# Knowledge Resources Heritage of India: A Webometric Analysis

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Abstract - This paper presents the webometric analysis of 16 websites of Knowledge Resources Heritage of India comes under Ministry of Culture, Government of India. This study categories the domains or top-level domains of the websites. Domain and page authority, discovered and lost link, internal and external links, global traffic ranking and Google PageRank of the websites is calculated using appropriate tools such as SEO MOZ, Alexa Web Ranking Tool and Google PageRank. It is found that the website of Khuda Baksh Oriental Public Library has the highest domain and page authority of 62 and 50 respectively. The website of Khuda Baksh Oriental Public Library has highest number of internal links i.e. 3,10,86,062 and external links about 21,12,980 in the study. Web designer take an advantage from this study and design the website effectively in such a manner that people visit the website frequently.

**Keywords** – Webometric, knowledge resources heritage, top-level domain, global traffic ranking, discovered link

# Introduction

Information has become one of the fundamental needs of the human to grow and to develop specially for the developing nations or third world nation. The exponential growth of information and communication technology and the invention of Internet has led the change in accessing of information. Later, the emergence of mobile devices made the Internet or the web more exposed to masses. Users now used to access the required information on their fingertips through mobile devices anywhere anytime. As the Internet becomes an essential information access tool for general purposes to research and academic purposes to scholarly communication. Websites act as a communication tool which provide information about the organisations, institutions, etc. and provide services to the users.

In present scenario India has emerged as a popular tourist destination and the websites are very useful to provide deep and detail information about the heritage and culture of the country which increases the curiosity among tourists about the heritage, so the present study is to analyse how effective the accessibility and functionality of the websites.

# Webometric

Since the mid-1990's increasing effort have been made to investigate the nature and properties of theWorld Wide Web by applying modern informetric methodologies to its space of contents, link structures and search engines<sup>1</sup>. The term 'webomterics' was first coined by Almind and Ingwersen in 1997. The term webometrics consists of two words "web" and "metrics" which means measurements the 'quantitative aspects'<sup>2</sup> of websites. Webometric is also known as cybermetrics or nettometrics.

Webometric is an evolution of bibliometric to the web environment i.e. bibliometric evolved toscientometric then informetric and then comes webometric. Webometrics covers research of all network-based communication using informetric or other quantitative measures<sup>3</sup>.

According to Thelwall<sup>4</sup>, Webometrics is concerned with measuring aspects of the web: web sites, web pages, parts of web pages, words in web pages, hyperlinks, web search engine results.

Webometric analysis is a study of four aspects of the websites-

- Analysis of internal and external links of the websites.
- Content analysis of webpages.
- Evaluation of search engine performance.
- Descriptive analysis of the websites.

Webometric analysis is used to rank the world universities on the basis of their websites and their online impact. Webometric analysis helps in determining the structure and functioning of the websites globally.

#### **Review of the Literature**

Pal, Kar &Sardar<sup>5</sup> in their work studied the websites of ICCSR sponsored research institutions in India. They used many webometric tools to carry out their study such as SEO Review Tools, Alexa, SocScibot4 and Pajek. In Global Popularity Ranking (GPR) of Centre for Policy Research was 3,52,513 which was the best among the 29 institutions. Also, Centre for Policy Research tops in the list of domain authority and page authority with 53 and 49 respectively.

Majhi & Das<sup>6</sup>studied the websites of High Courts in India. The webometric tools like Alexa, Google PageRrank, Neil Patel SEO analysis, Google search engine and SocScibot4 were used for data collection and designing In-link, Out-link and mapping visualization of those sites. In study they found that Andhra Pradesh High Court has placed 1<sup>st</sup> with 41408.45 Simple Web Impact Facto and Meghalaya High Court is placed 1<sup>st</sup> rank with 13.57 Self Link web impact factor.

Stephen<sup>7</sup> evaluated the websites of 10 Central Universities of North Eastern Region of India using Alexa Internet Tool which is the product of Amazon.com. Here, he studied the traffic ranking of the websites, pageviews, links, bounce percentage, time spent by users on the site, geographical distribution of users. It is found that North Eastern Hill University (NEHU) and Tezpur University (TU) ranked best among Central Universities of North East Region. In case of highest average pageviews Nagaland University has the highest with 4.1 users per day.

Ninkov& Vaughan<sup>8</sup> analysed the online vaccination debate webometrically. The study tried to analyse the web presence of both sides of the debate. The study found that pro-vaccine web domains were less than anti-vaccine web domains. The sites authoritativeness of both the sides of the debate were measured by Google's PageRank and it was found that pro-vaccine domains were of higher quality as measured by PageRank score.

Beerappa& Sheshadri<sup>9</sup>done the web link analysis of websites of 12 documentation centres of India using the Google advanced web query syntaxes to collect the data. This paper also classified the domain of documentation centres and out of 12, 6 documentation centreswere using ".in" domain. MATLAB Documentation centre recorded the highest number of web pages i.e. 48,500.

Jalal, Biswas &Mukhopadhyay<sup>10</sup> made a webometric study of web presence of websites of Asian countries. The study uses popular search engine like Altavista, Google, Yahoo and MSN for the analysis. The study shows that among Asian countries, China and Japan had highest web presence consecutively with India at third place. The study also compared the growth of webpages in the span of one year and South Korea witnessed highest webpage growth.

# Objectives

Following are the objectives of the study:

- To categories the different types of domain of the websites.
- To calculate the number of domain authority and page authority of the websites.
- To calculate the external and internal links of the websites of the Knowledge Resources Heritage.
- To find out the world traffic rank, pageviews and in-links through Alexa Web Ranking Tool.
- To find out the Google PageRank of the selected websites.

# Scope of the Study

The scope of the study includes the 16 websites of Knowledge Resources Heritage under Ministry of Culture, Government of India. Knowledge resources heritage includes all the major library which have archival records and it also includes institution which is responsible for promotion of Buddhism and Tibetan Culture. Table 1 shows the list of knowledge resources heritage-

	Table 1- Milowieuge Resources Hernage officia						
S.No.	Knowledge Resources Heritage	Website Links	Esta. Year	Location			
1	Rampur Raza Library	http://razalibrary.gov.in/	1774	Rampur,Uttar Pradesh			
2	Asiatic Society	https://www.asiaticsocietykolkata.org/	1784	Kolkata, West Bengal			
3	National Archives of India	http://nationalarchives.nic.in/	1891	Kolkata, West Bengal			
4	Khuda Baksh Oriental Public Library	http://kblibrary.bih.nic.in/	1891	Patna, Bihar			
5	Thanjavur MaharajaSerfoji's Sarasvati Mahal Library (TMSSML)	http://www.tmssmlibrary.com/	1918	Thanjavur, Tamil Nadu			
6	Anthropological Survey of	https://ansi.gov.in/	1945	Kolkata, West			

Table 1- Knowledge Resources Heritage ofIndia

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	India (ANSI)			Bengal
7	Delhi Public Library (DPL)	https://dpl.gov.in/	1951	Delhi
8	National Library	https://www.nationallibrary.gov.in/	1953	Alipore, West Bengal
9	Central Reference Library	http://crlindia.gov.in/	1955	Kolkata, West Bengal
10	Nehru Memorial Museum and Library (NMML)	http://nehrumemorial.nic.in/en/	1964	New Delhi
11	Central Institute of Higher Tibetan Studies (CIHTS)	https://cihts.ac.in/webpage/index.aspx	1967	Sarnath, Uttar Pradesh
12	Raja Rammohun Roy Library Foundation (RRRLF)	http://rrrlf.nic.in/	1972	Kolkata, West Bengal
13	Indira GandhiRashtriya Manav Sangrahalaya (IGRMS)	https://igrms.gov.in	1978	Bhopal, Madhya Pradesh
14	Gandhi Smriti and Darshan Samiti (GSDS)	https://www.gandhismriti.gov.in/	1984	New Delhi
15	Maulana Abul Kalam Azad Institute of Asian Studies (MAKAIAS)	http://makaias.gov.in/	1993	Kolkata, West Bengal
16	Central Institute of Himalayan Cultural Studies (CIHCS)	http://www.cihcs.edu.in/	2003	Dahung, Arunachal Pradesh

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# Methodologies

For the present study, the list of Knowledge Resources Heritage was taken from the website of Ministry of Culture, Government of India. To fulfil the objectives of the present study, information about the selected websites was collected by using various tools. The relevant data was collected through appropriate tools such as Open Site Explorer (www.opensiteexplorer.org), Alexa (https://www.alexa.com/siteinto) and Google PageRank (https://checkpagerank.net/). The data is collected from 4<sup>th</sup> March 2020 to 16<sup>th</sup> March 2020.

# Analysis of Data and Interpretation

The data were collected using different tools. Further, they were tabulated and analysed to verify various objectives framed for the study.

S. No.	Knowledge Resources Heritage	Website Links	Top-Level Domain(TLDs)		
190.	Hentage		gTLDs	ccTLDs	
1	National Archives of India	http://nationalarchives.nic.in/	.nic	.in	
2	Anthropological Survey of India (ANSI)	https://ansi.gov.in/	.gov	.in	
3	Gandhi Smriti and Darshan Samiti (GSDS)	https://www.gandhismriti.gov.in/	.gov	.in	
4	Nehru Memorial Museum and Library (NMML)	http://nehrumemorial.nic.in/en/	.nic	.in	
5	Indira GandhiRashtriya Manav Sangrahalaya (IGRMS)	https://igrms.gov.in/en	.gov	.in	
6	Asiatic Society	https://www.asiaticsocietykolkata.org/	.org		
7	Maulana Abul Kalam Azad	http://makaias.gov.in/	.gov	.in	

 Table 2. URL Analysis of Websites of Knowledge Resources Heritage

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	Institute of Asian Studies (MAKAIAS)			
8	Central Institutes of Higher Tibetan Studies (CIHTS)	https://cihts.ac.in/webpage/index.aspx	.ac	.in
9	Central Institute of Himalayan Cultural Studies (CIHCS)	http://www.cihcs.edu.in/	.edu	.in
10	National Library	https://www.nationallibrary.gov.in/	.gov	.in
11	Raja Rammohun Roy Library Foundation (RRRLF)	http://rrrlf.nic.in/	.nic	.in
12	Delhi Public Library (DPL)	https://dpl.gov.in/	.gov	.in
13	Rampur Raza Library	http://razalibrary.gov.in/	.gov	.in
14	Central Reference Library	http://crlindia.gov.in/	.gov	.in
15	Khuda Baksh Oriental Public Library	http://kblibrary.bih.nic.in/	.nic	.in
16	Thanjavur MaharajaSerfoji's Sarasvati Mahal Library (TMSSML)	http://www.tmssmlibrary.com/	.com	

gTLD= Generic Top-Level Domain; ccTLD= Country Code Top-Level Domain

Table 5. Categories of Domains of Knowledge Resources Heritage					
S. No.	TLDs (Top Level Domain)	Number of Knowledge Resources Heritage	Percentage (%)		
1	.gov.in	8	50		
2	.nic.in	4	25		
3	.com	1	6.25		
4	.edu.in	1	6.25		
5	.org	1	6.25		
6	.ac.in	1	6.25		
	Total	16	100%		

# Table 3. Categories of Domains of Knowledge Resources Heritage

Table 2 and Table 3 shows the different categories of Top-Level Domain/ domain name. Table 3 shows that 6 types of domain extensions were found. It is found that about 8 (50%) knowledge resources heritage has ".gov.in" followed by 4 (25%) websites using ".nic.in". It is also found that rest 4 websites are using domain name of ".com", ".edu.in", ".org" and ".ac.in" for each websites. The above table also shows that all websites except 3 were not using ".in" ccTLDs.

Table 4. Domain Authority & Page Authority Knowledge Resources Heritage usingOpen Site Explorer as on 13 March 2020

Knowledge Resources Heritage	Domain Authority (%)	Page Authority (%)
KhudaBaksh Oriental Public Library	62(12.20%)	50(9.39%)
National Library	43(8.46%)	45(8.45%)
National Archives of India	42(8.26%)	44(8.27%)
Gandhi Smritiand Darshan Samiti	41(8.07%)	34(6.39%)
Nehru Memorial Museum and Library	37(7.28%)	35(6.57%)
Raja Rammohun Roy Library Foundation	36(7.08%)	39(7.33%)
Rampur Raza Library	36(7.08%)	37(6.95%)

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Total	508	532
Thanjavur MaharajaSerfoji'sSarasvatiMahal Library	13(2.55%)	21(3.94%)
Central Instituteof Himalayan Cultural Studies	14(2.75%)	24(4.51%)
Central Reference Library	22(4.33%)	28(5.26%)
Central Institute of Higher Tibetan Studies	23(4.25%)	17(3.19%)
Indira GandhiRashtriya ManavSangrahalaya	20(4.92%)	31(3.75%)
Asiatic Society	26(5.11%)	32(6.01%)
Maulana Abul Kalam Azad Institute of Asian Studies	26(5.11%)	35(6.57%)
Anthropological Survey of India	31(6.10%)	31(5.82%)
Delhi Public Library	31(6.10%)	40(7.51%)

LibraryTotal508532Table 4 shows the domain authority and page authority of the knowledge resources<br/>heritage websites. Domain authority is a rank of website on search engine result<br/>pages (SERPs) in the range of 100, while page authority is a rank of individual page<br/>on search engine result pages (SERPs) in the range of 100. These are a search<br/>engine ranking score developed by Moz an USA based company. The table 4, clearly<br/>shows that the Websites of Khuda Baksh Oriental Public Library has highest domain<br/>authority of 62 while Thanjavur Maharaja Serfoji's Sarasvati Mahal Library has<br/>lowest domain authority of 13 among all 16 websites of knowledge resources<br/>heritage. In case of page authority, again Khuda Baksh Oriental Public Library has<br/>highest page authority of 50 while Thanjavur Maharaja Serfoji's Sarasvati Mahal<br/>Library has highest page authority of 21.

Table 5. Internal Links, External Links and Total Links using Open SiteExplorer as on 16-Mar-2020

Explorer as on 10-Mar-2020					
Knowledge ResourcesHeritage	Internal Links(%)	External Links(%)	Total Links (%)		
Anthropological Surveyof India	8398 (0.01%)	24,033 (0.53%)	32,431 (0.05%)		
Asiatic Society	3980 (0.01%)	18,168 (0.4%)	22,148 (0.03%)		
Central Instituteof Himalayan Cultural Studies	3,532 (0.01%)	108 (0.002%)	3,640 (0.01%)		
Central ReferenceLibrary	9,049 (0.01%)	22,735 (0.5%)	31,832 (0.05%)		
Central Instituteof Higher Tibetan Studies	94,232 (0.15%)	2,131 (0.05%)	96,363 (0.14%)		
Delhi Public Library	10,728 (0.02%)	35,543 (0.8%)	46,271 (0.07%)		
Gandhi Smriti and DarshanSamiti	48,595 (0.08%)	23,697 (0.52%)	72,292 (0.11%)		
Indira GandhiRashtriya Manav Sangrahalaya	4,456 (0.05%)	49,391 (1.05%)	53,847 (0.08%)		
KhudaBakshOriental Public Library	3,10,86,062 (48.69%)	21,12,980 (46.4%)	3,31,99,042 (48.52%)		
Maulana AbulKalam Azad Institute of Asian Studies	4,301 (0.05%)	23,792 (0.52%)	28,093 (00.04%)		
National Archivesof India	9,89,240 (1.55%)	1,41,978 (3.12%)	11,31,218 (1.65%)		
National Library	88,34,542 (13.84%)	47,343 (1.04%)	88,81,885 (12.98%)		
Nehru MemorialMuseum and Library	2,16,83,960 (33.96%)	24,098 (0.53%)	2,17,08,058 (31.72%)		

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Raja RammohunRoy Library Foundation	1,056 (0.001%)	23,770 (0.52%)	24,826 (0.04%)
Rampur Raza Library	4,360 (0.05%)	29,974 (0.66%)	34,334 (0.05%)
Thanjavur MaharajaSerfoji'sSarasvati	10,60,327	19,77,570	30,37,897
Mahal Library	(1.66%)	(43.42%)	(4.44%)
Total	6,38,46,818	45,57,311	6,84,29,003

Table 5 illustrates the analysis of links on the basis of Internal links, external links and total links at root domain level. Internal links are a hyperlink to another webpage of particular website, while external link is a hyperlink to another domain other than link available on existing domain. Total links is sum total of above mentioned both links to a website.

The Internal links of Khuda Baksh Oriental Public Library is 3,10,86,062 (48.69%) and holds first rank followed by Nehru Memorial Museum and Library with 2,16,83,960 (33.96%) and NationalLibrary with 88,34,542 (13.84%) internal links. Also, in case of External Links of KhudaBaksh Oriental Public Library with 21,12,980 (46.4%) links ranked first then comes Thanjavur MaharajaSerfoji'sSarasvati Mahal Librarywith 19,77,570 (43.42%) and National Archives of India with 1,41,978 (3.12%) external links.

In case of the total links, Khuda Baksh Oriental Public Library has highest total links of 3,31,99,042 (48.52%) and ranked first after that Nehru Memorial Museum and Library with 2,17,08,058 (31.72%) and National Library with 88,81,885 (12.98%) total links at root domain level.

Table 6. Global Traffic Ranking, Indian Traffic Ranking, PageViews, In-links and
Average load time of websites using Alexa Web Ranking Tool as on 04 March 2020.

Knowledge Resources Heritage	Global Ranking	India Ranking	PageViews	In- Links	Average Load Time (in sec.)
KhudaBaksh Oriental Public Library	2469	207	3.04	3646	0.731(Very Fast)
Delhi Public Library	5,54,916	41,414	1.8	126	4.129(Very Slow)
National Archives of India	5,66,791	89,127	2.4	214	2.514(Slow)
National Library	5,95,816	80,356	3.5	282	1.397(Fast)
Raja Rammohun Roy Library Foundation	8,54,840	84,115	2.1	176	0.268(Very Fast)
Anthropological Survey ofIndia	8,89,142	1,32,544	1.4	28	No Data
Nehru Memorial Museum and Library	9,24,662	No Data	4	67	3.466(Very Slow)
Gandhi Smriti and Darshan Samiti	12,03,321	81,469	3	81	No Data
Maulana AbulKalam Azad Institute of Asian Studies	21,09,063	No Data	2	67	No Data
Central Institute of Higher Tibetan Studies	25,17,989	No Data	2	34	No Data
Asiatic Society	25,51,416	No Data	2	23	No Data
Central Reference Library	26,93,089	No Data	2	33	No Data
Rampur RazaLibrary	27,78,183	No Data	1	51	No Data

http://www.ijlis.org

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Thanjavur MaharajaSerfoji'sSarasvati Mahal Library	30,13,536	No Data	2	10	No Data
Central Instituteof Himalayan Cultural Studies	36,87,655	No Data	2	10	No Data
IndiraGandhiRashtriya Manav Sangrahalaya	40,94,157	No Data	1	88	No Data

Table 6 illustrates the global traffic ranking, Indian traffic ranking, page views, links and average load time of websites of knowledge resources heritage. Global traffic ranking shows the popularity of websites globally while Indian traffic rank shows the popularity of particular websites in India. Page views is a daily pageviews by per visitor. In-links is another type of measuring the popularity of websites which confines the number of websites connected to particular websites. Average load time is how much time websites takes to load.

It is clearly shown in the table 7 that KhudaBaskh Oriental Public Library ranked first among the 16 websites in global traffic ranking and Indian traffic ranking with securing the rank of 2469 and 207 respectively. Khuda Baksh Oriental Public Library also have the highest pageviews with 3.04 users daily, in-links with 3646 and average load time is very fast as it takes only 0.731 sec to load the page. The table shows the poor ranking of other websites globally.

	Google
Knowledge Resources Heritage	PageRank
Khuda Baksh Oriental Public Library	6
National Library	4
Delhi Public Library	4
National Archivesof India	4
Gandhi Smritiand Darshan Samiti	4
Raja Rammohun Roy Library Foundation	4
Rampur RazaLibrary	4
Anthropological Surveyof India	3
Asiatic Society	3
Maulana Abul Kalam Azad Institute of Asian	
Studies	3
Central ReferenceLibrary	3
Central Institute of Himalayan Cultural Studies	2
Thanjavur MaharajaSerfoji'sSarasvati Mahal	
Library	2
Nehru Memorial Museum and Library	_
Indira GandhiRashtriyaManavSangrahalaya	-
Central Institutueof Higher Tibetan Studies	_

 Table 7. Google PageRank of Knowledge Resources Heritage as on 16 March 2020.

Table 7 shows the Google PageRank of the websites. PageRank is developed by Larry Page one of the founder of Google. Using it's algorithms the tool ranks the websites on the scale of 0-10 to determines that page is relevant and important. To calculate the Google PageRank of the websites https://checkpagerank.net/ was used. Khuda Baksh Oriental Public Library website has topped the list with having 6 out

of 10 on Google PageRank scale followed by 6 websites with 4 out of 10 on Google PageRank.

#### Findings and suggestions

From the study it is found that about 7 websites are using ".gov.in" domain followed by 4 websites using ".nic.in" domain. Khuda Baksh Oriental Public Library websites has highest domain authority of 62 and National Library has second highest of 43. Again, the website of Khuda Baksh Oriental Public Library topped in page authority with 50 while National Library again secured the second rank of page authority of 45.

Khuda Baksh Oriental Public Library websites consists of highest internal links of 3,10,86,062 and the Nehru Memorial Museum and Library consist second highest internal links of 2,16,83,960. The website of Khuda Baksh Oriental Public Library having the highest external links of 21,12,980 after that second highest occupied by Thanjavur MaharajaSerfoji'sSarasvati Mahal Library with 19,77,570 external links. Khuda Baksh Oriental Public Library ranks first in discovered link with 1600 followed by National Library with 70. In case of lost link Khuda Baksh Oriental Public Library have highest lost link 545 in last 60 days of crawling. In global traffic rank Khuda Baksh Oriental Public Library secured rank first among all 16 websites with global traffic rank of 2469 and ranks first in Indian scenario of traffic ranking with rank of 207.

National Library website having highest page views of 3.5 and ranks first followed by Khuda Baksh Oriental Public Library with second highest i.e. 3.04. Khuda Baksh Oriental Public Library website have highest number of sites linking in with total of 3646 inlinks. Raja Rammohun Roy Library Foundation's website is very fast in loading as it only takes 0.268 second to load, followed by Khuda Baksh Oriental Public Library with loading time of 0.731 second. Khuda Baksh Oriental Public Library has highest ranking in Google PageRank of 6.

The study found that some websites have very poor quality in all aspects taken for the study like Indira Gandhi Rashtriya ManavSangrahalaya, Central Institute of Higher Tibetan Studies, Central Institute of Himalayan Cultural Studies. The performanceof the website of Thanjavur MaharajaSerfoji'sSarasvati Mahal Library, being the oldest library of India, is significantly not upto the mark. This studygives the insight to the concerned authority to improve their website performance. The websites performed good will improve more and increase its performance and engagement where they are lacking to reach the audience effectively.

#### Conclusion

For webometrics studies there is no single platform or tools, so there is possibilities of differences in research outcomes. The study shows that all the Knowledge Resources Heritage of India have web presence but their performance is not par. India having rich heritage which attracts world but the websites are not able to do so. It is clear, from traffic ranking, that users visits these websites not much for their information needs except Khuda Baksh Oriental Public Library. The under performing websites look into it's link structure and enhance the performance of the websites. Web designer take a advantage from this study and design the website informative in such a manner that people visit the websites frequently. Web designer should create quality backlinks to increase the websites visibility.

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