NIRF RANKING ANALYSIS FOR INDIAN INST

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ABSTRACT

Introduction: The year 2021 has witnessed an extraordinary increase of Higher Education Institutions (HEI) in India. This unexpected surge in the number of institutions led to many debates on the quality of higher education in the country. Apart from the mandatory certification of institutions established by thegovernment bodies. In 2015 government of India introduced theNational Institutional Ranking Framework (NIRF) to evaluate andjudge the annual performances of HEIs through pre-definedcriteria. This paper reports a comparative study of the various institutes which have been ranked by NIRF on the basis of several parameters

Objectives: The study aims to find out the relationship between the ranking of institutions in terms of various parameters and the overall ranking as per NIRF.

Methods: A total sample of 62 Indian Institutes is involved in the study. All the statistical analysis has been performed using the Advanced Excel Software and IBM product in IBM SPSS software
KEYBOARD: NIRF, HEIS, Ranking.

1. INTRODUCTION

All the countries in the world have their own history and vision of higher education system which plays a great role in their functioning and ultimately in the ranking. Perhaps this widely commended ranking culture and the methodological drawback of the international university ranking systems are the reasonwhy Government of India had to launch the National Institutional Ranking Framework (NIRF) in the year 2015 in spite of so many authorized agencies in place to monitor the quality of higher education in the country. University rankings are usually based on some specific parameters that are considered relevantin relation to different aspects of academic activities. **[1**]

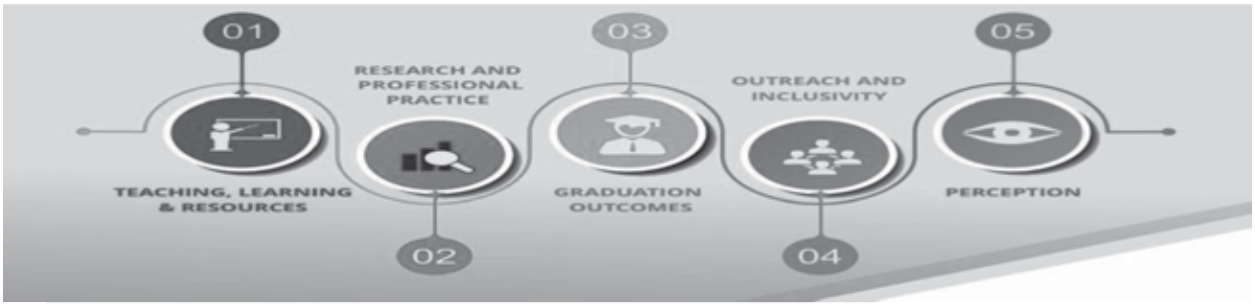
2. NATIONAL INSTITUTIONAL RANKING FRAMEWORK (NIRF): AN OVERVIEW

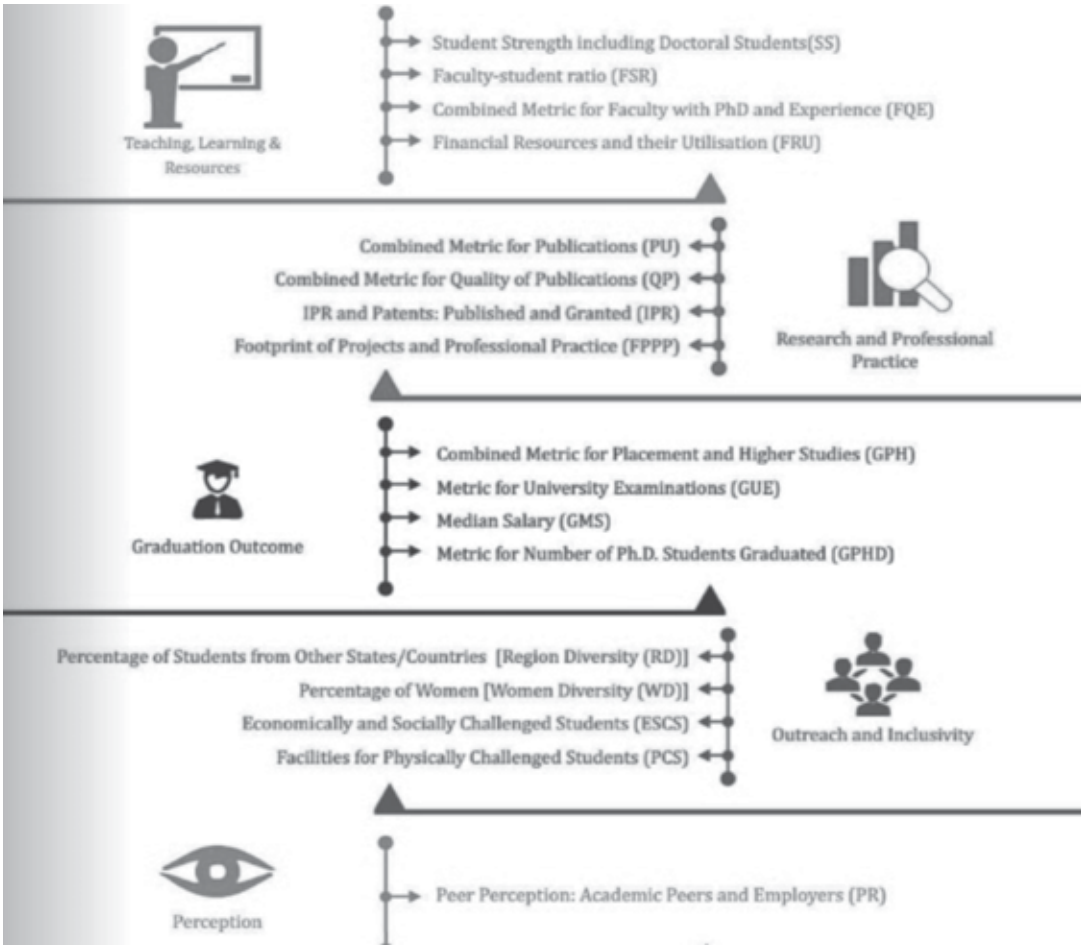
The National Institutional Ranking Framework (NIRF) was approved by the MHRD and launched by Honorable Minister of Human Resource Development on 29th September 2015. This framework summariesa methodology to rank institutions across the country. Taking into consideration the differences in the institutions in regard to their objectives, functions, programs and approaches there are separate rankingsfor different types of institutions depending on their areas of action. The methodology has been approvedby the overall recommendations and broad understanding by a Core Committee set up by MHRD, to identifythe broad parameters for ranking various universities and institutions. The parameters broadly cover "Teaching, Learning and Resources," "Research and Professional Practices," **"Gíaduation Outcomes," "Outíeach and Inclusivity," and "Peíception**. [2]

3. PARAMETERS

1. **Teaching Learning & Resources**: These parameters are related to the core activities of any placeof learning...
2. **Research and Professional Practice**: Excellence in teaching and learning is closely associatedwith the scholarship...
3. **Graduation Outcome**: This parameter forms the ultimate test of the effectiveness of the coreteaching/learning...
4. **Outreach & Inclusivity**: The Ranking framework lays special emphasis on representation ofwomen...
5. **Perception**: The ranking methodology gives a significant importance to the perception of theinstitution.

The image given below describes in details what all is included in the five parameters of NIRF rankingrespectively. [3]





3. OBJECTIVES

In this research article we have tried to find out the relationship between the ranking of institutions in termsof various parameters and the overall ranking as per NIRF using Kruskal-Wallis test. Additionally, some descriptive analysis of the data along with various graphs has also been shown.

4. METHODOLOGY

4.1 Study Design

The study includes a sample of 62 Indian Institutions based on different parameters of ranking by NIRF. The data set is secondary in nature and has been extracted from Kaggle dataset. The original dataset contained39 columns and 150 institutions(rows) after filtering and cleansing of data according to the requirement weare left with 62 institutions and 34 columns for our analysis.

4.2 Kruskal-Wallis Test

Kruskal-Wallis Test is used when the populations from which the samples are drawn are not normally distributed with equal variances, perhaps the best-known procedures of this type of data is the "Kruskal– Wallis One-Way Analysis of Variance by Ranks".

Assumptions

* **The samples are independent random samples from their respective populations.**
* **The measurement scale employed is at least ordinal.**
* **The distributions of the values in the sampled populations are identical except for the possibility that one or more of the populations are composed of values that tend to be larger than those of the other populations.**

Also, descriptive analysis using the Advanced Excel and some pivot charts forvisualizations are used to get the deeper insights of NIRF ranking.

5. STUDY LIMITATIONS

The data used in the study is the secondary data with a limited sample size of 62 institutions, hence this limitation should be acknowledged.

6. STATISTICAL ANALYSIS

Applying the Kruskal-Wallis test on all the 62 Institutions to test our hypothesis, which we filtered from thecrude data for the research under study, with a confidence level of 95 percent.

The hypothesis taken for the test are:

H_0(Null Hypothesis): All the K-samples comes from the same population.

H_1(Alternative Hypothesis): All the K-samples comes from the different populations.

6.1 Teaching, Learning and Resources (TLR)

The table for this analysis and graph is given in the appendix as Table 1.1

Descriptive Statistics

N		Mean	Std. Deviation	Minimum	Maximum
TLR	310	60.9685	10.47194	36.34	85.61
INSTITUTES	310	30.50	17.924	0	61

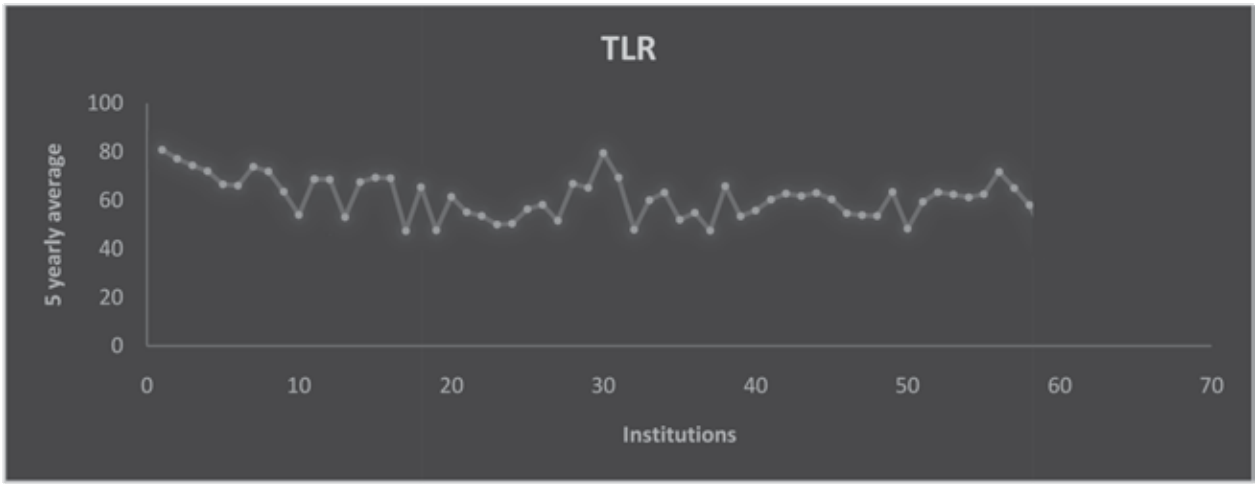
Test Statistics

INSTITUTES

Kruskal-Wallis H	197.644
Df	61
Asymp. Sig.	.000

Tabulated value = χ^2 = 43.188, where K=62

Since the calculated value is greater than the tabulated value at level of significance (alpha=0.05) we reject H_0, Hence, we conclude that all the K-samples are from different populations.



From the line graph it's pretty clear that the university *numbered as "1"* *i.e., Indian Institute of Technology, Madras is highest in terms of* ***Teaching, Learning and Resources (TLR)*** **and the lowest for the samecomes out to be university numbered as "59" i.e., Pondicherry University.**

6.2 Research and Professional Practice (RPP)

The table for this analysis and graph is given in the appendix as Table 2.1

Descriptive Statistics

N		Mean	Std. Deviation	Minimum	Maximum
RPP	310	36.8224	18.26056	4.90	92.51
INSTITUTES	310	30.50	17.924	0	61

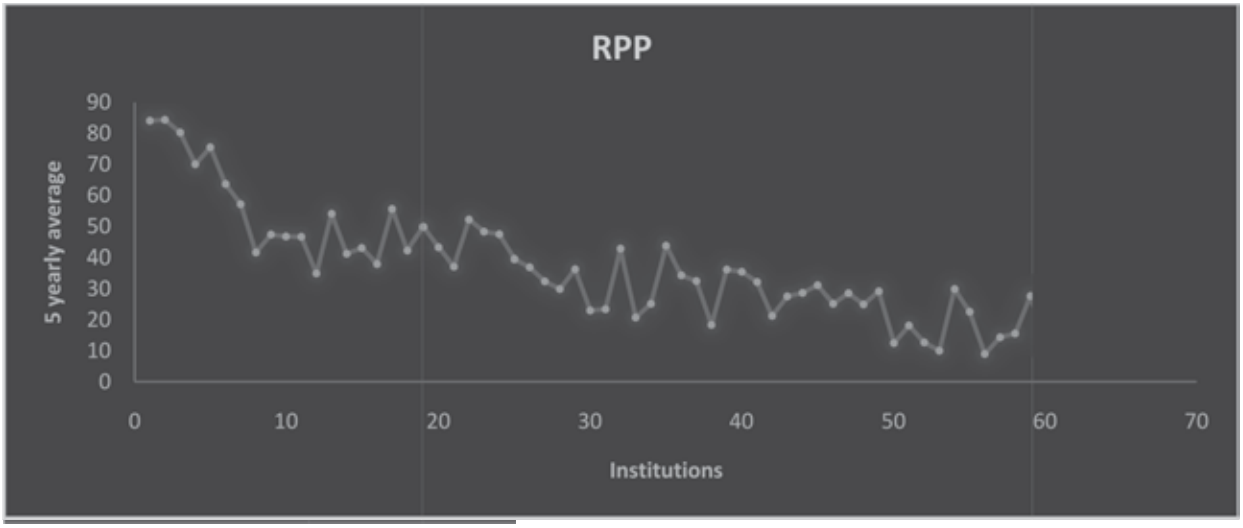
Test Statistics

INSTITUTES

Kruskal-Wallis H	277.905
Df	61
Asymp. Sig.	.000

Tabulated value = χ^2 = 43.188, where K=62

Since the calculated value is greater than the tabulated value at level of significance (alpha=0.05) we reject H_0, Hence, we conclude that all the K-samples are from different populations.



From the line graph it's pretty clear that the university *numbered as "2"* *i.e., Indian Institute of Technology, Bombay is highest in terms of Research and Professional Practice* **and the lowest for the same comes out to be university numbered as "56" i.e., Dr. D.Y. Patil Vidyapeeth**

6.3 Graduation Outcomes (GO)

The table for this analysis and graph is given in the appendix as Table 3.1

Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum

GO	310	72.6997	10.84566	43.61	100.00
INSTITUTE	310	30.50	17.924	0	61

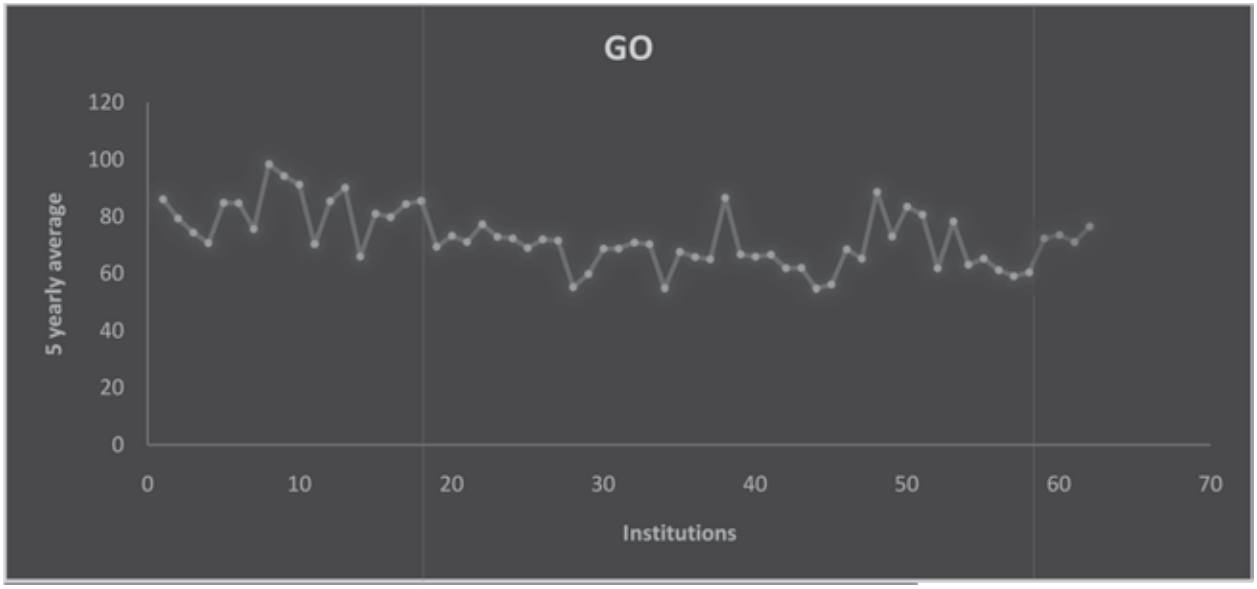
Test Statistics

INSTITUTE

Kruskal-Wallis H	271.746
Df	61
Asymp. Sig.	.000

Tabulated value = χ^2 = 43.188, where K=62

Since the calculated value is greater than the tabulated value at level of significance (alpha=0.05) we reject H_0, Hence, we conclude that all the K-samples are from different populations.



From the line graph it's pretty clear that the university *numbered as "8"* *i.e. Jawaharlal Nehru University is highest in terms of Graduation* ***Outcomes (GO)*** **and the lowest for the same comes out to be university numbered as "44" i.e., Indian Institute of Technology, Patna**

6.4 Outreach and Inclusivity (OI)

The table for this analysis and graph is given in the appendix as Table 4.1

Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum

OI	310	59.8342	9.48055	36.00	86.49
INSTITUTES	310	30.50	17.924	0	61

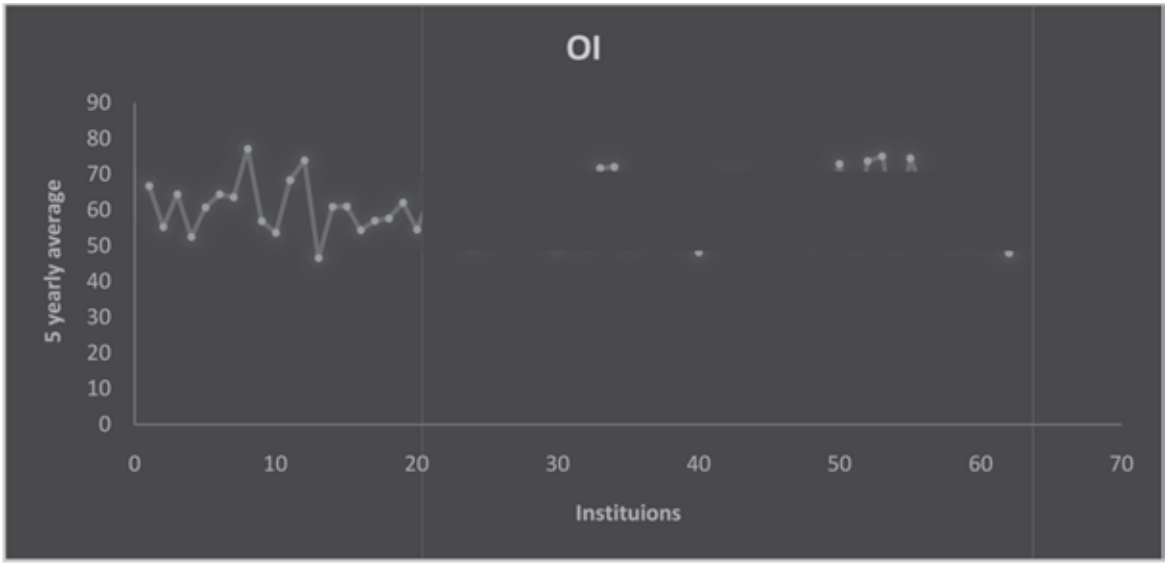
Test Statistics

INSTITUTES

Kruskal-Wallis H	205.574
Df	61
Asymp. Sig.	.000

Tabulated value = χ^2 = 43.188, where K=62

Since the calculated value is greater than the tabulated value at level of significance (alpha=0.05) we reject H_0, Hence, we conclude that all the K-samples are from different populations.



From the line graph it's pretty clear that the university *numbered as "8"* *i.e. Jawaharlal Nehru University is highest in terms of Outreach and* ***Inclusivity (OI)*** **and the lowest for the same comes out to be university numbered as "13" i.e., Jadavpur University.**

6.5 Perception

The table for this analysis and graph is given in the appendix as Table 1.1

Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum

PERCEPTION	310	25.2132	22.09260	.00	97.13
INSTITUTES	310	30.50	17.924	0	61

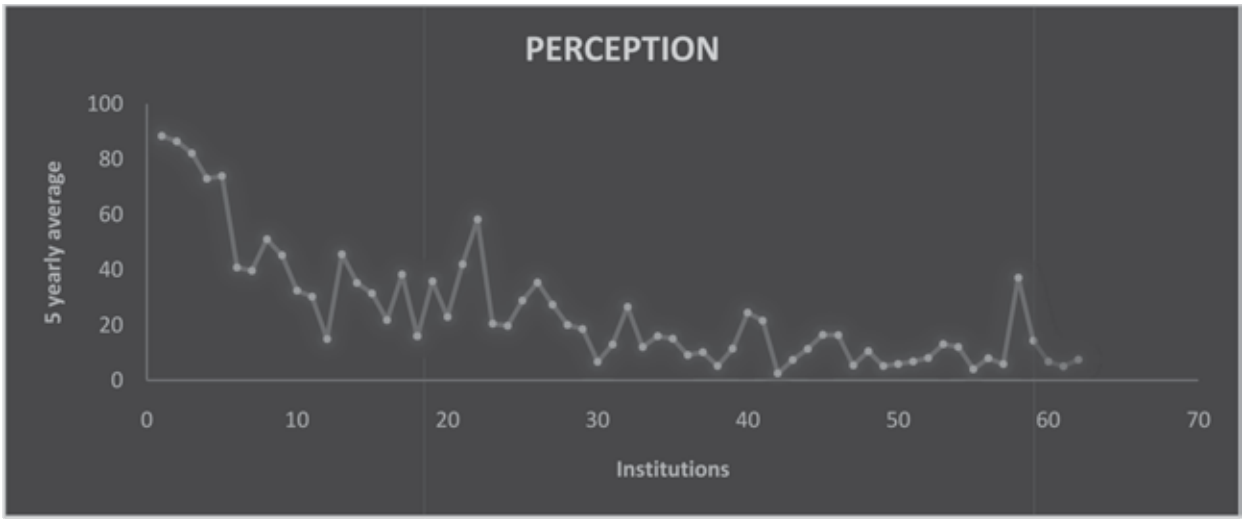
Test Statistics

INSTITUTES

Kruskal-Wallis H	264.566
Df	61
Asymp. Sig.	.000

Tabulated value = χ^2 = 43.188, where K=62

Since the calculated value is greater than the tabulated value at level of significance (alpha=0.05) we reject H_0, Hence, we conclude that all the K-samples are from different populations.



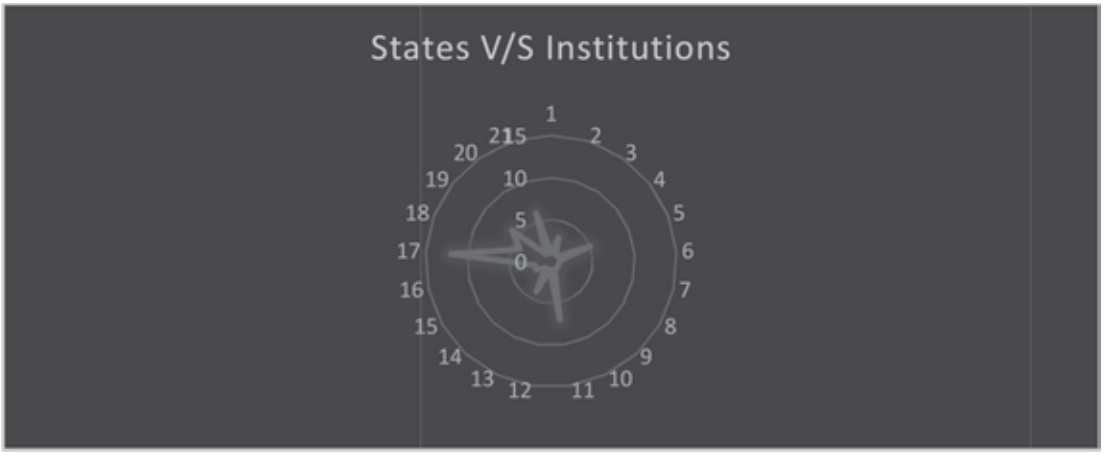
From the line graph it's pretty clear that the university *numbered as "1"* *i.e.* *Indian Institute of Technology, Madras is highest in terms* ***of Perception*** **and the lowest for the same comes out to be university numbered as "42" i.e., University of Madras.**

Hence, from this test we conclude that none of the 62 institutions belong to the same population in all the five categories. Also looking ateach category individually we found out some institutions have performed phenomenally great in different categories set by NIRF.

STATE WISE ANALYSIS

S.No.	States	No. of Institutions
1	Andhra Pradesh	1

2	Assam	3
3	Bihar	1
4	Chandigarh	1
5	Delhi	5
6	Gujarat	1
7	Jharkhand	1
8	Karnataka	1
9	Kerala	1
10	Madhya Pradesh	1
11	Maharashtra	7
12	Meghalaya	1
13	Odisha	4
14	Pondicherry	1
15	Punjab	2
16	Rajasthan	2
17	Tamil Nadu	12
18	Telangana	4
19	Uttar Pradesh	6
20	Uttarakhand	1
21	West Bengal	6
Total		62



From this we conclude that among the 21 states, *the state with number"17" i.e., Tamil Nadu has the highest number of Institutions*, **Now digging a bit deeper let's see which is the most preferred city and Institutions.**

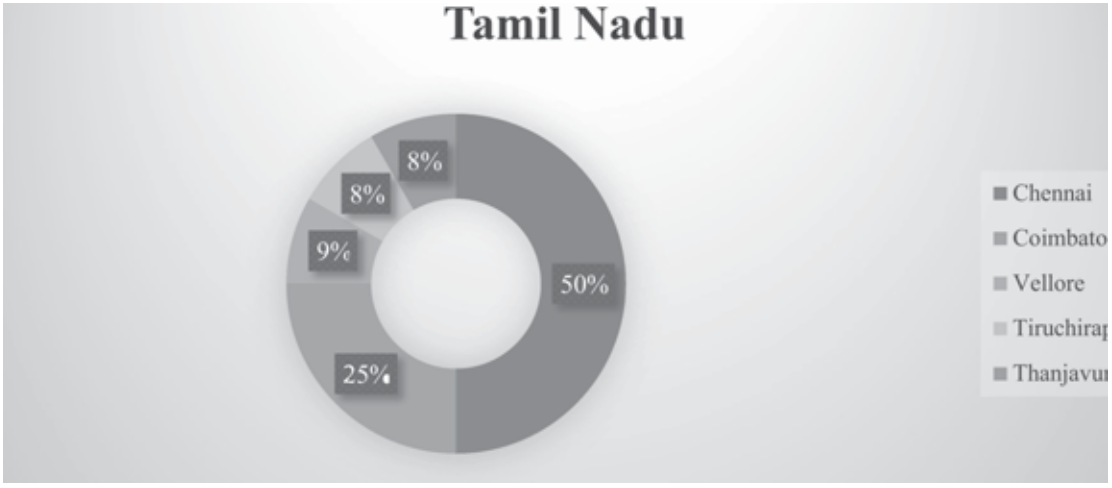
Cities	**No. of Institutions**
Chennai	6
Coimbatore	3
Vellore	1
Tiruchirappalli	1

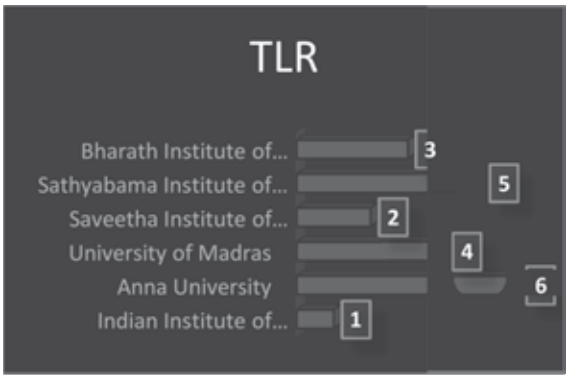
Thanjavur	1

From the donut graph it is very clear that *almost half of the Institutionslie in Chennai city* **of Tamil Nadu.**

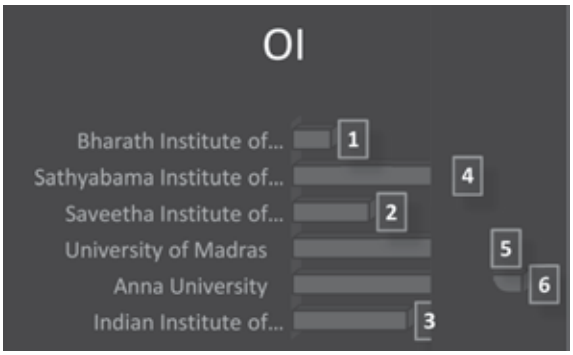
S.No.	Name of Institutions in Chennai	Ranks for TLR	Ranks for RPC	Ranks for GO	Ranks for OI	Ranks for Perceptions
1	Indian Institute of Technology Madras	1	1	1	3	1
2	Anna University	6	2	2	6	2
3	University of Madras	4	3	3	5	3
4	Saveetha Institute of Medical and Technical Sciences	2	6	6	2	6
5	Sathyabama Institute of Science and Technology	5	4	4	4	4
6	Bharath Institute of Higher Education & Research	3	5	5	1	5

Below are the graphs showing the showing the ranking for different categories set by NIRFamong top universities in the city Chennai.

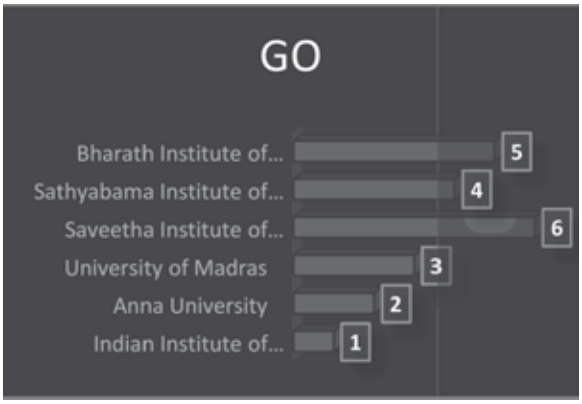




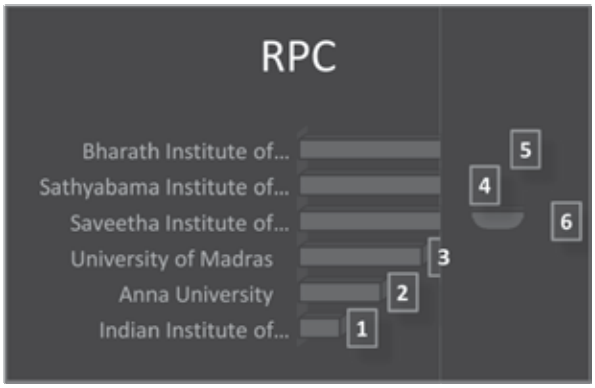
From this graph it is clear that IndianInstitute of Technology Madras is themost preferred university byconsidering the category of TIR



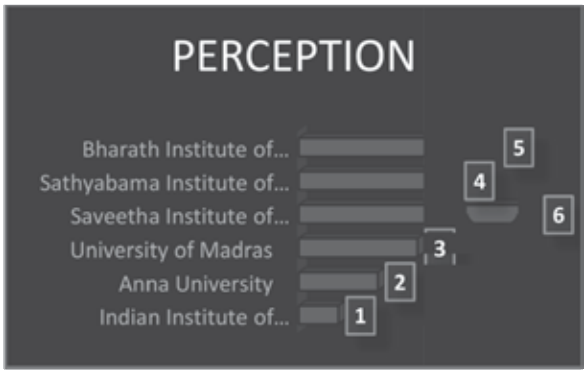
From this graph it is clear that Bharath Institute of Higher Education & Research is the most preferreduniversity by considering the category of OI



From this graph it is clear that IndianInstitute of Technology Madras is themost preferred university by considering the category of GO



From this graph it is clear that Indian Institute of Technology Madras is the most preferred university by considering the category of RPC



From this graph it is clear that Indian Institute of Technology Madras is the mostpreferred university by considering the category of Perception.

OVERALL ANALYSIS

S.No.	Universities Names	Rank_ Perception	Rank_ OI	Rank GO	Rank_R PC	Rank_ TLR	Avg	Overall Ranking
1	Indian Institute of Technology Madras	1	12	7	2	1	4.6	1
2	Indian Institute of Technology Bombay	2	41	17	1	3	12.8	6.5
3	Indian Institute of Technology Delhi	3	17	22	3	4	9.8	3
4	Indian Institute of Technology Kanpur	5	51	34	5	6	20.2	12
5	Indian Institute of Technology Kharagpur	4	26	10	4	16	12	4
6	Indian Institute of Technology Roorkee	11	18	11	6	17	12.6	5
7	Indian Institute of Technology Guwahati	12	19	21	7	5	12.8	6.5
8	Jawaharlal Nehru University	7	1	1	22	7	7.6	2
9	Banaras Hindu University	9	37	2	14	22	16.8	8
10	Calcutta University	18	47	3	15	47	26	18
11	Amrita Vishwa Vidyapeetham	20	9	35	16	12	18.4	10
12	Jamia Millia Islamia	37	4	9	31	13	18.8	11
13	Jadavpur University	8	62	4	9	52	27	20
14	Indian Institute of Technology Hyderabad	17	25	46	23	14	25	15
15	University of Hyderabad	19	24	14	19	9	17	9
16	Aligarh Muslim University	26	44	16	25	11	24.4	14
17	University of Delhi	13	36	12	8	61	26	18
18	Savitribai Phule Pune University	34	33	8	21	19	23	13
19	Vellore Institute of Technology	15	23	37	11	59	29	23
20	Bharathiar University	25	43	24	18	31	28.2	21
21	National Institute of Technology Tiruchirappalli	10	16	31	26	44	25.4	16
22	Anna University	6	45	19	10	50	26	18
23	Indian Institute of Technology (Indian School of Mines)	28	40	26	12	56	32.4	26

24	Institute of Chemical Technology	30	58	27	13	55	36.6	35
25	Indian Institute of Technology (Banaras Hindu University)Varanasi	21	46	38	24	42	34.2	29
26	Birla Institute of Technology & Science -Pilani	16	34	29	27	38	28.8	22
27	National Institute of Technology Surathkal	22	35	30	34	54	35	31.5
28	Indian Institute of Technology Gandhinagar	29	22	60	38	15	32.8	27
29	Indian Institute of Science Education & Research Kolkata	31	29	57	28	20	33	28
30	Homi Bhabha National Institute	54	59	40	50	2	41	50
31	Siksha `O` Anusandhan	40	14	39	48	10	30.2	25
32	Panjab University	23	56	33	20	58	38	40
33	Kalinga Institute of Industrial Technology	42	8	36	53	36	35	31.5
34	Indian Institute of Science Education & Research, Mohali	35	7	61	46	25	34.8	30
35	National Institute of Technology Rourkela	36	57	42	17	53	41	50
36	Shanmugha Arts Science Technology & Research Academy	47	28	47	32	45	39.8	46
37	Amity University	46	21	50	33	60	42	55.5
38	Kerala University	58	48	6	54	18	36.8	36
39	Thapar Institute of Engineering and Technology	43	42	43	29	51	41.6	54

40	Indian Institute of Engineering Science and Technology	24	60	45	30	43	40.4	47.5
41	University of Madras	27	39	44	35	35	36	34
42	Saveetha Institute of Medical and Technical Sciences	62	10	54	52	27	41	50
43	Indian Institute of Science Education & Research Bhopal	51	11	52	43	30	37.4	37
44	IIT, Patna	44	38	62	40	26	42	55.5
45	IIT, Bhubaneswar	32	27	59	36	34	37.6	38
46	National Institute of Technology Warangal	33	31	41	45	46	39.2	45
47	Sathyabama Institute of Science and Technology	57	13	48	41	48	41.4	53
48	Osmania University	45	49	5	47	49	39	44
49	Jamia Hamdard	59	30	25	39	23	35.2	33
50	Banasthali Vidyapith	56	6	13	60	57	38.4	41.5
51	Gauhati University	52	54	15	55	37	42.6	57
52	Symbiosis International	48	5	53	59	24	37.8	39
53	Tata Institute of Social Sciences	39	2	18	61	29	29.8	24
54	Tezpur University	41	52	51	37	33	42.8	58
55	Bharath Institute of Higher Education & Research	61	3	49	51	28	38.4	41.5
56	Dr. D. Y. Patil Vidyapeeth	49	20	55	62	8	38.8	43
57	Shiv Nadar University	55	15	58	57	21	41.2	52
58	PSG College of Technology	14	53	56	56	39	43.6	61
59	Pondicherry University	38	32	28	42	62	40.4	47.5
60	North Eastern Hill University	53	50	23	58	32	43.2	60
61	Sri Venkateswara University	60	55	32	49	41	47.4	62
62	Visva Bharati	50	61	20	44	40	43	59

From the table its utmost clear that *the best university with an* *outstanding NIRF ranking of "1" is given to the university numbered as'1' i.e., Indian Institute of Technology, Madras and the lowest rankingi.e., "62" has been given to the university numbered as '61' i.e., Sri Venkateswara University, Andhra Pradesh*

CONCLUSIONS

1. In this study we conclude that on applying the test, all the 62 Institutes belong to different populations. After digging a bit deeper and considering each category separately we found that –

- In **TLR IIT, Madras** has outshined from all the other 62 Institutes and the least performance is given by Pondicherry University.
- In **RPP IIT, Bombay** has outshined all the other 62 Institutes and the least performance is given by Dr. D.R. Patil Vidyapeeth.
- In **GO JNU** has outshined all the other 62 Institutes and the least performance is given by IIT, Patna.
- In **OI JNU** has outshined all the other 62 Institutes and the least performance is given by Jadavpur University.
- In **Perception IIT, Madras** has outshined from all the other 62 Institutes and the least performance is given by university of Madras.

2. Out of all the 62 Institutes major number of Institutes are in Tamil Nadu, to be specific 12 in number. And among these 12, 6 Institutes are in Chennai City.

If we go a bit deep in these specific 6 Institutes, we found that IIT, Madras is the only Institute which has secured Rank -1 in 4 categories that are TLR, RPP, GO and Perception out of 5.

The overall analysis of this paper concludes that among various *Indian states Tamil Nadu* is the only state with maximum number of top Institutions, to be specific city Chennai has major top Institutions and among those IIT, Madras is the best but in *all over India IIT, Madras and JNU* are equally preferred in correspondence with NIRF Ranking System.

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APPENDIX

Table 1.1 Teaching, Learningand Resources (TLR)

Institutions	N	Mean Rank of TLR	Average of 5years of TLR
0	5	293.2	80.802
1	5	277.8	77.162
2	5	254.8	74.348
3	5	252.6	71.974
4	5	209.4	66.648
5	5	202	66.082
6	5	268.8	73.876
7	5	256.8	71.948
8	5	184.2	63.626
9	5	106.8	53.906
10	5	230	68.772
11	5	230	68.568
12	5	77.4	53.04
13	5	221.1	67.502
14	5	237.2	69.442
15	5	234.2	69.112
16	5	37.6	47.34
17	5	199.3	65.392
18	5	35.8	47.558
19	5	163.1	61.48
20	5	101.6	55.106
21	5	86.1	53.572
22	5	59.2	49.91
23	5	59.6	50.372
24	5	116	56.338
25	5	126.1	58.22
26	5	70.6	51.51
27	5	212.2	66.91
28	5	198.9	65.214
29	5	289	79.522
30	5	236	69.386
31	5	45.6	47.854
32	5	149	59.988
33	5	177.1	63.206

Table 2.1 Research andProfessional Practice (RPP)

nstitutions	N	MeanRankofGO	Average of 5years of TLR
0	5	3	84.146
1	5	10	
2	5	12	
3	5	24	
4	5	28	
5	5	84.836	
6	5		
7	5		
8	5		
9	5		
10	5		
11	5		
12	5		
13	5		
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25	5		
26	5		
27	5		
28	5		
29	5		
30	5		

Table 3.1 Graduation Outcomes (GO)

Institutions	N	Mean Rank of GO	Average of 5 years of GO
0	5	270.7	86.218
1	5	219	79.45
2	5	184.1	74.444
3	5	135.3	70.734
4	5	259.6	84.924
5	5	259.1	84.836
6	5	185.2	75.692
7	5	306.5	98.554
8	5	296.9	94.36
9	5	293.4	91.372
10	5	146.7	70.418
11	5	264.4	85.524
12	5	290.6	90.25
13	5	89.3	65.994
14	5	234.2	81.1
15	5	216.8	79.884
16	5	256.7	84.45
17	5	265.1	85.608
18	5	135	69.55
19	5	175.7	73.392
20	5	158.2	71.242
21	5	211.6	77.426
22	5	174	73.004
23	5	168.8	72.478
24	5	131	69.088
25	5	167.8	72.16
26	5	162.3	71.624
27	5	14.2	55.384
28	5	55.4	60.004
29	5	127.4	68.82
30	5	127.8	68.908
31	5	153.5	70.936
32	5	147.2	70.41
33	5	26.9	54.972
34	5	113.4	67.766
35	5	87.2	65.878

36	5	78.8	65.092
37	5	272.6	86.75
38	5	100.5	66.776
39	5	90.6	66.026
40	5	100.6	66.752
41	5	45.6	62.026
42	5	56.1	62.14
43	5	12.2	54.896
44	5	19	56.31
45	5	126.6	68.592
46	5	78.3	65.372
47	5	279.4	88.74
48	5	178.1	73.1
49	5	248.8	83.58
50	5	232.2	80.828
51	5	43.5	62.048
52	5	219	78.38
53	5	54.1	63.274
54	5	81.5	65.338
55	5	40.5	61.288
56	5	34.8	59.144
57	5	31.9	60.524
58	5	170.2	72.3
59	5	182.6	73.532
60	5	146.6	71.088
61	5	205.9	76.632
Total	310		

Table 4.1 Outreach and Inclusivity (OI)

Institutions	N	Mean Rank of OI	Average of 5 years of *OI*
0	5	234.8	66.798
1	5	107	55.326
2	5	215.2	64.522
3	5	89.7	52.558
4	5	166.5	60.812
5	5	213.6	64.518
6	5	189.9	63.636

7	5	294.5	77.21
8	5	128	57
9	5	112.6	53.704
10	5	235.6	68.408
11	5	277.8	73.956
12	5	34.6	46.63
13	5	169.5	61.002
14	5	161.2	61.068
15	5	95.6	54.492
16	5	129.2	57.046
17	5	127	57.806
18	5	177.7	62.112
19	5	97.3	54.674
20	5	218	64.962
21	5	88.4	53.888
22	5	129.6	55.772
23	5	56.1	50.384
24	5	97.8	53.73
25	5	138.6	57.792
26	5	133	57.464
27	5	194.8	62.278
28	5	150	59.338
29	5	52	49.924
30	5	228.2	66.392
31	5	62	51.24
32	5	269.2	71.816
33	5	268.6	72.196
34	5	72.6	51.136
35	5	158	59.36
36	5	198.4	62.618
37	5	84.2	53.272
38	5	102.5	55.002
39	5	38	48.226
40	5	110.8	55.822
41	5	249.2	68.04
42	5	246.7	67.962
43	5	104.7	55.934
44	5	158	60.508
45	5	148	58.662

46	5	230.2	66.41
47	5	86	53.124
48	5	155.2	59.128
49	5	277	72.958
50	5	89	52.472
51	5	279.6	73.834
52	5	280.4	75.14
53	5	77	52.544
54	5	277	74.602
55	5	209.1	63.456
56	5	220.6	65.736
57	5	71.6	52.484
58	5	144.4	58.242
59	5	86.8	52.846
60	5	72.2	51.762
61	5	70.2	47.988
Total	310		

Table 5.1 Perception

Institutions	N	Mean Rankof Perception	Average of 5years of Perception
0	5	303.8	88.548
1	5	302.2	86.58
2	5	299	82.304
3	5	292	73.124
4	5	292.6	74.016
5	5	250.4	41.01
6	5	243.8	39.854
7	5	272.8	51.226
8	5	261	45.426
9	5	216.8	32.672
10	5	217	30.482
11	5	130.2	15.086
12	5	256.6	45.728
13	5	221.8	35.37
14	5	217.5	31.604
15	5	172.9	21.958

16	5	242.2	38.378
17	5	138.2	16.122
18	5	236.9	35.898
19	5	174.9	22.988
20	5	246	41.996
21	5	278.8	58.29
22	5	160.9	20.566
23	5	160.8	19.802
24	5	207.8	28.968
25	5	231	35.462
26	5	202.1	27.406
27	5	159.1	20.15
28	5	147.6	18.648
29	5	58.6	6.832
30	5	112.9	13.038
31	5	195.2	26.648
32	5	104.3	12.106
33	5	135.3	16.062
34	5	121.7	15.114
35	5	84.4	9.178
36	5	91.1	10.314