0.90	-0.95

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the publication by the institute in a reputed journal like web of sciences.

So, we can say that all the IIT's should try to increase the number of publication in web of sciences as it has a significant impact on the ranking of the institutes.

11. Citation on Publications Web of Sciences

Year	2016	2017	2018
R	-0.78	-0.88	-0.91

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Web of science. More citations would come only by publishing good papers. Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the IIT's under study in the long run.

12. Publication of Scopus

Year	2016	2017	2018
R	-0.78	-0.97	-0.94

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Scopus. More citations would come only by publishing good papers.

Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the IIT's under study in the long run.

13. Citation on Publications Scopus

Year	2016	2017	2018
R	-0.76	-0.94	-0.92

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Scopus. More citations would come only by publishing good papers.

Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the IIT's under study in the long run.

14. Total Expenditure

Year	2017	2018
R	-0.78	-0.91

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the total expenditure. So, we can say that the institutes should try to increase investment in the total capital and operational expenditure, as it would significantly help in improving the ranking of all IIT's under study in the long run.

15. Sponsorship

Year	2016	2017	2018
R	-0.59	-0.90	-0.89

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the sponsorship.

So, we can say that the institutes should try to get more sponsorship, thus, improving the ranking of all the IIT's under study in the long run.

16. Consultancy

Year	2016	2017	2018
R	0.74	-0.77	-0.81

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the consultancy.

So, we can say that the institutes should try to give more consultancy, thus, improving the ranking of all the IIT's under study in the long run.

17. Perception

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the overall perception of the institute.

So, we can say that the institutes should try to improve overall perception, thus, improving the ranking in the long run.

18. Patent Filed

Year	2016	2017	2018
R	-0.69	-0.90	-0.67

Filing patent has not that much impact on the rank. So it doesn't play an important role in the ranking of IIT's.

19. Patent Granted

Year	2016	2017	2018
R	-0.68	-0.88	-0.83

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the patent granted. So, we can say that the institutes should try to get the patent granted, thus, Improving the ranking in the long run.

20. Earning From Patent

Year	2016	2017	2018
R	-0.80	-0.81	-0.80

Earning patent has not that much impact on the rank. So it doesn't play an important role in the ranking of IIT's.

The analysis of NIT is done on the following parameters:

1. High Overall Score

As the output of the spearman correlation between rank and the score of the institutes is [-1], this implies that there is very high correlation between the rank of the institutes and the overall score.

So, the all the NIT's should try to improve their score constantly and try to maintain it so as to improve their ranking in the long run.

2. Total Number of Faculty

Year	2016	2017	2018
R	-0.64	-0.58	-0.53

As it is evident from the graph that there is low correlation (negative) between the rank of the institutes and the total number of faculty members in the institutes. So this factor is not an important contributor to improve the rank.

3. Total Number of Women Faculty

Year	2016	2017	2018
R	-0.73	-0.27	-0.22

As it is evident from the graph that there is low correlation(negative) between the rank of the institutes and the total number of women faculty members in the institutes. So this factor is not an important contributor to improve the rank.

4. Total Number of Faculty With Ph.D.

Year	2016	2017	2018
R	-0.62	-0.80	-0.86

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the total number of faculty members with Ph.D in the institutes.

So, more priority should be given to admit faculties with Ph.D. as it has a significant impact on the ranking of all the NIT's under study in the long run.

5. outside Student

Year	2016	2017	2018
R	-0.411	-0.2352	-0.5736

The trend has varied over the year. But as evident from the graph it is an important factor to improve the rank. So NIT's should attract student from outside state.

6. Female Student

Year	2016	2017	2018
R	-0.2791	-0.4286	-0.5956

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the total number of female students in the institutes. So, all the NIT's should try to improve the gender diversity or maintain it as it has a significant impact on the ranking of all the NIT's under study in the long run.

7. Socially Challenged Student

Year	2016	2017	2018
R	-0.5429	-0.2396	-0.367

As evident from the graph this factor does not contribute much to the improvement of rank. So this factor is not an important contributor to improve the rank.

8. Placement Number

Year	2016	2017	2018
R	-0.67	-0.66	-0.79

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the total number of placed student in the institutes.

So, all the NIT's should try to improve the placement record or maintain it as it has a significant impact on the ranking of all the IIT's under study in the long run.

9. Annual Salary

Year	2016	2017	2018
R	-0.79	-0.54	-0.57

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the annual salary of the placed students.

So, we can say that all the NIT's should try to improve upon the placement package as it has a significant impact on the ranking of the institutes.

Thus, improving the placement package would help improve the ranking of all the NIT' s under study in the long run.

10. Publication of Web of Sciences

Year	2016	2017	2018
R	-0.69	-0.64	-0.89

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the publication by the institute in a reputed journal like web of sciences.

So, we can say that all the NIT's should try to increase the number of publication in web of sciences as it has a significant impact on the ranking of the institutes.

11. Citation on Publications Web of Sciences

Year	2016	2017	2018
R	-0.72	-0.61	-0.69

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Web of science. More citations would come only by publishing good papers.

Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the NIT's under study in the long run.

12. Publication of Scopus

Year	2016	2017	2018
R	-0.74	-0.58	-0.86

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Scopus. More citations would come only by publishing good papers.

Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the NIT's under study in the long run.

13. Citation on Publications Scopus

Year	2016	2017	2018
R	-0.78	-0.60	-0.65

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the citations on the publications.

So, we can say that the institutes should try to publish papers in reputed journals like Scopus. More citations would come only by publishing good papers.

Thus, improving the citations on papers would definitely contribute towards improving the ranking of all the NIT's under study in the long run.

14. Total Expenditure

Year	2016	2017	2018
R	-0.28	-0.28	-0.55

As it is evident from the graph that there is low correlation(negative) between the rank of the institutes and the total expenditure. So it is not as important factor on which the institute should focus as there are other.

15. Sponsorship

Year	2016	2017	2018
R	-0.33	-0.61	-0.67

As it is evident from the graph that there is high correlation (negative) between the rank of the institutes and the sponsorship.

So, we can say that the institutes should try to get more sponsorship, thus, improving the ranking of all the NIT's under study in the long run.

16. Consultancy

Year	2016	2017	2018
R	-0.47	-0.06	-0.29

As it is evident from the graph that there is low correlation(negative) between the rank of the institutes and the consultancy. So we can say that it is not an important factor which contribute towards improvement of rank of NIT's.

So, we can say that the institutes should try to give more consultancy, thus, improving the ranking of all the NIT's under study in the long run.

17. Perception

Year	2016	2017	2018
R	-0.90	-0.80	-0.78

As it is evident from the graph that there is high correlation(negative) between the rank of the institutes and the overall perception of the institute.

So, we can say that the NIT's should try to improve overall perception, thus, improving the ranking in the long run.

18. Patent Filed

Year	2016	2017	2018
R	-0.49	-0.36	-0.27

Filing patent has not that much impact on the rank. So it doesn't play an important role in the ranking of NIT's.

19. Patent Granted

Year	2016	2017	2018
R	-0.37	-0.10	-0.13

Granting patent has not that much impact on the rank. So it doesn't play an important role in the ranking of NIT's.

20. Earning From Patent

Year	2016	2017	2018
R	-0.38	-0.03	-0.13

Earning patent has not that much impact on the rank. So it doesn't play an important role in the ranking of NIT's.

CONCLUSION AND RECOMMENDATIONS

1. High Variation Level

There is a wide variation of ranking in the 2016, 2017 and 2018 ranks. For example, ISM Dhanbad is 13th in the 2018 ranking but is absent in 2016 ranking framework. That means there is some flaw in the methodology adopted because it doesn't make sense that an institute with such a good rank in 18 was not there in top 100 in 2016 altogether. That means there is some flaw in the methodology adopted because it doesn't make sense that an institute with such a good rank in 16 was not there in top 50 in 2017 and 2018 altogether.

2. Problem of Visibility

It happens as larger institute with large faculty base gets more visibility. For example, IIT Madras has very high faculty strength and big infrastructure gets more visibility and hence more fund. But smaller

institute doesn't get the visibility and therefore gets less access to government funding.

3. Improper Comparison

Comparing institute like IIT Madras and Bhartiya Vidyapeeth doesn't make sense as one is government institute and other is private institute with different mode of expenditure, funding obligations etc. It is like comparing apple with mango. Even the statute of IIT and NIT are very different. This makes the comparison even more unreliable.

Though IIT's participate as engineering institutes they will be better judged if they would have participated as universities.

Some factors like patents are used to judge for universities also which doesn't make sense.

4. Improper Assignment of Weightage and Its Dynamic Nature

NIRF does its ranking on the cumulative score based on different parameters like TLR, RPC, GO and OI, and PR. Various heads come under the aforesaid parameters and NIRF keeps changing the marks allotted to various heads frequently. This makes it difficult to analyze the true nature of rank change over successive year. This results in ambiguity.

5. Focus on Numbers

High weightage is given to number of publication. Now the problem is institute with higher faculty will always have more publication than the institutes with less number of faculties. So the former one will always have an upper hand. Approved intake is again an issue because in government institute it is not in the hand of college management to decide the number of student to take. It is in the hand of government. Also larger institute have more resources at their disposal to conduct extensive research which other state universities or colleges lacks.

6. Taking into Account the Score of Perception

It is based on the perception of employer, academia and general public through online survey. The difference is very high. For example, IIT Ropar and IIT Patna perception score is 38 and 93 respectively. But their rank is 9 and 10 respectively.

7. Low Participation

Due to rigid framework of NIRF many institutes are left as they are not being able to meet such criteria. The institutions have to submit an affidavit in which they declare the availability of infrastructure, plans for the development and likewise. There are many

disciplines which are left out like commerce, literature etc. This is again an important issue which needs to be addressed.

8. Psychological Impact

Although it is good to have institute to have healthy competition among themselves but filtering out most of the colleges and universities has a very bad psychological impact on students as well as faculties. It gives them a sense of mediocre and inferior category. It should be noted that this class constitute most of the workforce, SME owners etc.

9. Rejuvenate the Concept of Feudal Society

This ranking promotes the concept of elitism and makes it more intact. It increases the negativity and frustration of the nation as a whole.

10. Problem of Authenticity

Whatever the institute files as an affidavit is accepted as it is. No cross verification is done or there is no mechanism to verify the same. Therefore, there is a serious question mark on the accuracy and reliability of the data.

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