

Webometric Analysis of Websites of Indian Universities' with status of Potential for Excellence (UPE)

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Abstract

Websites are the gateway of information for institutions and play an important role in dissemination of information. The present study is an attempt to examine and analyze the websites of Indian universities with status of potential for excellence on the basis of established webometric criteria i.e. number of web pages, link pages, domain authority, equity passing links, individual domain authority and web impact factor.

Keywords: Indian Universities with Potential for Excellence (UPE), Link Analysis, Web Impact Factor, Webometrics, Websites

1. Introduction

The Web is playing an important role in diverse application domains such as business, education, industry and entertainment. The World Wide Web (WWW) has become a major source of information for academic and research activities. Websites play a key role in dissemination of information effectively and efficiently. Services rendered through websites have been gaining significant momentum in academic institutions in recent years and have become a gateway of information. Webometric analysis is one of the established methods used by library and information professionals to analyze websites. The term webometrics was coined by Thomas C. Almind and Peter Ingwersen (1977)¹⁶

Bojerneborne and Ingwersen (2004)⁴ defined it as “the study of quantitative aspects of the construction and the use of information resources, structure, and technologies on the World Wide Web drawing on informetric and bibliometric approaches.

2. Universities with Potential for Excellence (UPE) Scheme

There are 15 universities in India having the status of

UPE from University Grant Commission (UGC). During the IX and X plan periods the UGC adopted a strategy to identify a few universities which have the potential to achieve excellence in teaching and research. The main intention was to make these Indian universities comparable to world class universities by enabling them “to adapt to modern methods of teaching and learning, developing learner-friendly lecture materials, changing their evaluation methods and striving for excellence, to sustain themselves in this competitive world”. Any university applying for the support of UGC under the UPE Scheme may set higher achievement goals and strive for achieving them. Striving for excellence is a sustained reform process generated within the university by covering all staff, students and stakeholders with a view to raising the quality and performance results of educational processes of the university. The 15 Indian UPE are listed in Table 1.

3. Web Impact Factor

Web impact factor is a used to determine the relative standing of websites in particular fields, or a country; for instance, academic websites in a country. The higher the impact factor, the higher the perceived reputation of the website. The web impact factor answers the question

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Table 1. List of universities under UPE scheme with their websites

Sl. No.	Universities (UPE)	Website	Established	State/City
1	Jadavpur University	www.jaduniv.edu.in/	1955	Kolkata
2	Pune University	www.unipune.ac.in/	1948	Pune
3	University of Hyderabad	www.uohyd.ac.in/	1974	Hyderabad
4	Jawaharlal Nehru University	www.jnu.ac.in/	1969	New Delhi
5	University of Madras	www.unom.ac.in/	1857	Chennai
6	Madurai Kamraj University	http://mkuniversity.org/direct/	1965	Tamil Nadu
7	North-Eastern Hill University	www.nehu.ac.in	1973	Shillong
8	University of Calcutta	www.caluniv.ac.in/	1857	Calcutta
9	University of Mumbai	http://mu.ac.in/portal/	1857	Mumbai
10	Osmania University	www.osmania.ac.in/	1918	Hyderabad
11	Banaras Hindu University	www.bhu.ac.in/	1916	Varanasi
12	University of Rajasthan	www.uniraj.ac.in/	1947	Jaipur
13	University of Mysore	www.uni-mysore.ac.in/	1916	Karnataka
14	Karnatak University	www.kud.ac.in/	1949	Dharwad
15	Guru Nanak Dev University	web.gndu.ac.in/	1969	Amritsar

(Source: [http://www.ugc.ac.in/page/Universities-\(UPE\).aspx](http://www.ugc.ac.in/page/Universities-(UPE).aspx))

“what impact has this website had?” It is a measure of the frequency with which the “average webpage” in a website has been linked at a given point in time. In general, a website with a higher impact factor may be considered to be more prestigious or of a higher quality than those websites with a lower impact factor. The web impact factor provides quantitative tools for ranking, evaluating, categorizing and comparing websites, top-level domains and sub-domains.

The three types of links are:

1. The Simple WIF

The ratio of all links to the number of pages.

Distribution of Data by SWIF has been calculated by the following formulae:

$$\text{SWIF} = \frac{\text{Total no. of Links}}{\text{Total no. of Webpages}}$$

2. The Internal WIF

The ratio of internal links within the site to number of pages.

Distribution of Data by IWIF has been calculated by the following formulae:

$$\text{IWIF} = \frac{\text{Total no. of Internal links}}{\text{Total no. of Webpages}}$$

3. The External WIF

The ratio of links made from external sites to the target site, to the number of pages at the site. Distribution of Data by EWIF has been calculated by the following formulae:

$$\text{EWIF} = \frac{\text{Total no. of External links}}{\text{Total no. of Webpages}}$$

4. Literature Review

Arif and Ismail² evaluated the Public universities in Malaysia based on the webometric perspective by using Majestic SEO and Google Search engine and found that UMS have the highest average WIF with 13.013 followed by Universiti Malaysia Kelantan (UMK) with 2.670 WIF and Universiti Pertahanan Nasional Malaysia (UPNM) with 1.289 WIF in the third place. Babu, Jeysankar and Rao³ made a study on websites of central universities in India. They examined websites of 40 central universities analyzed the number of web pages, link pages and calculates the simple web impact factor, self-link web impact factor, external web impact factor and revised web impact factor and ranked the websites according to their WIF. Islam⁷ made a Webometrics study of 71 universities in Bangladesh based on data obtained using Alta Vista search engine which was used to rank the websites based on webometric indicators. It was found that some universities in Bangladesh have more number of web pages but their link pages are fewer and websites fall behind in their web impact factor. Jalal, Biswas and Mukhopadhyay⁸ studied the Web impact factor and link analysis of selected Indian universities.

SocSciBot 3.0 is used to generate link data to develop micro link topology under study. The result shows that all the NITs are closely related in the topology framework whereas nodes are not linked significantly in case of state universities and central universities. Jeysankar and Babu⁹ conducted a webometric study on websites of 45 universities in Tamil Nadu Madhusudhan and Prakash¹¹ examined the Websites of IITs. The study explored different characteristics of link analysis of IIT websites. The comparison of ranking of IITs has been done by using WISER, WIF (inlink) and World Rank. Maharana, Panda and Sahoo¹² made a study on web impact factor and link analysis of 16 IITs of India on the basis of domain systems of the websites, analyses the number of web pages and link pages and calculates the simple web impact factor, self links WIF and external WIF. Devi and Verma²⁰

compared the design and content of North-Eastern Hill University (NEHU) and Mizoram University (MZU) websites and found that the websites are very simple and easily accessible but NEHU has more features in comparison to MZU. Verma and Devi²¹ conducted a study on web content and design trends of Indian Institutes of Management (IIMs) library websites. They evaluated 12 IIMs and it is observed that out of 12 IIMs, only 7 IIMs have separate library webpage. Vijayakumar²² conducted a webometric analysis of university websites in Sri Lanka.

5. Significance and Scope of Study

A number of webometrics analyses have been conducted both in India and elsewhere to measure and evaluate websites, but no detailed study has been conducted present study is confined to 15 Indian UPE listed in Table 1 ([http://www.ugc.ac.in/page/Universities-\(UPE\).aspx](http://www.ugc.ac.in/page/Universities-(UPE).aspx)).

6. Objectives of the Study

The main objectives of the present study are to:

1. Identify and analyze the domain authority,
2. Examine the number of web pages,
3. Examine the number of link-equity,
4. Find out the internal link and external link pages, and
5. Calculate the web impact factor of university websites.

7. Methodology

The data were collected from the universities' websites using open site explorer (www.opensiteexplorer.org) which is a search engine optimization tool for links. It is a tool developed by Moz.com that helps to track the links leading to the website. It provides a large amount of information about the links to any page or site. The study identified the websites of 15 universities under UPE Scheme and also the individualized domains of all the websites.

8. Data Analysis

Table 2 shows the Domain and Page Authority of universities under UPE scheme, in which Domain Authority of Jawaharlal Nehru University with 64 (8.52%) ranks at top, followed by University of Mumbai with 57 (7.58%) and Pune University with 55 (7.32%). The Page Authority of Jawaharlal Nehru University with 70 (8.41%)

occupies the first place, followed by Pune University and Banaras Hindu University with 62 (7.45%), and University of Calcutta with 61 (7.33%).

Table 2. Domain authority and page authority

Sl. No.	Name of Universities (UPE)	Domain Authority	Page Authority
1	Jadavpur University	48 (6.39%)	57 (6.85%)
2	Pune University	55 (7.32%)	62 (7.45%)
3	University of Hyderabad	49 (6.52%)	57 (6.85%)
4	Jawaharlal Nehru University	64 (8.52%)	70 (8.41%)
5	University of Madras	51 (6.79%)	60 (7.21%)
6	Madurai Kamraj University	47 (6.25%)	43 (5.16%)
7	North-Eastern Hill University	49 (6.52%)	57 (6.85%)
8	University of Calcutta	53 (7.05%)	61 (7.33%)
9	University of Mumbai	57 (7.58%)	56 (6.73%)
10	Osmania University	52 (6.92%)	60 (7.21%)
11	Banaras Hindu University	54 (7.19%)	62 (7.45%)
12	University of Rajasthan	48 (6.39%)	56 (6.73%)
13	University of Mysore	49 (6.52%)	57 (6.85%)
14	Karnatak University	32 (4.26%)	42 (5.04%)
15	Guru Nanak Dev University	43 (5.72%)	32 (3.84%)
Total		751	832

Table 3 shows the Just-Discovered and Established Links of universities under UPE Scheme, in which the University of Hyderabad with 70 got the highest Just-Discovered Links, followed by University of Calcutta with 8 and Jawaharlal Nehru University and North-Eastern Hill University with 7. The Established Links of Jawaharlal Nehru University with 641RDs (14,128 TLs) got the highest, followed by Banaras Hindu University with 400 RDs (7,564 TLs) and Osmania University with 383 RDs (4,404 TLs).

Table 3. Just-discovered and established links

Sl. No.	Name of Universities (UPE)	Just-Discovered Links (in 60 days)	Established Links (Root domains out of Total links)
1	Jadavpur University	2	166 (879)
2	Pune University	0	293 (2,806)
3	University of Hyderabad	70	157 (9,066)
4	Jawaharlal Nehru University	7	641 (14,128)
5	University of Madras	2	342 (11,121)
6	Madurai Kamaraj University	0	29 (40)
7	North-Eastern Hill University	7	162 (2,006)
8	University of Calcutta	8	374 (7,588)
9	University of Mumbai	1	40 (1,753)
10	Osmania University	1	383 (4,404)
11	Banaras Hindu University	0	400 (7,564)
12	University of Rajasthan	4	183 (971)
13	University of Mysore	1	178 (1,707)
14	Karnatak University	2	57 (282)
15	Guru Nanak Dev University	0	1 (2)

Table 4 shows the Internal Equity-Passing Links (IE-PLs), External Equity-Passing Links (EE-PLs) and Total Equity-Passing Links (TE-PLs) of universities, in which the IE-PLs of University of Hyderabad with 7,187 (49.66%) has the highest number of links, followed by Banaras Hindu University with 1,756 (12.13%) IE-PLs and University of Madras with 1,646 (11.37%) IE-PLs. The EE-PLs of Jawaharlal Nehru University with 12,545 (27%) has the highest number of links, followed by University of Madras with 9,394 (20.27%) EE-PLs and University of Calcutta with 5,869 (12.66%) EE-PLs. The TE-PLs of Jawaharlal Nehru University with 13,260 (21.80%) has

Table 4. Internal equity-passing links, external equity-passing links and total equity-passing links

Sl. No.	Name of Universities (UPE)	Internal Equity-Passing Links	External Equity-Passing Links	Total Equity-Passing Links
1	Jadavpur University	1 (0)	843 (1.81%)	844 (1.38%)
2	Pune University	603 (4.16%)	2,143 (4.62%)	2,746 (4.51%)
3	University of Hyderabad	7,187 (49.66%)	1,818 (3.92)	9,005 (14.80%)
4	Jawaharlal Nehru University	715 (4.94%)	12,545 (27%)	13,260 (21.80%)
5	University of Madras	1,646 (11.37%)	9,394 (20.27%)	11,040 (18.15%)
6	Madurai Kamraj University	3 (0)	30 (0)	33 (0)
7	North-Eastern Hill University	273 (1.88%)	1,127 (2.43%)	1,400 (2.30%)
8	University of Calcutta	856 (5.91%)	5,869 (12.66%)	6,725 (11.05%)
9	University of Mumbai	1,107 (7.64%)	629 (1.35%)	1,736 (2.85%)
10	Osmania University	63 (0)	4,220 (9.10%)	4,283 (7.04%)
11	Banaras Hindu University	1,756 (12.13%)	5,151 (11.11%)	6,907 (11.35%)
12	University of Rajasthan	1 (0)	926 (1.99%)	927 (1.52%)
13	University of Mysore	254 (1.75%)	1,384 (2.98%)	1,638 (2.69%)
14	Karnataka University	4 (0)	265 (0.5%)	269 (0.4%)
15	Guru Nanak Dev University	2 (0)	0	2 (0)
Total		14471	46344	60815

Table 5. Total internal links, total external links and total links

Sl. No.	Name of Universities	Total Internal Links	Total External Links	Total Links
1	Jadavpur University	1 (0)	878 (1.76%)	879 (1.36%)
2	Pune University	603 (4.16%)	2,203 (4.41%)	2,806 (4.36%)
3	University of Hyderabad	7,187 (49.66%)	1,879 (3.76%)	9,066 (14.09%)
4	Jawaharlal Nehru University	715 (4.94%)	13,413 (26.90%)	14,128 (21.96%)
5	University of Madras	1,646 (11.37%)	9,475 (19%)	11,121 (17.29%)

6	Madurai Kamraj University	3 (0)	37 (0)	40 (0)
7	North-Eastern Hill University	273 (1.88%)	1,733 (3.47%)	2,006 (3.11%)
8	University of Calcutta	856 (5.91%)	6,732 (13.50%)	7,588 (11.79%)
9	University of Mumbai	1,107 (7.64%)	646 (1.29%)	1,753 (2.72%)
10	Osmania University	63 (0)	4,341 (8.70%)	4,404 (6.84%)
11	Banaras Hindu University	1,756 (12.13%)	5,808 (11.65%)	7,564 (11.76%)
12	University of Rajasthan	1 (0)	970 (1.94%)	971 (1.50%)
13	University of Mysore	254 (1.75%)	1,453 (2.91%)	1,707 (2.65%)
14	Karnatak University	4 (0)	278 (0.5%)	282 (0.4%)
15	Guru Nanak Dev University	2 (0)	0	2 (0)
Total		14471	49846	64317

the highest number of links, followed by University of Madras with 11,040 (18.15%) TE-PLs and University of Hyderabad with 9,005 (14.80%) TE-PLs.

Table 5 illustrates the Total Internal Links (TILs), Total External Links (TEs) and Total Links (TLs) of universities under UPE Scheme, in which University of Hyderabad with 7,187 TILs (49.66%) occupies the first place, followed by Banaras Hindu University with 1,756 (12.13%) and University of Madras with 1,646 (11.37%) TILs. Jawaharlal Nehru University with 13,413 TELs (26.90%) occupies the first place, followed by University of Madras with 9,475 (19%) TELs and University of Calcutta with 6,732 (13.50%) TELs. In terms of TLs Jawaharlal Nehru University with 14,128 (21.96%) occupies the first place, followed by University of Madras with 11,121 (17.29%) TLs and University of Hyderabad with 9,066 (14.09%) TLs.

Table 6 shows the Followed Linking Root Domains (FLRDs) and the Total Linking Root Domains (TLRDs) of universities under UPE Scheme, in which Jawaharlal Nehru University with 577 (19.06%) ranks at top, followed by Banaras Hindu University with 355 (11.72%) and University of Calcutta with 338 (11.16%). In terms of TLRDs Jawaharlal Nehru University with 641 (18.81%) ranks at top, followed by Banaras Hindu University with 400 (11.74%) and Osmania University with 383

(11.24%).

Table 6. Followed linking root domains, total linking root domains

Sl. No.	Name of Universities (UPE)	Followed Linking Root Domains	Total Linking Root Domains
1	Jadavpur University	156 (5.15%)	166 (4.87%)
2	Pune University	271 (8.95%)	293 (8.60%)
3	University of Hyderabad	141 (4.65%)	157 (4.60%)
4	Jawaharlal Nehru University	577 (19.06%)	641 (18.81%)
5	University of Madras	300 (9.91%)	342 (10.04%)
6	Madurai Kamraj University	23 (0.7%)	29 (0.8%)
7	North-Eastern Hill University	143 (4.72%)	162 (4.75%)
8	University of Calcutta	338 (11.16%)	374 (10.98%)
9	University of Mumbai	33 (1.09%)	40 (1.17%)

10	Osmania University	333 (11%)	383 (11.24%)
11	Banaras Hindu University	355 (11.72%)	400 (11.74%)
12	University of Rajasthan	162 (5.35%)	183 (5.37%)
13	University of Mysore	147 (4.85%)	178 (5.22%)
14	Karnataka University	47 (1.55%)	57 (1.67%)
15	Guru Nanak Dev University	1 (0)	1 (0)
Total		3027	3406

Table 7 and the Figure 1 depict the Web Impact Factor of the universities under UPE scheme. It is seen that Jawaharlal Nehru University with 201.82 SWIF scores the highest, followed by University of Madras with 185.35 and University of Hyderabad with 159 SWIF. On the basis of ranking of IWIF, it is found that the University of Hyderabad with 126 IWIF scores the highest, followed by Banaras Hindu University with 28.32 IWIF and University

of Madras with 27.44 IWIF. On the basis of ranking of EWIF, it was found that Jawaharlal Nehru University with 191.61 EWIF scores the highest, followed by University of Madras with 157.91 University of Calcutta with 110.36 EWIF.

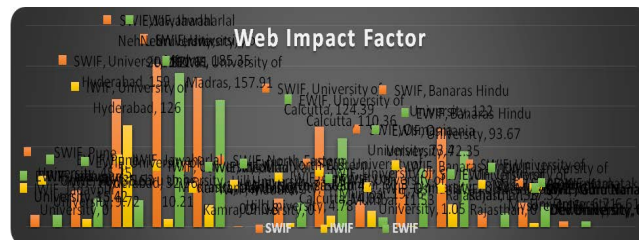


Figure 1. Web impact factor of Indian universities under UPE scheme.

9. Discussion

Domain authority includes the domains and sub-domains of websites and computes a quality score that predicts how well a website will rank on search engines. Among the 15 universities with status of UPE, Jawaharlal Nehru

Table 7. Web impact factor of Indian universities under UPE scheme

Sl. No.	Name of Universities (UPE)	Simple Web Impact factor (SWIF)	Internal Web Impact Factor (IWIF)	External Web Impact Factor (EWIF)
1	Jadavpur University	15.42	0	15.40
2	Pune University	45.25	9.72	35.53
3	University of Hyderabad	159	126	32.96
4	Jawaharlal Nehru University	201.82	10.21	191.61
5	University of Madras	185.35	27.44	157.91
6	Madurai Kamaraj University	0.9	0	0.8
7	North-Eastern Hill University	35.19	4.78	30.40
8	University of Calcutta	124.39	14.03	110.36
9	University of Mumbai	31.30	19.76	11.53
10	Osmania University	73.4	1.05	72.35
11	Banaras Hindu University	122	28.32	93.67
12	University of Rajasthan	17.33	0	17.32
13	University of Mysore	29.94	4.45	25.49
14	Karnataka University	6.71	0	6.61
15	Guru Nanak Dev University	0	0	0

University tops with the highest Domain authority and Karnataka University is at the bottom. The Jawaharlal Nehru University again tops with the highest Page Authority. A high page authority score suggests that the page has the potential to rank well in search engine results. University of Hyderabad scores high in terms of Just-Discovered Links; Pune University, Madurai Kamaraj University, Banaras Hindu University and Guru Nanak Dev University have got 0 (Zero) links. The Just-Discovered Links report helps any one to identify recently created URLs and links. Jawaharlal Nehru University has got the highest number of Established Links while Guru Nanak Dev University, Madurai Kamraj University, University of Mumbai and Karnataka University the least Established Links.

The Equity-passing Links are the links which pass value from one page to another (From Page A to Page B). Jawaharlal Nehru University again tops while Guru Nanak Dev University is at the bottom. A website with a higher web impact factor may be considered to be more prestigious or of a higher quality. Thus, greater the number of links to a web site, the greater the WIF. Indeed, Jawaharlal Nehru University has the highest SWIF and EWIF, University of Hyderabad has the highest IWIF while, Jadavpur University, University of Rajasthan, Karnataka University have got Zero IWIF.

10. Conclusion

Institution websites are the primary source of information related to their hosting institutions and increasingly used for a variety of purposes like attracting new students, information regarding courses, syllabus, job vacancies, library catalogue, news and announcements. This study provides information about the websites of 15 UPE scheme. Most universities need to improve their ranking.

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