January 2021

Websites of Top-Ranked Indian Higher Education Institutions: A Webometric Analysis

Santosh Kadam
ksantosh016@gmail.com

Shankar Chandrakant Bhusawar Mr.
shankarbhusawar@gmail.com

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Dr. Santosh Dnyanobarao Kadam,
I/c Librarian, University Library, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (MS), India
Email : ksantosh016@gmail.com

Mr. Shankar Chandrakant Bhusawar,
Librarian, CSMSS Chh. Shahu College of Engineering , Aurangabad (MS), India
Email : shankarbhusawar@gmail.com

Abstract

This paper explores a webometric study of the top25 institutions in India as ranked by the National Institutional Ranking Framework (NIRF), a nodal ranking agency of the Ministry of Human Resource Development (MHRD), Government of India. Efforts were made to establish a sort of ranking among these institutions' websites by applying various webometric indicators, the important ones being web impact factor, WISER index, Alexa traffic rank, search engine optimisation, the security rank of website, the number of social media followers, and external backlinks. Indian Institute of Technology, Indore, ranked first regarding web impact factor (WIF) (8.678343949), whereas Indian Institute of Technology, Roorkee ranked first regarding search engine optimisation. Eleven institutions' (44 percent) websites had very strong security ranks. Anna University, Chennai, ranked first in Alexa traffic rank, with a loading time of 0.693 seconds, and was followed by the University of Delhi, Delhi, and Indian Institute of Technology, Hyderabad. University of Delhi, Delhi, ranked first in the WISER index, with a value of 23.8984, and was followed by Bharathiar University, Coimbatore, and Jamia Millia Islamia, New Delhi.

***Keywords*: Webometric, Web Impact Factor (WIF), Alexa Ranking, WISER Value, NIRF, Search Engine Optimisation, Security Rank, Social Media Followers**

Introduction

In this era of globalisation, which considerably affects higher education, institutions are highly concerned with their position in ranking lists prepared by various national and international agencies. Every year, lists of top-ranked Indian higher education institutions are published by different private agencies according to their own surveys. Since 2015, the National Institutional Ranking Framework (NIRF) has been publishing the list of the top 100 Indian higher education institutions based on broad parameters such as teaching, learning, and resources, research and professional practices, graduation outcomes, outreach and inclusivity, and perception. The Indian higher education system is one of the largest education systems in the world, and according to the All India Survey on Higher Education,

there are a total of 993 universities and 39931 colleges across the country, in which 3.73 crore students are obtaining various degrees under the supervision of 14.16 lakh teachers.

Owing to the competitive nature of higher education, it becomes an important task for any educational institution to attract the students. A website is an important tool for this purpose, as it helps to attract students and other stakeholders of higher education by disseminating the institution's portfolio on its portal. A well- and systematically designed website is a mirror of its respective academic institution; it must provide an interface for easy and effective communication. Attempts were made to analyse the websites of the top Indian universities/institutions with the help of webometric indicators. According to Thelwall and Vaughan (2004), webometrics is concerned with web phenomena and drawsits methodology from bibliometrics. Bojorneborne and Ingwersen elaborate on the following main aspects of a webometric study:

- Web page content analysis
- Web link structure analysis
- Web usage analysis
- Web technology analysis.

Scenario of Indian higher education and NIRF: Brief note

In India, higher education is imparted in various disciplines, such as engineering and technology, medical sciences, pharmacy, social sciences, arts and humanities, through different types of institutions and universities, such as central universities, state universities, institutions of national importance, private universities, deemed universities, and open universities. The state of Indian higher education in 2018–19 is presented in Table 1. The figures in the table reflect that state public universities constituted a major share (37.36 percent) of Indian higher education, followed by state private universities (30.61 percent). It can also be seen that these together form nearly 68 percent of the Indian higher education system. The institutions of national importance constituted12.78 percent, while the institutions under the State Legislature Act and central open universities contributed very little to the Indian higher education system.

Table 1: Scenario of Indian Higher Education: 2018-19

Sr. No	Type of University / Institute	Number
01	Central University	46
02	Central Open University	01
03	Institution of National Importance	127
04	State Public University	371

05	Institution under State Legislature Act	05
06	State Open University	14
07	State Private University	304
08	State Private Open University	01
09	Deemed University – Government	34
10	Deemed University – Government Aided	10
11	Deemed University – Private	80
	Total	993

Source: All India Survey on Higher Education
(http://aishe.nic.in/aishe/viewDocument.action?documentId=262)

NIRF

The Ministry of Human Resource Development (MHRD), Government of India, constituted the National Institutional Ranking Frame Work (NIRF) in 2015 for ranking Indian universities and institutions. Before 2015, there was no authorised national agency for this purpose. The NIRF prepares the list of the top 100 universities/institutions in general and in specific categories, such as the top hundred institutions in India, top engineering institutions, and top management institutions. The NIRF parameters for this ranking are broadly concerned with teaching, learning, and resources, research and professional practices, graduation outcomes, outreach and inclusivity, and perception.

Review of selected literature

Thelwall (2012) explained the concept of webometrics with its brief history and elaborated on the terms link analysis, network analysis, and citation analysis. **Dolai (2018)** carried out a webometric analysis of the thirteen government-aided universities in Kolkata with the help of the Google search engine. The parameters used for this study were WISER value, web impact factor (WIF), and the correlation between WIF and WISER. **Jeyshankar and Nachiappan (2018)**studied the websites of the 41 CSIR institutions in India. The webometric indicators used for this study were self-link WIF, in-link WIF, external link WIF, and revised WIF. **Kutty (2018)** conducted a webometric analysis of 92 websites of ICAR organisations. The webometric indicators used for this study were WIF, absolute WIF, and others. **Ramanayaka, Chen, and Shi (2018)** carried out a webometric study of the 15university library websites in Sri Lanka. The assessment tools they used were WIF,

WISER value, rich files, and external backlinks. **Rani and Pal (2018)** examined the websites of 16 health science universities in India, their parameters being Alexa rank, Google Page Rank, and rich files. **Gupta (2017)** carried out a webometric study of the websites of the national libraries in Asia with the help of WIF and WISER values. **Islam and Alam (2017)** explored the websites of 44 private universities in Bangladesh with the help of overall WIF, absolute WIF, self-link, and internal link. **Lalbiakmawia and Verma (2017)** studied the websites of the Indian Institute of Management by analysing domain classification, domain authority, WIF, and file formats supported. **Verma and Brahma (2017)**analysed the websites of ten central universities in North-East India. The study was based on domain authority, page authority, total internal links, total external links, internal equity passing link, external equity passing link, and total equity passing link. **Baka and Leyni (2015)** explored the websites of the top 30and bottom 30world-class universities using Alexa ranking and Eval Access. **Chakravarty and Wasan (2015)** analysed the library websites of the higher education institutions in India through Google search engine and WIF. **Gharibeniazi, Kamran, and Ghaebi (2015)** conducted a study on Iranian state universities with the help of web quality evaluation method (WebQEM) and web assessment index (WAI). **Maharana, Panda, and Sahoo (2014)** examined the websites of 16Indian Institutes of Technology (IITs) with the help of Alexa ranking andWIF. **Ratha, Joshi, and Naiddu (2012)** carried out a webometric study of the library websites of IITs with the help of WIF and link analysis. **Kothainayaki and Gopalkrishnan (2011)** carried out a webometric study of 54 agriculture universities in India using Google Page Rank, Alexa traffic rank, and rich files. **Babu, Jeyshankar, and Rao (2010)** examined the websites of 40central universities in India by using parameters such as simple WIF, self-link WIF, external WIF, and revised WIF.

From these studies, it can be concluded that the majority of webometric studies were conducted with the help of link analysis and WIF, whereas some studies used WISER value and Alexa rank. Only one study, Ahmed and Nur, usedEval Access for assessing websites, and WebQEM and WAI were also only seen in the study carried out by Gharibeniazi, Kamran, and Ghaebi.

Objectives of the study

The objectives of this study are listed below:

1. To find out the domain classification and domain age of the top-ranked Indian higher education institutions' websites.
2. To know the WIF of the top-ranked Indian higher education institutions' websites.
3. To analyse the search engine optimisation (SEO) results for the top-ranked Indian higher education institutions' websites.
4. To calculate the website security rank of the top-ranked Indian higher education institutions' websites.
5. To know the external backlinks of the top-ranked Indian higher education institutions' websites.
6. To find out the Alexa rank of the top-ranked Indian higher education institutions' websites.

7. To know the number of social media followers ofthe top-ranked Indian higher education institutions' websites.
8. To ascertain the ranking of the top-ranked Indian higher education institutions' websites based on WISER values.

Scope and limitations

The present study is limited to the 25 websites of the top-ranked Indian higher education institutions for the year 2020 by NIRF.

Methodology and data collection

The Webimax portal is used as a tool for analysing the top-ranked Indian higher education institutions' websites. To find out the domain age of the concerned websites, theDupli Checker portal was used.

The following eight Boolean search statement methods and the Google search engine wereused to collect data from each university's website. The search commands and retrieved Google results are presented below:

Search Command	Result
site:~abc	Total number of webpages
Site:~abc NOT link-domain:~abc	Total number of external links or in-links/R-WIF
Site:~abc AND link-domain:~abc	Total number of self-links
Site:~abc filetype:pdf	Total number of PDF files
Site:~abc filetype:doc	Total number of DOC files
Site:~abc filetype:ppt	Total number of PPT files
Site:~abc filetype:xls	Total number of XLS files
Site:~abc (search in Google Scholar)	Total number of pages in Google Scholar

Note: (~) denote space among command

(WP=Web Page, WIF=Web Impact Factor, IL=In-link, SL=Self Link)

Statistical Tool for applying on data

$$\text{R-WIF (In-link-WIF)} = \frac{\text{In-link (external backlinks to the website)}}{\text{Number of web pages published on the website that are indexed by a search engine}}$$

- WISER formula =log (visibility 50%) +log (size 20%) + log (Rich file15%) +log (scholer15%)

Top 25 institutions and domain extension classification of the websites

Table 2 presents the data regarding the list of top 25 Indian higher education institutions as ranked by NIRF and the domain extension classification of the websites. It is clear from the table that out of top 10Indian higher education institutions, seven were IITs, and out of the 25 top institutions,10were IITs. The state-wide analysis shows that 20 percent of the institutions were from Tamil Nadu, which was followed by Delhi (16 percent), Maharashtra (12 percent), and Bengal (12 percent). The institutions have three different types of domain extension: **.ac.in**, **.edu** and **.edu.in.** Twenty institutions (80 percent) had the domain extension **.ac.in**, while four (16 percent) had **edu.in** and one **(4** percent) had **.edu.**, displaying a lack of uniformity in the domain extension.

Table 2: Domain extension classification

Sr.No.	**Name**	URL
1	Indian Institute of Technology, Chennai	https://www.iitm.ac.in
2	Indian Institute of Science, Bengaluru	https://www.iisc.ac.in
3	Indian Institute of Technology, New Delhi	https://home.iitd.ac.in
4	Indian Institute of Technology, Mumbai	http://www.iitb.ac.in
5	Indian Institute of Technology, Kharagpur	http://www.iitkgp.ac.in
6	Indian Institute of Technology, Kanpur	https://www.iitk.ac.in
7	Indian Institute of Technology, Guwahati	https://www.iitg.ac.in
8	Jawaharlal Nehru University, New Delhi	https://www.jnu.ac.in
9	Indian Institute of Technology, Roorkee	https://www.iitr.ac.in
10	Banaras Hindu University, Varanasi	https://www.bhu.ac.in
11	Calcutta University, Kolkata	https://www.caluniv.ac.in
12	Jadavpur University, Kolkata	http://www.jaduniv.edu.in
13	Amrita Vishwa Vidyapeetham, Coimbatore	https://www.amrita.edu
14	Manipal Academy of Higher Education, Manipal	https://manipal.edu
15	University of Hyderabad, Hyderabad	https://www.uohyd.ac.in

16	Jamia Millia Islamia, New Delhi	https://www.jmi.ac.in
17	Indian Institute of Technology, Hyderabad	https://iith.ac.in
18	University of Delhi, Delhi	http://www.du.ac.in
19	Savitribai Phule Pune University, Pune	http://www.unipune.ac.in
20	Anna University, Chennai	https://www.annauniv.edu
21	Bharathiar University, Coimbatore	https://www.b-u.ac.in
22	Indian Institute of Technology (Indian School of Mines), Dhanbad	https://www.iitism.ac.in
23	Indian Institute of Technology, Indore	https://www.iiti.ac.in
24	National Institute of Technology, Tiruchirappalli	https://www.nitt.edu
25	Indian Institute of Science Education & Research, Pune	https://www.iiserpune.ac.in

Domain registration age

Efforts were made to know the domain age of the institutions' websites. For calculating this, Dupli Checker was used. Table 3 ascertains the data about the domain registration age of the studied websites. It can be observed that Anna University, Chennai's website ranked first regarding the domain registration age, having completed 22 years since domain registration. Meanwhile, Amrita Vishwa Vidyapeetham, Coimbatore's website also had completed 22 years since domain registration and ranked second. The websites of Manipal Academy of Higher Education, Manipal, Calcutta University, Kolkata, and Jamia Millia Islamia, New Delhi,ranked third, fourth and fifth respectively. The majority of the institutions'(80 percent) domainshad completed more than 10 years since registration.Furthermore, six institutions' domainshad completed 16years since registration.

Table 3: Domain age

Age Rank	Name of Institution	Domain Created on	Completed	
			Years	Months
1	Anna University, Chennai	22/05/1998	22	5
2	Amrita Vishwa Vidyapeetham, Coimbatore	14/08/1998	22	2
3	Manipal Academy of Higher Education, Manipal	27/09/1999	21	1
4	Calcutta University, Kolkata	30/11/2002	17	11
5	Jamia Millia Islamia, New Delhi	21/12/2002	17	10
6	Indian Institute of Technology Madras, Chennai	28/02/2003	17	8

7	Indian Institute of Technology Delhi, New Delhi	28/02/2003	17	8
8	Banaras Hindu University, Varanasi	31/07/2003	17	3
9	Indian Institute of Technology, Guwahati	31/08/2003	17	2
10	National Institute of Technology, Tiruchirappalli	12/8/2003	17	2
11	Bharathiar University, Coimbatore	19/09/2003	17	1
12	Indian Institute of Technology, Mumbai	28/02/2004	16	8
13	Indian Institute of Technology, Kharagpur	23/02/2004	16	8
14	Indian Institute of Technology, Kanpur	28/02/2004	16	8
15	Jawaharlal Nehru University, New Delhi	28/02/2004	16	8
16	University of Delhi, Delhi	28/02/2004	16	8
17	Indian Institute of Technology, Roorkee	31/05/2004	16	5
18	Indian Institute of Science Education & Research, Pune	29/05/2006	14	5
19	Indian Institute of Technology, Hyderabad	8/8/2008	12	3
20	Savitribai Phule Pune University, Pune	23/01/2009	11	9
21	Jadavpur University, Kolkata	30/03/2010	10	7
22	Indian Institute of Technology, Indore	7/4/2010	10	7
23	University of Hyderabad, Hyderabad	2/6/2011	9	5
24	Indian Institute of Science, Bengaluru	5/8/2015	5	3
25	Indian Institute of Technology (Indian School of Mines), Dhanbad	6/9/2016	4	2

Web Impact Factor (WIF)

WIF is one of the important quantitative indicators of a webometric study. According to Ingwersen, WIF means the ratio of links made to a website to the number of pages on the website. The number of in-links (IL) is the most important factor in WIF calculation. The formula for calculating the WIF is given below:

$$\text{R-WIF (In-link-WIF)} = \frac{\text{In-link (External backlinks to the Website)}}{\text{Number of Web pages published on the website Which are indexed by a search engine}}$$

Table 4 ascertains the data about the WIFs of the websites studied. It can be observed that Indian Institute of Technology, Indore, ranked first regarding WIF (8.678343949) and was followed by the Manipal Academy of Higher Education, Manipal (0.857142857) and Indian Institute of Technology Bombay, Mumbai (0.743362832). Meanwhile, Banaras Hindu

University, Varanasi, Jawaharlal Nehru University, New Delhi, and Jamia Millia Islamia, New Delhi, was in the23rd, 24th and 25th positions respectively. Out of the 25 top-ranked institutions, University of Delhi, Delhi, had highest number of in-links and was followed by Bharathiar University, Coimbatore, and Indian Institute of Technology, Indore. Indian Institute of Science Education and Research, Pune, Calcutta University, Kolkata, and Jadavpur University, Kolkata had the lowest number of in-links as compared to the other institutions studied.

Table 4: Web Impact Factor

Sr. No	Name	Webpages	In -Link	Self-Link	In-link WIF/R-WIF	Rank
1	Indian Institute of Technology, Indore	628000	5450000	6030000	8.678343949	1
2	Manipal Academy of Higher Education, Manipal	637000	546000	528000	0.857142857	2
3	Indian Institute of Technology, Mumbai	452000	336000	315000	0.743362832	3
4	Bharathiar University, Coimbatore	203000000	119000000	116000000	0.586206897	4
5	Amrita Vishwa Vidyapeetham, Coimbatore	1590000	858000	772000	0.539622642	5
6	Calcutta University, Kolkata	36700	19700	19700	0.536784741	6
7	Indian Institute of Technology, Kharagpur	282000	150000	198000	0.531914894	7
8	Indian Institute of Technology, Hyderabad	1880000	963000	1060000	0.512234043	8
9	University of Delhi, Delhi	1150000000	443000000	399000000	0.385217391	9
10	Jadavpur University, Kolkata	33400	12400	12600	0.371257485	10
11	Anna University, Chennai	128000	45400	44300	0.3546875	11
12	University of Hyderabad, Hyderabad	729000	182000	191000	0.249657064	12
13	Indian Institute of Technology (Indian School of Mines), Dhanbad	95900	23300	26200	0.242961418	13
14	Indian Institute of Technology, Guwahati	602000	119000	98400	0.197674419	14
15	Savitribai Phule Pune University, Pune	1260000	248000	325000	0.196825397	15

16	Indian Institute of Science Education & Research, Pune	112000	20600	25500	0.183928571	16
17	National Institute of Technology, Tiruchirappalli	612000	112000	104000	0.183006536	17
18	Indian Institute of Technology, Delhi	399000	66500	60500	0.166666667	18
19	Indian Institute of Technology, Kanpur	1450000	230000	286000	0.15862069	19
20	Indian Institute of Technology, Chennai	2400000	276000	292000	0.115	20
21	Indian Institute of Science, Bengaluru	2560000	271000	300000	0.105859375	21
22	Indian Institute of Technology, Roorkee	1440000	135000	176000	0.09375	22
23	Banaras Hindu University, Varanasi	8750000	504000	497000	0.0576	23
24	Jawaharlal Nehru University, New Delhi	7080000	372000	343000	0.052542373	24
25	Jamia Millia Islamia, New Delhi	20400000	889000	838000	0.043578431	25

Search engine optimisation (SEO)

Table 5 pertains to the data about the SEO ranks of the websites studied. SEO is useful for enhancing the popularity and visibility of websites. It also helps enhance the quality and quantity of website traffic from across the world. The figures in the table show that Indian Institute of Technology, Roorkee, ranked first regarding SEO and was followed by Amrita Vishwa Vidyapeetham, Coimbatore, and Indian Institute of Technology, Indore. Meanwhile, Anna University, Chennai, Indian Institute of Technology (Indian School of Mines), Dhanbad, and Indian Institute of Science, Education, and Research, Pune, ranked 23rd, 24th, and 25th respectively. It is clear from Table 5 that the majority of the institutions studied had very poor SEO results.

Table 5: Search Engine Optimization

SEO Rank	Name of the Institution	SEO Result
1	Indian Institute of Technology, Roorkee	A+
2	Amrita Vishwa Vidyapeetham, Coimbatore	A
3	Indian Institute of Technology, Indore	B
4	Jawaharlal Nehru University, New Delhi	B-

5	Manipal Academy of Higher Education, Manipal	B-
6	National Institute of Technology, Tiruchirappalli	B-
7	Indian Institute of Technology, Bombay	C+
8	Jamia Millia Islamia, New Delhi	C+
9	Indian Institute of Technology, Chennai	C
10	Indian Institute of Technology, Delhi	C
11	Indian Institute of Technology, Kanpur	C
12	Indian Institute of Science, Bengaluru	C-
13	University of Hyderabad, Hyderabad	C-
14	Indian Institute of Technology, Hyderabad	C-
15	Bharathiar University, Coimbatore	D+
16	Banaras Hindu University, Varanasi	D-
17	Jadavpur University, Kolkatta	D-
18	Indian Institute of Technology, Kharagpur	F
19	Indian Institute of Technology, Guwahati	F
20	Calcutta University, Kolkata	F
21	University of Delhi, Delhi	F
22	Savitribai Phule Pune University, Pune	F
23	Anna University, Chennai	F
24	Indian Institute of Technology (Indian School of Mines), Dhanbad	F
25	Indian Institute of Science Education & Research, Pune	F

Website security rank

While creating, hosting, and maintaining a website, the security of the website is of utmost importance. Website security issues involve attack from hackers, website malware, and other online threats. Efforts were made to know the website security issues of the institutions covered under this study. The data about the website security rank of the websites studied is presented in Table 6. The results show that out of selected 25 institutions,

11institutions'(44 percent) websites had very strong security, whereas five institutions' websites had average security, and two institutions' websites had poor security. The remaining seven institutions' websites had very poor security.

Table 6: Website security

Security Rank	Name	Security Result
1	Indian Institute of Technology, Roorkee	A+
2	Amrita Vishwa Vidyapeetham, Coimbatore	A+
3	Manipal Academy of Higher Education, Manipal	A+
4	Jamia Millia Islamia, New Delhi	A+
5	Indian Institute of Technology, Hyderabad	A+
6	Indian Institute of Technology, Chennai	A+
7	Indian Institute of Technology, Delhi	A+
8	National Institute of Technology, Tiruchirappalli	A+
9	Calcutta University, Kolkata	A+
10	Indian Institute of Science, Bengaluru	A+
11	Indian Institute of Technology (Indian School of Mines), Dhanbad	A+
12	Bharathiar University, Coimbatore	C
13	Indian Institute of Technology, Indore	C
14	Jawaharlal Nehru University, New Delhi	C
15	University of Hyderabad, Hyderabad	C
16	Indian Institute of Science Education & Research, Pune	C
17	Indian Institute of Technology, Guwahati	D+
18	Savitribai Phule Pune University, Pune	D+
19	Indian Institute of Technology, Bombay	F
20	Indian Institute of Technology, Kharagpur	F
21	Anna University, Chennai	F
22	Indian Institute of Technology, Kanpur	F
23	Banaras Hindu University, Varanasi	F
24	Jadavpur University, Kolkata	F
25	University of Delhi, Delhi	F

External backlinks

External backlink refers to other domains than the existing source. Table 7 presents the data about external backlinks. The figures in the table show that Indian Institute of Technology, Kanpur, ranked first with the highest number of external backlinks and was

followed by the Indian Institute of Technology ,Mumbai and Indian Institute of Technology, Kharagpur, with 3500000 and 3100000 external backlinks respectively. Meanwhile, Indian Institute of Technology (Indian School of Mines), Dhanbad, Indian Institute of Technology, Indore, and University of Delhi, Delhi, ranked 23rd, 24th and 25th,respectively.

Table 7: External backlinks

Rank	Name	External Backlinks
1	Indian Institute of Technology, Kanpur	9300000
2	Indian Institute of Technology, Bombay	3500000
3	Indian Institute of Technology, Kharagpur	3100000
4	Indian Institute of Technology, Delhi	1600000
5	Indian Institute of Science, Bangalore	1500000
6	Anna University, Chennai	1300000
7	Indian Institute of Technology, Madras	971300
8	Amrita Vishwa Vidyapeetham, Coimbatore	623700
9	Calcutta University, Kolkata	492400
10	Indian Institute of Technology, Guwahati	302500
11	Savitribai Phule Pune University, Pune	287800
12	Jawaharlal Nehru University, New Delhi	263200
13	Indian Institute of Technology, Roorkee	227800
14	Indian Institute of Technology, Hyderabad	202400
15	Bharathiar University, Coimbatore	171200
16	National Institute of Technology, Tiruchirappalli	143100
17	Banaras Hindu University, Varanasi	141900
18	Jamia Millia Islamia, New Delhi	97300
19	Indian Institute of Science Education & Research, Pune	75200
20	Jadavpur University, Kolkata	69900
21	University of Hyderabad, Hyderabad	41500
22	Manipal Academy of Higher Education, Manipal	31400
23	Indian Institute of Technology (Indian School of Mines), Dhanbad	21100
24	Indian Institute of Technology, Indore	17800
25	University of Delhi, Delhi	00008

Alexa traffic rank

The Alexa rank is calculated on the basis of proprietary methodology that combines a site's estimated traffic and visitor engagement over the past three months. Table 8 contains the data about the Alexa traffic rank of the websites studied. The results show that Anna University, Chennai, ranked first in Alexa traffic rank, with a loading time of 0.693 seconds, and was followed by the University of Delhi, Delhi, and Indian Institute of Technology, Hyderabad, with loading time 0.723 seconds and 0.764 seconds respectively. It can also be seen that Indian Institute of Technology (Indian School of Mines), Dhanbad, was in the last position regarding Alexa traffic rank. The institutions should improve the loading time of their websites to enhance their rank.

Table 8 : Alexa Traffic Rank

Alexa Rank	Name	Alexa Traffic Rank	Alexa Traffic Rank in India	Load Time
1	Anna University, Chennai	26445	2384	Very Fast (0.693 Seconds)
2	University of Delhi, Delhi	3730	293	Very Fast (0.723 Seconds)
3	Indian Institute of Technology Hyderabad, Hyderabad	80731	7059	Very Fast (0.764 Seconds)
4	Indian Institute of Technology, Guwahati	28595	3712	Very Fast (0.863 Seconds)
5	Indian Institute of Technology, Indore	157831	22550	Very Fast (0.877 Seconds)
6	Savitribai Phule Pune University, Pune	12615	866	Very Fast (0.921 Seconds)
7	Jamia Millia Islamia, New Delhi	40965	3549	Very Fast (0.932 Seconds)
8	University of Hyderabad, Hyderabad	66181	5731	Very Fast

				(0.932 Seconds)
9	Indian Institute of Technology, Mumbai	4144	417	Very Fast (0.933 Seconds)
10	Indian Institute of Technology, Delhi	12679	1261	Fast (0.977 Seconds)
11	Manipal Academy of Higher Education, Manipal	38856	5820	Fast (0.988 Seconds)
12	Indian Institute of Technology, Kanpur	9598	977	Fast (1.03 Seconds)
13	Banaras Hindu University, Varanasi	45780	4902	Fast (1.032 Seconds)
14	Calcutta University, Kolkata	90106	11420	Fast (1.048 Seconds)
15	Indian Institute of Technology, Kharagpur	14547	1522	Fast (1.146 Seconds)
16	Indian Institute of Technology, Roorkee	40375	4866	Fast (1.147 Seconds)
17	Indian Institute of Technology, Chennai	10433	658	Fast (1.172 Seconds)
18	Amrita Vishwa Vidyapeetham, Coimbatore	31192	3041	Fast (1.318 Seconds)
19	National Institute of Technology Tiruchirappalli, Tiruchirappalli	83631	11848	Fast (1.323 Seconds)
20	Jadavpur University, Kolkata	83088	13694	Average (1.606 Seconds)

21	Indian Institute of Science, Bengaluru	28581	1821	Average (1.775 Seconds)
22	Bharathiar University, Coimbatore	86499	9725	Average (1.833 Seconds)
23	Jawaharlal Nehru University, New Delhi	45122	3772	Average (1.911 Seconds)
24	Indian Institute of Science Education & Research, Pune	172359	16265	Slow (2.32 Seconds)
25	Indian Institute of Technology (Indian School of Mines), Dhanbad	107407	20563	Slow (2.763 Seconds)

Social media followers

The websites provide the links to the social media accounts of their respective institutions. Attempts were made to know the social media followers of the selected institutions on Twitter and YouTube. The data regarding this is presented in Table 9. The figures in the table reflect that among the top 25 ranked institutions, Indian Institute of Technology Bombay, Mumbai, had the highest number of followers on Twitter, with 83889 followers, and was followed by the Indian Institute of Technology, Madras, and Indian Institute of Science, Bengaluru, with 75477 and 58705 followers respectively. Efforts werealso made to find out the YouTube followers of the institutions. The results show that Jamia Millia Islamia, New Delhi, had the highest number of YouTube channel followers, with 31600 subscribers, and was followed by Indian Institute of Technology, Roorkee, and Indian Institute of Technology, Kanpur, with 11700 and 5950 subscribers respectively.

Table 9: Social media followers

TWITTER FOLLOWERS		
Followers Rank	**Institute Name**	**No of Followers**
1	Indian Institute of Technology, Mumbai	83889
2	Indian Institute of Technology, Chennai	75477
3	Indian Institute of Science, Bengaluru	58705

4	Indian Institute of Technology, Kharagpur	48171
5	Indian Institute of Technology, Delhi	42810
YOUTUBE CHANNEL FOLLOWERS		
Followers Rank	**Institute Name**	**No of Followers**
1	Jamia Millia Islamia, New Delhi	31600
2	Indian Institute of Technology, Roorkee	11700
3	Indian Institute of Technology, Kanpur	5950
4	Indian Institute of Technology, Kharagpur	5550
5	Manipal Academy of Higher Education, Manipal	1830

WISER Value

WISER stands for web indicators for scientific, technological, and innovation research. It is a web indicator that calculates the number of in-link pages, web pages, rich content files, and Google Scholar data.

WISER = log (visibility 50%) +log (size 20%) + log (Rich file15%) +log (scholer15%)

Table 10 pertains to the data about the WISER values of the websites studied. It is clear from the table that University of Delhi, Delhi, ranked first in the WISER index value and was followed by Bharathiar University, Coimbatore, and Jamia Millia Islamia, New Delhi. Meanwhile, Calcutta University, Kolkata, Indian Institute of Technology (Indian School of Mines), Dhanbad, and Jadavpur University, Kolkata, ranked 23rd, 24th,and 25th.

Table 10: WISER Index and Ranking

Sr. No	Name	WISER Index Value	WISER Ranking
1	University of Delhi, Delhi	23.8984	1
2	Bharathiar University, Coimbatore	21.6263	2
3	Jamia Millia Islamia, New Delhi	17.1146	3

4	Jawaharlal Nehru University, New Delhi	16.4603	4
5	Indian Institute of Technology, Chennai	16.1685	5
6	Indian Institute of Technology, Kanpur	15.9689	6
7	Indian Institute of Technology, Indore	15.7276	7
8	Amrita Vishwa Vidyapeetham, Coimbatore	15.724	8
9	Savitribai Phule Pune University, Pune	15.703	9
10	Banaras Hindu University, Varanasi	15.6059	10
11	Indian Institute of Technology, Hyderabad	15.4528	11
12	Indian Institute of Science, Bengaluru	15.2905	12
13	Indian Institute of Technology, Mumbai	15.2845	13
14	Indian Institute of Technology, Guwahati	14.965	14
15	Indian Institute of Technology, Roorkee	14.852	15
16	Manipal Academy of Higher Education, Manipal	14.4895	16
17	Indian Institute of Technology , Kharagpur	14.3514	17
18	University of Hyderabad, Hyderabad	14.1815	18
19	National Institute of Technology, Tiruchirappalli	14.0306	19
20	Anna University, Chennai	12.4271	20
21	Indian Institute of Technology, Delhi	12.3592	21
22	Indian Institute of Science Education & Research, Pune	11.6409	22
23	Calcutta University, Kolkata	11.0481	23
24	Indian Institute of Technology (Indian School of Mines), Dhanbad	10.8696	24
25	Jadavpur University, Kolkata	10.3329	25

Major findings :

According to the data from 2018–19, state public universities and private universities contributed nearly 68 percent of the Indian higher education system, and the institutions of national importance formed12.78 percent, whereas institutions under the State Legislature Act and central open universities contributed very little. Since 2015, the NIRF has been working as a nodal agency for ranking the higher education institutions in India. Out of the

top 10of such institutions, seven were IITs. Meanwhile, out of the top 25,10 were IITs. The institutions have three different types of domain extension: **.ac.in**, **.edu**, and **.edu.in.** Twenty institutions (80 percent) had the domain extension **.ac.in**, followed by four (16 percent) with**.edu.in**, and one institution (4percent) with **.edu.** The majority of the institutions' (80 percent) domains had completed more than 10 years since registration.

Indian Institute of Technology, Indore, ranked first regarding WIF (8.678343949) and was followed by the Manipal Academy of Higher Education, Manipal (0.857142857) and Indian Institute of Technology Bombay, Mumbai (0.743362832). Out of the top 25 institutions, University of Delhi, Delhi had highest number of in-links and was followed by Bharathiar University, Coimbatore, and Indian Institute of Technology, Indore. Indian Institute of Technology, Roorkee, ranked first regarding SEO and was followed by Amrita Vishwa Vidyapeetham, Coimbatore, and Indian Institute of Technology, Indore. As for security,11 institutions' (44 percent) websites had very strong security, whereas five institutions' websites had average security and two institutions' websites had poor security.

Indian Institute of Technology, Kanpur, ranked first in the highest number of external backlinks and was followed by Indian Institute of Technology, Bombay, and Indian Institute of Technology, Kharagpur, with 3500000 and3100000 external backlinks respectively. Anna University, Chennai, ranked first in Alexa traffic rank, with a loading time of 0.693 seconds, and was followed by the University of Delhi, Delhi, and Indian Institute of Technology, Hyderabad, with loading times of 0.723 seconds and0.764 respectively. Among the top 25 institutions, Indian Institute of Technology, Bombay, had the highest number of followers on Twitter, with 83889 followers, and was followed by Indian Institute of Technology, Madras, and Indian Institute of Science, Bengaluru, with 75477 and 58705 followers respectively. Jamia Millia Islamia, New Delhi, had the highest number of YouTube channel followers, with 31600 subscribers, and was followed by Indian Institute of Technology, Roorkee, and Indian Institute of Technology, Kanpur, with 11700 and5950 subscribers respectively. University of Delhi, Delhi, ranked first in the WISER index value and was followed by Bharathiar University, Coimbatore, and Jamia Millia Islamia, New Delhi.

Conclusion

The findings of this study revealed that for ensuring more presence and visibility for their websites, the institutions should pay attention to factors such as WIF, WISER value, and Alexa ranking. Website security should also be prioritised, and the necessary steps should be taken to secure the websites. In order to increase the usability of the website, proper external backlinks should be provided. It is better to upload selected informative files with proper in-linking rather than a large number of files. At the time of web designing, webometric indicators should be considered for enhancing the visibility and presence of the website.

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Appendix – I: Top 100 Indian Higher Education Institutions by NIRF for the year 2020

Rank	Institute Name	State	Score
1	Indian Institute of Technology Madras, Chennai	Tamil Nadu	85.31
2	Indian Institute of Science, Bengaluru	Karnataka	84.18
3	Indian Institute of Technology Delhi, New Delhi	Delhi	81.33
4	Indian Institute of Technology Bombay, Mumbai	Maharashtra	80.75
5	Indian Institute of Technology Kharagpur, Kharagpur	West Bengal	75.85
6	Indian Institute of Technology Kanpur, Kanpur	Uttar Pradesh	74.99
7	Indian Institute of Technology Guwahati, Guwahati	Assam	68.81
8	Jawaharlal Nehru University, New Delhi	Delhi	68.76
9	Indian Institute of Technology Roorkee, Roorkee	Uttarakhand	68.48
10	Banaras Hindu University, Varanasi	Uttar Pradesh	62.03
11	Calcutta University, Kolkata	West Bengal	61.01
12	Jadavpur University, Kolkata	West Bengal	60.77
13	Amrita Vishwa Vidyapeetham, Coimbatore	Tamil Nadu	60.74
14	Manipal Academy of Higher Education, Manipal	Karnataka	59.96

15	University of Hyderabad, Hyderabad	Telangana	59.92
16	Jamia Millia Islamia, New Delhi	Delhi	59.85
17	Indian Institute of Technology Hyderabad, Hyderabad	Telangana	59.59
18	University of Delhi, Delhi	Delhi	58.97
19	Savitribai Phule Pune University, Pune	Maharashtra	58.77
20	Anna University, Chennai	Tamil Nadu	58.1
21	Bharathiar University, Coimbatore	Tamil Nadu	57.32
22	Indian Institute of Technology (Indian School of Mines), Dhanbad	Jharkhand	56.05
23	Indian Institute of Technology Indore, Indore	Madhya Pradesh	55.94
24	National Institute of Technology Tiruchirappalli, Tiruchirappalli	Tamil Nadu	55.92
25	Indian Institute of Science Education & Research Pune, Pune	Maharashtra	55.43
26	Indian Institute of Technology (BHU) Varanasi, Varanasi	Uttar Pradesh	54.82
27	Birla Institute of Technology & Science, Pilani	Rajasthan	54.13
28	Vellore Institute of Technology, Vellore	Tamil Nadu	53.89
29	Indian Institute of Science Education & Research Kolkata, Mohanpur	West Bengal	53.49
30	Homi Bhabha National Institute, Mumbai	Maharashtra	53.2
31	Aligarh Muslim University, Aligarh	Uttar Pradesh	52.54
32	National Institute of Technology Rourkela, Rourkela	Odisha	51.87
33	National Institute of Technology Karnataka, Surathkal	Karnataka	51.86
34	Institute of Chemical Technology, Mumbai	Maharashtra	51.7
35	Indian Institute of Technology Gandhinagar, Gandhinagar	Gujarat	51.49
36	Andhra University, Visakhapatnam	Andhra Pradesh	51.24
37	Jamia Hamdard, New Delhi	Delhi	51.02
38	Siksha `O` Anusandhan, Bhubaneswar	Odisha	50.97
39	Indian Institute of Technology Ropar, Rupnagar	Punjab	50.92
40	Indian Institute of Science Education & Research Bhopal, Bhopal	Madhya Pradesh	50.83
41	University of Madras, Chennai	Tamil Nadu	50.76

42	Kerala University, Thiruvananthapuram	Kerala	50.71
43	Indian Institute of Engineering Science and Technology, Shibpur	West Bengal	50.41
44	Panjab University, Chandigarh	Chandigarh	50.24
44	Kalinga Institute of Industrial Technology, Bhubaneswar	Odisha	50.24
46	National Institute of Technology Warangal, Warangal	Telangana	49.82
47	Mysore University, Mysuru	Karnataka	49.75
48	Shanmugha Arts Science Technology & Research Academy, Thanjavur	Tamil Nadu	49.4
49	Mahatma Gandhi University, Kottayam	Kerala	49.29
50	King George`s Medical University, Lucknow	Uttar Pradesh	48.91
51	Sri Ramachandra Institute of Higher Education And Research, Chennai	Tamil Nadu	48.59
51	Thapar Institute of Engineering & Technology, Patiala	Punjab	48.59
53	Osmania University, Hyderabad	Telangana	48.54
54	Indian Institute of Technology Patna, Patna	Bihar	48.09
54	JSS Academy of Higher Education and Research, Mysuru	Karnataka	48.09
56	Indian Institute of Technology Bhubaneswar, Bhubaneswar	Odisha	47.96
57	Tata Institute of Social Sciences, Mumbai	Maharashtra	47.45
58	S. R. M. Institute of Science and Technology, Chennai	Tamil Nadu	47.27
59	Indian Institute of Science Education & Research Mohali, Mohali	Punjab	47.19
60	Gujarat University, Ahmedabad	Gujarat	47.1
61	Sathyabama Institute of Science and Technology, Chennai	Tamil Nadu	47.03
62	Delhi Technological University, New Delhi	Delhi	46.89
63	Amity University Noida, Gautam Budh Nagar	Uttar Pradesh	46.88
64	Alagappa University, Karaikudi	Tamil Nadu	46.85
65	Tezpur University, Tezpur	Assam	46.83
66	Saveetha Institute of Medical and Technical Sciences, Chennai	Tamil Nadu	46.81
67	Indian Institute of Technology Mandi, Mandi	Himachal Pradesh	46.56
68	Sri Venkateswara University, Tirupati	Andhra Pradesh	46.14

69	Visva Bharati, Santiniketan	West Bengal	45.95
70	Koneru Lakshmaiah Education Foundation University, Vaddeswaram	Andhra Pradesh	45.89
71	Malaviya National Institute of Technology, Jaipur	Rajasthan	45.65
72	Gauhati University, Guwahati	Assam	45.48
73	Symbiosis International, Pune	Maharashtra	45.43
74	North Eastern Hill University, Shillong	Meghalaya	45.31
75	Dr. D. Y. Patil Vidyapeeth, Pune	Maharashtra	45.08
76	Calicut University, Malappuram	Kerala	44.71
77	Bharathidasan University, Tiruchirappalli	Tamil Nadu	44.7
78	University of Kashmir, Srinagar	Jammu and Kashmir	44.67
79	Banasthali Vidyapith, Banasthali	Rajasthan	44.61
80	Indian Institute of Science Education & Research Thiruvananthapuram, Thiruvananthapuram	Kerala	44.53
81	Pondicherry University, Puducherry	Pondicherry	44.48
82	Shiv Nadar University, Dadri	Uttar Pradesh	44.47
83	Sri Sivasubramaniya Nadar College of Engineering, Kancheepuram	Tamil Nadu	44.42
84	Madurai Kamaraj University, Madurai	Tamil Nadu	44.27
85	Birla Institute of Technology, Ranchi	Jharkhand	44.17
85	PSG College of Technology, Coimbatore	Tamil Nadu	44.17
87	Bharath Institute of Higher Education & Research, Chennai	Tamil Nadu	44.03
88	Guru Nanak Dev University, Amritsar	Punjab	43.81
89	Cochin University of Science and Technology, Cochin	Kerala	43.71
90	University of Jammu, Jammu	Jammu and Kashmir	43.61
91	Sawai Man Singh Medical College, Jaipur	Rajasthan	43.5
92	SVKM`s Narsee Monjee Institute of Management Studies, Mumbai	Maharashtra	43.07
93	Motilal Nehru National Institute of Technology, Allahabad	Uttar Pradesh	42.87
94	National Institute of Technology Silchar, Silchar	Assam	42.76
95	Mumbai University, Mumbai	Maharashtra	42.45

96	National Institute of Technology Durgapur, Durgapur	West Bengal	42.26
97	Datta Meghe Institute of Medical Sciences, Wardha	Maharashtra	42.24
98	Bharati Vidyapeeth, Pune	Maharashtra	42.23
99	Lovely Professional University, Phagwara	Punjab	41.81
100	Mizoram University, Aizawl	Mizoram	41.8