

WEBOMETRIC STUDY ON LIBRARY WEBSITES OF NATIONAL INSTITUTE OF TECHNOLOGIES (NITS) IN INDIA: A LINK ANALYSIS APPROACH

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Abstract

Now a days obtaining the web portal has become an obligatory to every organizations and individuals as well to execute their tasks in real time basis where the libraries are also not except from the same. It would be tough to imagine without the touch of the e-world. Here, an attempt has been made to analyze the NITs Libraries web portals of India by applying the webometric indicators to check their existence and performance in the virtual glob and ranked them according to the data availability in WIF and R-WIF basis. Further correlated both the ranking formulas with Spearman's Rank Correlation which was found that WIF and R-WIF are correlated and associated where there is very less difference between the two ranking methods.

Keywords: NITs, Webometric, Link analysis, Library websites

1.0 Introduction:

The modern tendency articulates that information seeking behavior has been changed from the paper format to the web format So that it is an inevitable to the human beings to rely on web content to get instant information irrespective of the circumstances and comfortability. It is witnessed that maintaining the own website has been obligatory for everyone what we are keen-sighted today institutional websites, social networks, personal blogs etc. Hence, No doubt that websites have become the main source to search for the information and attract the clientele as well over the network. Websites have to be very informative and rich in content to reach the end users to encounter their dynamic needs by the time.

There is a compulsion to oversee the websites recurrently how they are presence on the web and playing their vital role in changing world. Especially for the academic libraries it is the main motto to keep updating and proving required information even the beyond their premises. In changing bio sphere a fundamental role is being played by Library websites in regarding dissemination of information effectively. Even though there are few circumstances that still users may find difficult to retrieve the needed pages or material what they seek for. Here an attempt has been made to evaluate the NITs library websites by using webometric techniques and ranked based on the results in terms of Web Impact Factor (WIF) and Revised Web Impact Factor (R-WIF).

2.0 A Bird View on Webometric:

Webometrics also called as *cyber metric* engages in measuring the World Wide Web (WWW) to acquire knowledge about the number and types of hyperlinks, structure of the WWW and usage patterns which emphasizes on the progress of applied methods for the information presence on the web. According to Bjorn born and Ingwersen¹ webometrics is the study of the quantitative aspects of the web phenomena which includes the constructions and use of information resources, structures and technologies on web Whereas Thelwell² says it's a study of web-based content with primarily quantitative methods for social science research goals using techniques that are not specific to one field of the study.

Webometric helps to understanding the dynamic approach towards the sites in terms of in links, self-links and external-links which reveals the nature and ability in serving the end users at global perspective. Here, library websites of NITs have been selected for the study since they are the premier technical bodies in India.

3.0 Need of the Study:

The need of this study is to understand the role of NITs libraries on virtual world being the main source of the information hub. This study is projected to audit and map the websites of NITs libraries in India in order to measure their web structures, content, and visibility/presence. The study also focus on areas including the number of web pages, in-links, self-links, pages link to the webpage on NITs library centers websites, and the most popular link(s) etc. which are targeted by these NITs libraries.

4.0 Scope and Limitation of the Study:

In this current study the author has reflected the number of web pages, its internal links, external links and overall web impact factors for NITs library websites of India. The exclusive and active websites have been calculated using popular search engine Google. Then, the websites have been compared and ranked using webometric indicators.

5.0 Objectives of the Study:

The objectives of the study as follows:

- To find out the number of web pages, number of link pages, number of self-link pages, external link pages, and in link pages of NITs library websites in India.
- To measure the web impact factor, revised web impact factor and rank them as per the WIF.
- Calculate WIF and R-WIF of library websites of NITs. and
- Calculate the correlation between WIF and R-WIF of library websites of NITs of India through Spearman's Rank Correlation.
- To know the condition of the NITs libraries on the WWW in serving the end users.

6.0 Methodology:

A suitable search engine is required for calculating the WIF and R-WIF of library websites of NITs of India which should be massive, crawls more hyperlinks with advanced search facilities to sum the links possessed by the websites. Here, the author has selected the Google search engine since it's wide popularity which covers the required norms to assess as stated above. Exploiting Boolean operators different formulations have been used to collect the data, i.e., number of webpages, number of In-links and number of self-links.

Search Command	Results	Example
site:domain-name.	Total number of webpages extracted in Google (WP)	Site: www.library.nitrkl.ac.in
site:domain-name AND link domain: domain name.	To extract number of self-links (SL)	Site: www.library.nitrkl.ac.in AND link domain: www.library.nitrkl.ac.in
site:domain-name NOT link domain: domain-name.	To retrieve the Number of In-links (IL)	Site: www.library.nitrkl.ac.in NOT link domain: www.library.nitrkl.ac.in
$WIF = IL + SL/WP$	Web Impact Factor (WIF) can be calculated	number of In-links and number of Self-links divided by total number of web pages mined in Google
$R-WIF = IL/WP$	Revised Web Impact Factor (R-WIF) can be calculated	dividing number of In-links with total number of web pages dig out in Google

Spearman’s Rank Correlation-The relationship between WIF and R-WIF can be established through the correlation coefficient (r). In this attempt, the Spearman’s Rank Correlation has been used.

According to this method,

$$\text{Correlation coefficient (r)} = \frac{N\sum XY - (\sum X) * (\sum Y)}{\text{Sqrt} ([N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2])}$$

7.0 Analysis of Data:

List of NITs in India has been collected from the Council of NITs site which is the supreme governing body of India's National Institutes of Technology (NIT) system. Here, all functioning NITs have been taken for the study to add impartiality instead of going for selected or top NITs since it is difficult to consider and the results have been extracted from Google search engine on 11.10.2016. It is observed that most of the NITs libraries are disseminating the information through the parent website where they are still laid behind to maintain a separate portal for library and some of them have failed to get even a single web page.

Table:1 - List of NITs with URL Address

S N	Name of NIT	Parent Website URL	Status of Separate Library Portal and Home Page URL
1	National Institute of Technology Agartala	http://www.nita.ac.in/index.html	No
2	National Institute of Technology, Mizoram	http://www.nitmz.ac.in/	http://www.nitmz.ac.in/DisplayPage.aspx?page=ck&ItemID=18
3	Motilal Nehru National Institute of Technology Allahabad	http://www.mnnit.ac.in/	http://mnnit.ac.in/index.php/lib-home
4	Maulana Azad National Institute of Technology Bhopal	http://www.web.manit.ac.in/	http://www.web.manit.ac.in/index.php?option=com_content&view=article&id=85&Itemid=165
5	National Institute of Technology Calicut	http://www.nitc.ac.in/	http://www.library.nitc.ac.in/
6	National Institute of Technology Delhi	http://nitdelhi.ac.in/	http://nitdelhi.ac.in/centralLibrary.php
7	National Institute of Technology Nagaland	http://nitnagaland.ac.in/homenew/	http://nitnagaland.ac.in/homenew/facilities/library.jsp
8	National Institute of Technology Durgapur, West Bengal	http://www.nitdgp.ac.in/	http://www.nitdgp.ac.in/library.php
9	National Institute of Technology Uttarakhand	http://www.nituk.ac.in/	http://www.nituk.ac.in/library.php
10	National Institute of Technology Goa	http://www.nitgoa.ac.in/	http://www.nitgoa.ac.in/Deptindex.aspx?page=a&ItemID=93&nDeptID=20
11	National Institute of Technology Hamirpur	http://www.nith.ac.in/	http://library.nith.ac.in/library/index.php
12	National Institute of Technology Manipur	http://www.nitmanipur.ac.in/	http://www.nitmanipur.ac.in/DisplayPage.aspx?page=cq&ItemID=23
13	Malaviya National Institute of Technology Jaipur	http://www.mnnit.ac.in/	http://www.mnnit.ac.in/facilities/library.php
14	Dr. B R Ambedkar National Institute of Technology Jalandhar	http://www.nitj.ac.in/	http://www.nitj.ac.in/index.php/nitj_cinfo/index/66
15	National Institute of Technology Jamshedpur	http://nitjsr.ac.in/	http://nitjsr.ac.in/library/
16	National Institute of Technology	http://www.nitt.edu/home/nitp/	http://www.nitt.edu/home/students/faciliti

	Puducherry		http://www.nitkkr.ac.in/pagesUI/homePage.shtml?page=home&pageEvent=null&language=2	http://www.nitkkr.ac.in/pagesUI/homePage.jsf?pageEvent=50&page=content&language=2
17	National Institute of Technology Kurukshetra	http://www.nitk.ac.in/	http://www.nitk.ac.in/	http://library.nitk.ac.in/
18	National Institute of Technology Karnataka, Surathkal	http://www.vnit.ac.in/	http://www.vnit.ac.in/index.php/centers/academic-service-centers/2014-11-10-11-26-00	
19	Visvesvaraya National Institute of Technology Nagpur	http://www.nitp.ac.in/php/home.php	http://www.nitp.ac.in/php/facilities.php?pp=clib	
20	National Institute of Technology Patna	http://www.nitr.ac.in/	http://www.nitr.ac.in/dept-cl.php?dept=About%20us	
21	National Institute of Technology Raipur	http://www.nitrkl.ac.in/	http://www.nitrkl.ac.in/	http://library.nitrkl.ac.in/
22	National Institute of Technology Rourkela	http://nitmeghalaya.in/nitm_web/index.php	http://nitmeghalaya.in/nitm_web/fp/central_library/central_library_about.html	
23	National Institute of Technology Meghalaya	http://www.nits.ac.in/	http://www.nits.ac.in/academics/library.php	
24	National Institute of Technology Silchar	http://www.nitsikkim.ac.in/	http://www.nitsikkim.ac.in/	http://kic.nitsikkim.ac.in/
25	National Institute of Technology Sikkim	http://www.nitsri.net/indexo.htm	http://www.nitsri.net/library/index.htm	
26	National Institute of Technology Srinagar	http://www.svmit.ac.in/	http://www.svmit.ac.in/resources/library/	
27	S V National Institute of Technology Surat	http://www.nitt.edu/home/	http://www.nitt.edu/home/students/facilitieservices/library/	
28	National Institute of Technology Tiruchirappalli	http://www.nitw.ac.in/main/	http://www.nitw.ac.in/department/library/	
29	National Institute of Technology Warangal	https://www.nitap.in/	https://www.nitap.in/facilities/library.aspx	
30	National Institute of Technology Arunachal Pradesh			

It is found that only few institutes have been succeeded to get mere results out of 30 NITs where the others are unsuccessful to acquire even minimum points to get considering for the ranking. Data analysis reveals that which has been shown in table-2 NIT Silchar has been secured 1st rank in both the rankings WIF as well as R-WIF. Followed by MNIT, Jaipur and NIT, Jamshedpur in WIF ranking whereas in R-WIF ranking gradually NIT, Jamshedpur and NIT Tiruchirappalli have been succeeded to get place after the 1st position.

Table:2 - Comparing the Ranking of WIF and R-WIF of top NITs of India

SN	Name of the Library	WP	IL	SL	IL+SL	WIF	R-WIF
1	National Institute of Technology Agartala	0	0	0	0	0	0
2	National Institute of Technology, Mizoram	38	0	0	0	0	0
3	Motilal Nehru National Institute of Technology Allahabad	1	0	0	0	0	0
4	Maulana Azad National Institute of Technology Bhopal	564	0	0	0	0	0
5	National Institute of Technology Calicut	181	0	2	2	0.011049724 (10th)	0

6	National Institute of Technology Delhi	1	0	0	0	0	0
7	National Institute of Technology Nagaland	1	0	0	0	0	0
8	National Institute of Technology Durgapur, West Bengal	1	0	0	0	0	0
9	National Institute of Technology Uttarakhand	6	0	0	0	0	0
10	National Institute of Technology Goa	4	0	0	0	0	0
11	National Institute of Technology Hamirpur	0	0	0	0	0	0
12	National Institute of Technology Manipur	51	0	0	0	0	0
13	Malaviya National Institute of Technology Jaipur	1	0	1	1	1 (2nd)	0
14	Dr. B R Ambedkar National Institute of Technology Jalandhar	1	0	0	0	0	0
15	National Institute of Technology Jamshedpur	18	3	9	12	0.666666667 (3rd)	0.1666667 (2nd)
16	National Institute of Technology Puducherry	7	0	2	2	0.285714286 (5th)	0
17	National Institute of Technology Kurukshetra	214	0	0	0	0	0
18	National Institute of Technology Karnataka, Surathkal	18	2	3	5	0.277777778 (6th)	0.1111111 (4th)
19	Visvesvaraya National Institute of Technology Nagpur	3	0	0	0	0	0
20	National Institute of Technology Patna	13	0	0	0	0	0
21	National Institute of Technology Raipur	11	0	0	0	0	0
22	National Institute of Technology Rourkela	436	4	4	8	0.018348624 (9th)	0.0091743 (7th)
23	National Institute of Technology Meghalaya	1	0	0	0	0	0
24	National Institute of Technology Silchar	1	1	1	2	2 (1st)	1 (1st)
25	National Institute of Technology Sikkim	19	1	1	2	0.105263158 (8th)	0.0526316 (5th)
26	National Institute of Technology Srinagar	7	0	0	0	0	0
27	S V National Institute of Technology Surat	80	4	5	9	0.1125 (7th)	0.05 (6th)
28	National Institute of Technology Tiruchirappalli	7	1	2	3	0.428571429 (4th)	0.1428571 (3rd)
29	National Institute of Technology Warangal	13	0	0	0	0	0

30	National Institute of Technology Arunachal Pradesh	1	0	0	0	0	0
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Here, in this study the Spearman’s Rank Correlation has been used to establish The relationship between WIF and R-WIF through the correlation coefficient(r). The correlation coefficient (r) relates the strength and direction of linear relationship between two variables. The coefficient of determination represents the percent of the data that is the near to the line of best fit. Correlation has to be always between -1.0 and +1.0. If the correlation is positive, we have a positive relationship. If it is negative, the relationship is negative as shown in Table-3.

According to this method,

$$\text{Correlation coefficient (r)} = \frac{N\sum XY - (\sum X) * (\sum Y)}{\text{Sqrt} ([N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}$$

where, X=R-WIF, Y=WIF, Σ=Algebraic sum;N=Number.

Thus, the correlation coefficient (r) can be calculated as mentioned above. The values used in the formula are: Number (N) = 30; ΣX =1.53; ΣY = 4.90; ΣXY = 2.21; ΣX² =1.06; ΣY² =5.81.

Table:3 - Correlation CoefficientRelation

SN	URL of the Library	X (R-WIF)	Y (WIF)	X ²	Y ²	XY
1	http://www.nitmz.ac.in/DisplayPage.aspx?page=ck&ItemID=18	0	0	0	0	0
2	http://mnnit.ac.in/index.php/lib-home	0	0	0	0	0
3	http://www.web.manit.ac.in/index.php?option=com_content&view=article&id=85&Itemid=165	0	0	0	0	0
4	http://www.library.nitc.ac.in/	0	0.01105	0	0.000122	0
5	http://nitdelhi.ac.in/centralLibrary.php	0	0	0	0	0
6	http://nitnagaland.ac.in/homenew/facilities/library.jsp	0	0	0	0	0
7	http://www.nitdgp.ac.in/library.php	0	0	0	0	0
8	http://www.nituk.ac.in/library.php	0	0	0	0	0
9	http://www.nitgoa.ac.in/Deptindex.aspx?page=a&ItemID=93&nDeptID=20	0	0	0	0	0
10	http://library.nith.ac.in/library/index.php#gallery/libimages/1.jpg	0	0	0	0	0

11	http://www.nitmanipur.ac.in/DisplayPage.aspx?page=cq&ItemID=23	0	0	0	0	0
12	http://www.mnit.ac.in/facilities/library.php	0	1	0	1	0
13	http://www.nitj.ac.in/index.php/nitj_cinfo/index/66	0	0	0	0	0
14	http://nitjsr.ac.in/library/	0.166667	0.666667	0.027778	0.444444	0.111111
15	http://www.nitt.edu/home/students/facilitiesnserVICES/library/	0	0.285714	0	0.081633	0
16	http://www.nitkr.ac.in/pagesUI/homePage.jsf?pageEvent=50&page=content&language=2	0	0	0	0	0
17	http://library.nitk.ac.in/	0.111111	0.277778	0.012346	0.07716	0.030864
18	http://www.vnit.ac.in/index.php/centers/academic-service-centers/2014-11-10-11-26-00	0	0	0	0	0
19	http://www.nitp.ac.in/php/facilities.php?pp=club	0	0	0	0	0
20	http://www.nitr.ac.in/dept-cl.php?dept=About%20us	0	0	0	0	0
21	http://library.nitrkl.ac.in/	0.009174	0.018349	8.42E-05	0.000337	0.000168
22	http://nitmeghalaya.in/nitm_web/fp/central_library/central_library_about.html	0	0	0	0	0
23	http://www.nits.ac.in/academics/library.php	1	2	1	4	2
24	http://kic.nitsikkim.ac.in/	0.052632	0.105263	0.00277	0.01108	0.00554
25	http://www.nitsri.net/library/index.htm	0	0	0	0	0

26	http://www.svnit.ac.in/resources/library/	0.05	0.1125	0.0025	0.012656	0.005625
27	http://www.nitt.edu/home/students/facilities/services/library/	0.142857	0.428571	0.020408	0.183673	0.061224
28	http://www.nitw.ac.in/department/library/	0	0	0	0	0
29	https://www.nitap.in/facilities/library.aspx	0	0	0	0	0
30	National Institute of Technology Agartala	0	0	0	0	0
	Total	1.532441	4.905892	1.065886	5.811106	2.214533

$$\begin{aligned}
 r &= \frac{30 \times 2.21 - (1.53) \times (4.90)}{\sqrt{([30 \times 1.06 - (1.06)] [30 \times 5.81 - (5.81)])}} \\
 &= \frac{66.3 - 7.497}{\sqrt{(31.8 - 1.06)(174.3 - 5.81)}} \\
 &= \frac{58.803}{\sqrt{30.74 \times 168.49}} \\
 &= \frac{58.803}{71.967} \\
 &= + 0.817
 \end{aligned}$$

Thus, the value shows the positive relationship (r-plus sign) between R-WIF and WIF which indicates that there is much association or closeness between R-WIF and WIF. In general, there is very less variation and closeness between R-WIF and WIF.

8.0 Findings and Recommendations:

The present study optimistically provides a fair idea and information about the websites of all NITs library centers of the country. The study states that the NITs library centers do not have much impact on the Web. As the study observed that there are many negative remarks in the presence of their existence over WWW.

8.1 Findings

- It has been found that there are many NITs libraries which do not have even single portal to extend the services.

- It is observed that among the total numbers very few NITs have been included library information in the parent site which is also even not satisfied as content base.
- It is also observed that there is no information regarding the updating of the web portal every so often.

8.2 Recommendations

Based on the above findings, the study also proposes few recommendations which will help to make their website interactive, attractive and there by more user friendly. It will also be useful to users of NITs websites to evaluate its content, quality of information, design and organization of information. Hence, it is essential to the NITs libraries to step forward to enrich the quality of library services even beyond the library premises.

- A separate web portal has to be maintained by the library administration with keep updating periodically.
- Site map should be provided to view the overall functions easily.
- Most of the centres have totally failed to occupy in-links, self-links and which are helpful to resource sharing, evaluate the content of the site and reputation as well.
- Many of the library sites are having less web pages which shows the lack of content in their websites. Hence, providing the number of web pages with valuable content in regarding to satisfy their respective users is essential.
- There is a strong need to take personal interest by the parent organizations/management/authority to develop the websites with rich contents to satisfy the users which in turn attracts many new users

9.0 Conclusion:

WIF and R-WIF have been widely being used as webometric indicators to judge the quality of websites. Web link analysis of websites is the vital thing to understand how they are well conventional and serving to the end users in global perspective. Of course that Indian Libraries are also taking the better shape in extending their services in the electronic format as well which is the challenging to the LIS professionals to keep updating with the dynamic world over the internet but even there is a necessity to the library professionals to concentrate on getting exposed to the world by fulfilling the web content criteria's.

10.0 Reference:

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