

Webometrics based study on Public Library Websites of India



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ABSTRACT: *This study represents an innovative approach to investigate public library websites and evaluate them using webometric measures and web content parameters. Twelve websites from public libraries were selected at random by the researcher and used as a sample. Yahoo was used for the links, and data were gathered through a link analysis tool from MOZ (<https://moz.com/>) which aids in determining Domain Authority, Page Authority, Internal-links, and External-links. Public library official websites were examined using a well-organized checklist consisting of 28 criteria. Delhi Public Library receives the highest rating i.e. 25 out of 28. The results show that Parliament Library has the highest SWIP and IWIP, while Thanjavur Maharaja Serfoji's Sarasvati Mahal Library has the lowest. DA and PA on nine out of twelve public library websites are less than 50. Most important information is not available on the websites, such as new arrivals, ICT infrastructure, book recommendations, and FAQs. From this study, the public library will benefit to findings in terms of website maintenance and restructuring.*

Keywords: Webometrics, Public Library, Web Content Link, Web Impact Factor, Evaluation, India

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1. Introduction

Webometrics is the quantitative analysis of web-based content, structure, and usage. It involves measuring various aspects of the web, such as the number of websites, links between them, and the frequency of updates. Webometrics is often used to evaluate the impact and visibility of websites, particularly in academic and research contexts, where it can help assess the influence and reach of institutions or scholars based on their online presence. Key metrics in webometrics include website traffic, backlinks, and citation analysis of online publications. Webometrics is one of the metric methods used in Library and Information Science field. A website is a collection of related web pages, images, videos, or other digital assets that are addressed relative to a common uniform resource locator, often consisting of only the domain name or the IP address and the root path ('/') in an Internet protocol-based network. A website is hosted on at least one web server accessible via a network such as the Internet or a private local area network (Babu, Jeyshankar & Rao, 2010¹¹). (Almind and Ingwersen¹²) defined the publicly indexable WWW or simply web may be considered as a citation network where traditional information entities, and citations are replaced by web pages and hyperlinks respectively. The ratio between the external links received by a website and the number of web pages comprising that website is called web impact factor (WIF), which reflects its global

identity as well as the quality of information resources it provides. The concept of WIF was introduced in 1997 by a Spanish researcher, (Rodriguez Gairín¹³). Numerous studies on websites of groups, organizations, libraries, and academic institutions have been documented for many years. Webometrics is an intriguing and still-evolving subject of study in the Library and Information Science discipline. Using the optimization tool MOZ, the study aims to determine the most popular website and examine its number of root domains, web pages and authority, number of links, and WIF. The yahoo.com (Alta Vista) search engine was used to analysis the web pages which are linked to the home page of the public library websites.

2. Data Source

Twelve public library websites were randomly chosen which are most popular in India. The sample population of the study is portrayed in Table 1. It depicts the name of the public library, its abbreviation, name of the state, year of establishment and URL. Out of the 12 public libraries Asiatic Society of Mumbai is the oldest library which was established in the year 1804.

Table 1. List of Public Library Websites

S. No.	Name of Public Library	Abbreviation	State	Year of Establishment	URL
1	The Asiatic Society of Mumbai	ASM	Maharashtra	1804	https://www.asiaticsociety.org.in/
2	State Central Library Kerala	SCLK	Kerala	1829	https://statelibrary.kerala.gov.in/en/home/
3	Krishnadas Shama Goa State Central Library	KSGSCL	Goa	1832	https://centrallibrary.goa.gov.in/home
4	Allahabad Government Public Library	AGPL	Uttar Pradesh	1864	https://www.agplib.org/about-us/
5	The National Library	NL	West Bengal	1891	https://www.nationallibrary.gov.in/
6	Khuda Bakhsh Oriental Public Library	KBOPLS	Bihar	1891	https://kblibrary.bih.nic.in/
7	Connemara Public Library	CPL	Tamil Nadu	1896	http://www.punlib.net/tn/tnpls/connemara.html
8	Thanjavur Maharaja Serfoji's Sarasvati Mahal Library	TMSSML	Tamil Nadu	1918	http://www.tmssmlibrary.com/
9	Parliament Library	PL	New Delhi	1921	https://parliamentlibraryindia.nic.in/
10	Delhi Public Library	DPL	Delhi	1951	https://dpl.gov.in/
11	Anna Centenary Library	ACL	Tamil Nadu	2010	http://www.annacentenarylibrary.org/
12	Kalaigarnar Centenary Library	KCL	Tamil Nadu	2023	https://www.kalaigarnarcentenarylibrary.org/

3. Review of Related Study

In order to understand the present status of research and potential future prospects in webometrics and web content analysis, prior studies are examined. In an innovative study Madhusudan, Magam and Sashi Prakash (2013)² Looked at various linkage analysis criteria across sixteen IIT websites. The websites were analyzed, using World Rank, WIF (in-link), and WISER. In both the word and WIF (in-link) rankings, IIT Bombay and IIT Madras came in first and second place, respectively; in contrast, IIT Rajasthan's WIF (in-link) ranking is one spot higher, compared to the world ranking, which is 15th. This research will assist the recently founded IITs in raising their global standing relative to other well-known and more established IITs. Dhar and Gayan (2022)¹ studied on web content as well as web link analysis of international library association websites. 19 checklists for content analysis and MOZ tool used for web links analysis. From this article, the library associations will benefit to restructure and improve website maintenance. Nitesh Kumar Verma and Akhandanand Shukla (2017)³ explored the usability analysis of Central Universities Library websites of North-East India: an evaluative study. It is found that most of selected central universities of North-Eastern India ignored their usability features of libraries and there are numerous scopes for further improvement in terms of applications of Web 2.0 tool. Udartseva, Blinov and Kosyakov (2021)⁴ conducted a study on webometric ranking of library sites in the world. The Library of Congress (Washington, DC) consistently got ranked first (2018–2020). The website of the Russian National Library topped the Russian category for the first two years. Eventually it was taken over by the Vologda Regional Universal Scientific Library. Aminpour, Kabiri *et. al* (2009)⁵ investigated the Webometric analysis of Iranian universities of medical sciences and used webometric indicators to examine the websites. According to the report, Iranian medical science universities were not well-known abroad and had little influence on the internet. Language obstacles are the main cause. A few of them also experience technical issues with their website design. Taram and Doulani (2014)⁶ made an attempt to explore a webometric analysis of major keywords and expressions in biochemistry using LexiURL Searcher. By taking into account the primary phrases and keywords obtained from the MeSH database, the LexiURL Searcher has come before webometric analysis. This document provides information about websites that share a similar thread, utilizing a standard thesaurus. Hadagali G.S., Bulla, S D and Shettar, I. M. (2021)⁷ examined the Indian Institutes of Technology's webpages. Simple WIF, self-link WIF, external link WIF, back links, and broken links are the parameters. The data from the IIT websites is gathered using the Google Search Engine, Web Link Analyzer, Back Link Watch, and Broken Link Checker tools; IIT Mandi holds the top, while IIT Palakkad is in first place.

4. Objectives

- To assess the web content and functional features of the chosen Public Libraries.
- To determine the number of webpages, domain authority and page authority metrics.
- To identify and perform link analysis on the hyperlinks exist.
- To classify the Simple Web Impact Factor (SWIF), External Web Impact Factor (EWIF) and Internal Web Impact Factor (IWIF).
- To compute the Web Impact Factor (WIF) among Public Library websites.

5. Materials and Methods

5.1. Study Design

In the present study, checklist/parameters evaluation method was used. 28 criteria were framed for evaluating the web contents of public libraries. The report generated by the tool indicated how good the website contests for user-friendliness. Furthermore, a webometric analysis is performed to find out the quality of websites.

5.2. Data collection

The web content data from the sample websites were collected by visiting the Public Library websites. A link analysis tool called MOZ <https://moz.com/> (the freely available version) which was previously known as open site explorer was used in the present study. MOZ is one of the most authentic and add-free online tools for web analytics. It is employed on various studies as well¹. The URL of a particular public library was copied and pasted on the search box for obtaining different webometric indicators like Domain Authority (DA), Page Authority (PA), Internal Links (IL), External Links (EL), Total Links (TL), and Individualized domains. Websites are one of the major information sources in today's world. Having an error-free, properly functioning and well-maintained website gives an edge to any organization. Apart from the webometric analysis, to check the availability of different features on the public library websites, a detailed checklist with 28 web evaluation criteria was structured and employed. The criteria are given in Annexure I. The websites were personally visited and observed to collect relevant data.

5.3. Method of data collection

Three types of links and WIF are calculated in the following way:

i) The simple web impact factor (SWIF) = A/D

ii) The external web impact factor (EWIF) = B/D

iii) The internal web impact factor (IWIF) = C/D

Where,

A: Total number of links

B: Total Number of external links C: Total Number of internal links

D: Total number of webpages are published and indexed by search engines.

6. Results and Inference

Figure 1 illustrates the Domain Authority (DA) and Page Authority (PA) metrics for public library websites. These metrics are developed by MOZ, to predict how well a website or specific page will gain rank in search engines. The metrics are key components identified in website analysis. The website for SCLK achieved the highest DA score at 70, while KBOPL recorded the highest PA score at 52. Conversely, KCL exhibited the lowest scores, with a DA of 1 and a PA of 0. The majority of the public library websites (9 out of 12) have DA and PA metrics below 50.

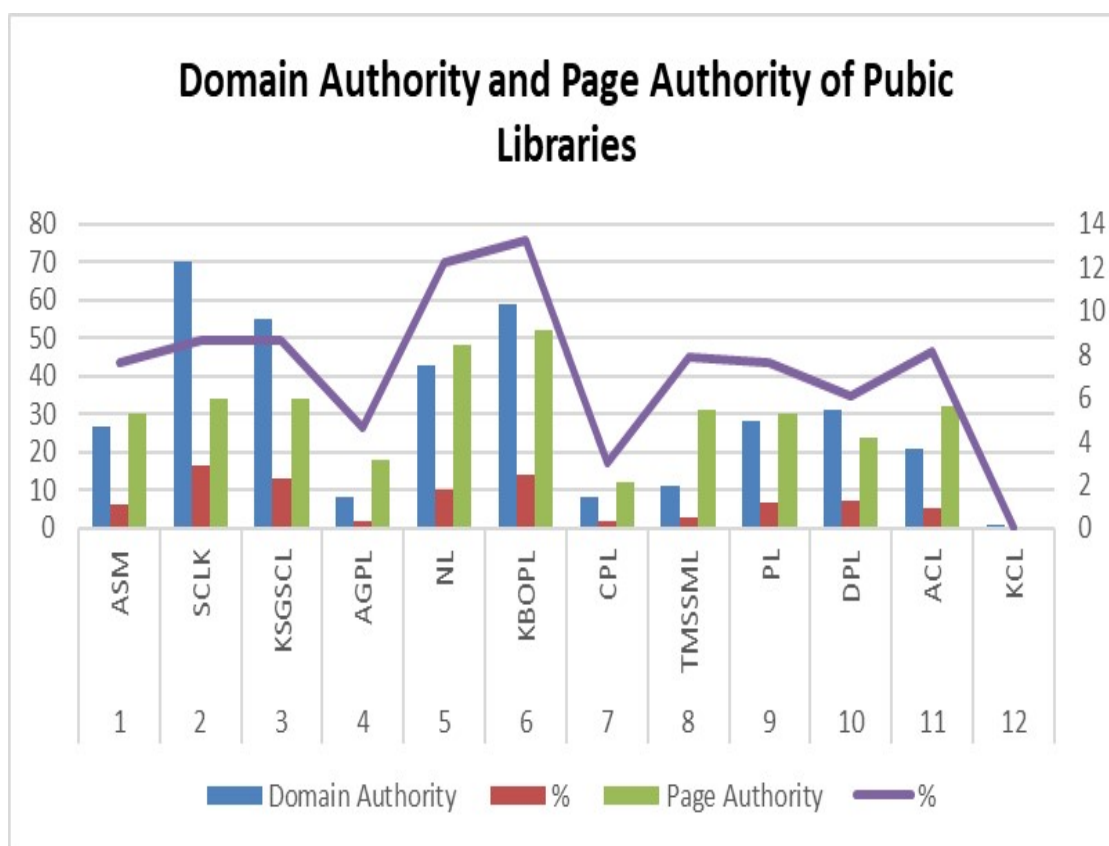


Figure 1. Domain Authority and Page Authority

Table 2 reveal the Domain Authority, Page Authority, and Linking Root Domain of public library websites. The website of SCLK got the highest percentage (16.70%) in terms of DA of 70 and KBOPL got the highest percentage (13.29%) in terms of PA of 52. On the other hand, KCL got the lowest percentage (0.23%) and (0) in terms of DA of 1 and PA of 0. Also, the majority of the public library websites (9 out of 12) have below percentage 50 of DA and PA.

Table 2. Domain Authority and Page Authority

S. No.	Name	Domain Authority (DA)	%	Page Authority (PA)	%
1	ASM	27	6.44	30	7.67
2	SCLK	70	16.70	34	8.69
3	KSGSCL	55	13.12	34	8.69
4	AGPL	8	1.90	18	4.60
5	NL	43	10.26	48	12.27
6	KBOPL	59	14.08	52	13.29
7	CPL	8	1.90	12	3.06
8	TMSSML	11	2.62	31	7.92
9	PL	28	6.68	30	7.67
10	DPL	31	7.40	24	6.13
11	ACL	21	5.2	32	8.18
12	KCL	1	0.23	0	0

Table 3. Total Internal and External Links

S.No.	Name	InternalLinks	ExternalLinks	Total Links
1	ASM	2698	768	3466
2	SCLK	497353	3649	501002
3	KSGSCL	971576	3442	975018
4	AGPL	270	455	725
5	NL	16136	2854	18990
6	KBOPL	468261	5189	473450
7	CPL	68	2800	2868
8	TMSSML	564	545	1109
9	PL	1086866	764	1087630
10	DPL	498	415	913
11	ACL	2761	586	3347
12	KCL	480	4830	5310
	Total	3048387	29757	3078144

Table 4. Top Individualized Root Domains

Name	Root Domain	DA	Linking Domains
ASM	en.wikipedia.org	98	7196049
	wikimedia.org	95	2104619
	medium.com	95	1891308
SCLK	apple.com	99	6918811
	en.wikipedia.org	98	7196049
	plus.google.com	97	10807698
KSGSCL	en.wikipedia.org	98	7196049
	plus.google.com	97	10807698
	github.com	96	3273398
AGPL	en.wikipedia.org	98	7196049
	illinois.edu	92	244114
	dbpedia.org	66	21840
NL	en.wikipedia.org	98	7196049
	github.com	96	3273398
	wikimedia.org	95	2104619
KBOPL	en.wikipedia.org	98	7196049
	fr.wikipedia.org	95	659703
	issuu.com	94	1030152
CPL	sourceforge.net	93	792558
	pages.net	84	102720
TMSSML	en.wikipedia.org	98	7196049
	wikimedia.org	95	2104619
	fr.wikipedia.org	95	659703
	soundflare.org	60	418
PL	un.org	94	649247
	uq.edu.au	86	93798
	thediomat.com	83	73466
DPL	en.wikipedia.org	98	7196049
	fr.wikipedia.org	95	659703
	issuu.com	94	1030152
ACL	en.wikipedia.org	98	7196049
	airbnb.com	92	252132
	wikiwand.com	86	75214
KCL	oneindia.com	84	47778
	xploredomains.com	9	1089
	tamilfox.com	8	25

The analysis of total links, external links, and internal links are explained in Table 3. With 1086866 internal links, the PL website has the most, while KBOPL has 5189 external links. DPL has at least 415 external links, while CPL has at least 68 internal links. It demonstrates how the greatest amount of internal and external links varies throughout public library websites.

Table 4 highlights the top three unique root domains for each Public Library website, the frequent appearance of domains such as en.wikipedia.org, plus.google.com, wikimedia.org, and fr.wikipedia.org indicates a significant presence in the webometric analysis as well. The data can be used to assess the web visibility and impact factor of such public library websites within the broader digital ecosystem. These patterns will assist for future strategies so as to enhance the online presence and information dissemination capabilities of Public Library websites.

Table 5. Web Impact Factor

Name	SWIF	IWIF	EWIF
ASM	0.93172043	0.725268817	0.206451613
SCLK	167.0006667	165.7843333	1.216333333
KSGSCL	221.595	220.8127273	0.782272727
AGPL	0.008002208	0.002980132	0.005022075
NL	0.444730679	0.377892272	0.066838407
KBOPL	345.5839416	341.7963504	3.787591241
CPL	53.80863039	1.275797373	52.53283302
TMSSML	0.005867725	0.002984127	0.002883598
PL	1307.247596	1306.329327	0.918269231
DPL	0.006296552	0.003434483	0.002862069
ACL	1.923563218	1.586781609	0.336781609
KCL	0.079372197	0.007174888	0.072197309

Table 5 presents the Web Impact Factor (WIF) for 12 public library websites, breaking it down into three specific metrics: Simple Web Impact Factor (SWIF), Internal Web Impact Factor (IWIF), and External Web Impact Factor (EWIF). In this analysis, PL stands out by achieving the highest WIF, demonstrating its strong web presence and influence across all three metrics. The KBOPL secures the second position, indicating a significant, though slightly lesser, web impact. KSGSCL takes the third place, further highlighting its effective use of web resources to connect both internally and externally. TMSSML occupies the last position in the ranking, indicating a relatively weaker web impact.

7. Discussion

Twelve public library websites are examined in this study in order to assess their features online. Four out of twelve websites (33.33%) have more internal links than external links, indicating a stronger internal relationship. This is indicative of link dynamics. Researchers previously discovered that there was more IL than EL on every website in their study¹. Out of the 12, three websites had DA scores higher than 50. Furthermore, one website had a PA score of greater than 50. An earlier investigation into the webometrics research of websites run by international library associations in terms of DA and PA, seven out of eight association websites have scores lower than 50. It is noteworthy to measure that, for eight of the twelve public library websites, Wikipedia appears in the list of the top personalized connections. A checklist with 28 parameters is used to evaluate the web content analysis of twelve public library websites; the checklist is shown in Annexure 1. All public library websites contain information about its accuracy, authority, currency, and libraries. None of the public library websites scored more than 28. The majority (91.66%) of public library websites have separate page, contact page, information about library hours, and holiday schedule. The majority of public library websites (83.33%) provide details about library membership. Since 75% of public library websites offer library services online, an effort may be made on their part to include feature

in order to provide better services. The DPL had the highest score of 25 out of 28. Furthermore, the majority of public library websites did not have FAQ section. 50% of public library websites have Hierarchy of Library staff, Library committee and Publication, 66.66% of public library websites have Search option and Library collection, the DPL scored highest 25 out of 28. The CPL scored least 7 out of 28. Only 3 (25%) public library websites have Book recommendation criteria. And only two public library websites provided the option FAQ (16.66%) and most of the public library websites neglected, these features which are essential. In the future, more public library websites ought to incorporate this capability, as demonstrated by the SCLK and KBPOL websites, to better serve their users.

8. Conclusion

The purpose of this article is to ascertain the current status of Indian public library websites. During the recent epidemic, we have witnessed a paradigm change in academic debates from traditional to digital formats. The success of any institution or organization in the digital sphere is ensured by having a well-functioning website, and being able to contact any library directly through the website is essential. In this case, interactive elements like web 2.0 tools, online e- resources and services, etc., may be used by public library websites to foster stronger user relationship. In a similar vein, in order to remain relevant in the rapidly evolving technological period, websites should include more dynamic features through the use of the newest online tools, such as numerous web 4.0 technologies, which facilitate the easy detection of users' demands and behavior. Websites and the Internet play a major role in the provision of global library services, and web designers have an obligation to build visually attractive, dynamic, and user-friendly websites. The quality and visibility of these selected public library websites is improving day by day and proved from comparison with findings of a previous study (Brahma, K., & Verma, M. K.)¹⁰ and this present study. The results of this investigation showed that KBOPL has 52 PA and SCLK has 70 DA. The PL website has the most internal links (1086866), while KBOPL has the most external links (5189). According to the data, DPL has at least 415 external links while CPL has at least 68 internal links. Popular websites like wikipedia.org are observed to be among the top personalized Root Domains of Public Library websites. The WIF of 12 public library websites illustrates that, in terms of SWIF, IWIF, and EIWF, PL, KBOPL, and KSGSCL, respectively, are in first, second, and third place, with TMSSML occupying the final spot. In order to increase accessibility and visibility, it is advised that the internal links on the individual library websites have to be improved. Additionally, libraries should link to one another so that resources can be accessed whenever needed.

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ANNEXURE I: Web Content Analysis of Public Library Websites

S. No.	Parameter	ASML	SCLK	KSGSCL	AGPL	NL	KBOPL	CPL	TMSSML	PL	DPL	ACL	KCL	Total Score (Out of 12)
1	Separate website	1	1	1	1	1	1	0	1	1	1	1	1	11 (91.66%)
2	Multilingual Options	0	1	1	0	1	0	0	0	1	1	1	1	7 (58.33%)
3	Authority	1	1	1	1	1	1	1	1	1	1	1	1	12 (100%)
4	Accuracy	1	1	1	1	1	1	1	1	1	1	1	1	12 (100%)
5	Currency	1	1	1	1	1	1	1	1	1	1	1	1	12 (100%)
6	Search Option	0	1	1	0	1	1	0	0	1	1	1	1	8 (66.66%)
7	Web 2.0 Tools	1	0	1	1	1	0	0	0	0	1	1	1	7 (58.33%)
8	About Library	1	1	1	1	1	1	1	1	1	1	1	1	12 (100%)
9	Library Collection	1	1	0	1	1	0	1	1	1	1	0	0	8 (66.66%)
10	Library Rules and Regulations	1	1	1	0	1	1	0	0	1	1	0	0	7 (58.33%)
11	New Arrivals	0	1	0	0	1	0	0	0	1	1	0	0	4 (33.33%)
12	e-Resource	1	0	1	0	1	0	0	0	1	1	1	0	6 (50%)
13	Library Membership	1	1	1	0	1	1	1	0	1	1	1	1	10 (83.33%)
14	Library services via website	1	1	1	0	1	1	0	1	1	1	1	0	9 (75%)
15	Library Timing and Holidays	1	1	1	1	1	0	1	1	1	1	1	1	11 (91.66%)
16	Library News and Updates (Events)	1	1	1	0	1	0	0	0	1	1	1	0	7 (58.33%)
17	Archive	1	1	1	0	0	0	0	1	1	1	1	0	7 (58.33%)
18	ICT Infrastructure	0	1	1	0	1	0	0	0	0	0	1	0	4 (33.33%)
19	Book Recommendation	0	0	1	0	0	0	0	0	0	1	1	0	3 (25%)
20	Hierarchy of Library Staff	0	1	0	1	1	0	0	0	0	1	1	1	6 (50%)
21	Library Committee	1	1	1	1	0	0	0	0	1	1	0	0	6 (50%)
22	Publication	1	0	1	0	0	1	0	1	1	1	0	0	6 (50%)
23	FAQ	0	1	0	0	0	1	0	0	0	0	0	0	2 (16.66%)
24	Contact Us	1	1	1	1	1	1	0	1	1	1	1	1	11 (91.66%)
25	Feedback	0	0	1	0	1	1	0	0	0	1	0	0	4 (33.33%)
26	Google Map	0	1	0	0	1	1	0	0	0	0	0	1	4 (33.33%)
27	Visitor statistic	0	0	1	1	1	0	0	0	1	1	1	1	7 (58.33%)
28	Dead link	0	0	1	0	0	1	0	0	1	1	0	1	5 (41.66%)
	Score (out of 28)	17	21	23	12	22	15	7	11	21	25	19	15	

Note: 1 = Presence of the feature in the website, 0 = Absence of the feature in the website